ABSTRACT

Title of Dissertation: **EFFECTS OF SOIL CROSS-SECTIONAL MODELING ON THE SITE DESIGN SPECTRA AND FUNDAMENTAL PERIOD**

Musaid A Assaf, Ph.D., 2004

Dissertation Directed By: **Professor M. Sherif Aggour, Department of Civil and Environmental Engineering**

The most important tools in earthquake engineering are the site design spectra and fundamental period. Design spectra allow the determination of the expected ground acceleration as a function of the structure's period, while a site fundamental period indicates the resonance period of the site. The National Earthquake Hazard Reduction Program (NEHRP) Provisions allow the determination of a site design spectrum by a general procedure, which applies to most of the locations within the U.S.A. and its territories, or by a site specific method for some locations that have a certain class of weak soils. This dissertation addresses the general procedure that uses site classification to determine the site design spectra. A site classification can be determined from a soil profile modeling by one of three methods; the site weighted average standard

penetration test uncorrected blow counts, the site weighted average shear wave velocity, and the site weighted undrained shear strength. The shear wave velocity profile for a certain location can be determined by invasive tests such as cross-hole tests, or by the more economical non-invasive tests such as Controlled Source Spectral Analysis of Surface Waves method, which is also referred to as the CXW test. In addition, NEHRP Provisions require modeling of only the top 30 m of the soil cross-section.

The dissertation has four main objectives: to examine the effects of the various soil profile modeling methods on the site design response spectra; to examine the effects of the various soil profile modeling methods on the site fundamental period; to examine the effects of increasing the bedrock depth beyond the NEHRP depth of 30 m on the site fundamental period; and to examine the effects of the presence of embedded soft soil layers within the soil profile on the site fundamental period.

To achieve these objectives, a seismically active site was chosen for field testing, as well as a five-station seismic array was installed and utilized. Different tests were performed and seismic activities were recorded at different locations within the site, then dynamic analyses were performed that were then used to accomplish the dissertation's objectives.

EFFECTS OF SOIL CROSS-SECTIONAL MODELING ON THE SITE DESIGN SPECTRA AND FUNDAMENTAL PERIOD

By

Musaid A Assaf.

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2004

Advisory Committee:
Professor M. S. Aggour, Chair
Professor Amde m. Amde
Professor Bilal M. Ayyub
Professor Amr M. Baz
Professor Chung C. Fu

Dedication

To my mother, my wife, my sons Khalid, Mohammed, Abdulaziz, and to my daughter Sara.

Acknowledgements

I am truly indebted to so many individuals whose guidance and assistance were essential to the completion of this dissertation. My sincere thanks and gratitude go to my academic advisor, the dissertation director, and dissertation committee chairman, Prof. M. S. Aggour. Prof. Aggour graciously devoted a great deal of his time on this project. His continuous encouragement, interest and support made this dissertation possible. I am also very grateful to all of the other members of the dissertation committee, especially Prof. Ayyub and Prof. Fu, for their helpful suggestions.

The field work was supported by King Abdulaziz City for Science and Technology (KACST), under project number AR-19-46. The financial and technical support from KACST is highly appreciated. In addition, I would like to thank the President of KACST, Dr. Al-Athel and his two Vice Presidents, Dr. Al-Rasheed and DR. Al-Swyel for their support. I would also like to thank the Director of KACST's Scientific Support Department and the Director of KACST Space Research Institute for their cooperation in this project. My special thanks go to the Director and staff of KACST Institute of Astronomy and Geophysics for their cooperation as well as for providing the equipment and technicians for some of the field work.

I am also very grateful to my dear friend Dr. Mohammed Al-Haddad, head of the Research Center at King Saud University in Riyadh, who was the primary investigator for the KACST project. Dr. Al-Haddad's suggestions and experience in the field work were extremely valuable. In addition, Dr. Al-Amri of King Saud University was kind enough to share his experience in interpreting the raw data of the vertical electric sounding tests in the Al-Durrah site. My sincere thanks also go to Dr. Assakkaf at UMCP and Dr. Erdal at the USGS for their support.

Last, but not least, my sincere thanks to the Saudi Cultural Attaché, Dr Mazyed Al-Mazyed, and all of the Cultural Mission's staff for their moral support and encouragement.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

1.1 Background

Earthquakes are considered to be the most powerful natural disaster. Seismic hazards include ground shaking, structural failures, liquefaction, land slides, and lifelines damages. Most earthquakes can be explained by the two theories of plate tectonics and elastic rebound.

The former suggests that the earth's crust is composed of plates that are separated by boundaries. Plate boundaries include spreading ridge, subduction zone, and transform fault boundaries. Plates separated by spreading ridge boundaries move away from one another without building up any significant stress. At subduction zone boundaries, one plate subducts or dives beneath the other, whereas transform fault boundaries exist where plates move past one another.

The elastic rebound theory suggests that elastic strain energy is stored in the materials near the subduction zone and transform fault boundaries as shear stress increases on the fault planes that separate the plates. As the shear stress approaches the shear strength of the rock material along the fault, the rock material begins to fail and releases the stored energy. If the rock material is strong and brittle, the level of the stored energy can be very high. In addition, rupture along the plain of the fault will be rapid and the energy release will be violent. The location within a fault where rupture takes place is called the hypocenter, and the point on the earth's surface directly above the hypocenter, is called the epicenter, Figure (1.1) [1].

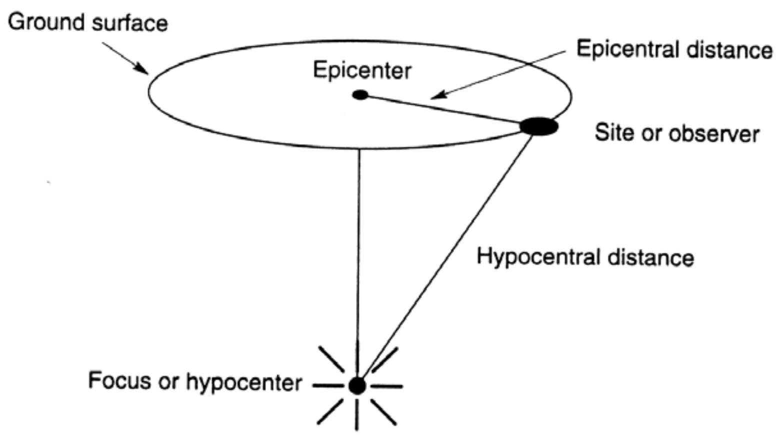


Figure1.1: Schematic representation of hypocenter and epicenter [1]

The released energy is transmitted through the earth in the form of many types of seismic waves. These waves fall into two main categories, namely, body waves and surface waves, Figures (1.2) and (1.3). Body waves include primary and secondary waves (p-waves and s-waves, respectively). The surface waves include Rayleigh waves and Love waves. The most destructive component of seismic waves are Rayleigh waves, since they carry about two third of the energy of an earthquake. The "size" of an earthquake can be characterized or measured by a number of methods. Qualitative as well as quantitive scales have been developed for such purposes.

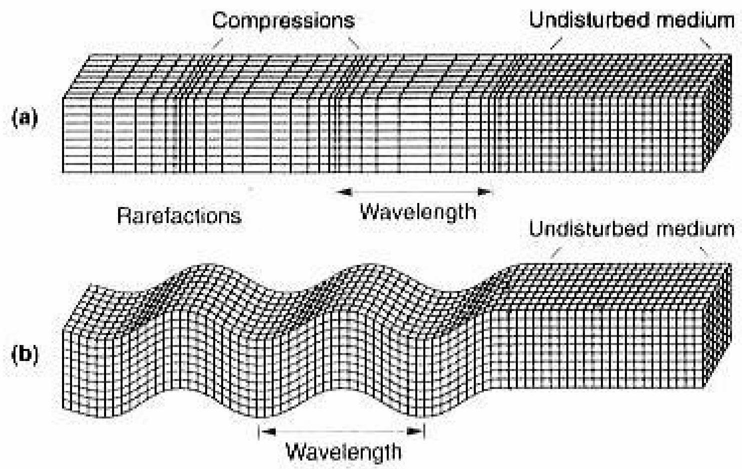


Figure1.2: Main types of body waves; (a) p-wave, (b) sv-wave [2]

Qualitative methods are subjective and they describe the effects of earthquakes on humans and properties. Qualitative scales include the Modified Mercalli (MMI), Rossi-Forel (RF), the Japanese Meteorological Agency (JMA), and the Medvedev-Spoonheuer-Karnik (MSK) scales. Quantitative or magnitude scales, which are more recent, are based on seismometer measurements. Magnitude scales include the Richter, surface wave, body wave, and moment scales [1].

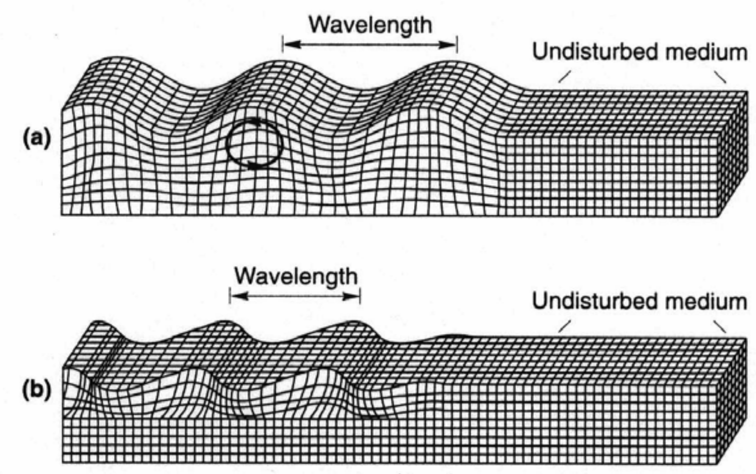


Figure1.3: Main types of surface waves;
(a) Raleigh -wave, (b) Love-wave [2]

1.2 Problem Statement

1.2.1 General

Earthquake engineers require certain tools to calculate the forces that earthquakes exert on structures that exist on the site where earthquakes occur. The most commonly used tools for this purpose are the design response spectra and the site fundamental period. The design response spectrum indicates the magnitude of the ground acceleration as a function of the period of the structure, while the site fundamental period represents the resonance period of the site. Design response spectra can be determined by the General Method of the National Earthquake Hazard Reduction Program (NEHRP) Provisions that is presented in Chapter 2 [3]. The site fundamental period can be estimated by the approximate method, microtremors method, or it can be calculated more accurately by performing dynamic site response analysis. These methods are presented in Chapter 3. The methods of determining a site design response spectrum as well as a site fundamental period are based on determining the soil cross-section models of the site being studied. The soil cross-section models can be established by a number of different tests, which are presented in Chapter 5. The following sections present the possible implications of using the different tests for soil cross-sectional modeling on the site design response spectrum and the site fundamental period. In addition, other implications that stem from using NEHRP Provisions method are also examined.

1.2.2 Effects of the Soil Cross-section Modeling Methods on the Design Response Spectrum

NEHRP Provisions allow the determination of a design response spectrum for the design of structures by the General Method. This method requires the establishment of the soil cross-sectional model (or profile) for the top 30 m of the site by one of the following tests [3]:

1. The site weighted average standard penetration test (SPT) uncorrected blow counts ($\overline{N}$) (or $\overline{N}_{ch}$ for cohesionless soils)
2. The site weighted average shear wave velocity ($\overline{v}_S$)
3. The site weighted average undrained shear strength ($\overline{s}_U$)

These methods, *with the exception of the undrained shear strength test*, are also presented in detail in subsequent chapters. The undrained shear strength was not included in this research since no significant cohesive soils were encountered at the site where the research was conducted. The shear wave velocity (SWV) of the soil cross-section can be determined by invasive tests such as the cross-hole (CH) test, or by non-invasive tests such as the Controlled Source Spectral Analysis of Surface Waves method, which is also referred to in the literature as the (CXW) method. Details of these tests and their theoretical background are presented in chapter 5. NEHRP Commentary indicates that using the $\overline{N}$ or the $\overline{s}_U$ methods instead of the $\overline{v}_S$ method for the determination of the site classification, *may* lead to more conservative results [5].

The first objective of this dissertation is to examine the effects of the different soil cross-section modeling methods on the site classification and the site design response spectra. To achieve this objective, a seismically active site was selected, and soil cross-section models were established in a number of locations within the site by the following tests:

i. Twelve SPT borings (one of the SPT borings was performed just outside the site where the lowest ground surface exists)
ii. Four CH tests
iii. Fourteen CXW tests

The tests were arranged so that at each CH test boring location, one SPT boring and one CXW test were undertaken. In addition, each SPT boring was also accompanied by a CXW test. The cross-sectional models that were established were used to determine the site classification and the site design response spectra in accordance with NEHRP Provisions. The resulting spectra were then analyzed and compared to examine the effects of the different soil cross-sectional modeling methods on the site design response spectra.

1.2.3 Effects of the Soil Cross-section Modeling Methods on the Site Fundamental Period

The site fundamental period can be estimated by the approximate method, the microtremors method, or it can be calculated more accurately by the dynamic site response analysis using a computer. However, the approximate method and the dynamic site response analysis require the use of the site soil cross-sectional SWV models. The soil cross-section SWV models can be generated by CH tests or by CXW tests. The second objective of this dissertation is to examine the effects of the different soil-cross-sectional modeling on the site fundamental period. The same SWV soil cross-section models that were used for the analysis of the design response spectra were used to estimate the site fundamental period by the approximate method, and were also used in an extensive dynamic site response analysis to determine the site fundamental period. The results were then analyzed to examine the effects of the different soil cross-sectional modeling methods on the site fundamental period.

1.2.4 Effects of Increasing the Bedrock Depth on the Site Fundamental Period

NEHRP Provisions allow sites to be classified based on the soil cross-section model of only the top 30 m (100 ft) of the site. This effectively disregards the actual depths of the bedrock that are greater than 30 m. Thus, the third objective of this dissertation is to examine the implications of limiting the soil model depth to the top 30 m of the site, on the site fundamental period.

These implications were examined in two ways. First, the dynamic site response analysis that was performed to determine the site fundamental period was repeated using incrementally increasing bedrock depth for each soil cross-section model, up to the estimated actual bedrock depth. The resulting fundamental periods for the various bedrock depths were then analyzed to examine the effects of increasing the bedrock depths, on the site fundamental period.

Second, a seismic array of five co-linear seismic stations was established near the selected site. The seismic stations started at a rock outcrop, and had increasing bedrock depths that included an approximate

NEHRP specified depth, as well as other greater depths. Simultaneous records of an actual earthquake at all of the array stations were used to evaluate the effects of increasing the bedrock depths on the site fundamental period.

1.2.5 Effects of the Presence of an Embedded Soft Soil Layer on the Site Fundamental Period

NEHRP Commentary states that "Site response studies have shown that continuous, thin, soft clay strata may increase the site amplification" [5]. However, NEHRP Commentary does not offer any direct cause and effect between the presence of embedded soft layers and the fundamental period of the site. In addition, non-invasive tests such as the CXW test can not always detect the presence of such embedded soft strata, which can be critical to the fundamental period [4]. The fourth objective of this dissertation is to examine the effects of the presence of an embedded soft soil layer in conjunction with increasing bedrock depth, on the site fundamental period. A soil cross-section at the selected site was used for this analysis, and all of its embedded soft layers were removed. The soil cross-section was then modeled twice. The first model was assigned the NEHRP depth of 30 m, while the second model was assigned the actual bedrock depth which was much higher than NEHRP depth. A soft soil layer with a specific thickness and SWV was inserted into both soil cross-section models at the same depth. The dynamic site response analysis was performed repeatedly for both profiles with varying soft layer thickness and SWV. In each analysis, the soft layer SWV was decreased incrementally. For each soft layer SWV, the analysis was repeated four times using increasing soft layer thickness. The overall analysis was performed twice using soil damping ratios of 5% and 10%. The fundamental periods were determined after each analysis, and the results were used to examine the effects of the presence of an embedded soft soil layer on the fundamental period.

1.2.6 Summary of the Dissertation Objectives

The objectives of this dissertation as presented in the previous sections can be summarized as follows:

1. Examine the effects of the various soil cross-section modeling methods on the site design response spectrum
2. Examine the effects of the various soil cross-section modeling methods on the site fundamental period
3. Examine the effects of increasing the bedrock depth beyond the NEHRP depth of 30 m, on the site fundamental period.
4. Examine the effects of the presence of an embedded soft soil layer within the soil cross-section model on the site fundamental period.

1.2.7 Methodology

In order to achieve the dissertation objectives, a seismically active site in Saudi Arabia was selected for this purpose. The site, which is called Al-Durrah, is located in the northwest of Saudi Arabia along the coast of the Gulf of Aqaba. In addition, a seismic array of five co-linear seismic stations that started at a rock outcrop east of Al-Durrah was established. Additional information about the Al-Durrah site and the seismic array is presented in Chapter 4. The soil cross-section models at Al-Durrah were established by the following tests:

i. Twelve SPT borings, (9 tests to a depth of 30 m and 3 tests to a depth of 60 m)
ii. Four CH tests
iii. Fourteen CXW tests.

In addition six vertical electric sounding (VES) tests were performed in and around Al-Durrah to establish the actual depth of the bedrock at the site. The theoretical background and testing procedure for the VES are presented in Chapter 5. In addition, actual seismic records of earthquakes and microtremors were recorded at Al-Durrah as well as the seismic array. The bedrock depth at each seismic station along the array was estimated by VES tests. The procedures for using seismic records are presented in Chapter 3.

1.3 Background information on The Research Project

This research was carried out as part of a larger pilot project to establish seismic zoning for the northwestern region of Saudi Arabia. The project was supported financially and technically by the King Abdulaziz City for Science and Technology (KACST). KACST is a Saudi government organization that funds and oversees most of the scientific research in the Kingdom. Most of the equipment and instrumentation were provided by KACST. The organization also provided the necessary technicians to operate the equipment. The rest of the field work that required specialization or heavy machinery were carried out by specialized contractors or consultants who were contracted to do the work. However, all of the field work pertaining to this dissertation was carried out under my direct or indirect supervision.

1.4 Organization of Dissertation

The dissertation was arranged so that each chapter can be read individually. In addition, the Chapters were organized in a manner that presented information in a logical order. Some of the data tables, graphs, and other materials were reproduced more than once for convenience when it was appropriate. The following is a brief description of the contents of each chapter of the dissertation:

1. Chapter 2 presents the NEHRP General Method for determining the site classification and the site design response spectra.
2. Chapter 3 presents the methods for determining the site fundamental period. These methods include the approximate method, the microtremors method, and the dynamic site response analysis.
3. Chapter 4 presents information on the selected site, including its coordinates, and its structural geology. The chapter includes the Al-Durrah site as well as the seismic array. In addition, this chapter presents the regional earthquake history and characteristics.
4. Chapter 5 presents the field test methods, including the tests theoretical background and procedures. The tests include the SPT, CH, CXW, and VES. The chapter also presents the seismic data acquisition methods and systems that were used in this research.
5. Chapter 6 presents the field work tasks and equipment information. The chapter identifies the participants in the field work, and gives detailed information on the equipment and instruments that were used in the field tests. These include the SPT, CH, CXW, and VES tests, as well as the seismic instruments and the advanced global positioning system (GPS) that were used in the field.
6. Chapter 7 presents the results of the field tests. These tests include the SPT, CH, CXW, and VES tests. In addition, seismic records in

the form of microtremors and actual earthquakes are presented in this chapter. The results were not discussed or analyzed in this Chapter due to the relevance of the results of other tests and analyses that were presented in Chapter 8.

7. Chapter 8 presents the results of the analytical methods, including the approximate method and the dynamic site response analysis. The dynamic site response analyses of this chapter include the Al-Durrah site as well as the seismic array. Again, the results were not discussed or analyzed in this chapter due to the relevance of the results of some of the tests in Chapter 7 to those in Chapter 8. The results of Chapters 7 and 8 were rearranged and reproduced in Chapters 9, 10 and 11, where they are discussed and analyzed.
8. Chapter 9 examines the effects of the different soil cross-sectional modeling methods on the site design response spectra. The analysis is based on the results of the SPT, the CH, and the CXW tests.
9. Chapter 10 examines the effects of the different soil cross-sectional modeling methods on the site fundamental period. The analysis examines the results of the approximate method, the microtremors methods, and the dynamic site response analysis method. Initially, the results of each method are analyzed separately from the results

of the other two methods. This is followed by a comparative analysis of the three methods.

10. Chapter 11 examines the effects of increasing the bedrock depth beyond the NEHRP depth of 30 m on the site fundamental period. In addition, this chapter examines the effects of the presence of an embedded soft soil layer within the soil cross-section, in conjunction with increasing the bedrock depth, on the site fundamental period.
11. Chapter12 presents the conclusions and recommendations of the dissertation.

Chapter 2: Determination of Design Response Spectra

2.1 Introduction to NEHRP Provisions

One of the most difficult aspects of earthquake engineering is the determination of accurate design response spectra, and the site fundamental period. A number of methods, such as code based methods and more recently, NEHRP Provisions have been used for that goal [3]. The NEHRP Provisions permit the determination of response spectra by using either the General Method, or by the Site-specific Method. Both methods require the use of NEHRP seismic spectral acceleration maps (Maps 1 through 24), and site coefficients tables (Tables 4.1.2.4a and 4.1.2.4b of NEHRP Provisions). Maps 1 and 2, respectively, provide two parameters S_s and S_1 based on a national seismic hazard study conducted by the U.S. Geological Survey. S_s is the mapped value, from Map 1 of the 5 percent damped maximum considered earthquake spectral response acceleration , for short period structures founded on Class B (competent rock with moderate weathering and fracturing) sites. The short period acceleration has been determined at a period of 0.2 seconds. This is because it was concluded that 0.2 seconds was reasonably representative of the shortest effective period of buildings and structures that are designed by NEHRP Provisions. Similarly, S_1 is the mapped value from Map 2 of the 5 percent damped maximum considered earthquake spectral response acceleration at a period of 1 second on Site Class B. The spectral response acceleration at periods other than 1 second can typically be derived from the acceleration at 1 second. Consequently, these two response acceleration parameters, S_S and S_1, are sufficient to define an entire response spectrum for the period range of importance for most buildings and structures. The generalized method and the site-specific method are summarized in the following two sections [3].

2.1.1 The General Method

The General Method applies to site that have values of S_s > 0.15g or values of S_1 > 0.04g. This method classifies sites in categories A to F, with F-class requiring site-specific evaluation. Site classification by this method is determined in the following manner [3]:

1- Check for Site Class F. If applicable, use site-specific procedure. Soils requiring site-specific evaluation are:

- Soils susceptible to potential failure or collapse (Exception: structures with T < 0.5 sec.)
- Peats and/or highly organic clays with thickness H > 10 ft
- Very high plasticity clays (H > 25 ft with PI > 75)
- Very thick soft/medium stiff clays (H > 120 ft)

2- Check for the existence of soft clay with total thickness > 10 ft, and (Su < 500psf, $w \geq 40\%$, PI>20). If applicable classify as Site Class-E

3- Categories A to E can be classified by one of the following methods applied to the top 100 ft (30 m) of the soil:

a) The $\bar{v}_s$ method

This method is based on the weighted average of the shear wave velocity ($\bar{v}_s$) through the soil profile. For a given soil profile with n layers, the weighted average $\bar{v}_s$ is defined as follows:

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \left(\frac{d_i}{v_{si}} \right)} \qquad i = 1,2,3,\ldots\ldots n$$

Where d_i and v_{si} are the thickness and shear wave velocity for layer (i), respectively.

b) The $\bar{N}$ method

This method is based on the weighted average of blow counts ($\bar{N}$) of the Standard Penetration Resistance (ASTM D1586-84) not to exceed 100 blow/ft as directly measured in the field without correction. The weighted average ($\bar{N}$) is defined as:

$$\overline{N} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n}\left(\frac{d_i}{\overline{N}_i}\right)} \qquad i = 1,2,3......n$$

Where $\bar{N}_i$ is the standard penetration resistance within (i), not exceeding 100 blows/ft uncorrected.

c) The $\bar{S}_U$ method

This method uses $\bar{N}_{ch}$ (weighted average of blow count for SPT) for cohesionless soil layers (PI < 20), and average $\bar{s}_u$ (weighted average undrained shear strength) for cohesive soil layers (PI >20).

$\bar{N}_{ch}$ and $\bar{s}_u$ are defined as follows:

$$\overline{N}_{ch} = \frac{d_s}{\sum_{i=1}^{m}\left(\frac{d_i}{\overline{N}_i}\right)} \qquad i = 1,2,3,....n$$

where $\sum_{i=1}^{m} d_i = d_s$, and d_s is the total thickness of cohesionless soil layers in the top 100 ft, and:

$$\overline{S}_u = \frac{d_c}{\sum_{i=1}^{k} \frac{d_i}{s_{ui}}} \qquad i = 1,2,3,.....n$$

where $\sum_{i=1}^{k} d_i = d_c$, and d_c is the total thickness (100- *ds*) of

cohesive soil layers in the top 100 ft

Table (2.1) shows the relationship between these parameters and the site classifications. Each of these methods applies the resulting weighted averaged parameter in conjunction with Tables and seismic maps to determine the design earthquake and response spectra.

Site Class	$\bar{v}_s$ (ft/sec)	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$ (psf)
A	> 5,000	N/A	N/A
B	$2500 < \bar{v}_s \le 5000$	N/A	N/A
C	$1200 < \bar{v}_s \le 2500$	>50	>2000
D	$600 \le \bar{v}_s \le 1200$	15 to 50	$1000 \le \bar{S}_u \le 2000$
E	< 600	< 15	< 1000
F	Soils requiring site-specific evaluation		

Table 2.1: NEHRP Site Classifications [3]

The maximum considered earthquake spectral response acceleration at short period (S_S) and at 1 second (S_1) are determined from seismic spectral acceleration maps 1 through 24. The maximum considered earthquake spectral response acceleration at short period (S_{MS}) and at 1 second (S_{M1}), adjusted for site class effects, are determined as follows:

$S_{MS} = F_a S_S$

And

$S_{M1} = F_v S_1$

where $F_{a\ and}$ F_v are site coefficients that are tabulated in the NEHRP provisions, and can be obtained using site classification. NEHRP values of F_a and F_v are reproduced in Tables (2.2) and (2.3), respectively.

Site Class	Mapped Maximum Considered Earthquake Spectral Response Acceleration at Short Periods (S_S)				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9

Table 2.2: NEHRP Values of Fa

Site Class	Mapped Maximum Considered Earthquake Spectral Response Acceleration at 1 Second Periods (S_1)				
	$S_1 \leq 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 1.00$	$S_1 \geq 0.5$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4

Table 2.3: NEHRP values of Fv

The design earthquake spectral response acceleration at short period (S_{DS}) and at 1 second (S_{D1}), are determined as follows:

$$S_{DS} = \frac{2}{3} S_{MS}$$

and

$$S_{D1} = \frac{2}{3} S_{M1}$$

The general design response spectrum curve can be developed as shown in Figure (2.1), by the following procedure:

- For periods ≤ T_0, the design spectral response acceleration S_a is determined as:

$$S_a = 0.6 \frac{S_{DS}}{T_0} T + 0.4 S_{DS}$$

- For periods equal to T_0 and equal or less than T_s:

  $S_a = S_{DS}$

- For periods greater than T_s:

$$S_a = \frac{S_{D1}}{T}$$

where:

$\boldsymbol{S_{DS}}$ = the design spectral response acceleration at short period;

S_{D1} = the design spectral response acceleration at 1 second period;

T = the fundamental period of the structure (in seconds);

$$T_0 = 0.2\frac{S_{D1}}{S_{DS}}\text{; and}$$

$$T_S = \frac{S_{D1}}{S_{DS}}$$

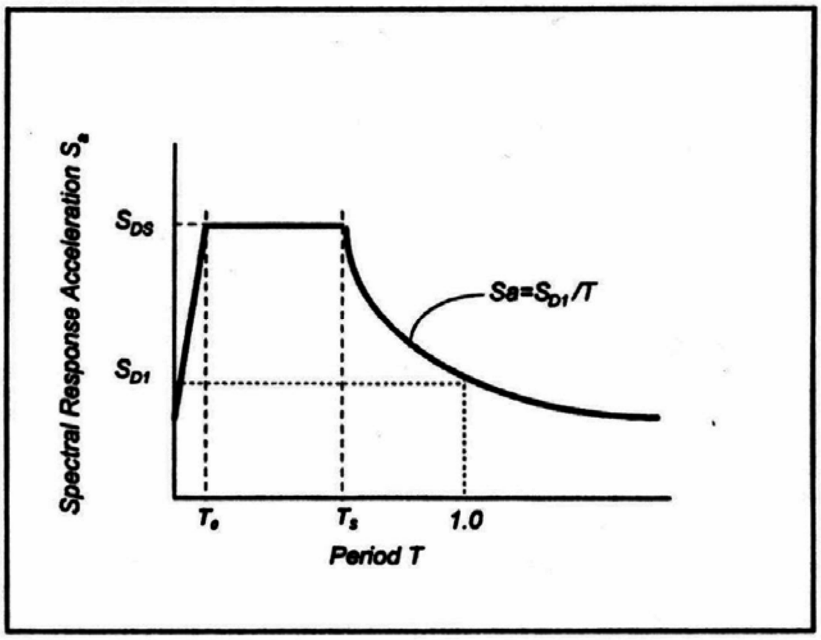


Figure 2.1: NEHRP Provisions Design response spectrum [3]

2.1.2 Site-Specific Method

Site-specific procedures are required to account for regional seismicity and geology, the expected recurrence rates and maximum magnitudes of events on known faults and source zones, the location of the site with respect to these, near source effects if any, and the characteristics of subsurface site conditions. Site-specific methods produce site-specific spectra based on the following regional parameters:

- The probabilistic maximum considered earthquake
- Evaluating the deterministic limit on maximum considered earthquake ground motion [3].

This method, however, is outside the scope of this research

Chapter 3: Determination of Site Fundamental Frequency

3.1 General

One of the most important objectives of earthquake engineering is the determination of site fundamental or resonant frequency. A resonant frequency is defined as the input motion (or forcing) frequency at which the largest response amplitude occurs. The resonant frequency $\boldsymbol{\omega}_d$ for a damped system is defined as:

$$\omega_d = \frac{\omega_n}{\sqrt{1-2\xi^2}}$$

where ω_n is the system's natural frequency and ξ is the system damping. However, for typical values of soil damping in the range of 5 to 10 percent, the difference between ω_n and ω_d is negligible, and ω_n can be assumed to be the resonant or fundamental frequency [6]

3.2 The Approximate Method

For uniform, isotropic, linear elastic damped soil on rigid rock, the simplified amplification function at the free surface for a wave generated by a horizontal motion at the base is [1].

$$|F_2(\omega)| \approx \frac{1}{\sqrt{\cos^2 kH + (\xi kH)^2}} \tag{3.2.1}$$

where:

k = the wave number = $\frac{\omega}{v_s}$

H = the soil depth

ξ = soil damping ratio.

The maximum amplification occurs when:

$\cos^2 (kH) = 0$

or

$$kH = \frac{\pi}{2} + n\pi \qquad n = 0,1,2,3,..\infty \qquad (3.2.2)$$

substituting for (k) in equation (3.2.2):

$$\frac{\omega H}{v_S} = \frac{\pi}{2} + n\pi \qquad n = 0,1,2,3,...\infty \qquad (3.2.3)$$

From equation (3.2.3), the *n*th natural frequency of the soil is given by:

$$\omega_n = \frac{v_S}{H}(\frac{\pi}{2} + n\pi) \qquad n = 0,1,2,3,..\infty \qquad (3.2.4)$$

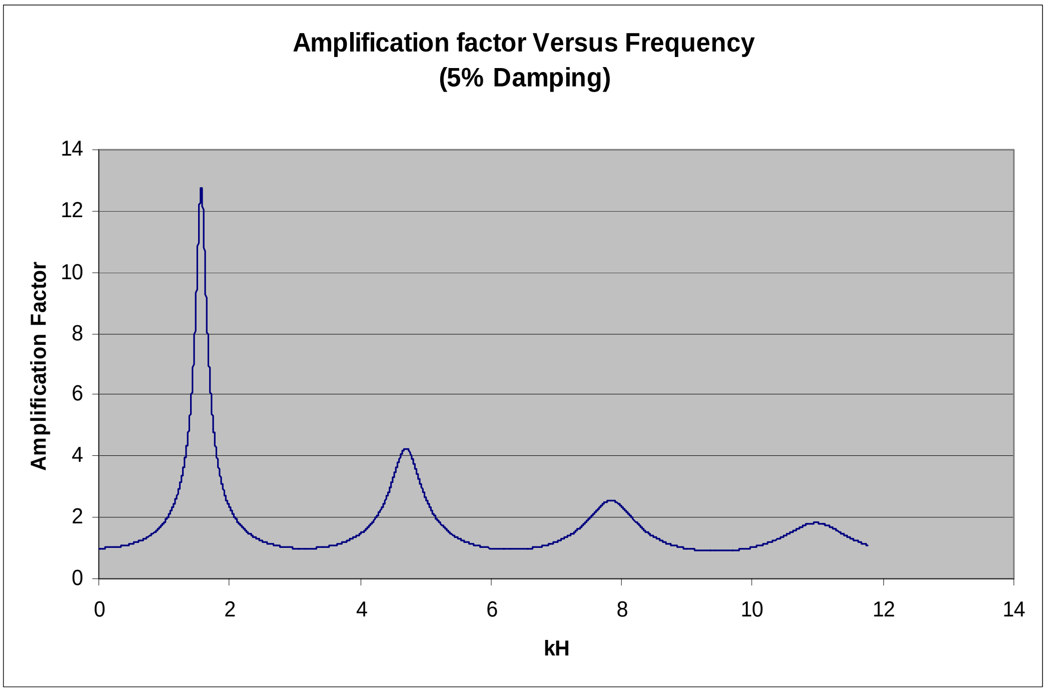


Figure 3.1: Effects of increased frequency on peak amplification factors [1].

Figure (3.1) is a plot of equation (3.2.1) with a damping ratio of (5%). The graph shows a decreasing value of the peak amplification factor with increasing frequency (since both H and v_s are assumed constant for this site). Therefore, the largest amplification factor will occur at the lowest natural frequency, which is the site fundamental frequency. From equation (3.2.4), the fundamental frequency is given by:

$$\omega_o = \frac{\pi v_S}{2H} \qquad (3.2.5)$$

The period corresponding to the fundamental frequency is the site fundamental period (also called the site characteristic period), and is given

by [1]:

$$T_S = \frac{2\pi}{\omega_n} = \frac{4H}{v_S} \tag{3.2.6}$$

For a multi-layered site the procedure is far more complicated, and essentially requires the use of dynamic analysis that involves the use of soil profiles modeling with certain computer programs (section 3.4 of this chapter). However, the Uniform Building Code Standard Number 23-X offers a simplified procedure based on equation (3.2.6). The procedure is called the Equivalent Single Layer Method, and for a site with *n* layers, the approximate fundamental period can be determined as:

$$T_S = \frac{4H}{\bar{v}_S} \tag{3.2.7}$$

Where: $\bar{v}_S$ is the profile average shear wave velocity as defined by the NEHRP Provisions and can be calculated as:

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \left(\frac{d_i}{v_{si}} \right)} \qquad i = 1,2,3,.......n$$

Equation (3.2.7) was used in conjunction with field tests that generated the site profile's shear wave velocities, to establish the site approximate fundamental period.

3.3 Microtremors Spectral Ratio Method

3.3.1 General

Microtremors method refers to the technique that uses the spectral ratio of horizontal-to-vertical (H/V) components of ambient noise (or microtremors) at the ground surface to estimate the site fundamental frequency. Based on the original method proposed by Kanai and Tanaka [7], Nakamura and Ueno [8] proposed a revised method in which they proposed a quasi-transfer function model. This model states that the horizontal-to-vertical (H_B/V_B) motion at the base (bedrock) is approximately one. The model also states that the vertical component of the motion does not change as it travels upward to the surface. Therefore, the peak spectral H/V at the surface becomes a good indicator of the site response to motions occurring at the base [9].

3.3.2 The Discrete Fast Fourier Transform

Before addressing the step-by-step procedure for generating microtremors spectral ratios, the topic of discrete fast Fourier transform will be presented here because of its relevance to the procedure. The Fourier transform provides the means of transforming a signal defined in the time domain, such as an earthquake signal, into one defined in the frequency domain. The discrete Fourier transform (DFT) is used in the case where both the time and the frequency variables are discrete [10].

For a variable $x(t_k)$, $k= 1,2..N$, where $t_k=k\Delta t$, the DFT is given by [1]:

$$X(\omega_n) = \Delta t \sum_{k=1}^{N} [x(t_k)\cos\omega_n t_k - ix(t_k)\sin\omega_n t_k]$$

where $\omega_n = n\Delta\omega = (2\pi n)/(N\Delta t)$,

and N=total number of sample points in variable $x(t_k)$.

The DFT is very tedious, even for a small value of N. Cooly and Tukey developed an algorithm for the case where N is a power of 2 that makes the process much more efficient. This algorithm is known as the fast Fourier transform (FFT). [1]. However, for this research a software called Seismosignal by Seismosoft, which is readily available online, was used to for the Fourier transform of the microtremors signals components [11].

3.3.3 Procedure for Generating Microtremors Spectral Ratio

The microtremors method has been subject to number of modifications and improvements. Currently, there are two commonly used methods for generating microtremors ratio spectra:

1. The direct H/V ratios method
2. The mean ratio spectra $(H/V)_m$ method

A direct H/V ratio spectrum can be generated by applying fast Fourier transform to the microtremors components (east-west, north-south, and vertical components), and calculating the ratios of the east-west and north-south component to the vertical component. [12]. Therefore, the direct spectra for a microtremors record with an east-west component (S_{EW}), a north-south component (S_{NS}), and a vertical component (S_V), can be found as follows:

The east-west spectrum: $\frac{H}{V} = \frac{S_{Ew}}{S_V}$ (3.3.2a)

And the north-south spectrum: $\frac{H}{V} = \frac{S_{NS}}{S_V}$ (3.3.2b)

The mean ratio spectra $(H/V)_m$ is defined as [8]:

$$(\frac{H}{V})_m = \frac{\sqrt{S_{EW}^2 + S_{NS}^2}}{S_V} \qquad (3.3.2c)$$

where:

S_{EW} = the east-west component of the record.

S_{NS} = the north-south component of the record.

S_V = the vertical component of the record.

The step-by step procedure for generating microtremors mean ratio spectra from raw, 3-components microtremors record is as follows [8]:

1. Select sections of the record (for all three components) to be analyzed.
2. Segment signals into non-overlapping time windows of about (20-30) seconds each.
3. Taper each segment by multiplying it by a triangular unit window function and perform FFT on the segment. Tapering the segment is important to minimize frequency leakage when the FFT is performed [13]. Figure (3.2) show an example of triangular unit window that can be used for a 4000 point seismic record

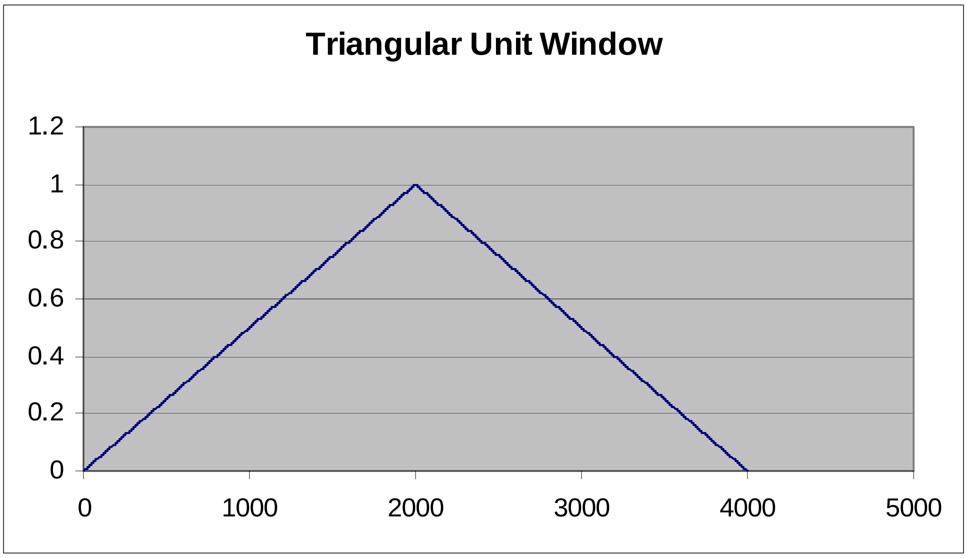


Figure 3.2: A triangular unit window for 4000 values segment

4. Smooth the resulting spectra using a Parzen window function. A Parzen window function is a unity function, and is defined as [14]:

$$
\text{Parzen}(x) = 0.25 \begin{cases} (2+x)^3 & -2 \leq x < -1 \\ 4-6x^2-3x^3 & -1 \leq x < 0 \\ 4-6x^2+3x^3 & 0 \leq x < 1 \\ (2-x)^3 & 1 \leq x < 2 \\ 0 & \text{else} \end{cases}
$$

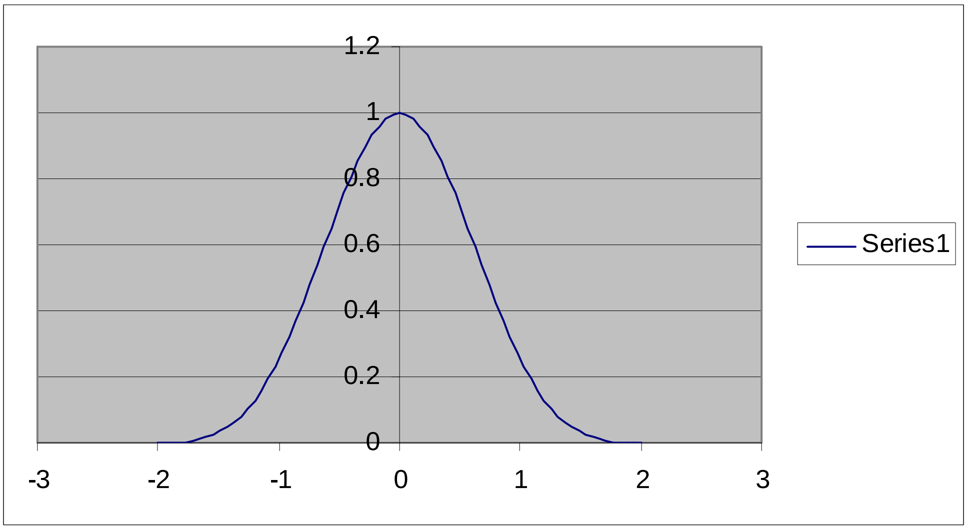


Figure 3.3: Parzen Smoothing Window

Figure (3.3) is a plot of a standard Parzen window. Although the range of a Parzen window is from -2 to 2, it can be scaled to fit any required window width. Smoothing with Parzen window minimizes rapid fluctuations, and emphasizes the underlying trends of the spectra [13].

5. Compute the mean ratio spectra by using equation (3.3.2c).

6. Compute the average mean ratio spectra.
7. Plot the resulting graphs simultaneously.
8. Compute the direct ratio spectra by using equation (3.3.2a) and (3.3.2b)
9. Compute the average direct ratio spectra.
10. Plot the resulting graphs simultaneously.
11. Determine the fundamental frequency (or period) from the largest common peak of the graphs.

3.4 Dynamic Site Response Analysis Method

3.4.1 Introduction to the Dynamic Site Response Analysis Computer Program ProShake

Soil dynamic analysis uses certain computer programs, such as ProShake, to generate ground response to an input earthquake. The analysis requires soil profile modeling in terms of soil properties at each soil layer. Typically, a one-dimensional soil column extending from the ground surface to the bedrock is adequate to capture first-order site response characteristics [5]. ProShake is a one-dimensional, linear soil dynamic analysis computer program. ProShake was used for the analysis of soil profiles in Al-Durrah and the East-west Seismic Array. Once a soil profile is analyzed, the output file allows the determination of ground response spectra, from which the soil fundamental period can be found.

ProShake evolved from an attempt to provide a simpler interface to SHAKE for geotechnical earthquake engineering. ProShake uses a frequency domain approach to solve the ground response problem. ProShake automatically performs a fast Fourier transform on the input ground motion, thereby breaking it into its components of sine and cosine waves. It then applies each wave to the profile, and calculates the response to each individual wave. The total response is obtained by the summation of all responses to the input waves. ProShake is organized into three "managers"- an Input Manager, a Solution Manager, and an Output Manage. Data and plots from the Input and Output Managers can be copied to the Report section of the program [15]. The theoretical background for ProShake is presented in Appendix (A).

3.4.2 Input Manager

The Input Manager allows the entry of soil profiles and input motion data. Among the ProShake Input Manager's features are [15]:

- The ability to enter soil profile data in English, metric, or mixed units. For example, unit weight can be in pound per square foot (pcf) while shear wave velocity in m/sec - ProShake will automatically convert units to a single system.

- Soil profile data can be entered quickly using drag-and-drop techniques, and can be checked graphically for errors prior to analysis.
- Built-in soil models can be selected from pulldown menus, or user-defined models can be input and saved for subsequent use.
- Input motions can be entered and applied as outcrop or within profile motions at any layer. A ProShake utility allows conversion of input motions from any format to ProShake format, and converted motions can then be saved as ProShake motions.

The input manager requires the input of the following information for the soil profile:

1. Soil layers shear wave velocities or maximum shear modulus of each soil layer up to the bedrock
2. Thickness of each soil layer
3. Unit weight of the soil of each layer
4. Depth of the water table
5. Selection of a modulus reduction curve
6. Selection of a damping ratio curve

For input motion, the input manager requires the following information:

1. The number of input motions (earthquakes)
2. maximum number of iterations
3. strain ratio

4. Error tolerance
5. The input motion earthquake record
6. The object motion location within the soil profile
7. Selection of the input motion as an outcrop motion or not

3.4.3 The Solution Manager

The Solution Manager reads the input file (.dat file) prepared by the Input Manager, performs the analysis, and then writes an output file (.lyr file) that can be read by the ProShake Output Manager. The ProShake Solution Manager's features include a completely rewritten analysis code that features a state-of-the-art FFT algorithm [15]:

3.4.4 The Output Manager

The Output Manager has a graphical interface that allows easy review and interpretation of ProShake results. The Output Manager allows ProShake results to be plotted in a variety of ways. Among the features of the Output Manager are [15]:

- The ability to rapidly plot time histories of parameters such as acceleration, velocity, displacement, shear stress, and shear strain. Multiple time histories can be superimposed, if desired, for comparative purposes. Acceleration time histories can be saved as ProShake input motions.

- The ability to rapidly plot response spectra in linear or logarithmic form. Acceleration, velocity, and displacement spectra can be plotted as functions of period or frequency. Multiple spectra can be plotted on the same plot.
- All ProShake plots can be copied to the ProShake Report.
- The raw data for each plot can be written to a data file.

3.4.5 The Report

The ProShake Report serves a number of purposes [15]:

- It documents the conditions of each analysis. By simply opening the Report, tabular summaries of the soil profile and input motion data are inserted into the Report. The summaries include all information that would be required to recreate the analysis at a later time.
- The Report allows the analyst to insert notes and comments regarding conditions, assumptions, etc. as the analysis proceeds.
- The Report can receive graphics - any plot produced by ProShake can be copied into the Report.

Chapter 4: Site Information

4.1 Site Location

4.1.1 Al-Durrah

In order to perform the field test for this dissertation, a seismically active site was selected. Since the overall research project was sponsored by King Abdulaziz City for Science and Technology (KACST), the selected site had to be in Saudi Arabia. The selected site is located on the northeastern coast of the Gulf of Aqaba, which is the most seismically active area of Saudi Arabia. The general site coordinates are approximately 34^{o} 57.3” east, and 29^{o} 21.5” north, Figures (4.1) and (4.2). The site is called Al-Durrah, and is located about five miles north of the city of Haqil. Figures (4.3), (4.4), and (4.5) show a satellite view and a general view of the site at Al-Durrah [16]. The site includes many buildings and hangers.

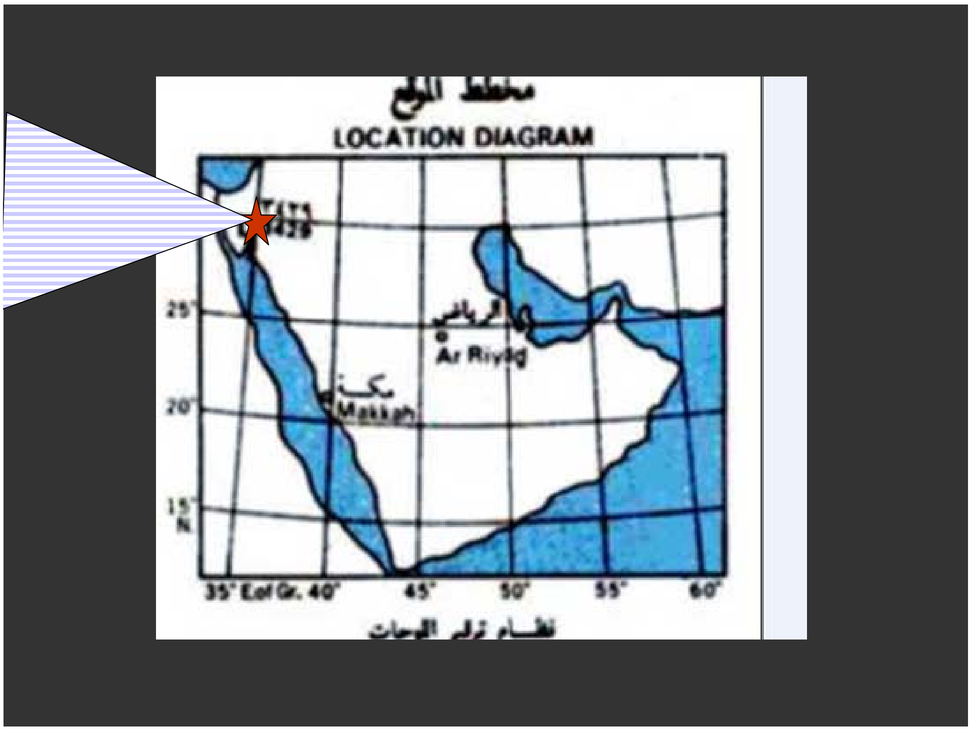


Figure 4.1: Location of Al-Durrah.

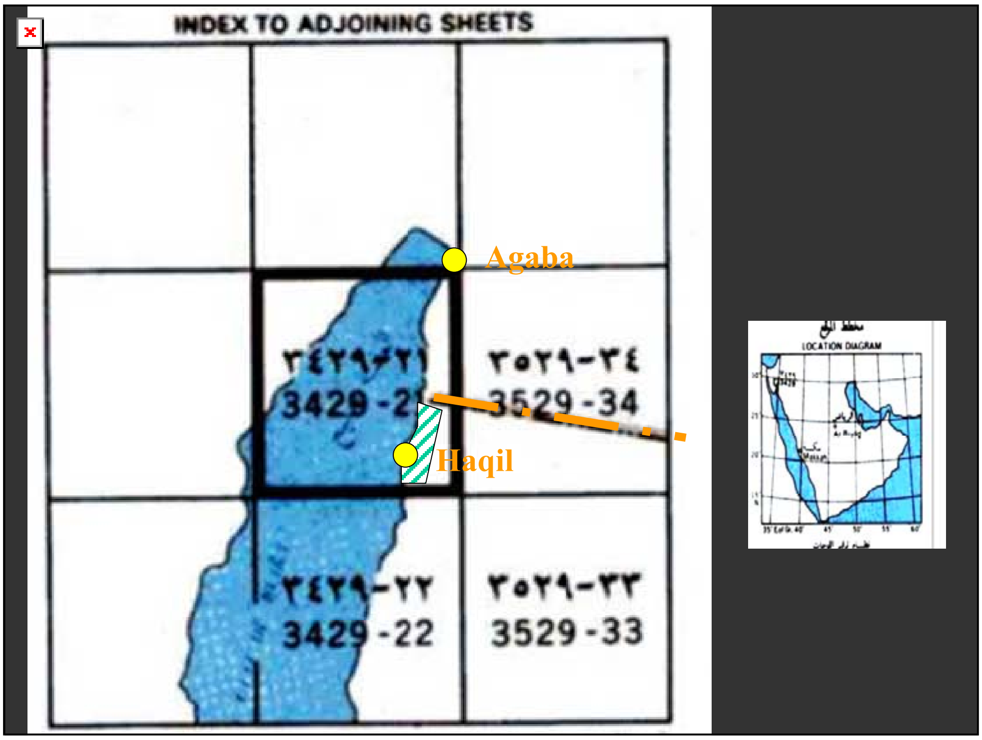


Figure 4.2: A Close up of the location and coordinates of the Al-Durrah Site.

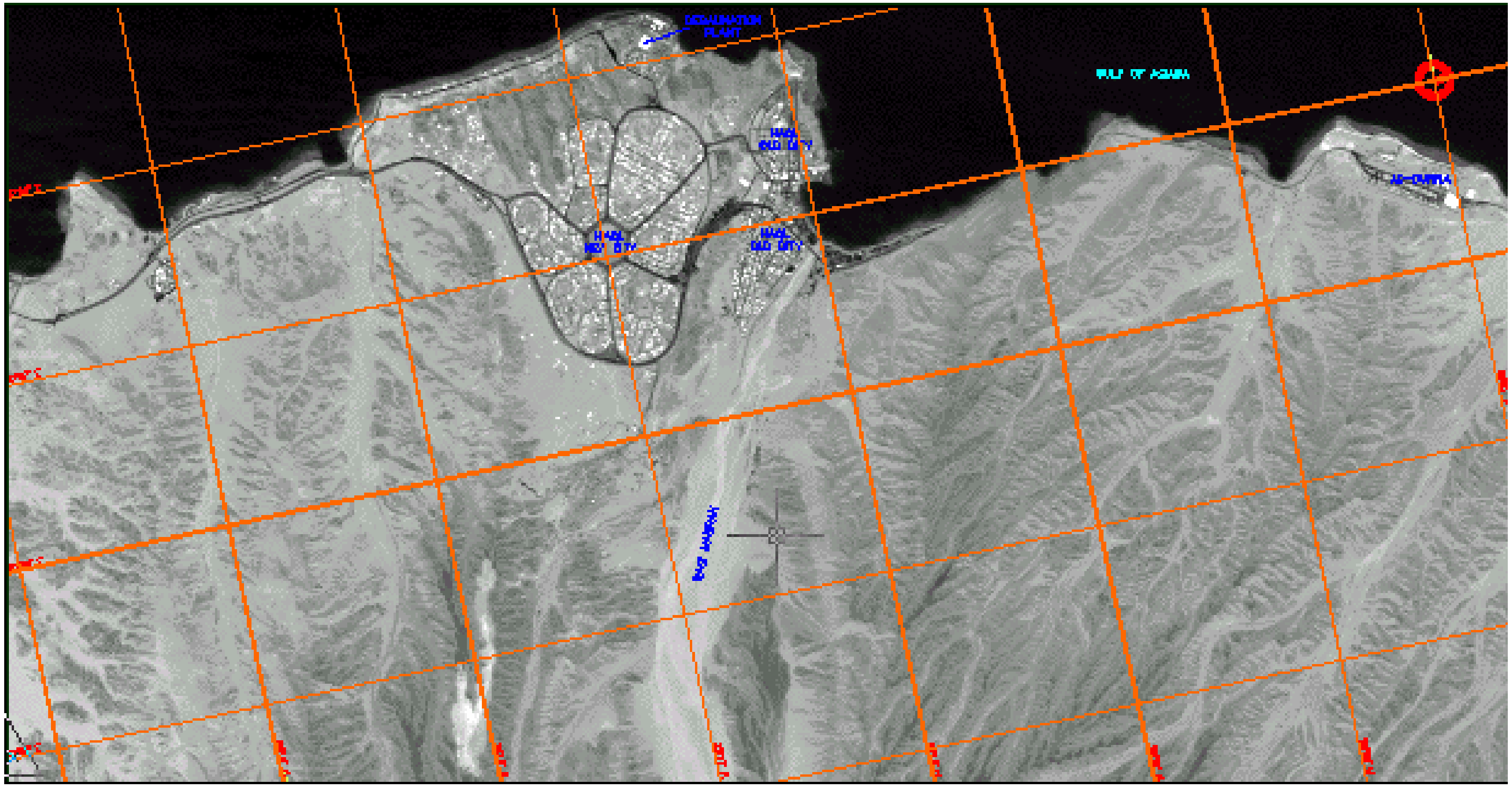


Figure 4.3: Satellite image of Haqil City and the Al-Durrah area.

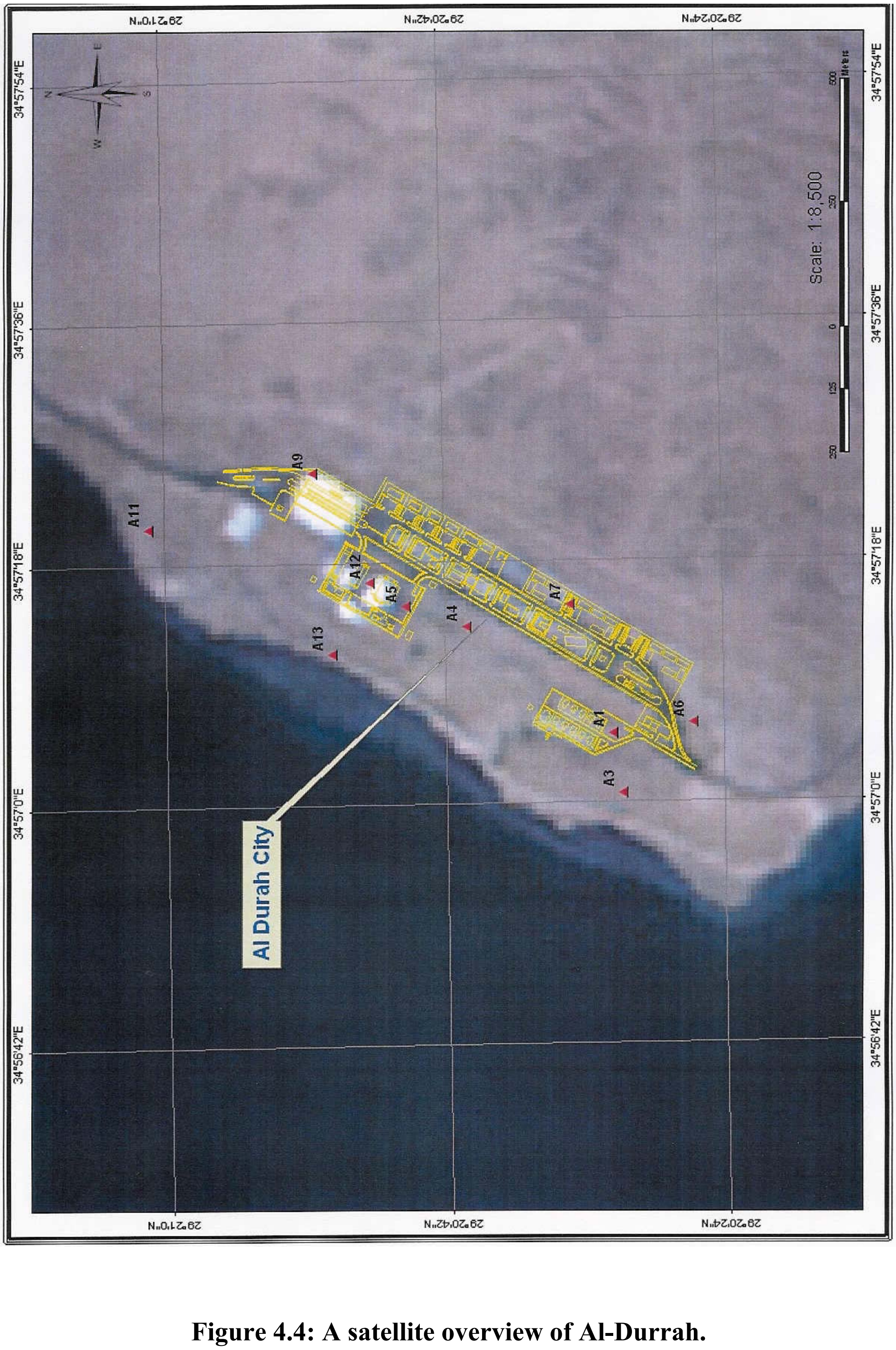


Figure 4.4: A satellite overview of Al-Durrah.

Figure 4.5: General view of Al-Durrah and the Gulf of Aqaba (looking west).

4.1.2 East-West Seismic Array

The objectives of the study of the seismic array as described in the Problem Statement earlier played a major role in selecting the location and orientation of the East-west Array. The selected array had to start at a rock outcrop and the bed rock depth had to increase gradually as one moved away from the rock outcrop. Earlier parts of this research have established that the bedrock depth at Al-Durrah was approximately 350 m. The first rock outcrop is located about 9 kilometers (approximately 6 miles) east of Al-Durrah, and the superficial soil seemed uniform from areas immediately east of Al-Durrah to the rock outcrop. Therefore this particular array was selected. Figure (4.6) shows part of the East-west Seismic Array, and the first rock outcrop appears in the distance.

Figure 4.6: General view of the East-west Seismic Array (looking north-east)

The locations of the seismic stations along the array was determined and fixed using a high precision, advanced global positioning system (GPS). The GPS system is presented in the Equipment and Instrumentation chapter (Chapter 6).

4.2 Site Structural Geology

4.2.1 AL-Durrah Area

The Geological terrain of Saudi Arabia is divided into the shield area consisting of Precambrian rocks, and the area of younger sedimentary rocks. Various sedimentary rocks from the Paleozoic era to recent times overlie the northwestern part of the Arabian Shield. The research area is on the west edge of the Arabian Plate, adjacent to the Sinai and Nubian Plates. The Arabian and Nubian Plates are separated by the axial trough that exists in the central part of the Red Sea. Many active faults exist in this area. The Sinai and Arabian Plates are separated by a transform fault branching from the axial trough of the Red Sea. The Gulf of Aqaba is situated in this part. The Dead Sea Trench starts in the northern part of the Gulf of Aqaba, which is a pull-apart basin. The "Gulf of Aqaba-Dead Sea Fault" is the transform fault boundary connecting the Zagros-Taurus Fault Belt (Iran and Turkey) as a converging boundary, and the Red Sea as a spreading boundary [17].

The Al-Durrah area is characterized by a narrow, irregular fault controlled coastal plain. This plain is low, flat, loose and overlain by recent Quaternary alluvium deposits composed of saturated coarse to medium sand, silt and little gravel. In addition, a strip of fossiliferous coralline limestone also exists along the shore line that is black stained in certain places. A raised terrace exists in the south of the area. The northwestern corner is completely overlain by raised terraces of fossiliferous coralline limestone, reaching 15m high on the shore line [16]. Figures (4.7) and (4.8) show some of the superficial geological features in Al-Durrah.

Figure 4.7: Lower level of Al-Durrah (looking east from the beach)

Figure 4.8: Middle level of Al-Durrah (looking north)

4.2.2 East-West Array

To the east of Al-Durrah, the soil material is composed of very dense unconsolidated natural deposits of boulders of different sizes and composition consisting of gravel and very coarse to medium sand. The estimated slope towards the Gulf of Aqaba as a result of the uplift associated with the Dead Sea transform fault is 10° [16]. Figures (4.9) and (4.10) show a general view of the array and the first rock outcrop in the area.

Figure 4.9: East-West Seismic Array (looking east)

Figure 4.10: The first rock outcrop east of Al-Durrah.

4.3 Regional Earthquake History and Characteristics

The “Dead Sea Transform Fault” in relation to the expansion of the Red Sea controls the tectonics in the area. Previous earthquakes were reported in historical records and are evident from trench surveys [17].

Judging by the past 2,000-year historic record; it is estimated that the cycle of the earthquakes in the area is 40 years for $M_s \geq 4.5$, 400 years for $M_s \geq 5.75$, and 4000 years for $M_s \geq 7.0$. The seismic activity in the Gulf of Aqaba is more active than that in the Red Sea Rift area. It is assumed that the earthquakes observed around the Gulf of Aqaba during the period of 1985 to 1989 have been caused by the extensional tectonic movement. The last major event was recorded on October 1995, and had a magnitude of (M_D = 5.8), figures (4.11) and (4.12) [17], where M_D = the duration magnitude, and M_S = the surface wave magnitude.

The interpretation of the "Aqaba-Dead Sea Fault Belt" earthquake mechanism indicates that almost all earthquakes show strike-slip displacement caused by tension components. A normal faulting activity in the area between the Gulf of Aqaba and Midyan area to the northeast has been confirmed by data obtained from air-borne magnetic survey and the distribution of hypocenters in that area. The survey shows that the normal faulting is especially active in the Elat Deep in the northern part of the Gulf of Aqaba; figure (4.11) [17].

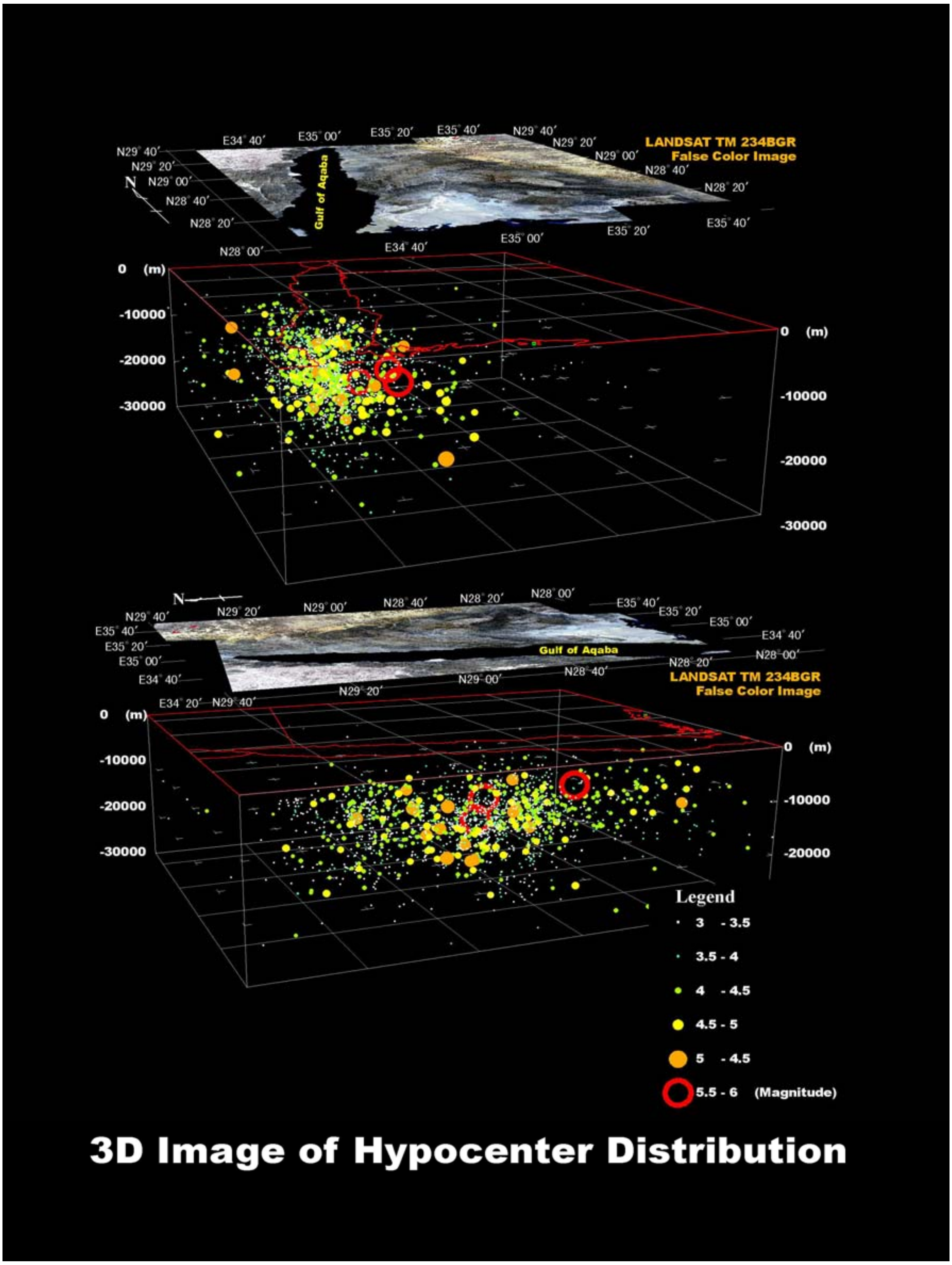


Figure 4.11: 3-D images of hypocenters distribution for the Gulf of Aqaba For the period of 1985-2000 in the Gulf of Aqaba region [17].

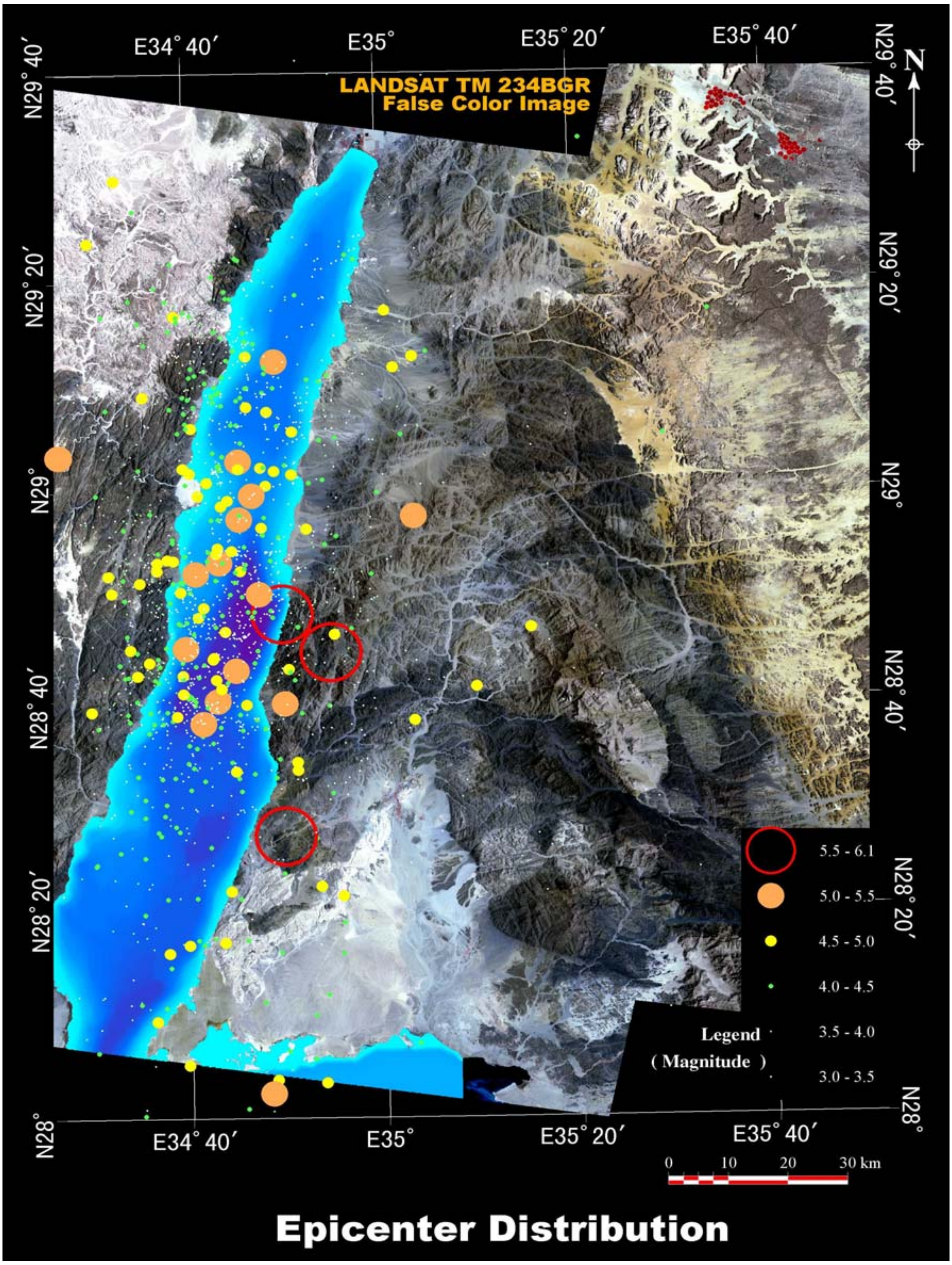


Figure 4.12: Epicenter distribution for the October 1995 earthquakes in the Gulf of Aqaba region [17].

Chapter 5: Field Test Methods

5.1 General

Two separate sets of tests for the purpose of this research were conducted, one set at the Al-Durrah site, and a second set in the East-west array. The Al-Durrah set of tests included the following:

- Standard penetration test (SPT)
- Cross-hole test
- Controlled Source Spectral Analysis of Surface Waves (CSSASW); also referred to as the (CXW) method
- Vertical Electric Sounding (VES) Test
- Microtremors recording

The aim of conducting this group of tests was to achieve the following objectives:

1. Establish soil profiles at various locations within the site based on conventional exploration and shear wave velocity (SWV) tests.
2. Establish the depth of bedrock at the site
3. Record seismic activities and microtremors at the site
4. Determine the fundamental period and ground response spectra at the site by the various methods including,

NEHRP, profiles modeling analysis, and actual seismic records.

At the East-west Seismic Array, the set of tests included the following:

- VES at each seismic station to establish the depth of bedrock
- Recording of an actual earthquake simultaneously at all stations within the array
- microtremors recording

The aim of conducting this group of tests was to achieve the following objectives:

1. Establish the depth of bedrock at each seismic station
2. Study the effects of increasing bedrock depth on the Fundamental period of soil profiles.
3. Determine the site fundamental period at each station from records of actual earthquake events and microtremors.

5.2 Tests Background and Procedures

5.2.1 Standard Penetration Test (SPT)

The standard penetration test (SPT) is one of the oldest and most commonly used in situ tests in geotechnical as well as earthquake engineering. In the SPT, a standard split-barrel sampler is driven into the soil at the bottom of a borehole by repeated blows (30 to 40 blows per minute) using a 140-Ib hammer released from a height of 30 in. The sampler is usually driven 18 in. and the number of blows required to achieve the last 12 in. of penetration is taken as the standard penetration resistance, N. [1]. NERHP general procedure requires the use of the Standard Penetration Resistance (ASTM D1586-84) not to exceed 100 blows/ft as directly measured in the field without correction [3].

5.2.2 Cross-Hole (CH) Method

This method uses two or more boreholes to measure wave propagation velocities along horizontal paths. The simplest cross-hole test consists of two boreholes, one that contains an impulse source and the other a receiver. By fixing both the source and the receiver at the same depth in each borehole, the wave propagation velocity at that depth is measured by dividing the distance between the boreholes by the measured time of the wave travel. Repeating this process at depths corresponding to various soil layers gives the shear wave velocity for that particular location. Figure (5.1a) shows a schematic illustration of cross-hole setups [1].

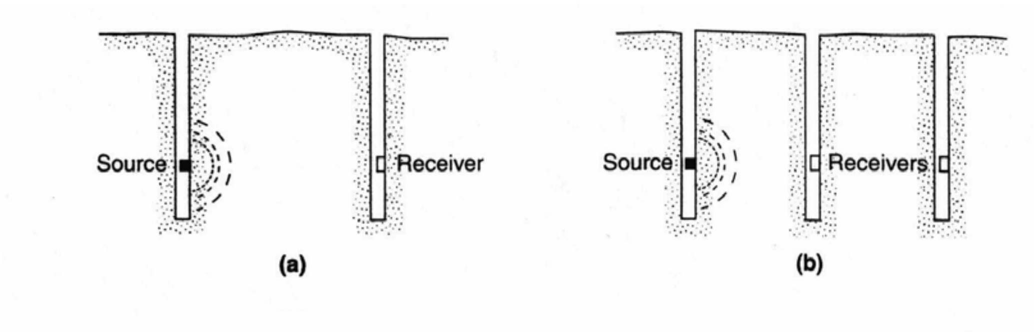


Figure 5.1a: Cross-Hole Tests; (a) Two holes, (b) Multi holes [1].

A modified version of the cross-hole test is the down-hole test, which utilizes a single borehole. In down-hole tests a signal source is placed on the ground surface and a receiver is lowered in the borehole and fixed to borehole wall at certain depth, Figure (5.1b). A signal from the source to the receiver is timed, and the process is repeated at different depths. Each measurement gives the average shear wave velocity for the soil between the source and the receiver [1].

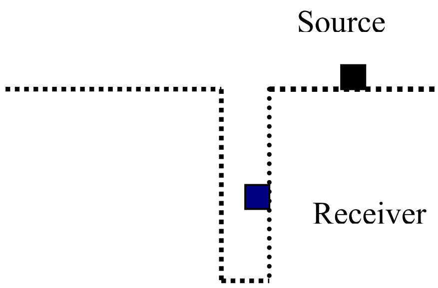


Figure 5.1b: Down-hole test illustration.

5.2.3 The Controlled Source Spectral Analysis of Surface Waves (CXW) Method

5.2.3a Theoretical Background

If a harmonic exciter is used to generate harmonic Raleigh waves on the surface of a semi-infinite, homogenous soil layer, Raleigh waves will travel along the surface inducing a harmonic response. If two receivers are placed at two points close to the source and as close to one another, while they pick up the signal in phase, the distance between the receivers is equal to the wave length of the generated Rayleigh waves. The phase velocity (v_R) of the generated Rayleigh waves can be found by [1]:

$$v_R = f\,\lambda_R \tag{5.1}$$

where:

f = frequency

λ_R = Rayleigh wave length

The velocity of a surface wave, such as Rayleigh waves, depends on the shear wave velocity (v_s) of the soil. For a Rayleigh wave with a velocity (v_R), propagating through a soil layer with constant properties and a shear wave velocity (v_s), the relationship between the two velocities is given by [18]:

$$v_R = S v_s \tag{5.2}$$

where (S) is a function of Poisson's ratio (μ), and varies between 0.875 and 0.995 for (μ) values of 0.0 to 0.5 [4]. It can be seen from equation (5.2) that for a homogeneous soil layer that has constant shear wave velocity and Poisson's ratio with depth, Rayleigh waves with different wave lengths travel at the same velocity.

If the soil is layered, and shows variations of shear wave velocity with depth, then Rayleigh waves of different wavelengths have different phase velocities causing waves dispersion. In addition, a number of studies showed that the measured phase velocity of surface waves correspond to the soil properties at depths ranging from $\lambda_R/3$ to $\lambda_R/2$ [18]. By varying the frequency of the exciter, the variation of the soil shear wave velocity with depth can be estimated. The resulting dispersion of the phase velocity can be used to estimate the shear wave velocity variation with depth [1]. This can be achieved by analyzing dispersion curves, which are plots of phase velocities versus depth (or wavelength), Figure (5.2) [19].

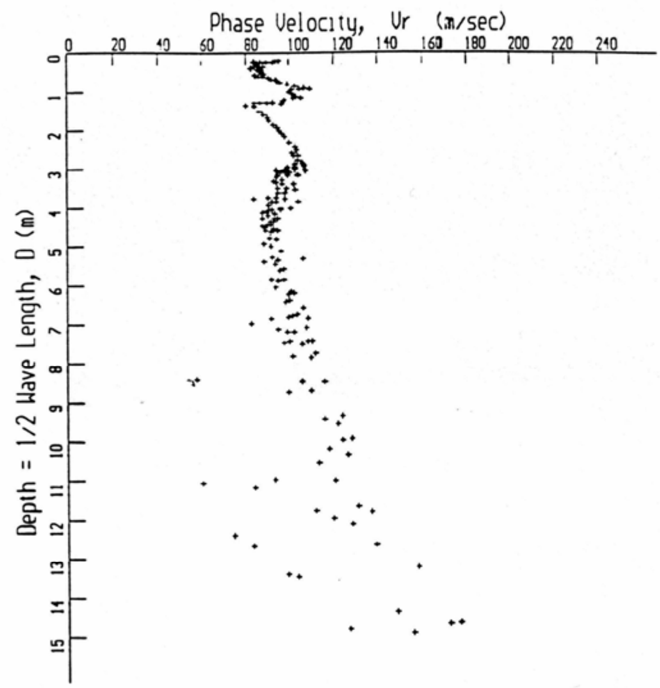


Figure 5.2: Example of a Rayleigh waves' dispersion curve [19].

The simple harmonic loading method evolved subsequently into the Spectral Analysis of Surface Waves (SASW) test. In this type of test, a source that can generate waves with random frequencies is used. This eliminated the need of repeating field tests at different frequencies in the previous method. SASW tests are done by placing two receivers on ground surface and in line with a random frequency wave source, Figure (5.3) [1].

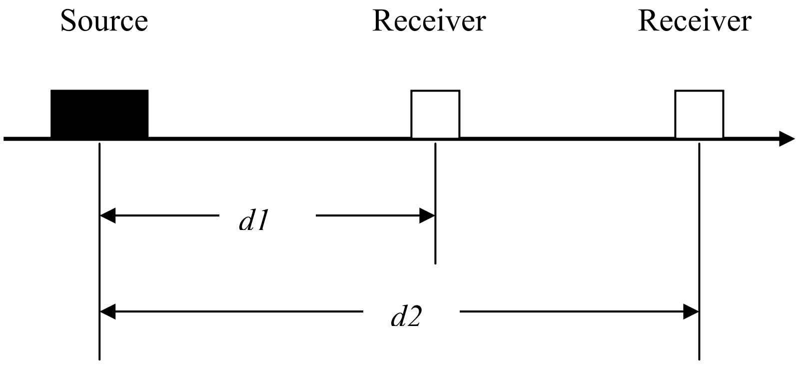


Figure 5.3: SASW test configuration [1].

The two receivers record the wave signals and transform them into the frequency domain by fast Fourier transform. The phase difference Φ (*f*) is then computed for each frequency. The travel time between the two receivers for each frequency can be calculated by:

$$\Delta t(f) = \frac{\phi(f)}{2\pi f}$$

The distance between the two receivers is:

$(\Delta d) = d2 - d1$

The Rayleigh wave phase velocity (v_R), and wave length (λ_R) can be calculated as follows [1]:

$$v_R(f) = \frac{\Delta d}{\Delta t(f)}$$

and

$$\lambda_R = \frac{v_R(f)}{f}$$

The results of SASW field measurements can be plotted to produce Rayleigh waves' dispersion curves. Current applications of this method employ controlled sources that can generate predetermined frequencies. Therefore, this method came to be known as the Controlled Source Spectral Analysis of Surface Waves (CSSASW) systems. The CSSASW is also referred to in the literature as the CXW method. Rodriguez-Ordonez formulated algorithms to compute basic parameters controlling V_R [19]. The determination of the properties (shear wave velocities and layers thickness) of the tested soil, involves an iterative procedure to match the dispersion curve of a theoretical soil profile to the measured dispersion curve.

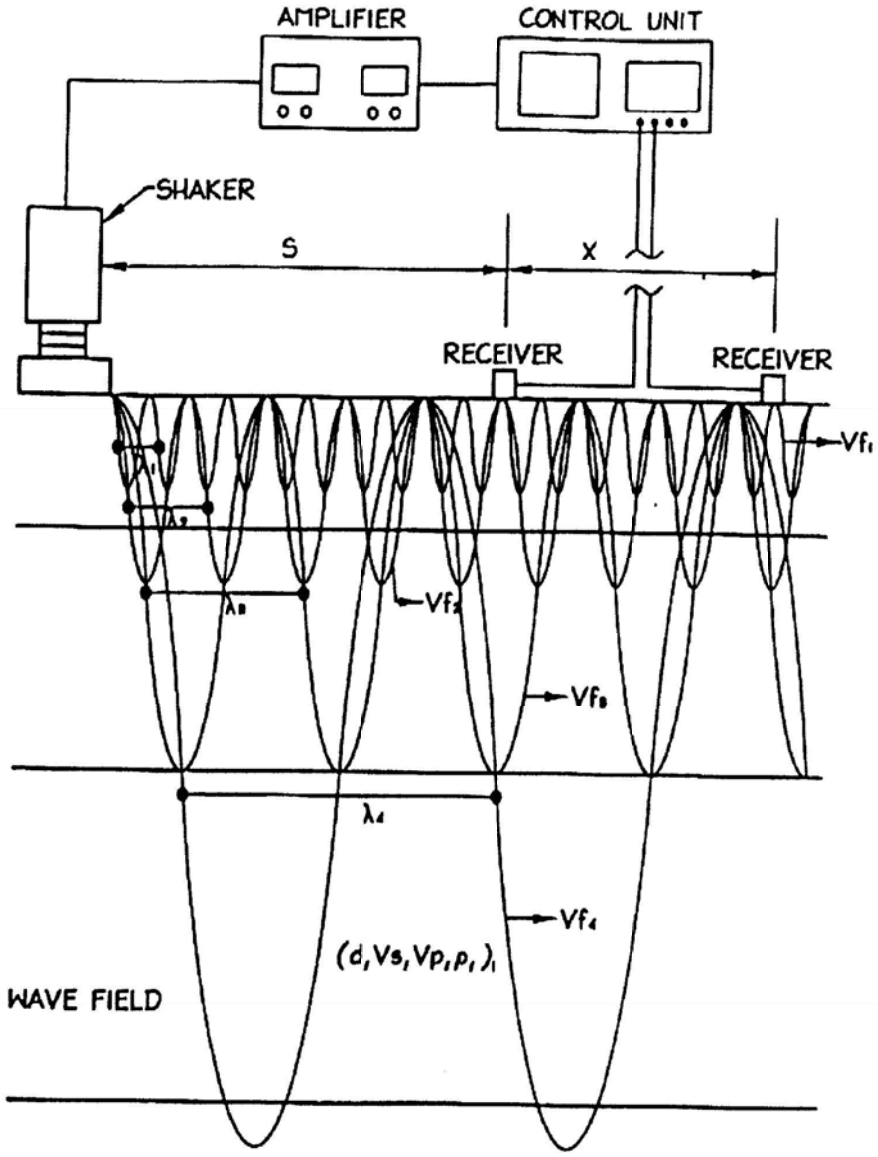


Figure 5.4: Schematic representation of a CXW test [19].

Most current CXW systems come programmed to produce dispersion curves on site in real time. Figure (5.4) shows a schematic representation of a CXW test [16].

5.2.3b Testing Procedures

The test procedure for the CXW test is very similar to that of SASW. The CXW differs from SASW in the source type and the CXW use of multi-receivers arrangements. The measurement procedure of wave dispersion, using the CXW requires the use of a system that includes an excitation source, appropriate receivers (usually two), control unit, and an electric generator. A typical CXW system is shown in Figure (5.4) [19]. The method is carried out as follows [19]:

1- A source-receivers' geometry is selected, while ensuring the source is firmly placed on a flat surface. The receivers should also be securely attached to the test surface in alignment with the source at selected distances.

2- The frequency range and other control unit settings are selected for the test. This defines the type of excitation either random or frequency sweep, the frequency content, and the frequency step.

3- The control unit acquires data approximately every three seconds and averages it according to the averaging setting as it becomes available.

4- The averaged dispersion data are displayed and evaluated. If the measurement is satisfactory the data is saved for further analysis.

5- Steps 2 to 4 are repeated for different excitations, and steps 1 to 4 are repeated for other source-receivers' arrangements.

Both of SASW and CXW have the advantage of being economical and relatively easy to mobilize, however, both methods have the following disadvantages:

1. They require very specialized equipment and highly experienced operators/analyzers [1].
2. The methods do not yield a unique SWV velocity profile. Scatter of the measured data allows for multiple interpretations [4].
3. It is not possible to detect the thickness and shear wave velocity of relatively thin layers embedded in the profile [19].

5.2.4 Vertical Electric Sounding (VES) Method

5.2.4a Theoretical Background

In Earth resistivity methods, a direct electric current is introduced into the ground by means of two electrodes connected to the terminals of a portable electric source. The resulting potential distribution on the ground, mapped by means of two probes is capable of yielding information about the distribution of electric resistivity below the surface [20]. Vertical Electric Sounding (VES) tests, also called DC Resistivity Tests are used to estimate the depth of bedrock or the level of water table in the ground [21]

Based on Ohm's Law for the potential difference (*dV*), the electric current (I), and the resistance (R):

$$I = -\frac{dV}{R} \qquad (5.2.1)$$

R is directly proportional to the length of the conductor (*dL)*, and inversely proportional to the cross-section area of the conductor (*dA*):

$$R = \rho\frac{dL}{dA} \qquad (5.2.1)$$

where ρ is the constant of proportionality and is the resistivity in Ohms of the material of the conductor. From equations (5.2.1) and (5.2.2):

$$\frac{I}{dA} = -\frac{dV}{\rho dL} \qquad (5.2.3)$$

The current density (***j***) (current per unit area of the conductor cross-section), and the electric field (***E***) is defined as:

$$j = \frac{I}{dA}$$

and $$E = \frac{dV}{dL}$$

From equation (5.2.3): $$E = \rho j \qquad (5.2.4)$$

Equation (5.2.4) expresses Ohm's law for a homogenous isotropic material [20].

Vertical electric sounding (VES) tests are carried out by electrifying two electrodes that penetrate the top of the soil, and measuring the potential across a pair of probes that also penetrates the top of the soil. The depth of penetration of both pairs is only a few inches. There are many versions of the VES test, and different versions use different electrodes' arrangements to achieve their objectives. One of the most commonly used versions is the Schlumberger method. For this research, the Schlumberger method was used to estimate the depth and inclination of the bedrock at the site. A Schlumberger array is shown in Figure (5.5) below. Electrodes A and B are the electric sources, while electrodes M and N are the voltage measurement electrodes [22].

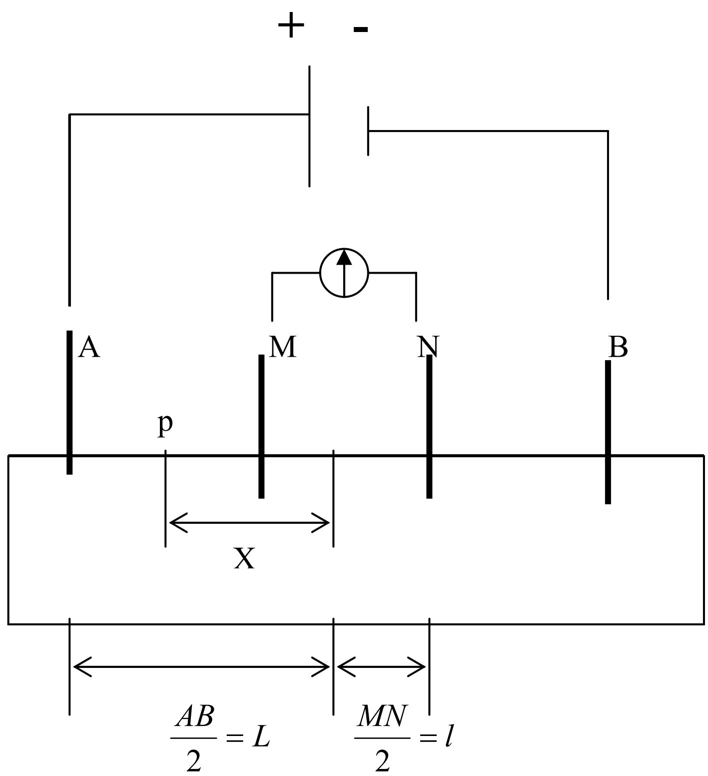


Figure 5.5: Schlumberger VES Test Arrangement [22].

Figure (5.6) shows a single electrode on the surface of a homogenous, isotropic soil layer extending to infinity in the downward direction. If we consider a hemisphere around the electrode with a radius (r) and a thickness (dr), then symmetry dictates that the current at any point on the shell is along the radius. The voltage drop across the shell is given by equation (5.2.3) [20]:

$$\Delta V = -\frac{I\rho dr}{2\pi r^2} \tag{5.2.5}$$

where I =the current of the electrode

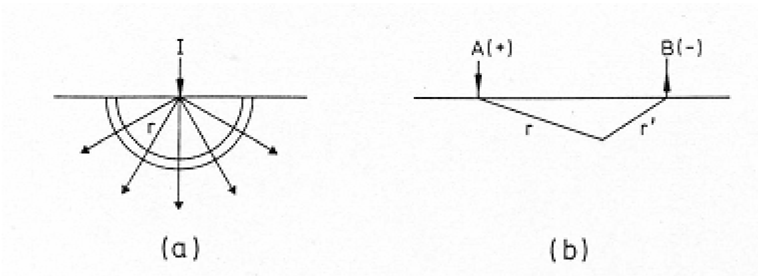


Figure 5.6: Point electrodes on homogenous infinite soil layer;
(a) single electrode, and (b) two electrodes [21].

The voltage at a distance *(r)* can be found by integrating equation (5.2.5):

$$V = \frac{I\rho}{2\pi r} + C \tag{5.2.6}$$

When $r = \infty$, $V = 0$, therefore $C = 0$ and equation (5.2.6) becomes:

$$V = \frac{I\rho}{2\pi r}$$

A Schlumberger array has two electrodes, positive electrode (A) and negative electrode (B). For a point in the soil at a distance *(r)* from (A) and *(r')* from (B), Figure (5.6b), the total drop in voltage is given by [20]:

$$V = \frac{I\rho}{2\pi}\left(\frac{1}{r} - \frac{1}{r'}\right) \tag{5.2.7}$$

For an arbitrary point (p) on the ground surface within the Schlumberger array of Figure (5.6) equation (5.2.7) gives:

$$V = \frac{I\rho}{2\pi}\left(\frac{1}{L+x} - \frac{1}{L-x}\right) \tag{5.2.8}$$

Differentiating with respect to (x), gives:

$$\frac{dV}{dx} = -\frac{I\rho}{2\pi}\left(\frac{1}{(L+x)^2} + \frac{1}{(L-x)^2}\right)$$

At the center of the array (x = 0), therefore:

$$\frac{dV}{dx} = -\frac{I\rho}{\pi L^2}$$

and the apparent resistivity is:

$$\rho = \frac{\pi L^2}{I}\left(-\frac{dV}{dx}\right)$$

Since (MN = 2l) is very small, we can assume that ($-dV/dx = V_{MN}/2l$), where

V_{MN} is the measured potential difference between M and N [21]:

$$\rho = \frac{\pi L^2}{2l}\left(\frac{V_{MN}}{I}\right)$$

5.2.4b Testing Procedure

When conducting a Schlumberger VES, the voltage meter electrodes are normally centered with respect to the electrifying electrodes in

a symmetric manner. It is also important to maintain a distance MN (=*2l*) that is much smaller than the distance AB (=2L). Electrodes A and B are moved out co-linearly and symmetrically in steps and the voltage difference between M and N is measured each time. The steps are repeated until the MN voltage difference approaches the accuracy limit of the voltmeter being used, [22].

Data of apparent resistivity versus depth is interpreted using established guide curves; however, most current systems use specialized soft wares to interpret the data [16].

5.2.5 Seismic Data Acquisition:

5.2.5a General

Microtremors and actual earthquakes were recorded in both of Al-Durrah and the East-west Seismic Array. Microtremors recording can normally be done in 5 to 15 minutes sessions at each testing point [8] [11]. For this project , however, the records were of much longer durations. In the East-west Seismic Array, the objective was to record at least one actual earthquake event by all stations in the array simultaneously. Once the systems were installed and become operational in all stations, daily contacts were made with the shift operators of the Saudi National Seismic Network monitoring office in King Abdulaziz City for Science and Technology (KACST) to gather information on seismic activities in the area. When information on occurrence of an actual earthquake was confirmed, the systems in all stations were checked to verify that the same event has been recorded by all of them.

5.2.5b Seismic Recording Systems

Two types of seismic recording systems were used:

1. Portable Very-Wide-Band Tri-Axial Seismometer: This system is a very advanced seismometer and has a commercial name of STS2 IRIS Special, This device is an electronic force-feedback sensor that provides a three-components output signal proportional to the ground velocity over a range of 0.08 to 40 (Hz). The system must be placed on a firm surface on the ground, and has a built-in bubble level and three adjustable legs for leveling [23].

2. EpiSensor Force Balance Accelerometer: The EpiSensor is a triaxial accelerometer optimized for earthquake recordings with three orthogonal mounted low-noise force balance accelerometer sensors.

It has a user selectable recording ranges of ± 4g, ± 2g, ± 1g, ±0.5g, ± 0.25g. The EpiSensor has a band width to 200 Hz. The EpiSensor must be anchored by a bolt that fits into a bracket on the bottom side of the device. The anchor bolt must be screwed into a solid surface such as rock or concrete for proper ground motion recording [24]. To meet this requirement, concrete platforms with a surface area of 1 m^2 will be cast over rough soil surface.

The output data from both systems was digitized using a system called the Quanterra Q330 Data engine. Digitized data was then stored in another device called the Quanterra Q330 Packet Baler, which has a memory capacity of 20 gigabytes [24]. The system keeps track of its location and the time of recording by means of a global positioning system (GPS) that connects to the system's assembly. The complete system is powered by a DC battery that is complemented with a solar panel. More information on all of the systems is presented in Chapter 6.

Chapter 6: Field Work Tasks and Equipment Information

6.1 General

A number of field tests and seismic recordings were performed at the Al-Durrah site and the East-west seismic array. The research field tasks were carried out in three phases. The first phase took place in the spring of 2001. In this phase, the site selection for Al-Durrah was finalized, and the testing locations were selected and marked. In the second phase, all of the major tests were carried out in Al-Durrah. This included the standard penetration test (SPT), the cross-hole test (CH), The Controlled Source Spectral Analysis of Surface Waves (CXW), and vertical electric sounding (VES). The third phase included the establishment of the East-west seismic array, and microtremors recording in Al-Durrah. As stated in section (1.2), other contractors, consultants, and government staff and technicians were involved in executing the field work. The following sections detail the different parties' participation in the project tasks.

6.2 Field Work Tasks Participants

The overall tasks were carried out as follows:

- Adel Engineering Office (AEO) (Jeddah, Saudi Arabia): Conventional soil exploration, including SPT borings, logging, and soil analysis. AEO also prepared borings and casing for the cross-hole tests. In addition, AEO provided a truck with a mounted crane for handling of the 700 kg CXW shaker and additional set up equipment. The contractor truck-mounted drilling equipment was later modified for use as an impact source for wave amplitude measurements. AEO provided all logistical support for other fieldwork, including laborers as needed.

- ENSOL, Inc. (Cary, NC): Dr. Jorge A. Rodriguez from ENSOL was the technical supervisor for all wave propagation measurements. Dr. Rodriguez also personally performed the CXW and cross-hole/down-hole measurements.
- King Saud University (KSU), (Riyadh, Saudi Arabia): Dr. Al-Amri, Department of Geology KSU, provided assistance as a consultant for the vertical electric sounding VES in Al-Durrah that was carried out by KACST technicians.
- KACST: Provided and delivered the equipment for the CXW and wave propagation measurements (cross-hole and down-hole tests) in Al-Durrah, which included:

1. A complete set of CXW equipment, made by Vibration Instruments Company, Ltd. VIC, Tokyo, Japan.
2. A support Jeep Cherokee and trailer for the CXW equipment
3. Geometrics Strata View 48 channels engineering exploration seismograph.

4. Geostuff, three-component down-hole geophone with servo controlled orientation, motor driven clamping device, cables and control unit.
5. Down-hole Hammer Source with pneumatic packer, trigger and cables.
6. A pickup-truck-mounted impact source for shallow geophysical measurements.

   In addition, KACST technicians carried out the VES testing in Al-Durrah. For the tasks in the East-west seismic array, KACST technicians did or assisted in the following tasks:

1. Mark the locations of the seismic stations that were selected using the 5700 CORS advanced GPS system.
2. Prepare the stations' concrete base platforms to support the seismic recording systems
3. Install and run the seismometers and accelerometers at each station.
4. Conduct VES test at each station to establish the depth of bed rock.

6.3 Details of Testing Equipment and Instrumentation

This section presents brief descriptions for the main equipment and instruments that were used in this research project. The information and most of the pictures were taken from the user's manuals and/or suppliers' websites (when available). These websites provide extensive information and specification for their products.

6.3.1 Standard Penetration Test (SPT):

The soil borings were performed by means of hollow stem augers with a standard safety hammer. The boring was performed using a truck mounted safety hammer that drove hollow stem augers with an inner diameter of 8.3 cm. Figure (6.1) shows the actual rig used in this project.

Figure 6.1: Preparations for SPT

6.3.2 Cross-hole (CH) Test**:**

The holes were drilled and cased using the same truck mounted stem auger that was used for SPT. However, due to the break down of stem auger rig, the last two cross-hole tests (D11 and D12) were prepared using two truck-mounted water- well rigs. Figure (6.2), shows one of the cross-holes tests.

Figure 6.2: Setting up a cross-hole test

6.3.3 The Controlled Source Spectral Analysis of Surface Waves (CXW) Test**:**

The CXW system included a real time GR824 Signal Analyzer, controlled-source shaker model GR812/E500, with a frequency range of (3—200 Hz), and its driving amplifier, two receivers (piezoelectric accelerometers), cables, accessories, tools, and power generator, Figure (6.3).

Figure 6.3: CXW testing system components

6.3.4 Vertical Electric Sounding (VES)**:**

The VES system utilized a deep resistivity system, the SYSCAL R2 Deep Resistivity / IP System, Figure (6.4) [25]. It also included a DC/DC transformer capable of a voltage difference of 800 volts.

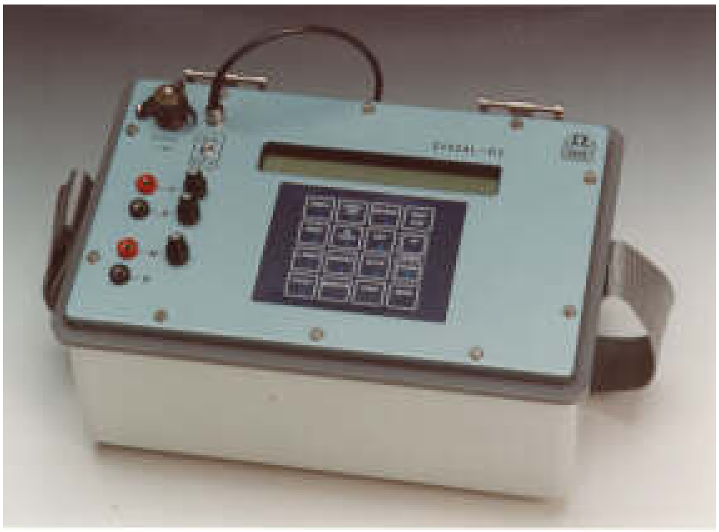


Figure 6.4: The SYSCAL R2 Deep Resistivity / IP System [25]

Figure 6.5: Conducting VES at a seismic station in the East-west array

6.3.5 Global Positioning System (GPS):

The project utilized a state of the art GPS system that is accurate to about 2 mm. The system brand is the 5700 CORS System [26], Figure (6.6). Although this high accuracy was not necessary, it was helpful in aligning the East-West Seismic array.

Figure 6.6: The 5700 CORS GPS system; (a) The base unit in the background

(b)

Figure 6.6-continued: The 5700 CORS GPS system; (b) the mobile unit

6.3.6 Seismic Data Acquisition Systems:

The seismic data acquisition system consisted of the following components:

1. Portable Very-Broad-Band Tri-Axial Seismometer (STS-2 IRIS Special), Figure (6.7).

Figure 6.7: Portable Very-Broad-Band Tri-Axial Seismometer STS-2 IRIS Special [23].

2. EpiSensor Force Balance Accelerometer-Model FBA ES-T, Figure (6.8).

Figure 6.8: EpiSensor Force Balance Accelerometer (Model FBA EST) [24].

3. Quanterra Q330 Data Engine Digitizer, Figure (6.9)

Figure 6.9: Quanterra Q330 Data engine digitizer [24].

4. Quanterra Q330 Packet Baler Data Storage Device, Figure (6.10).

Figure 6.10: The Quanterra Q330 Packet Baler Data Storage Devices [24].

Figure 6.11: The Seismometer and EpiSensor in the seismic station of the rock outcrop (the reference point).

Figure 6.12: A complete seismic station setup including the solar panel.

The digitizer and data storage devices are kept in the ice box for protection from the elements.

Chapter 7: Field Tests Results

7.1 General

Chapter 7 presents all the field test results for Al-Durrah as well as the East-west seismic array. Al-Durrah tests results include the following:

1. SPT test blow counts and the NEHRP average uncorrected number of blow counts for each profile
2. Cross-hole test shear wave velocity (SWV) profiles and the NEHRP average SWV for each profile
3. Controlled Source Spectral Analysis of Surface Waves (CXW) test SWV profiles and the NEHRP average SWV for each profile
4. Vertical electric sounding (VES) test results
5. Microtremors ratio spectra

The East-west seismic array tests results include the following:

6. VES tests results
7. Records of an actual earthquake that was recorded at all seismic stations simultaneously
8. Microtremors ratio spectra

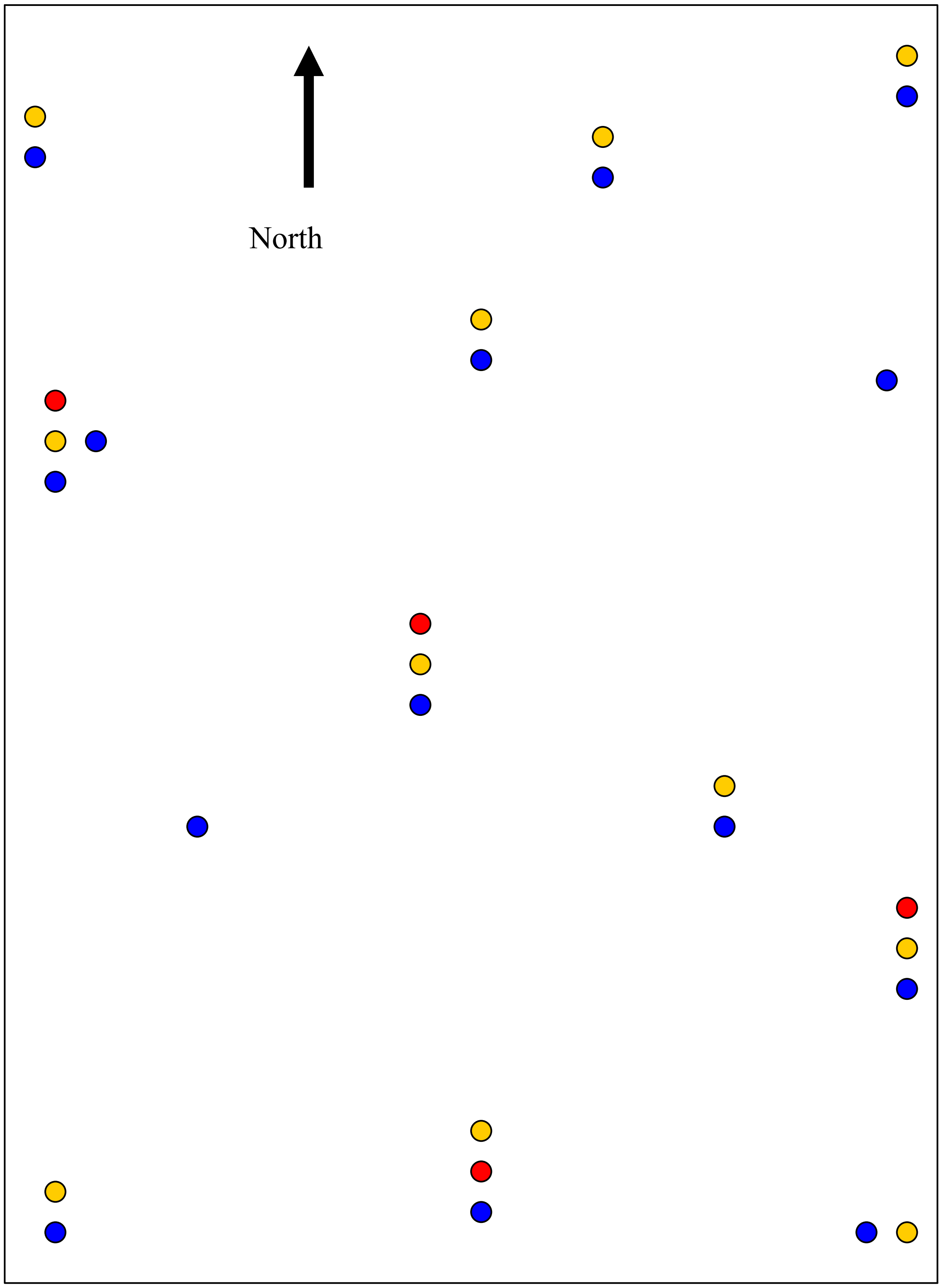
The results are not discussed or analyzed in this chapter because of relevance of some tests to one another. In addition, the results of the dynamic site response analysis that are presented in Chapter 8 are needed for the analysis of some of the results of Chapter 7. Therefore, the tests results of Chapters 7 and 8 are regrouped and reproduced in Chapters 9, 10, and 11 where they are discussed and analyzed.

7.2 Al-Durrah Site

7.2.1 Standard Penetration Tests (SPT)

7.2.1a General

Twelve SPT borings were performed at the Al-Durrah site. All borings were drilled to a depth of 30m, except for D1, D3, and D9 that were drilled to a depth of 60m.Figure (7.1) shows a schematic layout of the tests locations within the Al-Durrah site. Test D10 is not shown because it was performed just out site the northeastern corner of the site. The location of test D10 was selected because it was the lowest point in the whole area. Hollow stem augers were used for this field investigation. The SPT was performed at 1.5 m intervals and disturbed samples were recovered for soil analysis by laboratory testing that included sieve analysis and unit weight measurements. The Contractor for this work, AEO submitted their reports pertaining to the results of the boring at each site [16]. Sample SPT logs are presented in Appendix B. Tables (7.1a) and (7.1b) summarize the data of the SPT-N values and depths to the water table. Table (7.2) summarizes the resulting NEHRP average SPT blow counts.



Legend: SPT test CH test CXW test

Figure 7.1: Schematic layout of the Al-Durrah site tests locations

7.2.1b Test Results

Boring No.	D1	D3	D9
Water Depth (m)	8	29	25
Depth (m)	SPT N-Values (Uncorrected)		
1.75	60	45	100
3.25	72	17	30
4.75	75	47	100
6.25	48	100	100
7.75	60	100	100
9.25	62	65	100
10.75	100	100	100
12.25	100	100	100
13.75	100	100	100
15.25	100	75	100
16.75	100	75	100
18.25	100	100	100
19.75	100	100	100
21.25	100	100	100
22.75	100	100	100
24.25	100	100	54
25.75	100	100	65
27.25	100	100	48
28.75	100	65	58
30.25	100	75	70
31.75	100	100	55
33.25	100	100	60
34.75	100	55	54
36.25	100	50	50
37.75	100	53	52
39.25	100	40	40
40.75	100	53	60
42.25	100	63	58
43.75	100	75	80
45.25	100	77	79
46.75	100	100	79
48.25	100	100	100
49.75	100	77	100
51.25	100	80	100
52.75	100	100	100
54.25	100	100	100
55.75	100	100	100
57.25	100	100	100
58.75	100	100	100
60.25	100	100	100

Table (7.1a): Summary of SPT-N Values (60m Boreholes) and Water depths

Summary of SPT N-values and Water Table depths									
Boring No.	D2	D4	D5	D6	D7	D8	D10	D11	D12
Water Depth m	28	2.5	3	25	26	25	2.6	12	12
Depth (m)	SPT-N Values (Uncorrected)								
0.5	N/A	N/A	N/A	15	37	50	N/A	N/A	N/A
1.75	20	100	100	100	58	100	100	8	40
3.25	25	100	52	40	40	50	100	15	100
4.75	100	38	50	100	50	100	60	22	100
6.25	100	22	18	60	22	100	48	20	100
7.75	100	23	58	100	40	100	50	15	100
9.25	100	27	100	100	52	100	40	23	100
10.75	100	61	58	100	100	100	32	100	100
12.25	62	60	70	100	52	100	65	20	100
13.75	100	75	42	100	100	100	80	22	100
15.25	72	45	58	100	100	82	65	20	100
16.75	75	30	100	100	100	100	52	28	100
18.25	100	28	100	58	100	100	45	30	100
19.75	100	35	100	100	100	100	25	64	100
21.25	100	31	100	100	100	100	42	100	100
22.75	100	30	100	100	100	100	36	55	100
24.25	100	22	100	100	100	100	28	42	100
25.75	100	20	100	100	100	100	28	54	100
27.25	100	28	100	100	100	100	29	62	100
28.75	70	52	100	100	100	100	55	100	100
30.25	100	35	100	100	100	100	40	40	100

Table (7.1b): Summary of SPT-N Values (30m Boreholes) and Water table depth

SPT Test Location	NEHRP Average No. of blows $\bar{N}$
D1	83.92
D2	67.57
D3	70.74
D4	34.48
D5	65.84
D6	80.84
D7	65.62
D8	92.85
D9	74.30
D10	43.76
D11	25.85
D12	92.01

Table (7.2): Summary NEHRP Average SPT- values

7.2.2 Cross-Hole Tests

7.2.2a General

The Al-Durrah site cross-hole (CH) measurements were performed at four locations. Two drilling systems were used for the test boreholes, a hollow-stem augers and a water-well truck-mounted boring machine. The soils at the sites were mostly clean sands, which were highly unstable during drilling, especially under the water table. These conditions were aggravated by frequent microtremors, making casing installation for the tests very difficult. Based on the field notes from the installation crews, the cased borings D5 and D6 were installed by hollow-stem augers. However, boreholes D11 and D12 were drilled with the water-well boring machine that was about 40 cm in diameter, while the casing had an outer diameter of 7.6 cm. Therefore, the holes had to be backfilled after the casing was lowered into the borehole [16].

The boreholes were backfilled from the surface, and the backfill could not be compacted. Thus, based on field observations it is likely that backfill compaction around the casing was highly irregular, and that some voids could have been left around the casing by backfill arching that developed between the casing and borehole walls. Consequently, the corresponding CH results were most likely affected due to velocity change adjacent to the casing over the thickness of the void-laden borehole backfill, which was significant relative to the test distance of 3.0 m between boreholes. These effects were accounted for by the procedure that is presented in the next section. The complete cross-hole profiles' calculation is presented in Appendix (C).

7.2.2b Cross-Hole Data Correction

Correction of raw CH data is based on considering the space between the boreholes as consisting of two types of materials. One material corresponds to the natural soil being tested, and the other material is the loose backfill immediately adjacent to the casings in the boreholes. The correction method models the two materials in a way that is similar to the modeling of soil layers in NEHRP general procedure (Section 2.1.1). This is an approximate correction model for such conditions. In addition to the measured CH data, the correction model required the determination of the average soil velocity by performing down-hole (DH) tests at each measurement depth of the CH test. Details of the down-hole measurements and their results are presented in Appendix (C). The extent of the loose material zone was estimated based on measurement of the actual average diameter of the drilled boreholes. The shear wave velocity of the loose backfill in the borehole was estimated by using the results of the DH measurement results that were performed with a surface source and a down-hole geophone. Therefore, due to the longer wave travel path, the effect of the loose backfill on the SWV results from a DH test is much less significant compared with the (CH) results at a respective depth. The corrected CH SWV is then computed as [16]:

$$V_{s-corr} = \frac{L_t - L_l}{\frac{L_t}{V_{s-avg}} - \frac{L_l}{V_{s-loose}}} \tag{7.1}$$

Where:

$V_{s\text{-}corr}$: corrected CH shear wave velocity

$V_{s\text{-}avg}$: average (measured) shear wave velocity from CH test

$V_{s\text{-loose}}$: shear wave velocity in the loose soil fill (estimated From comparison of typical DH and CH results at a respective depth where DH result is considered as $V_{\text{s-corr}}$)

L_t: total wave path length between the boreholes

L_l: wave path length of loose soil

Equation (7.1) above is analogous to the NEHRP formula for calculating the average shear wave velocity for a profile (Section 2.1.1 of this dissertation):

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \left(\frac{d_i}{v_{si}} \right)} \qquad i = 1,2,3,\ldots\ldots n \qquad (7..2)$$

The ratio of the corrected SWV to the uncorrected SWV from the CH test is defined as the correction factor:

$$The \quad correction \quad factor = \frac{Corrected \quad SWV}{Uncorrected \quad SWV}$$

The correction factors used for each CH SWV measurement are shown in Table (7.3).

CH-D5		CH-D6		CH-D11		CH-D12	
Depth (m)	**Correction Factor**	**Depth (m)**	**Correction Factor**	**Depth (m)**	**Correction Factor**	**Depth (m)**	**Correction Factor**
2	1	2	1	0.25	1.43	1	1.48
4	1	4	1	1.25	1.81	2	1.54
6	1	6	1	2.25	1.91	3	1.4
7	1.57	8	1	3.25	1.54	4	1.21
8	1	9	1	4.25	1.44	5	1.09
9	1	10	1	5.25	1.53	6	1.09
10	1.49	12	1	6.25	1.61	7	1.09
11	1.37	13	1	7.25	1.73	8	1.09
12	1.64	14	2	8.25	1.51	9	1.09
13	1	15	1	9.25	1.54	10	1.09
14	1	16	2	10.25	1.45	11	1.09
15	1	16.5	2	11.25	1.45	12	1.49
16	1	18	1.28	12.25	1.45	13	2.19
17	1	18.5	2	13.25	1.45	14	2.3
18	1.54	21	1.71	14.25	1.45	15	1.09
19	1.62	22	1.38	15.25	1.45	16	1.09
20	2.48	23	1.38	16.25	1.45	17	1.09
21	2.48			17.25	1.45	18	2.35
22	2.16			18.25	1.45	19	1.09
				19.25	1	20	1.31
				20.25	1	21	1.06
						22	1.09
						23	1.53

Table 7.3: Cross-hole Correction Data

7.2.2c Cross-hole Test Results

Generally, the cross-hole (CH) shear wave velocity (SWV) profiles showed more irregular behavior compared to the Controlled Source Spectral Analysis of Surface Waves (CXW) SWV profiles. In addition, the cross-hole SWV results are generally lower than those obtained from the respective results from CXW tests at the same locations. This effect was more noticeable at the sites where large diameter boreholes were drilled. In order to correct for the large diameter borehole effects, the model previously discussed in Section 7.1.2.b was used for the respective test interpretation. The corrected CH SWV results are presented along with the uncorrected measurement data in Figures (7.2) to (7.5) [16].

An air compressor was used to remove water from three CH tests borings, namely D5, D11, and D12. The water table depth was 3 m at D5, and 12m at D11 and D12. For CH measurements, water should be removed from the casing prior to using the down-hole hammer. Although geophones can be used under water, it is generally preferred that the hole be dry to prevent signals from traveling through the water which can introduce difficulties in data interpretation.

The site average shear wave velocities as determined by the corrected cross-hole tests are presented in Table 7.4.

Test Location	Cross-hole NEHRP Average SWV (m/s)
D5	316
D6	438
D11	381
D12	223

Table7.4: Cross-hole Tests Results.

Cross-Hole Location: D5- CH

$$(Vs)cor = \frac{\Sigma\, di}{\Sigma \dfrac{di}{Vsi}} = 315.64 \text{ m/s}$$

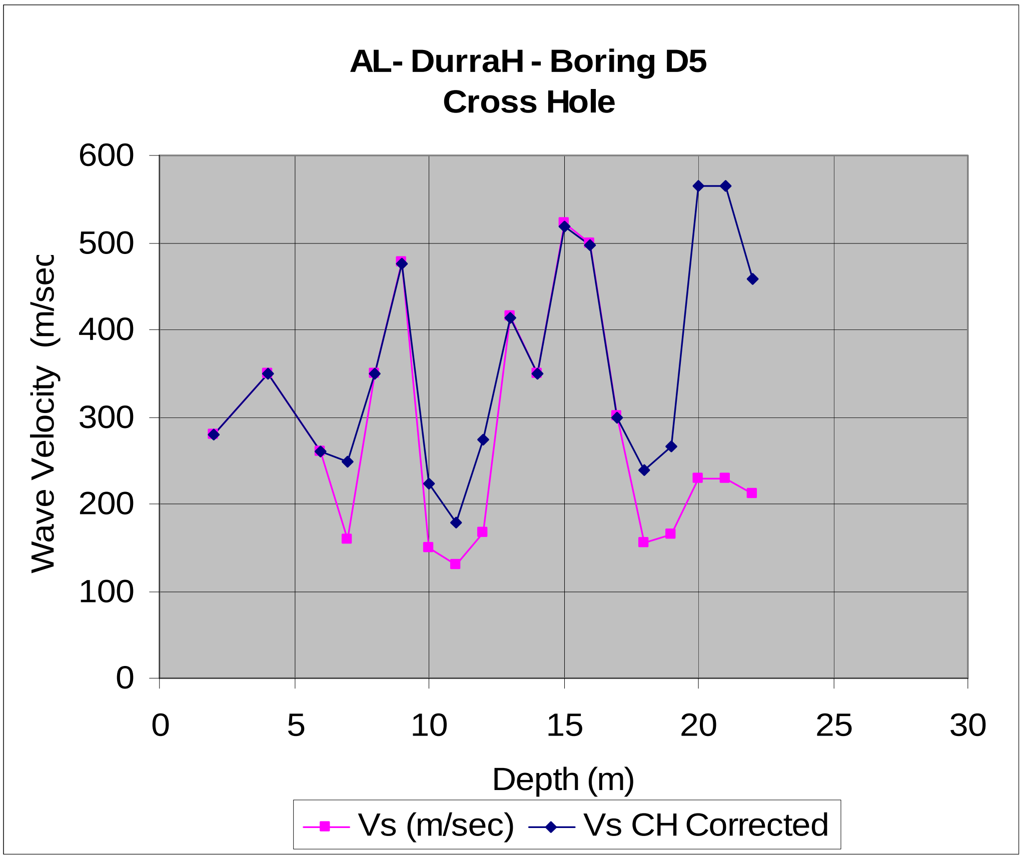


Figure 7.2: Profile of SWV of CH D5.

Cross-Hole Location.: D6-CH

$$(Vs)cor = \frac{\Sigma\, di}{\Sigma \frac{di}{Vsi}} = 438.33 \text{ m/s}$$

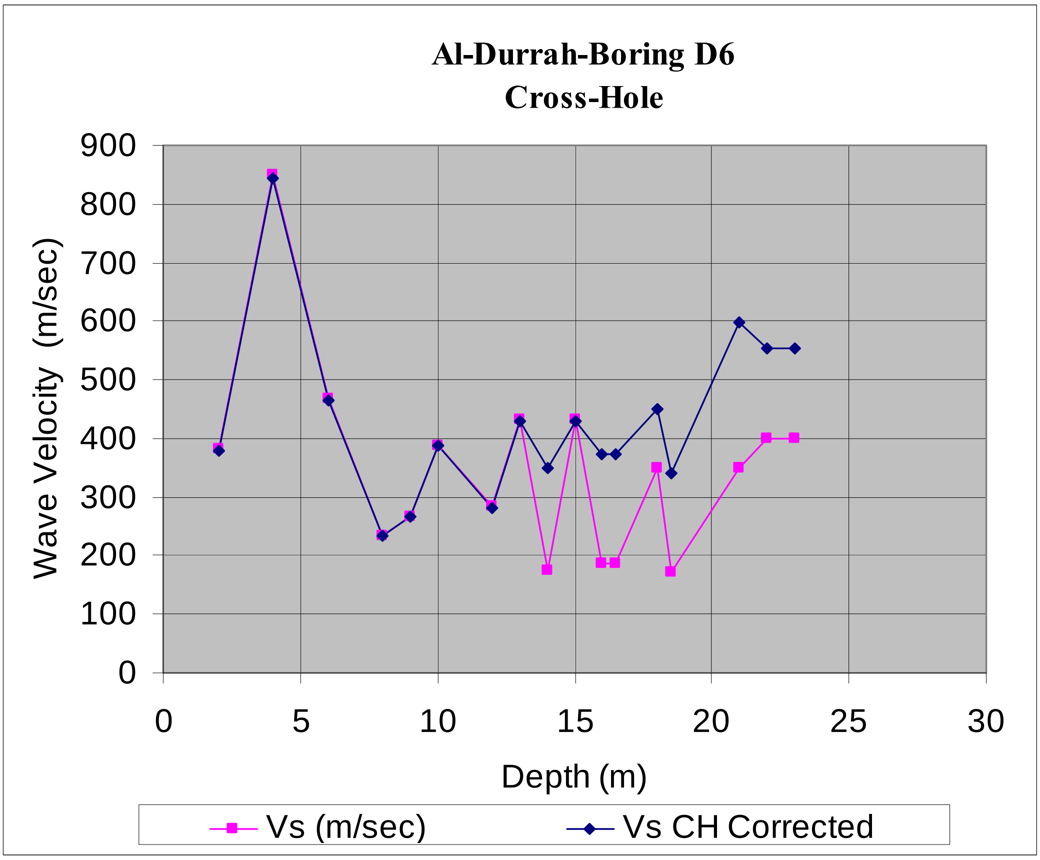


Figure 7.3: Profile of SWV of CH D6.

Cross-Hole Location: D11- CH

$$(Vs)cor = \frac{\Sigma\, di}{\Sigma \dfrac{di}{Vsi}} = 381.00 \text{ m/s}$$

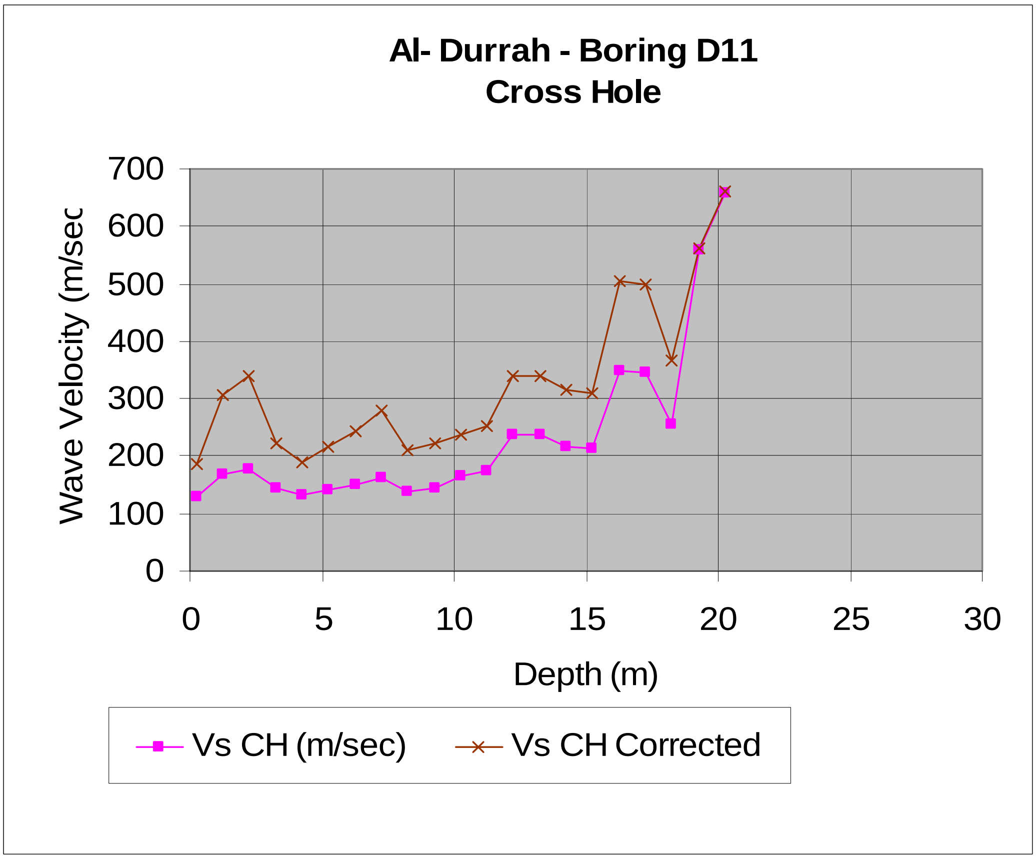


Figure 7.4: Profile of SWV of CH D11.

Cross-Hole Location: D12- CH

$$(Vs)cor = \frac{\Sigma\, di}{\Sigma \frac{di}{Vsi}} = 272.68 \text{ m/s}$$

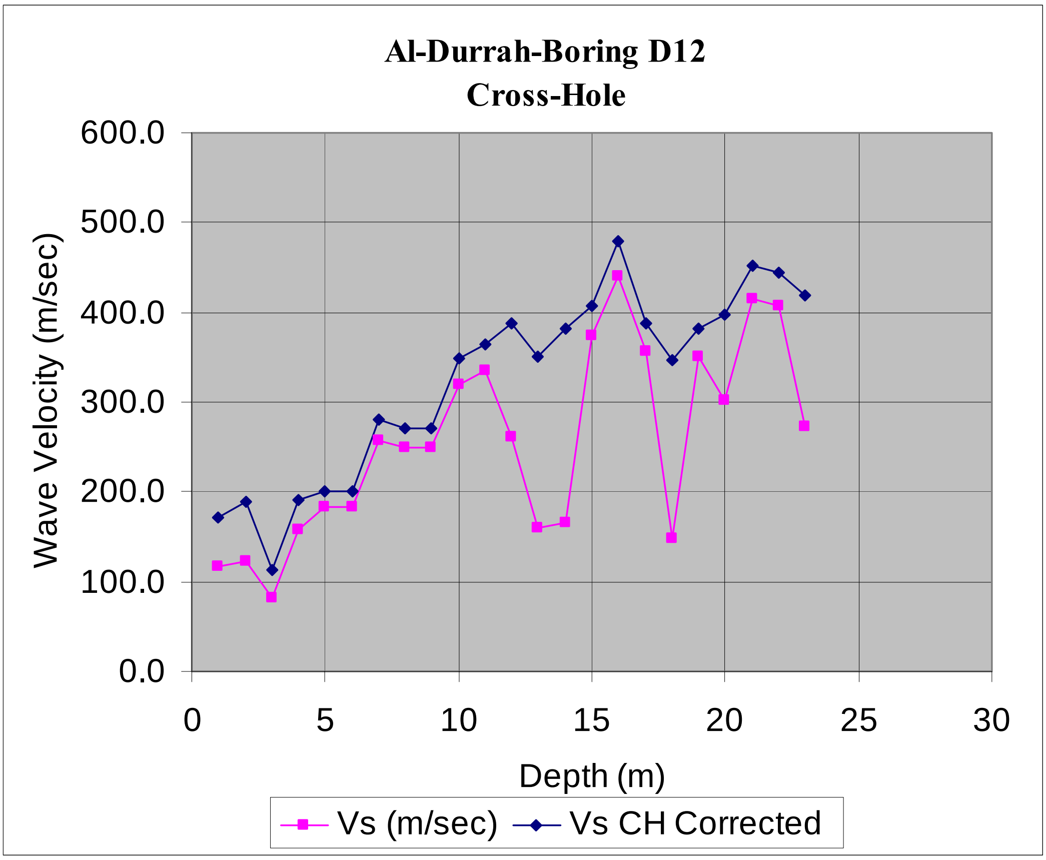


Figure 7.5: Profile of SWV of CH D12.

7.2.3 Controlled Source Spectral Analysis of Surface Waves (CXW) Tests

7.2.3a General

CXW tests were conducted by ENSOL [16] at 14 locations in Al-Durrah. Most of the tests were located as close as possible to the points where other tests (SPT and CH) were conducted. Two or three measurements were performed at each point using source to receiver (STR) and receiver to receiver (RTR) spacing (STR/RTR) of (15/15m), (15/5m), and (15/2m). The (CXW) results were calibrated using data from other tests (SPT and CH) [16]. Additional CXW tests details are presented in Appendix (D).

7.2.3b CXW Test Results

Table 7.5 shows the result of the CXW tests. The CXW Shear wave velocity (SWV) is the average shear wave velocity of each profile calculated from the individual CXW shear wave velocity of the soil layers within the top 100 ft (30m) of the soil. The average SWV is calculated in accordance with NEHRP Provisions equation (7.2). Figures (7.6) to (7.19) show the CXW SWV profiles.

Test Location		CXW Tests NEHRP Average Shear Wave Velocities (SWV) (m/s)
SPT	**CXW**	
D1	A10	420.
D2	A6	439
D3	A14	410
D4	A11	422
D5	A3a	465
D5a	A3b	523
D6*	A5	333
D7	A13	466
D8*	A12	424
D9	A4	476
D11	A1	371
D12	A7	353
N/A	A8	392
N/A	A9	387

* D6 and D8 numbers in the figures were switched

Table7.5: CXW average NEHRP SWV Summary

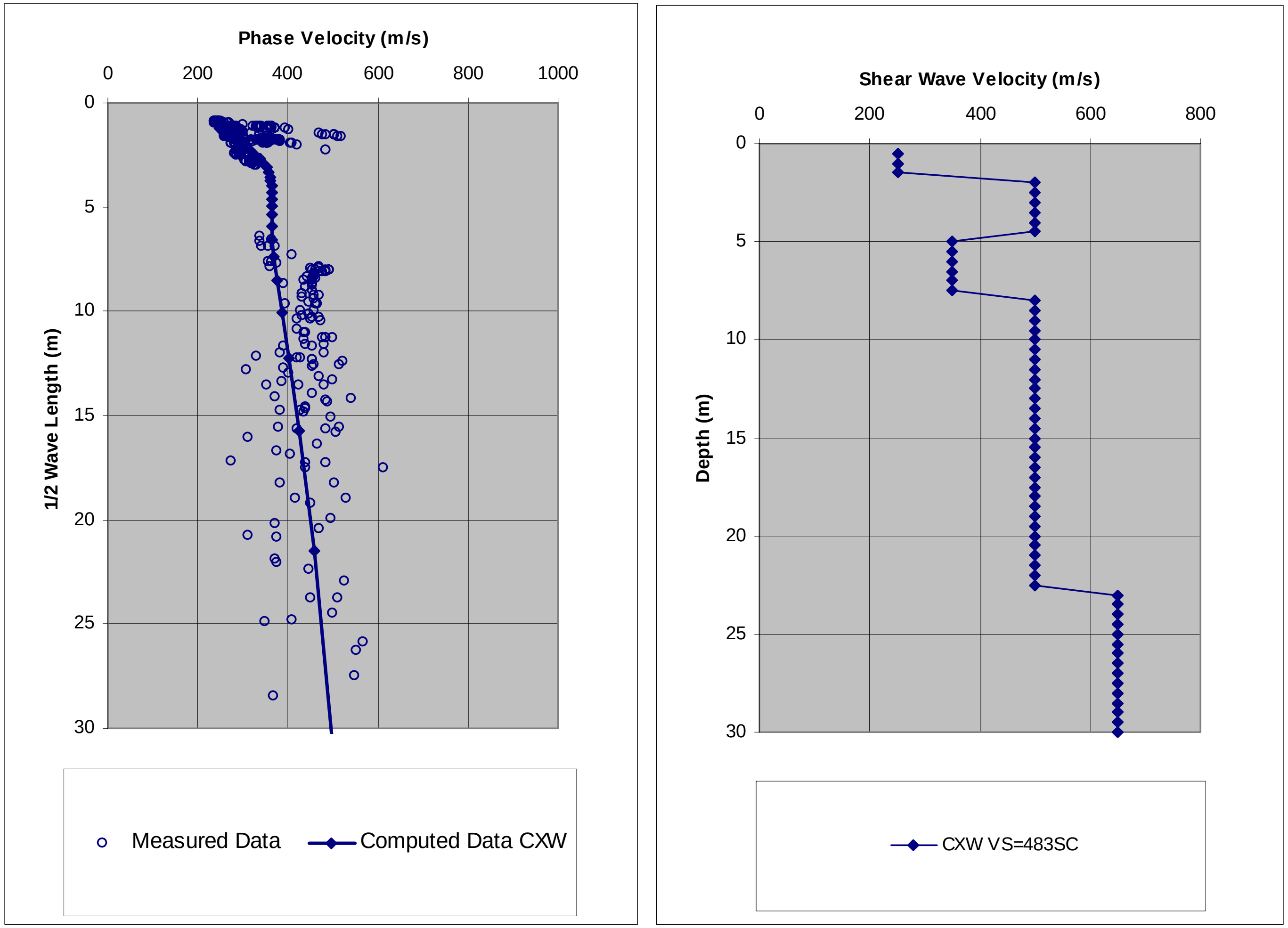


Figure 7.6: D1 (A10) CXW SWV Profile

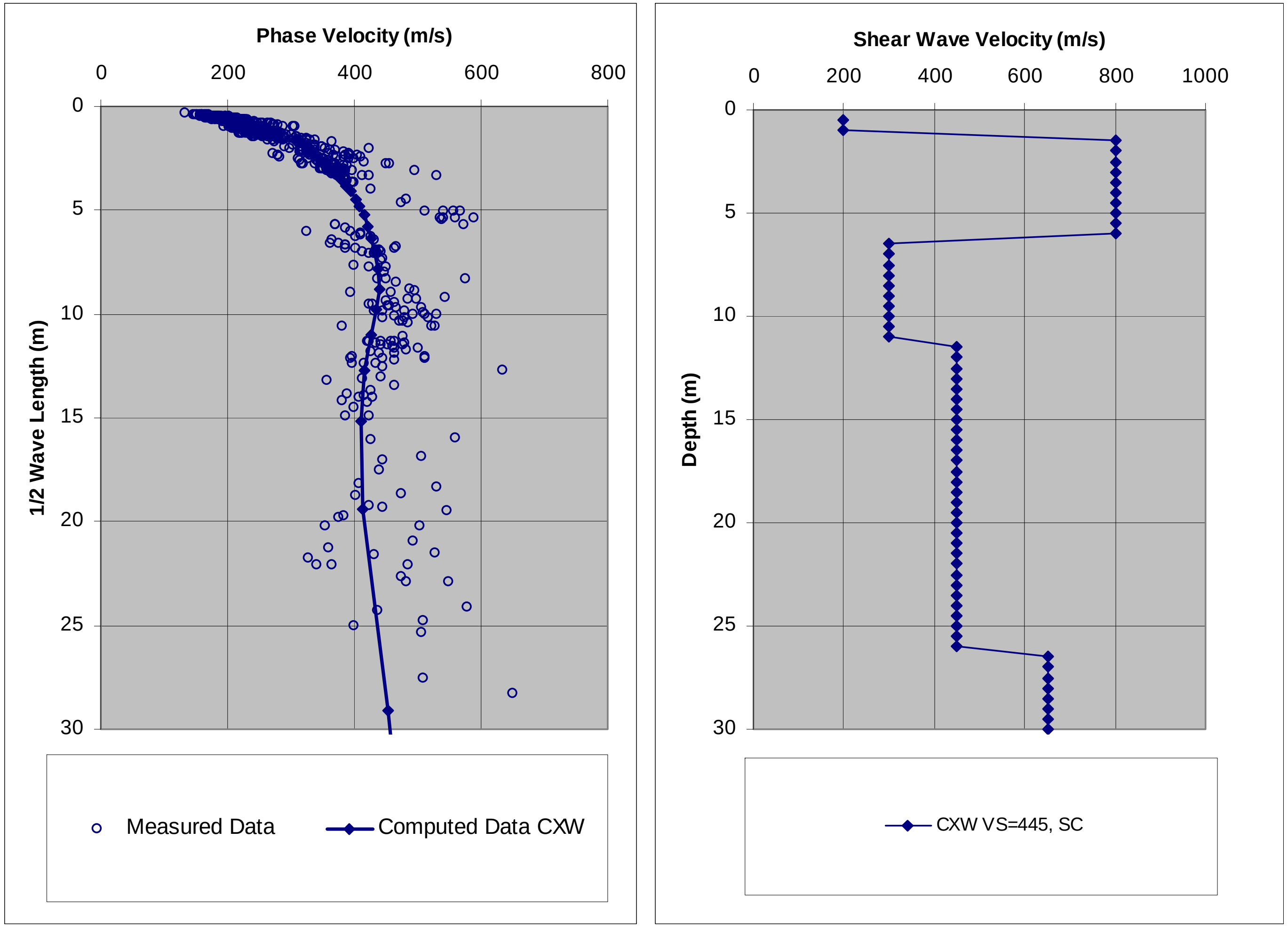


Figure 7.7: D2 (A6) CXW SWV profile

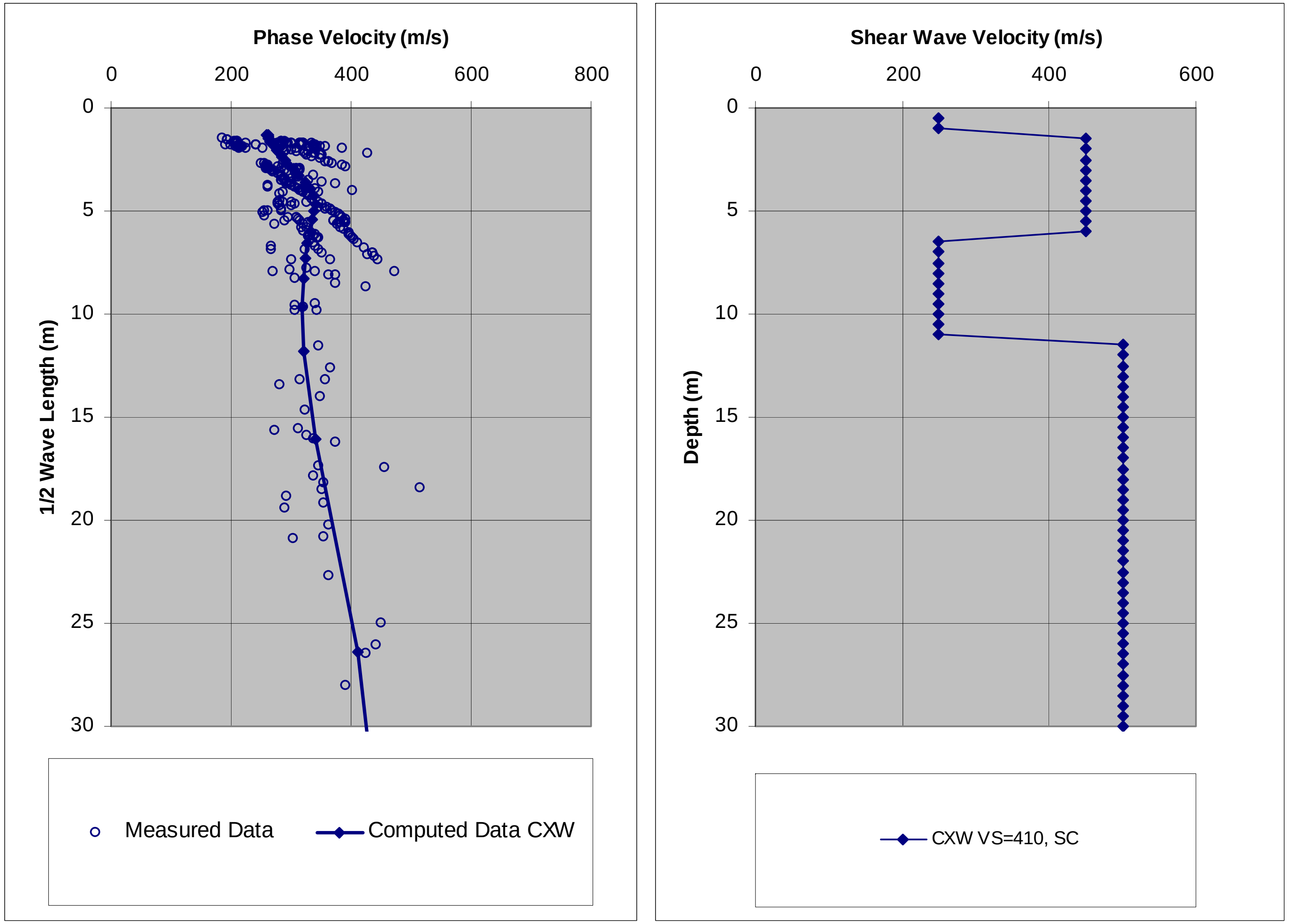


Figure 7.8: D3 (A14) CXW SWV profile.

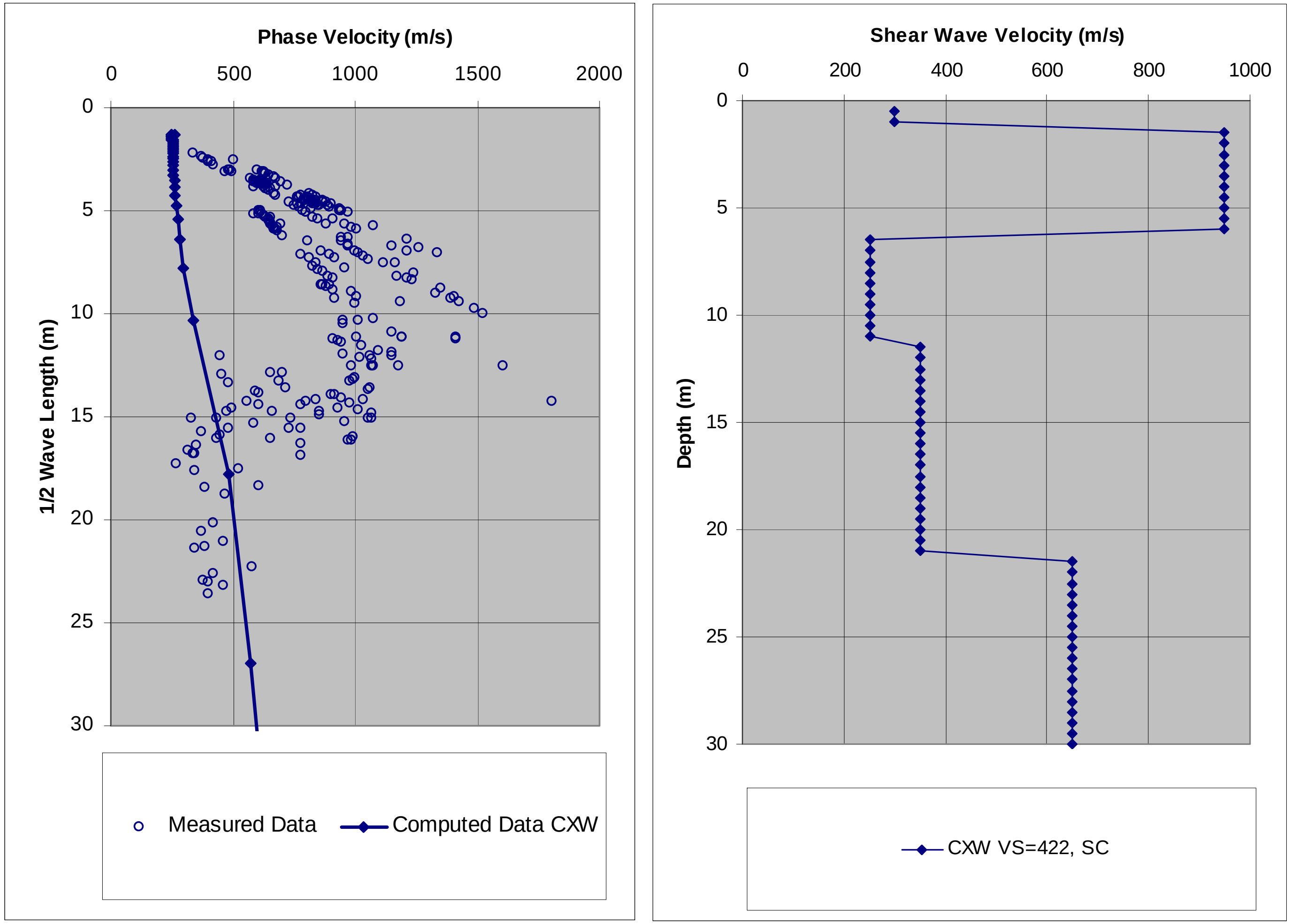
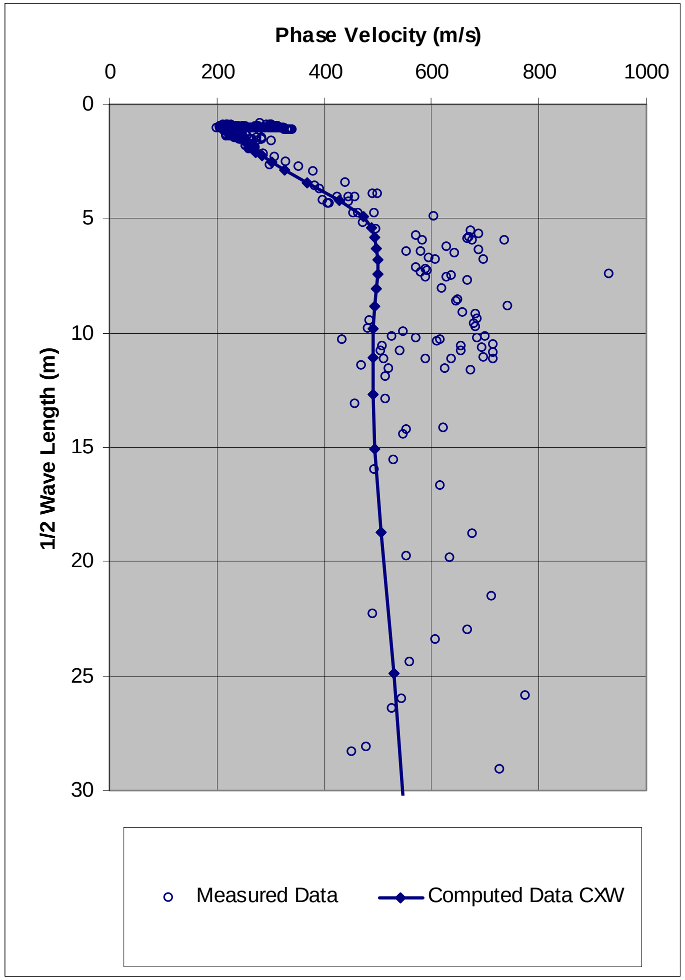


Figure 7.9: D4 (A11) CXW SWV profile.



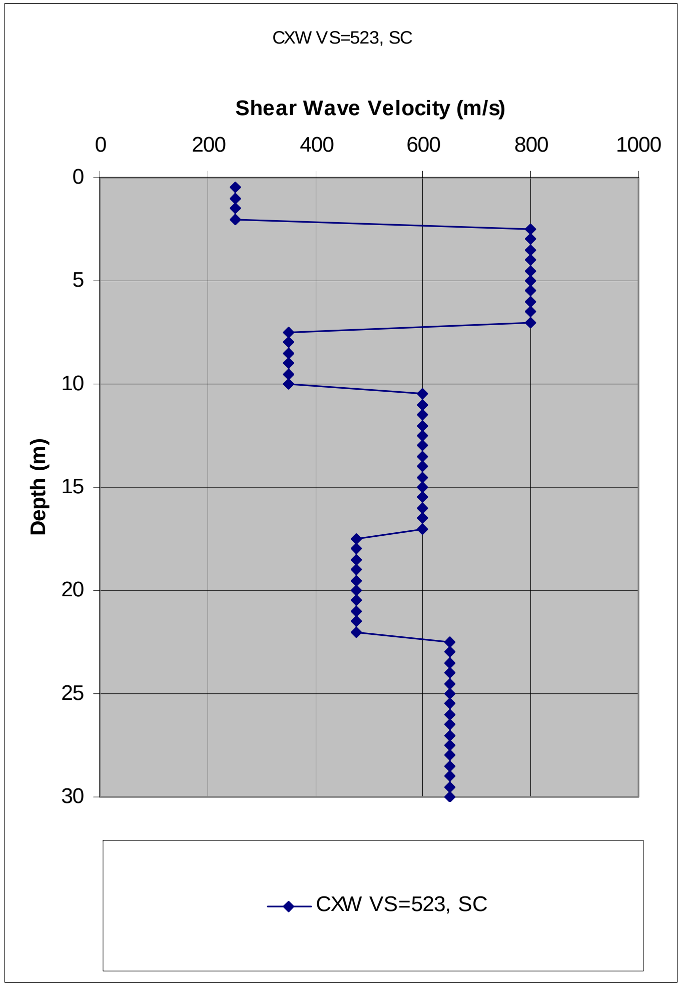


Figure 7.10: D5 (A3a) CXW SWV profile.

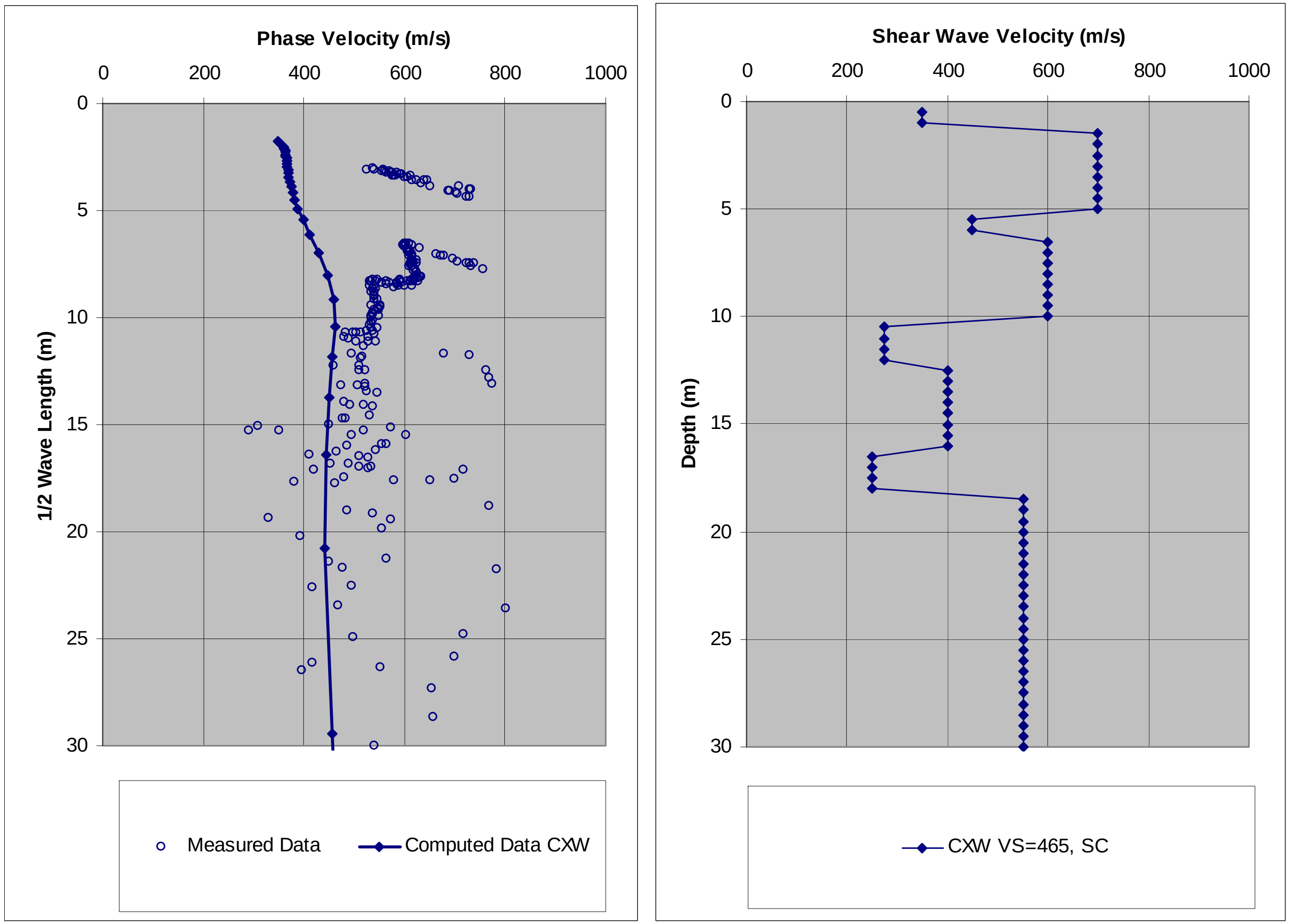


Figure 7.11: D5a (A3b) CXW SWV profile.

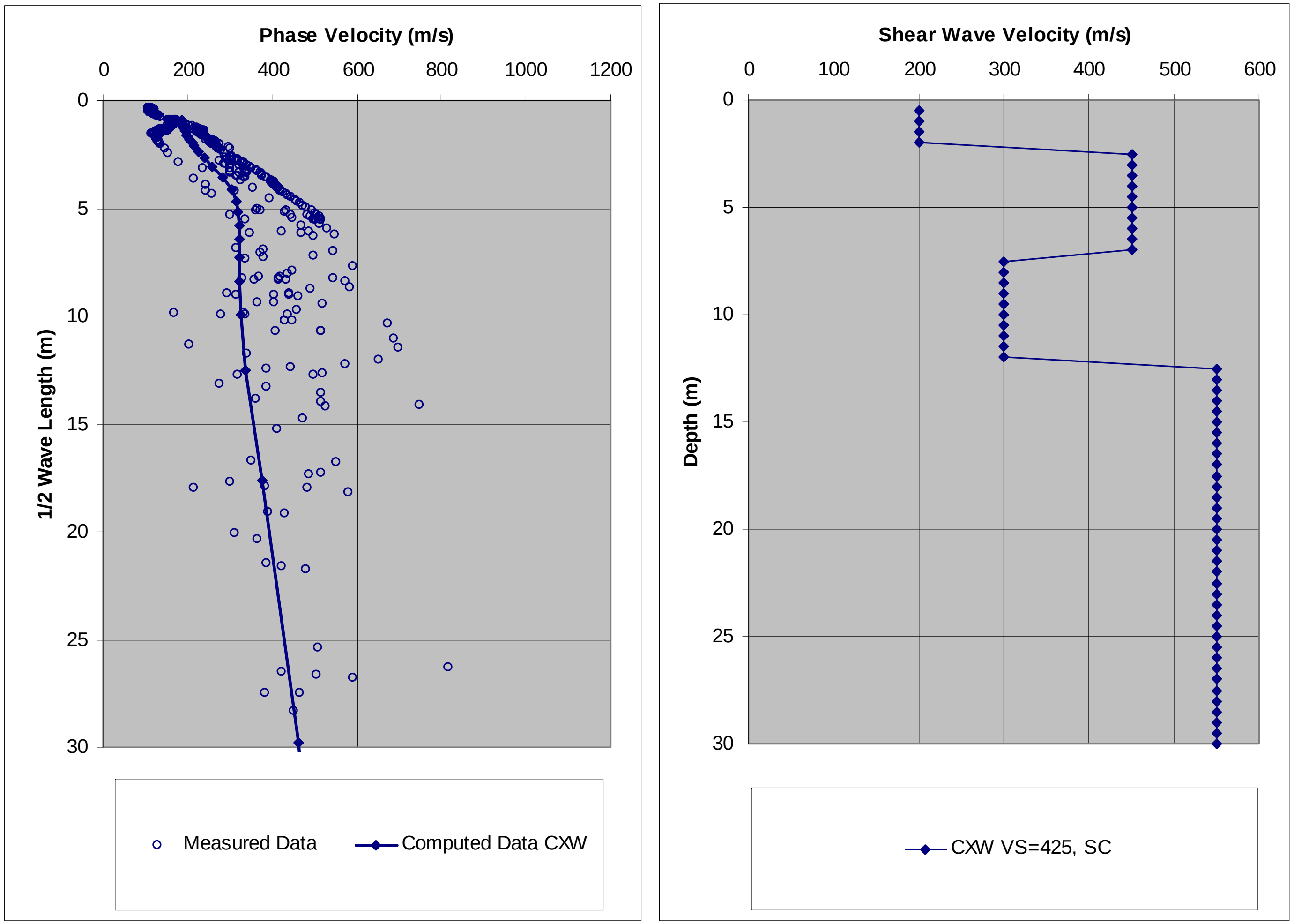


Figure 7.12: D6 (A12) CXW SWV profile.

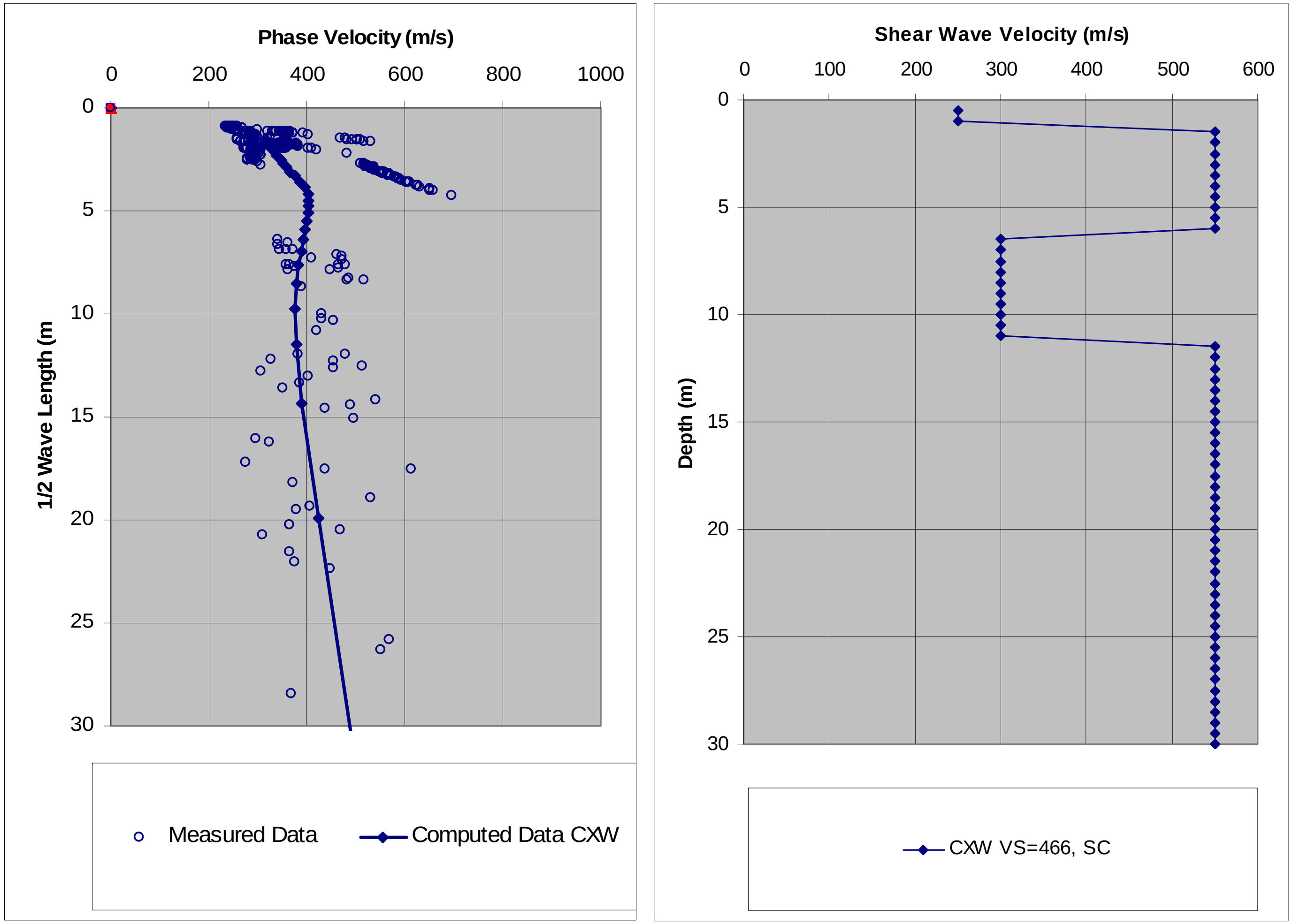


Figure 7.13: D7 (A13) CXW SWV profile.

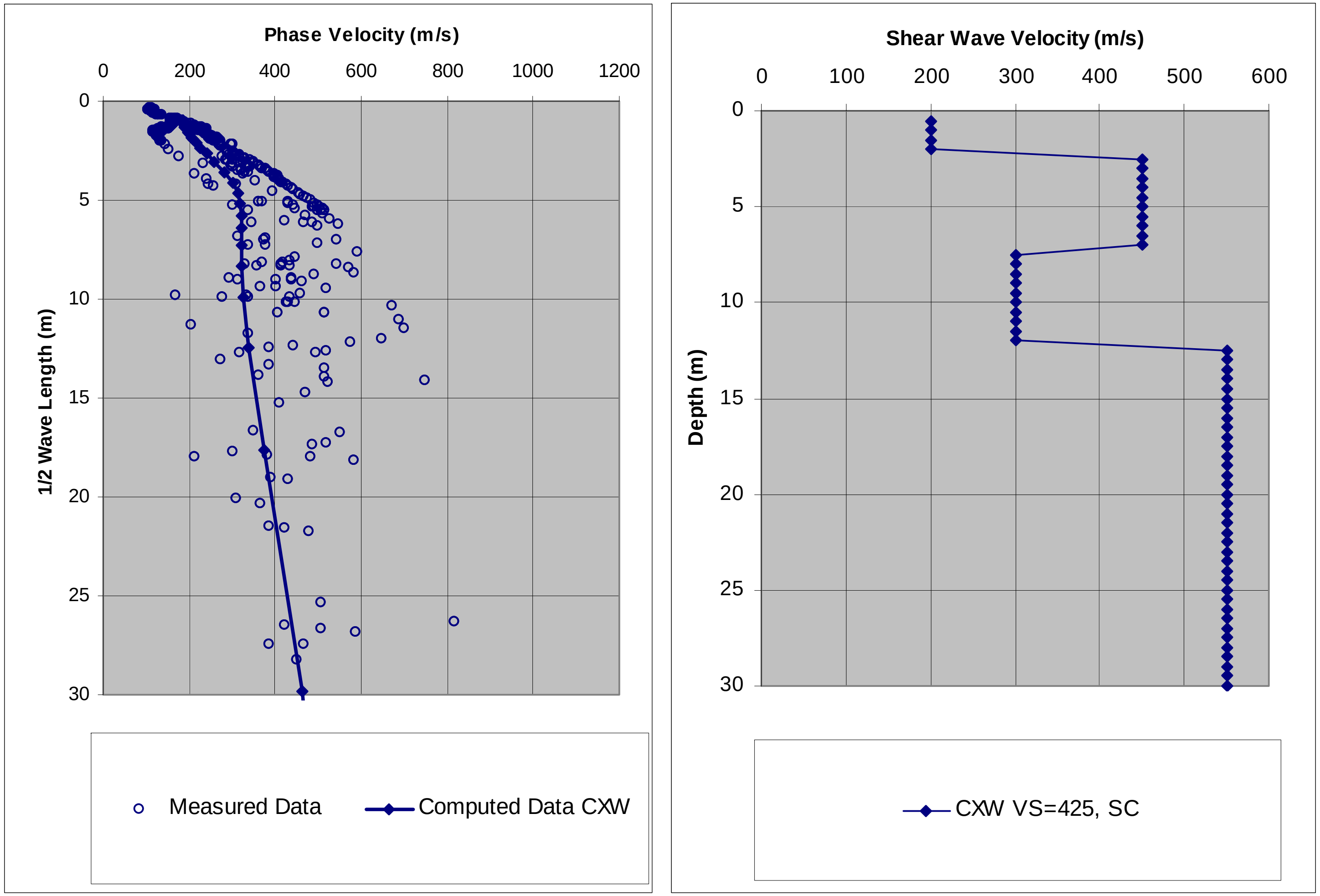


Figure 7.14: D8 (A5) CXW SWV profile

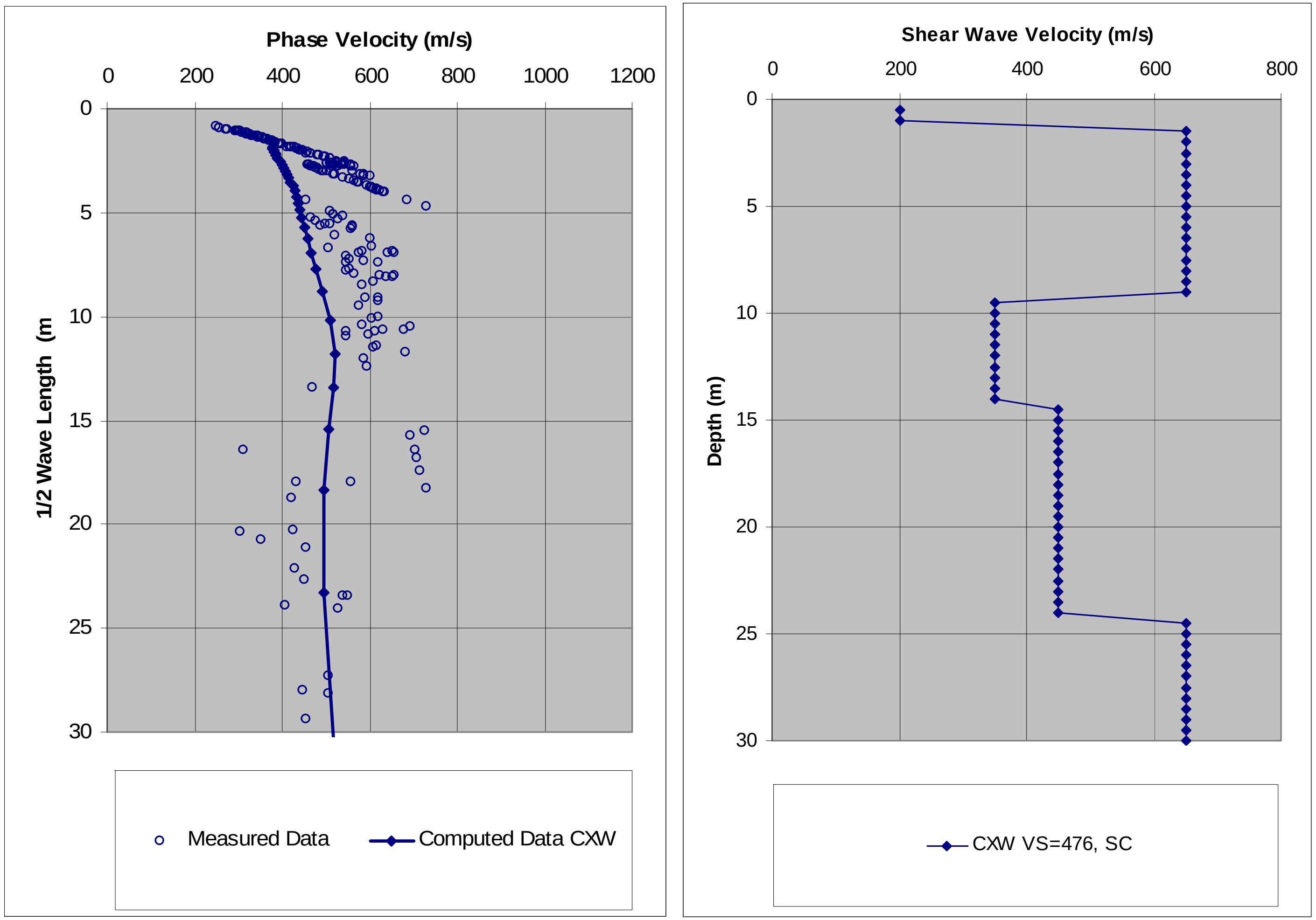
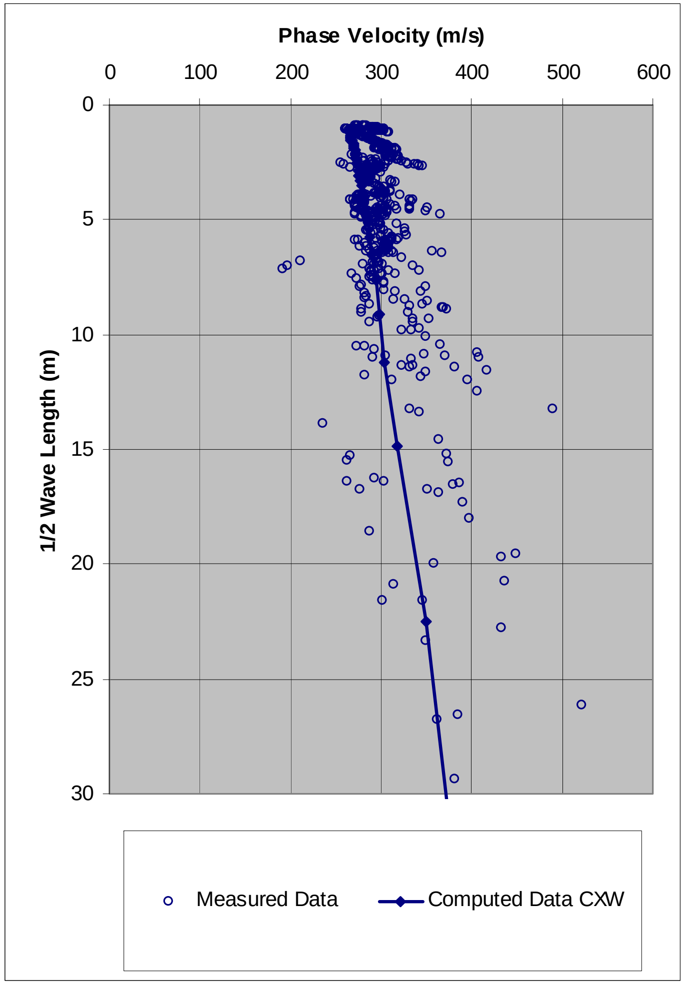


Figure 7.15: D9 (A4) CXW SWV profile.



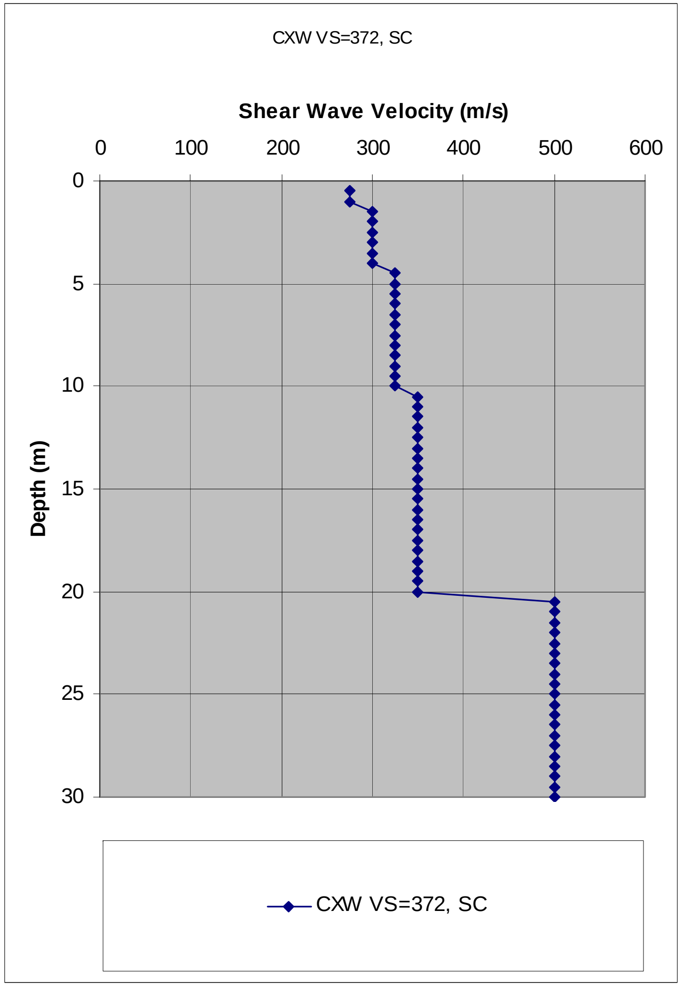
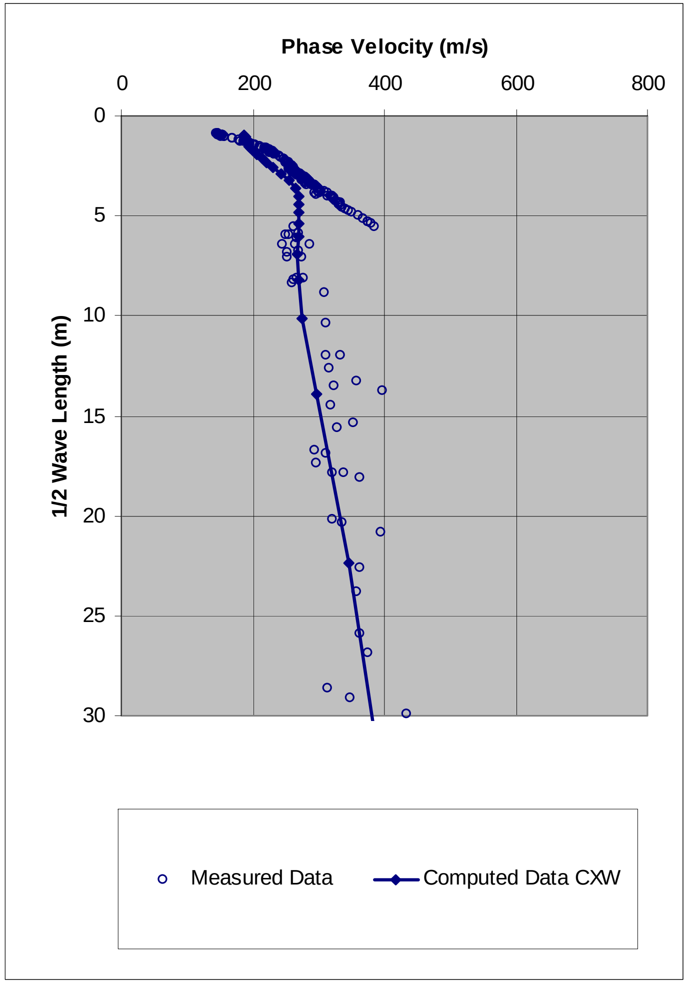


Figure 7.16: D11 (A1) CXW SWV profile



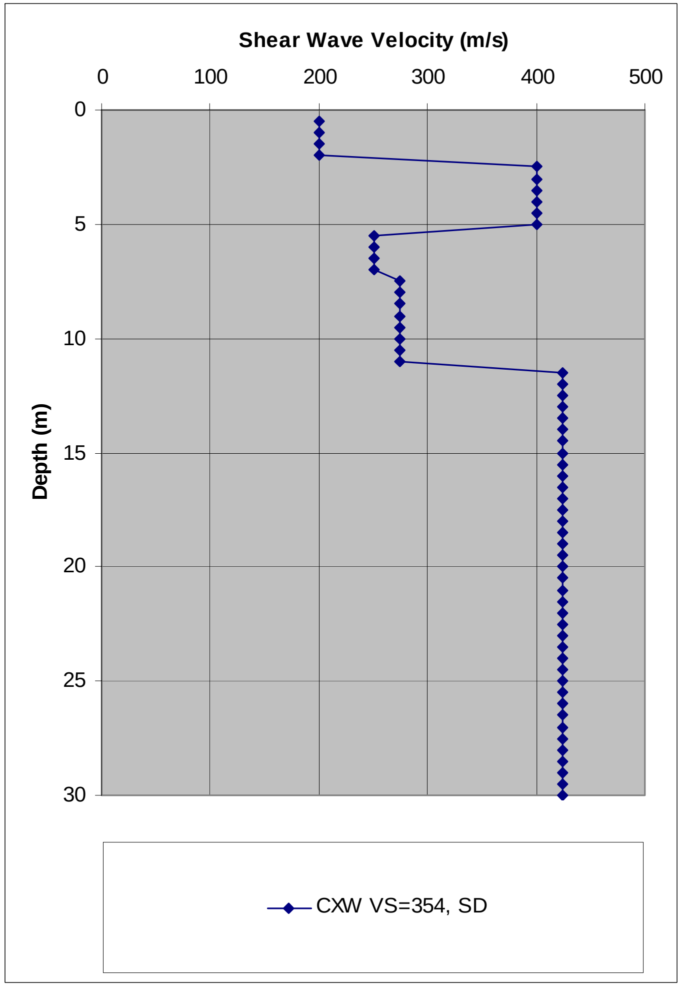
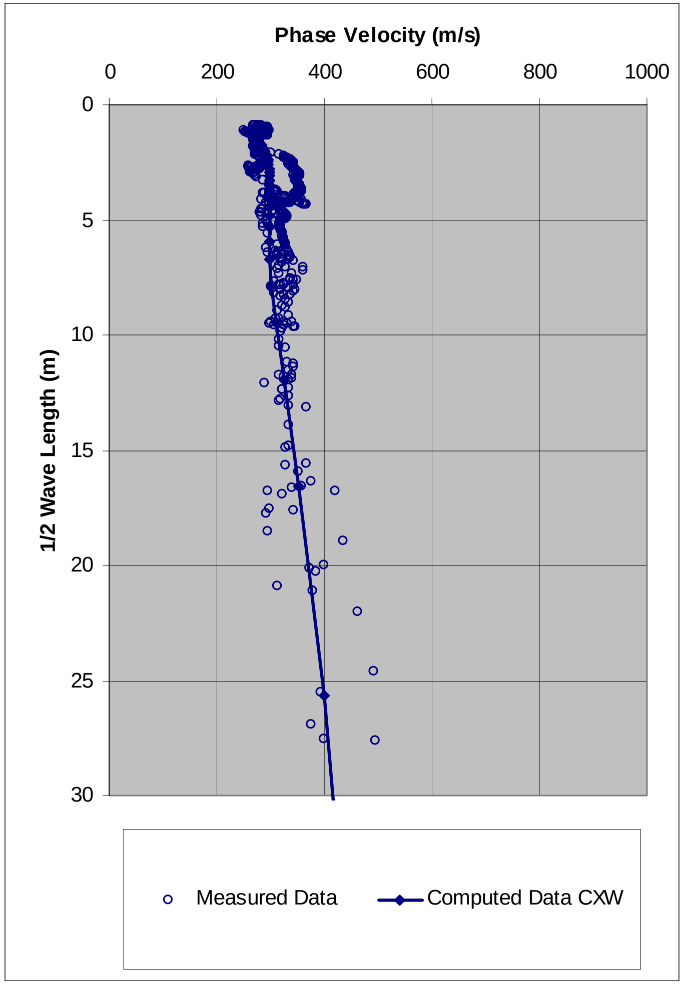


Figure 7.17: D12 (A7) CXW SWV profile.



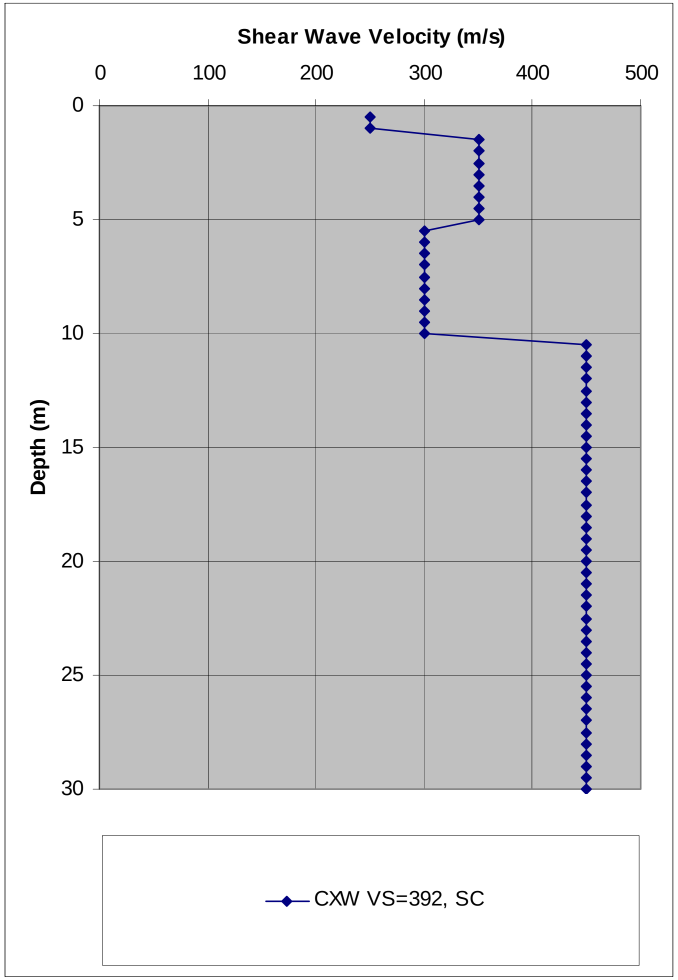


Figure 7.18: (A8) CXW SWV Profile

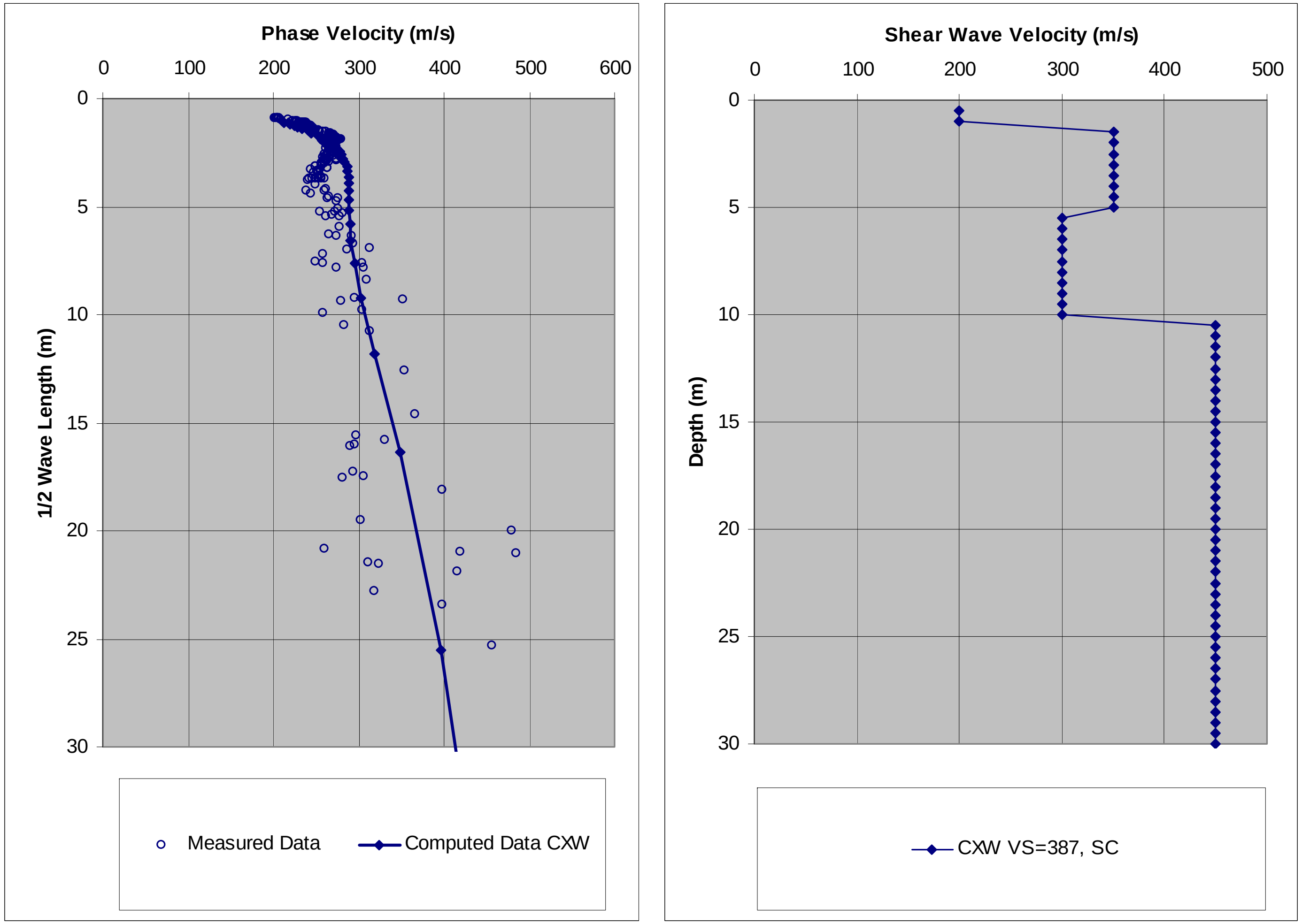


Figure 7.19: (A9) CXW SWV profile.

7.2.4 Vertical Electric Sounding (VES) Test

7.2.4a General

Six tests were carried out at and near the site at Wadi Mabrak, Figure (7.20). A special instrument (The SYSCAL R2 Deep Resistivity / IP System) [25], was used to read the resistivity measurement. The maximum current electrode half spacing (AB/2) in the Shlumberger method was 1000 m, which corresponded to depths of 330 to 360 m. The number of measurements was 6 per arrangement, at an AB/2 value of: 3, 4, 6, 8, 10, 15, 20, 30, 40, 60, 80, 100, 150, 200, 300, 400, 600, 800, and 1000 m. Plots of apparent resistivity versus electrodes spacing is shown in Appendix (E).

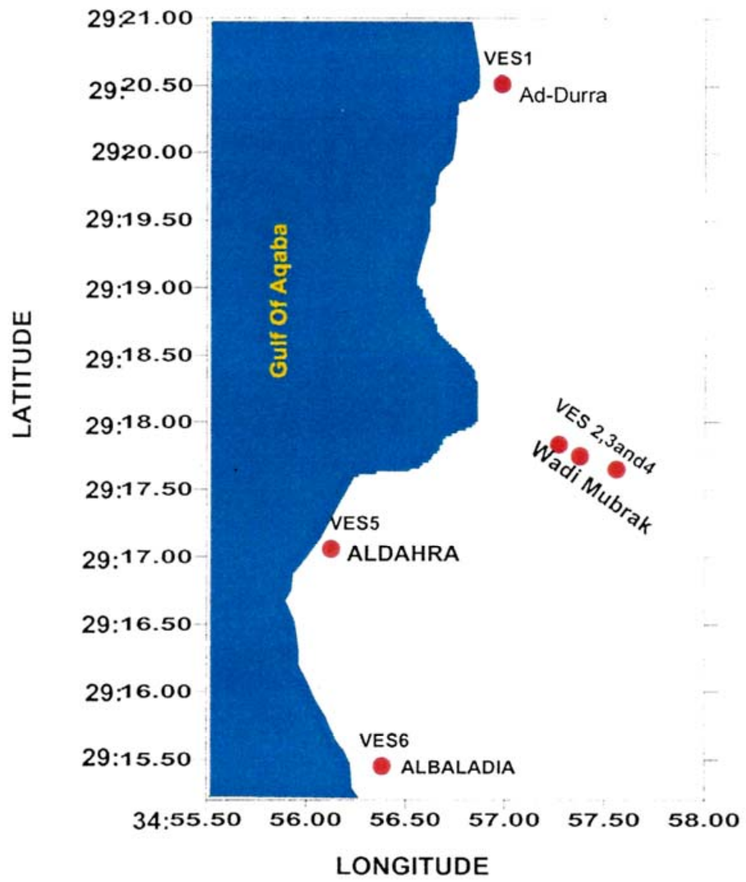


Figure 7.20: Vertical Electric Sounding tests locations in the Al-Durrah area.

7.2.4b Al-Durrah VES Test Results

The results of the VES are shown in figures (7.20) and (7.21). The results are discussed and analyzed in Chapters 9 and 10. Figure (7.21) shows a cross-section at Al-Durrah near the shore line to a depth of 120 m. Figure (7.22) shows the combined VES interpretations for VES1 at Al-Durrah, and VES3 at Wadi Mubrak (Figure 7.20). The resulting north-south cross-section indicates that the bedrock depth at Al-Durrah is approximately 350 to 375 m. For the purpose of the dynamic site response analysis of Chapter 8, the actual bedrock depth was assumed to be 350 m.

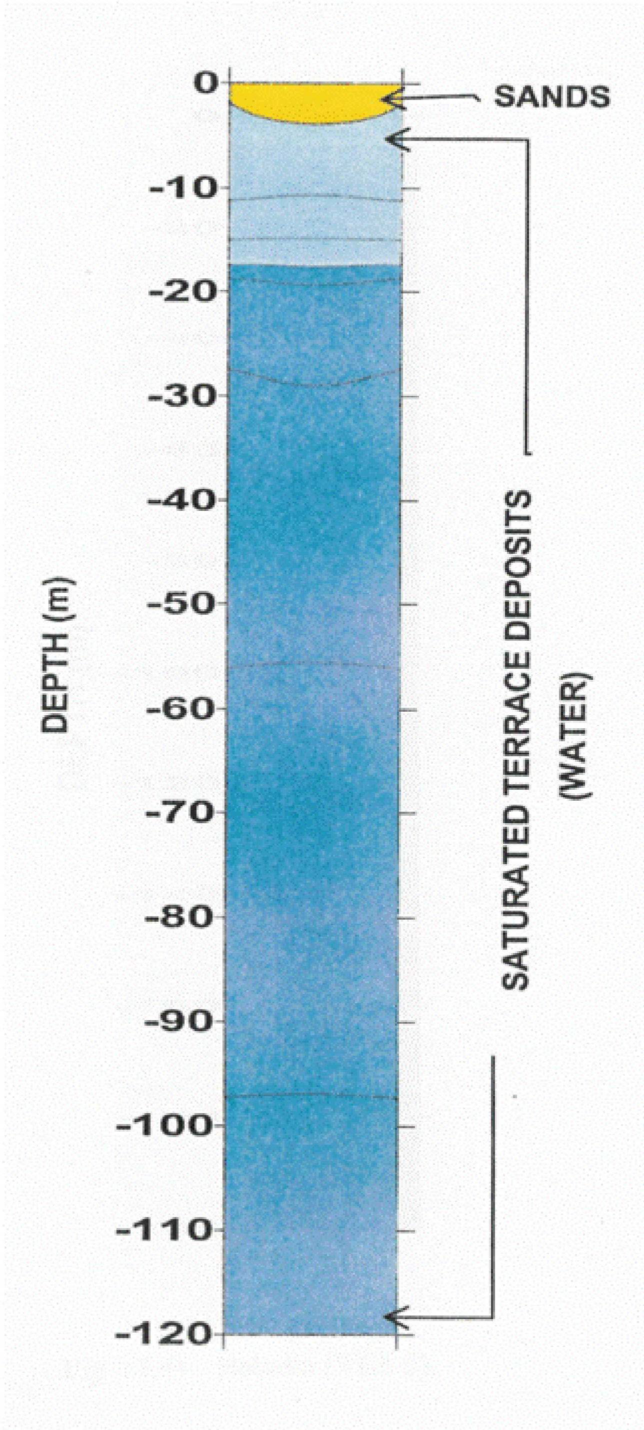


Figure 7.21: (VES1) cross-section at Al-Durrah

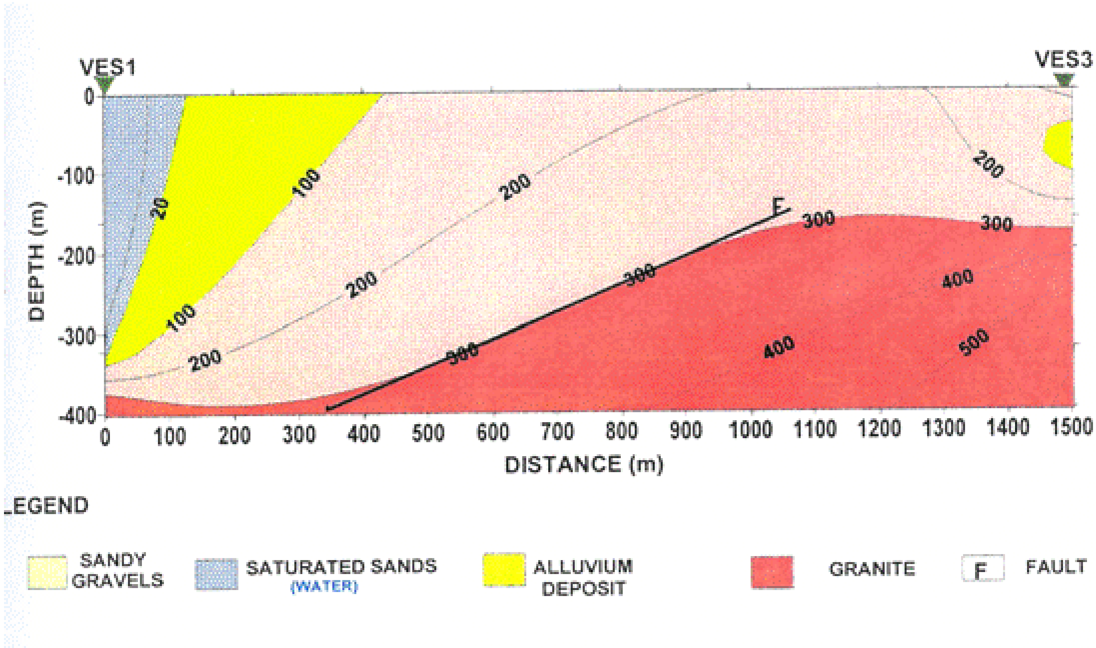


Figure 7.22: (VES) Cross-section (Al-Durrah-Wadi Mubrak)

7.2.5 Microtremors Measurements

7.2.5a General

Several microtremors recordings took place at four points in Al-Durrah, and at all of the seismic stations of the East-west seismic array. Each seismic recording session lasted for at least one day, and utilized all of the seismic station system equipment as described earlier in section (6.3.6) of Chapter 6. The systems recoded all three components of microtremors (two horizontal and one vertical), and the digital records were manipulated using the procedure outlined in section (3.3) of Chapter 3. Two types of ratios spectra were produced for each of the Al-Durrah's stations. The first type is the mean ratio spectra, and the second is the direct (Fourier amplitude (H/V)) ratio spectra. In addition, the horizontal component of the microtremors record is shown to demonstrate the effects of the presence of an earthquake event or a microevent on the spectra. If there are very small or no earthquake events in the microtremors record being analyzed, then the ratio spectra segments tend to have common and focused peaks. If a significant earthquake is present within the microtremors record being analyzed, then the ratio spectra tend to lose coherence and common peaks become hard to identify. Specific examples of these cases are presented in the following section.

7.2.5b Microtremors Results

The resulting microtremors ratio spectra plot are presented in this section. Microtremors records DRA1 and DRA2 were recorded at level A of the site, while records DRB1 and DRB3 were recorded at level B, of the site as shown in Figure (7.23).

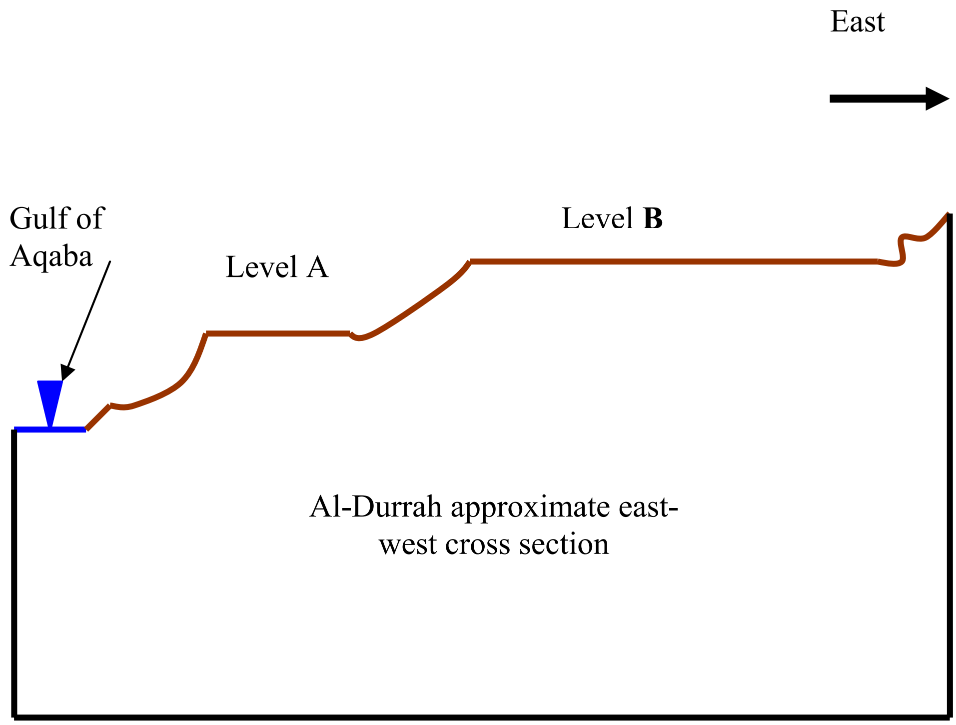
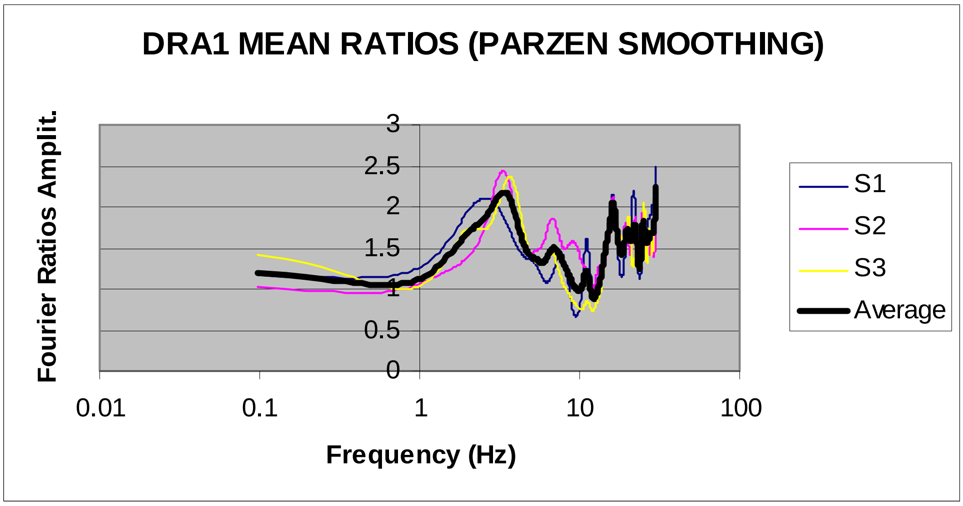


Figure 7.23: Al-Durrah approximate east-west cross-section.

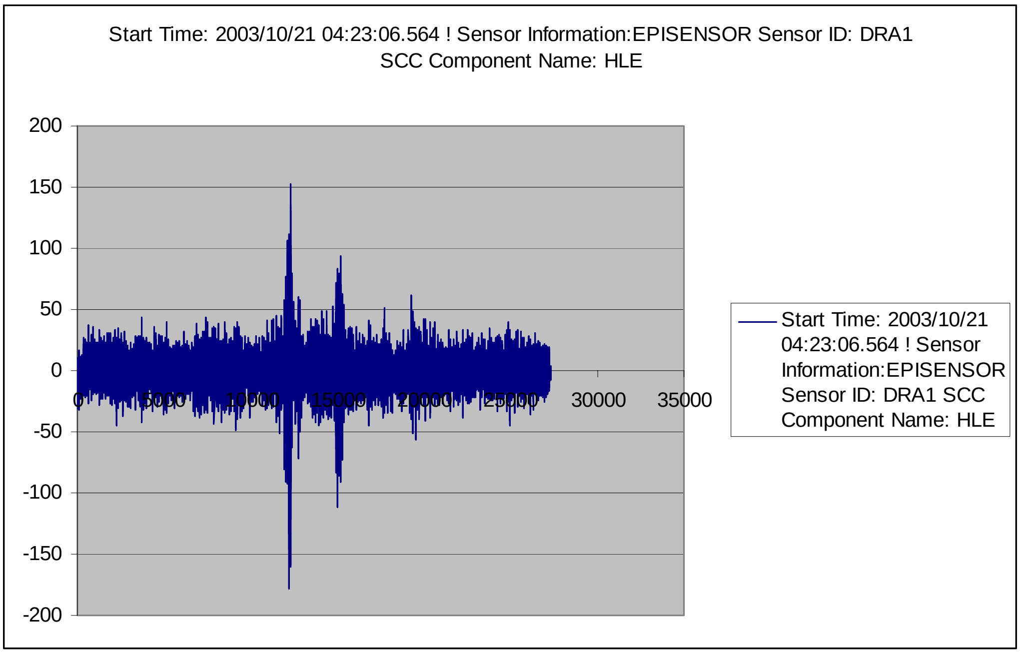
Figures (7.24a) and (7.26a) are microtremors mean ratio spectra plots from microtremors records DRA1 and DRB1, respectively. Figures (7.24b) and (7.26b) show the east-west component of the same microtremors records. The east-west components of DRA1 and DRB1 show that no significant earthquake events are present. The resulting mean ratio spectra share common peaks and tend to become focused at certain frequencies. The mean ratio spectra and the east-west component of the microtremors record for DRA2 are shown in Figures (7.25a) and (7.25b), respectively. The east-west component of the microtremors record indicates the presence of a relatively significant earthquake within the record. The presence of the earthquake causes the mean ratio spectra plots to lose coherence thus making the identification of common peaks more difficult. Figure (7.27a) shows ratio spectra that were generated from two microtremors records from the same seismic station. Both records had a significant earthquake as shown in Figures (7.27b) and (7.27c). The microtremors segments that were used to generate the ratio spectra were taken from the records parts that were as far as possible from the earthquake. The resulting ratio spectra plots have peaks at common frequencies, however the peaks themselves are not focused, Figure (7.27a). Figures (7.28) to (7.31) show the simple direct ratio spectra for the same stations. Additional mean ratio spectra calculations information are presented in Appendix (F)

A) Al-Durrah mean ratios spectra

- <u>Al-Durrah DRA1 Seismic Station:</u>



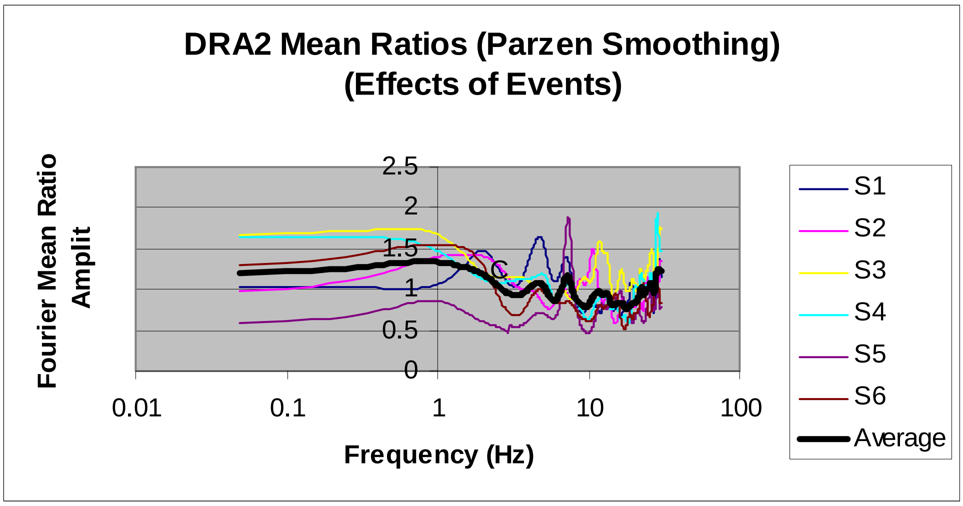
(a)



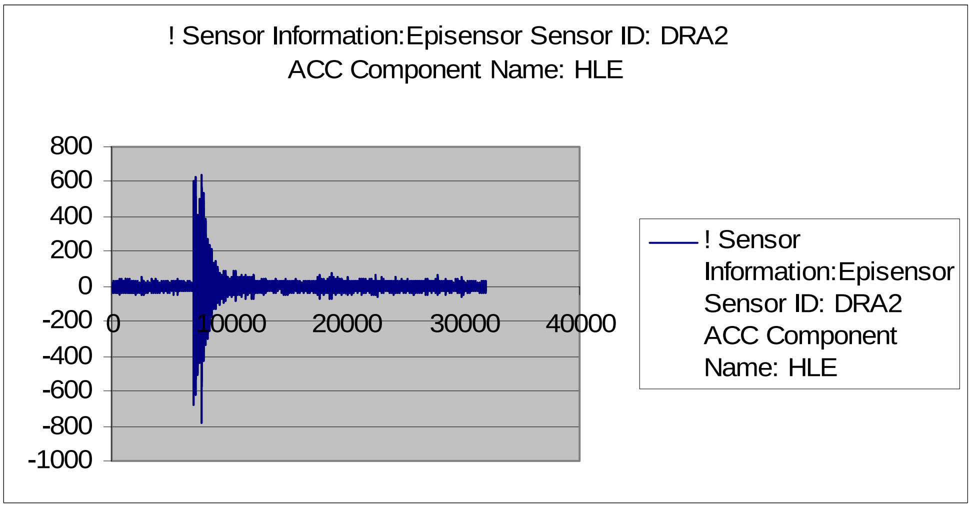
(b)

Figure 7.24: (a) Mean ratios spectra of DRA1, (b) The east-west component of the microtremors record showing the occurrence of a micro event.

- Al-Durrah Station DRA2 Seismic Station



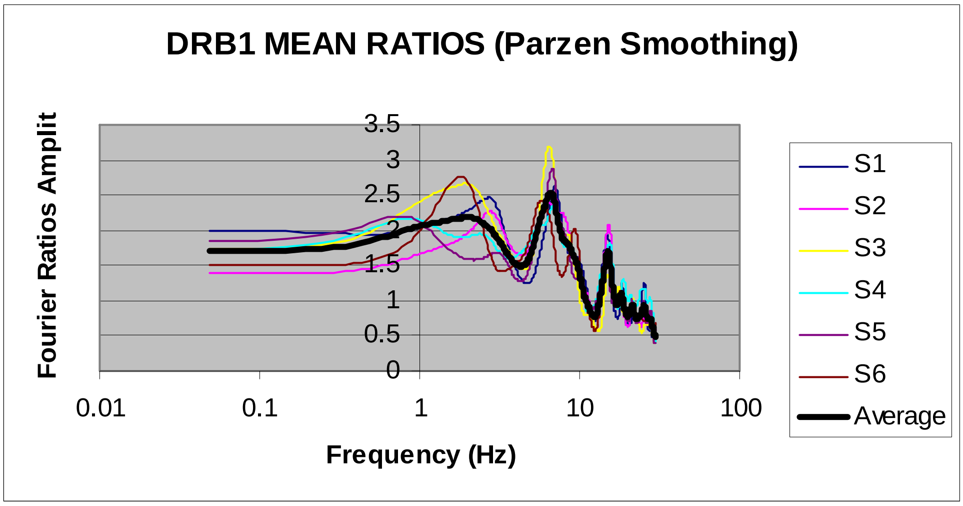
(a)



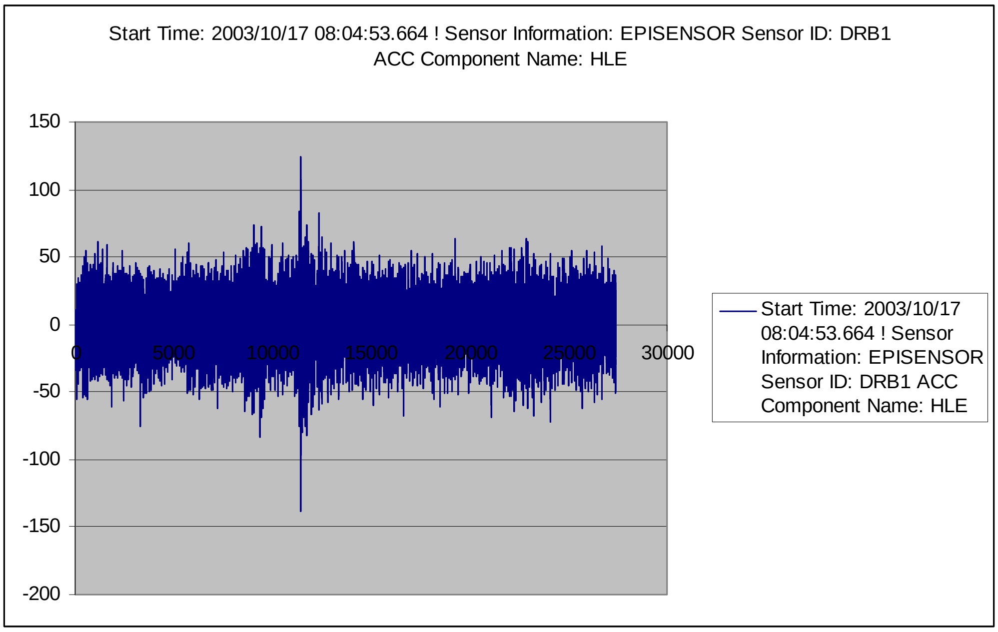
(b)

Figure 7.25: (a) Mean ratios spectra of DRA2, (b) The east-west component of the microtremors record showing the occurrence of a micro event.

- <u>Al-Durrah Station RDB1 Seismic Station:</u>



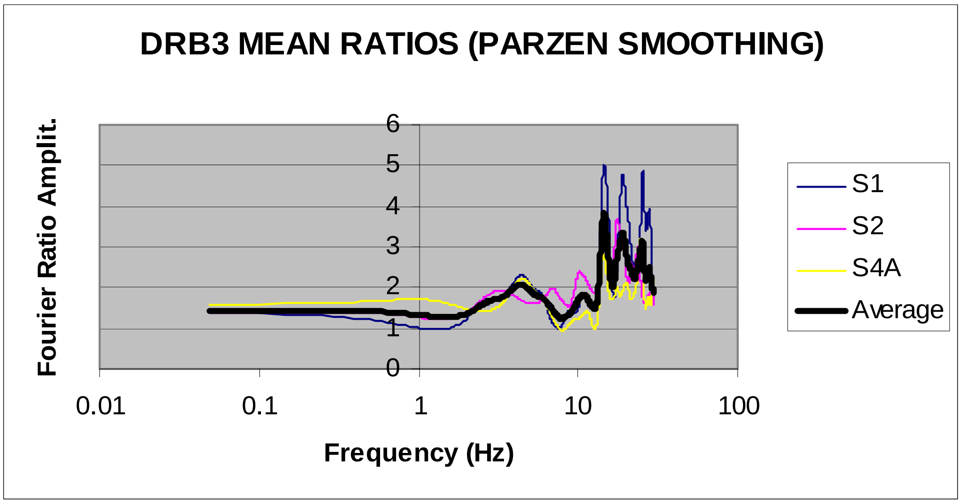
(a)



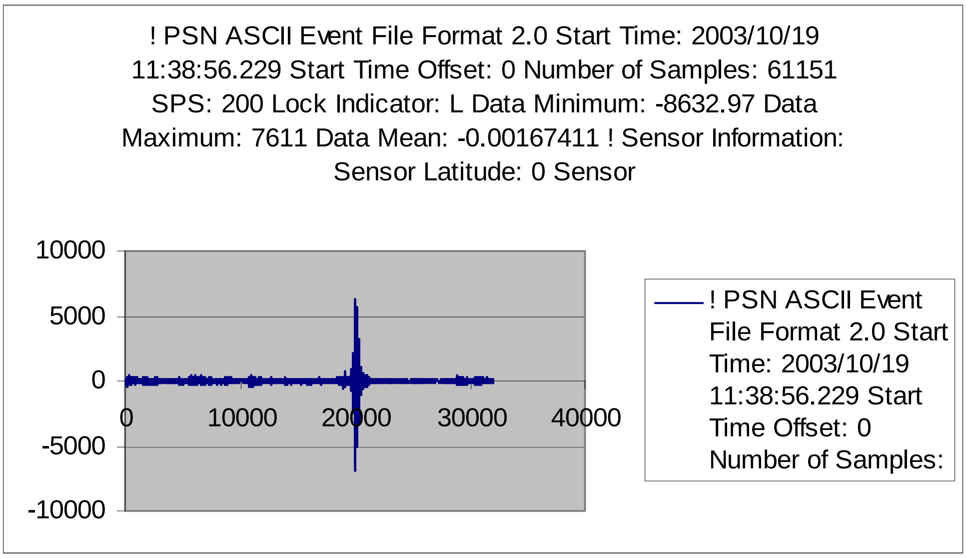
(b)

Figure 7.26: (a) Mean ratios spectra of DRB1, (b) The east-west component of the microtremors record showing the occurrence of a micro event.

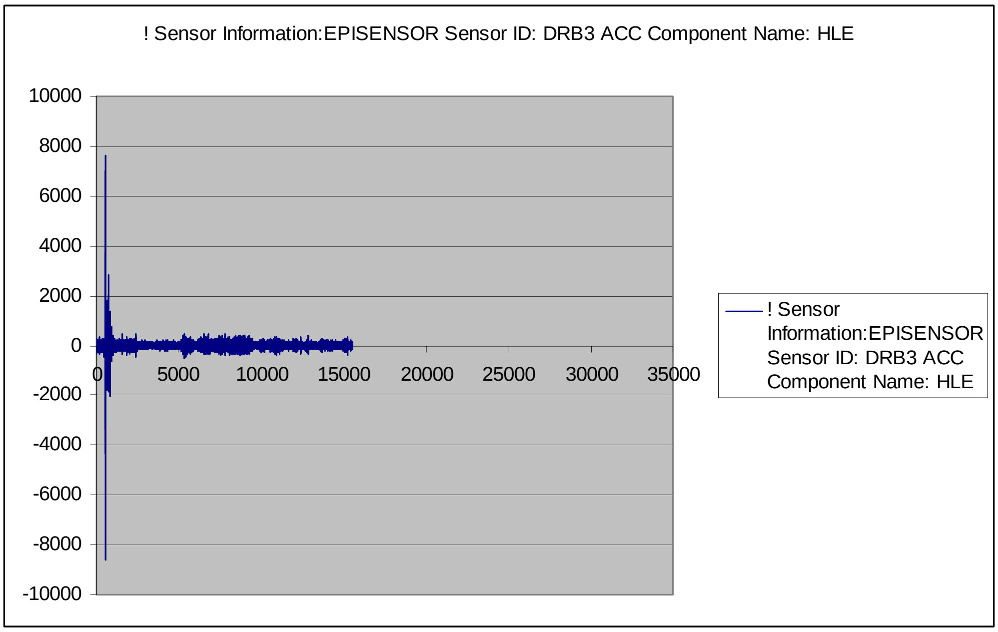
- Al-Durrah Station DRB3 Seismic Station:



(a)



(b)



(c)

Figure 7.27: (a) Mean ratios spectra of DRB3, (b) and (c) The two east-west component segments of the microtremors record showing the occurrence of a micro event.

B) Al-Durrah Direct Ratio Spectra

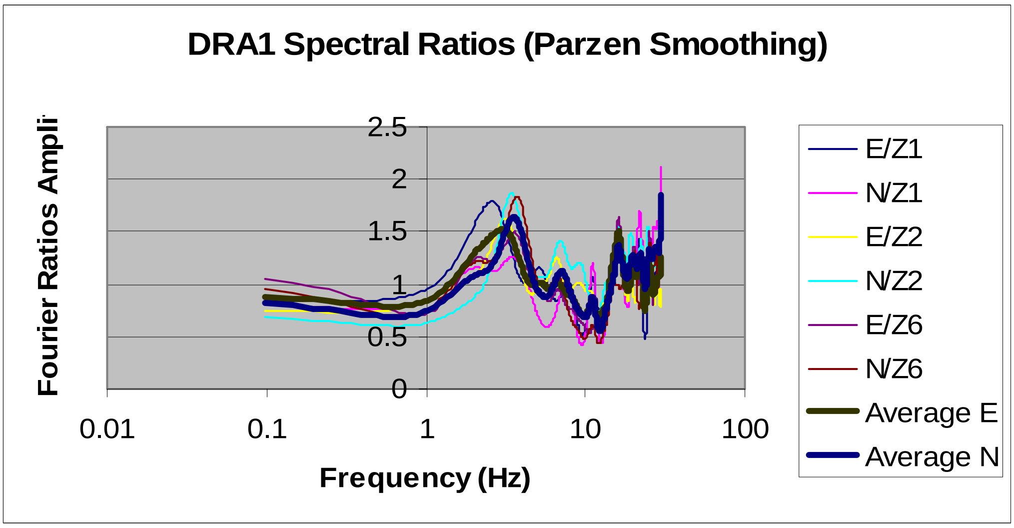


Figure 7.28: DRA1 direct ratios spectra.

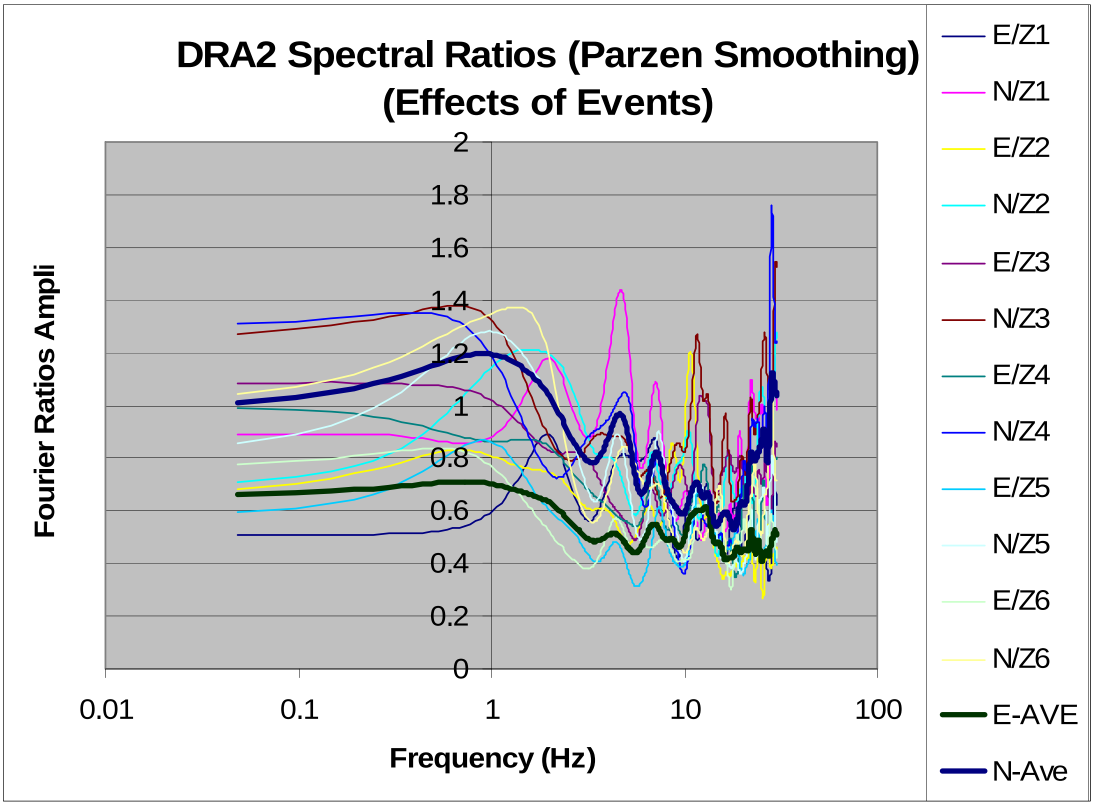


Figure 7.29: DRA2 direct ratios spectra.

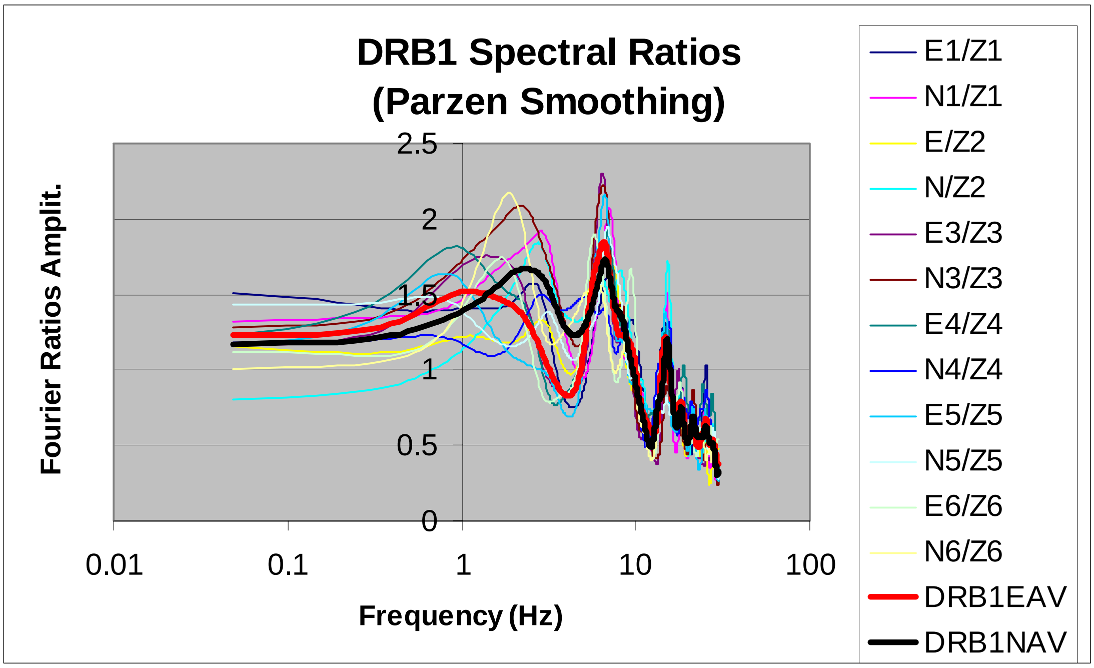


Figure 7.30: DRB1 direct ratios spectra.

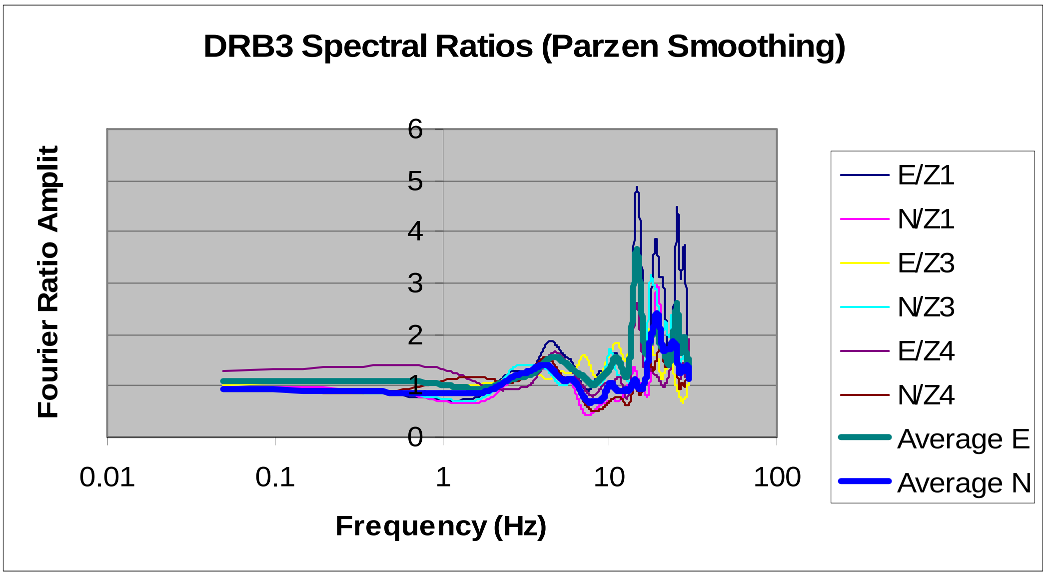


Figure 7.31: DRB3 direct ratios spectra.

7.3. East-West Seismic Array

7.3.1 Vertical Electric Sounding

7.3.1a General

It was first estimated that the bedrock depth at Station RD1 of the array, corresponded to NEHRP bedrock depth of 30 m. However, upon conducting a vertical electric sounding (VES) test, the bedrock depth turned out to be at about 95 to 100 m deep. Station RD1 was about 830 m away from the bedrock outcrop, therefore, another location that was closer to the bedrock outcrop had to be selected. Another VES test was conducted 400 m west from the bedrock outcrop, and the bedrock depth turned out to be about 35 m deep. This point was designated as Station RD0 and was used as the first point of the seismic array after the reference point of the bedrock outcrop (DREFF). The East-west seismic array stations were selected to be on an approximately collinear east-west line using the advanced global positioning system (The 5700 CORS GPS) system) [26]. Actual events, as well as microtremors were recorded simultaneously by all stations. The results of the vertical electric sounding test and the three components of the event record at each station are presented in this section. One of the events records were used in the dynamic site response analysis in Chapter 8, and the results are discussed further in Chapter 11. Sample plots of apparent resistivity versus electrodes spacing are shown in Appendix (E).

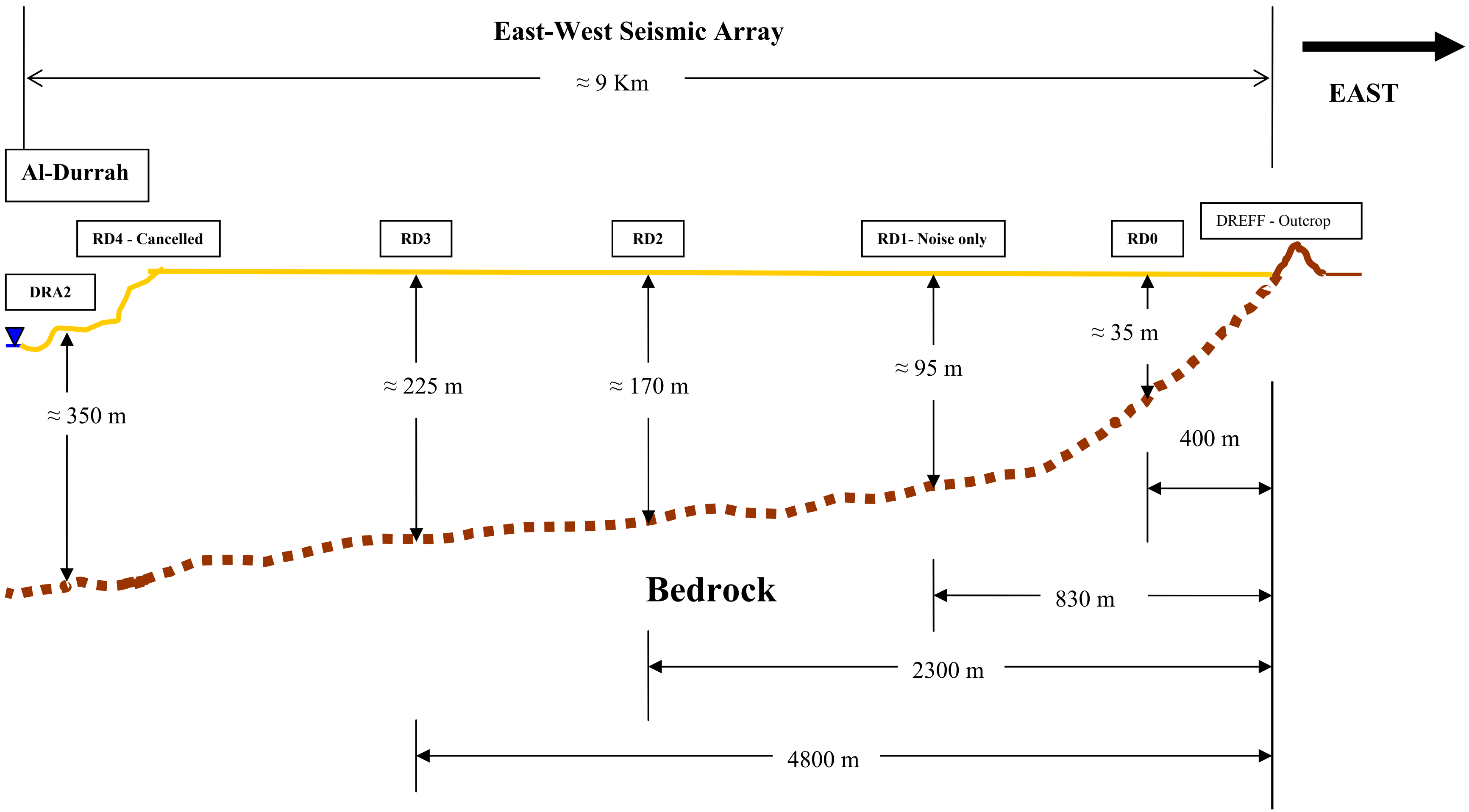


Figure 7.32: A Schematic illustration of the East-west Seismic Array (Scales are exaggerated).

7.3.1b (VES) Tests Results

Table (7.6) below shows the bedrock depth at each seismic station:

Location	Bedrock Depth (m)
RD0	35-40
RD1	90-95
RD2	≈ 170
RD3	≈ 225
DRA2	≈350

Table 7.6: Depth of the bed rock at the East-west seismic array stations.

7.3.2 Records of Actual Events

7.3.2a Actual Seismic Event Information

The actual earthquake was detected by The Saudi National Seismic Network, and was recorded by all five seismic stations in the East-west array. The earthquake occurred on October 23, 2003 at 11:58:56 am. Its relevant information is:

Magnitude: M_L= 1.59 (M_L = the local or Richter magnitude)

Epicenter location coordinates:

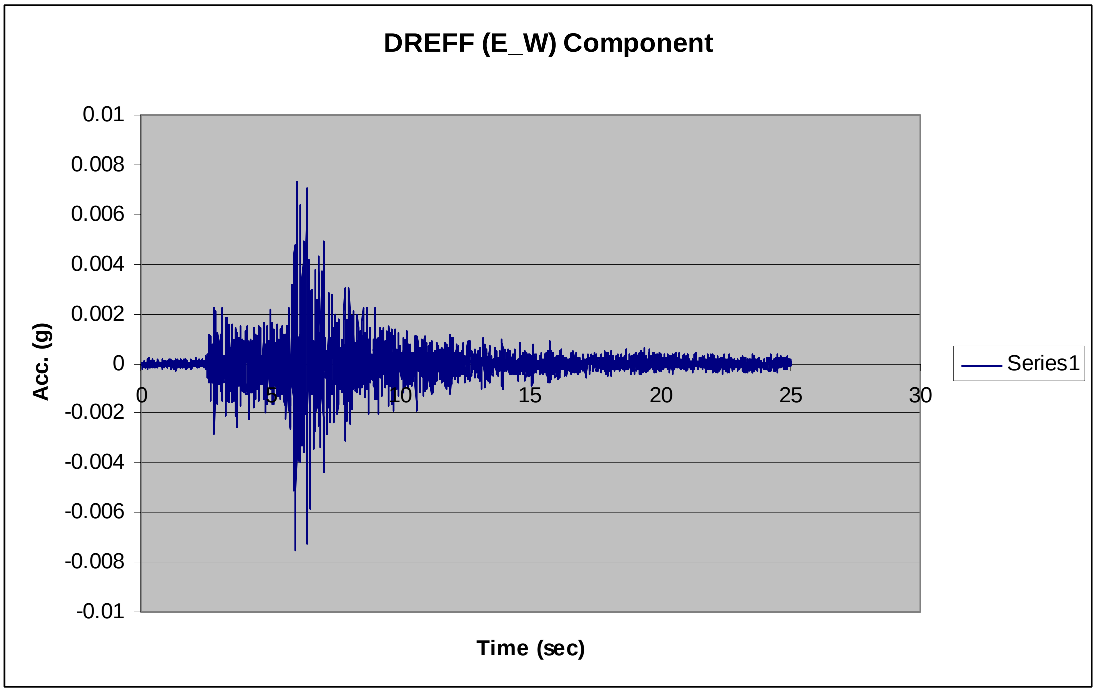
Latitude: 29^{o} $37^{'}$ North

Longitude: 34^{o} $86^{'}$ East

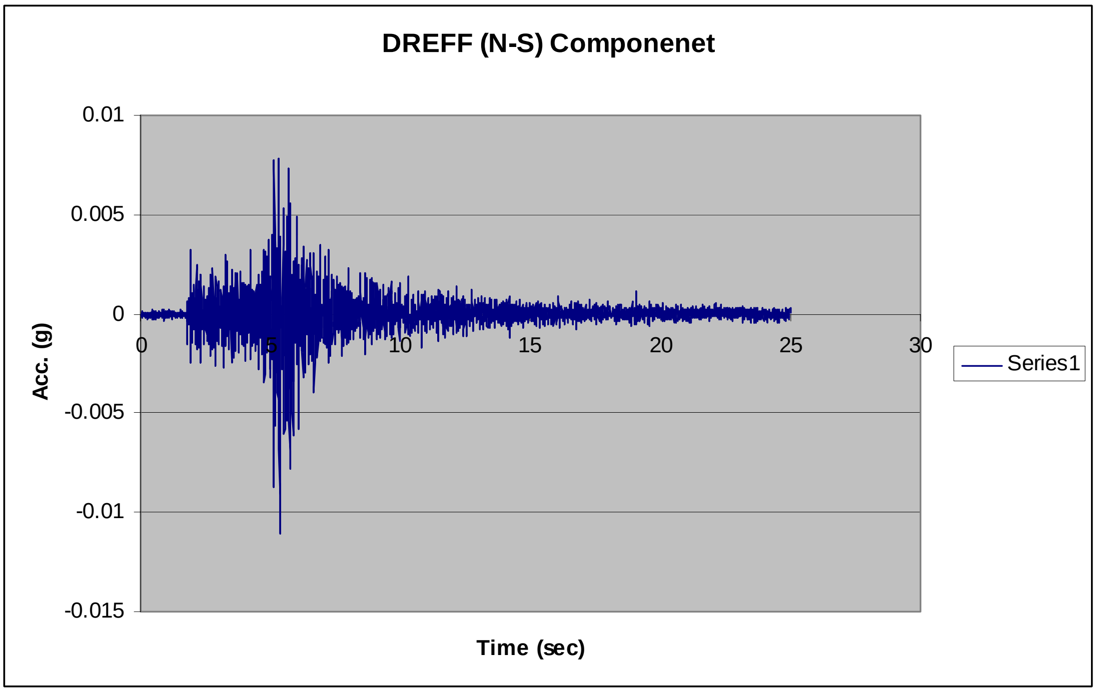
7.3.2b Actual Seismic Event Records:

The amplitudes of the actual records at the seismic stations of the array were too small for the dynamic site response analysis, and had to be scaled up for this purpose. All of the records shown here represent the scaled record. The raw field records and the methodology of obtaining the final version of the records are presented in Appendix (G).

- Station: DREFF

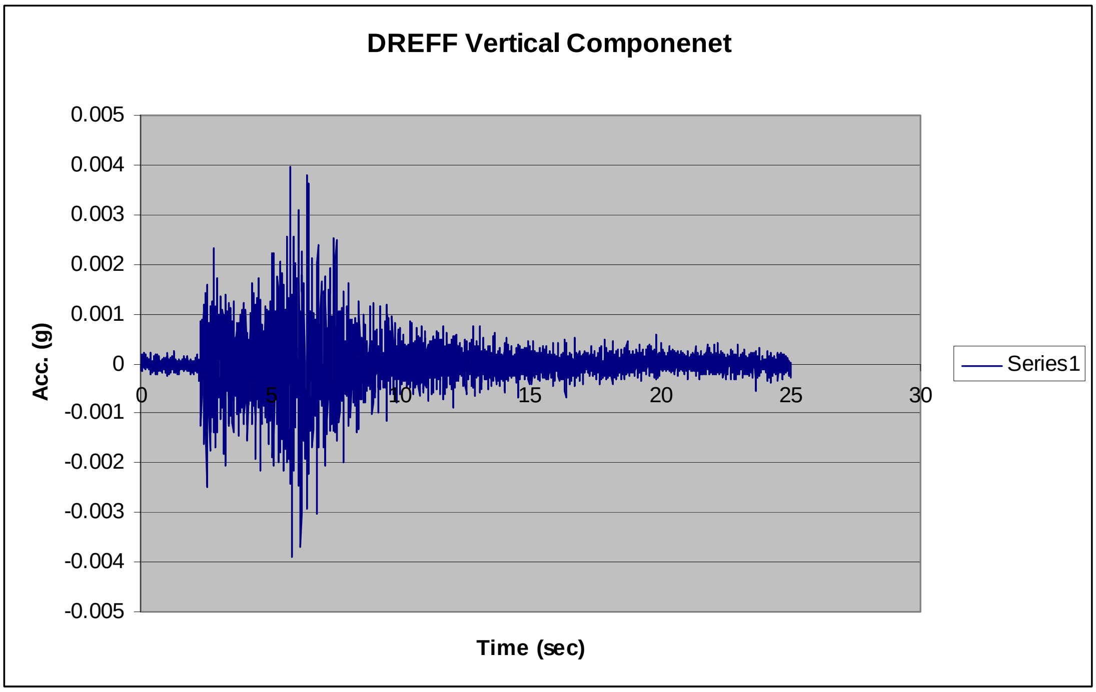


(a)



(b)

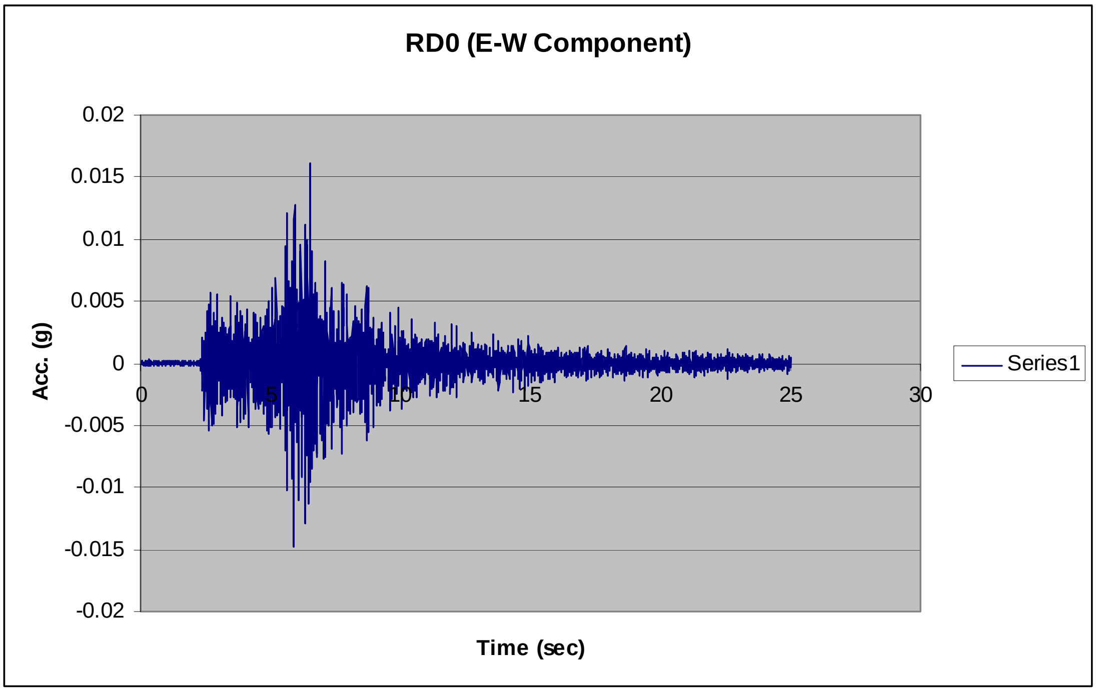
Figure 7.33: Components of Reference (DREFF) Station Record; (a) E-W, (b) N-S.



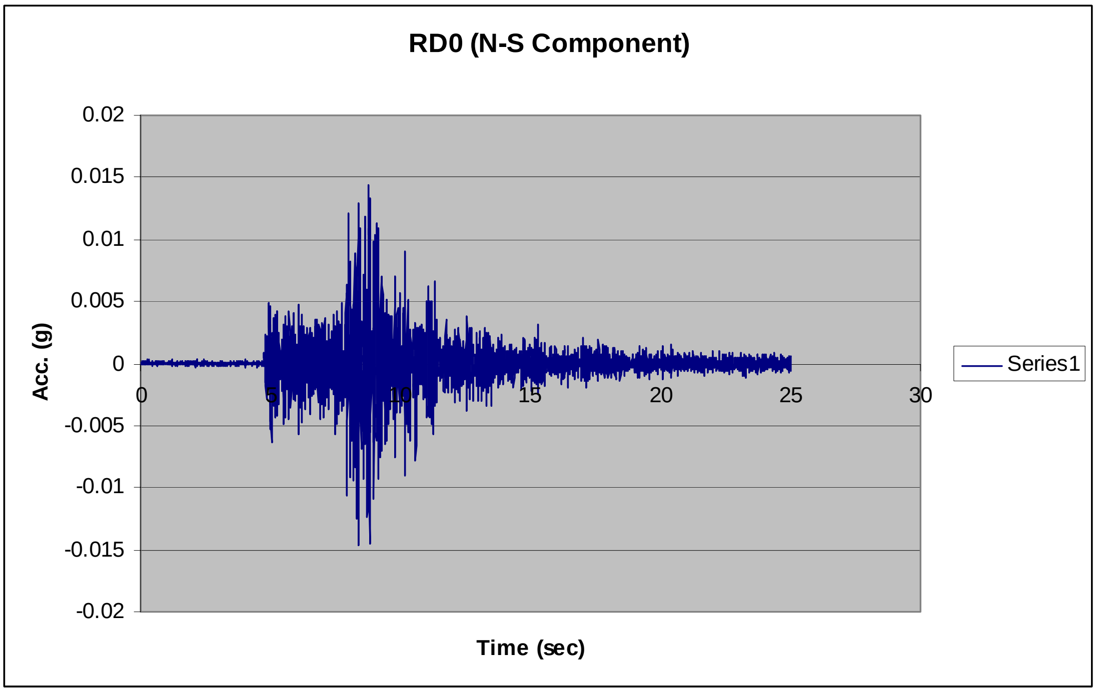
(c)

Figure 7.33-continued: Components of Reference (DREFF) Station Record; (c) vertical components.

- Station: RD0 (RD0)

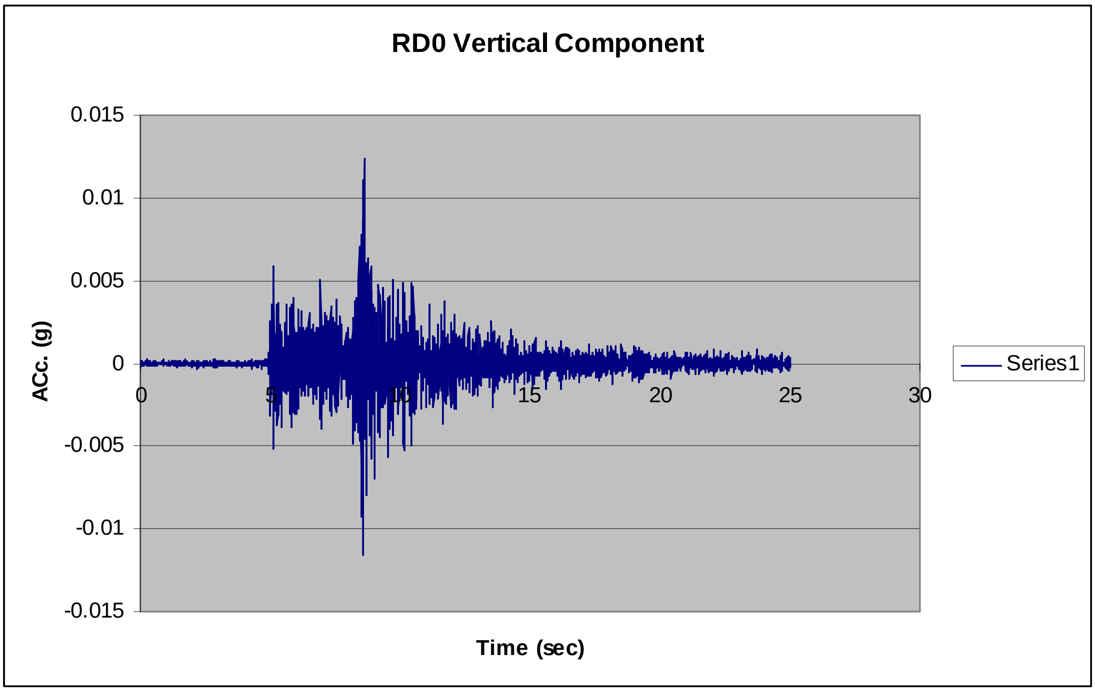


(a)



(b)

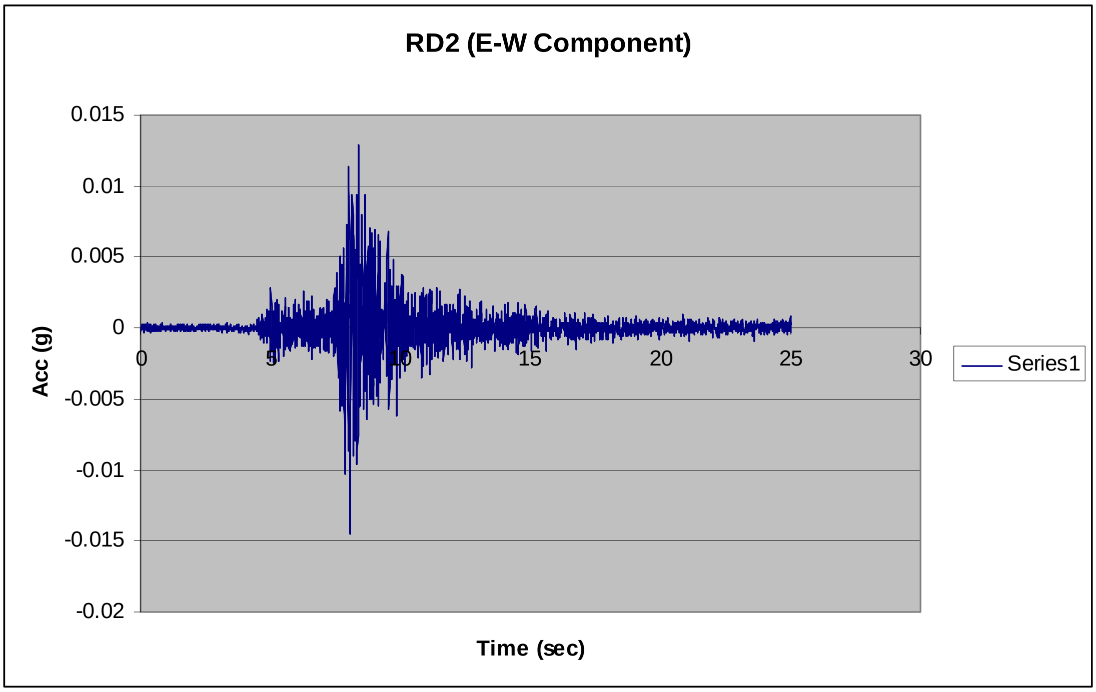
Figure 7.34: Components of (RD0) Station Record; (a) E-W,
(b) N-S components.



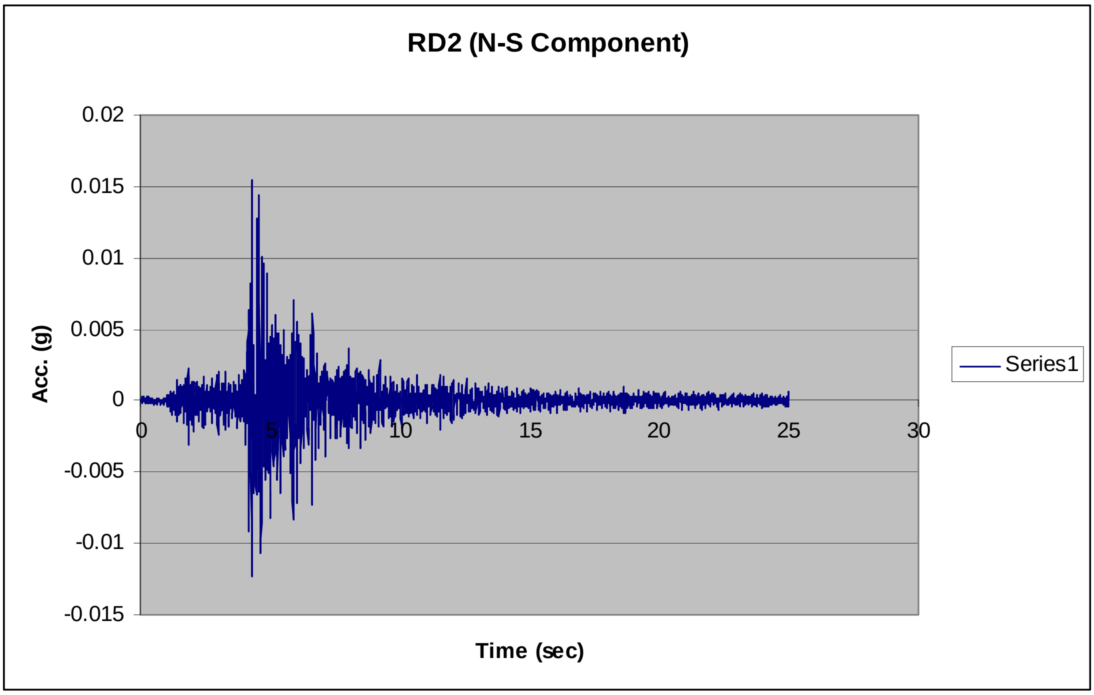
(c)

Figure 7.34-continued: Components of (RD0) Station Record; (c) vertical components.

- Station: RD2 (RD2)

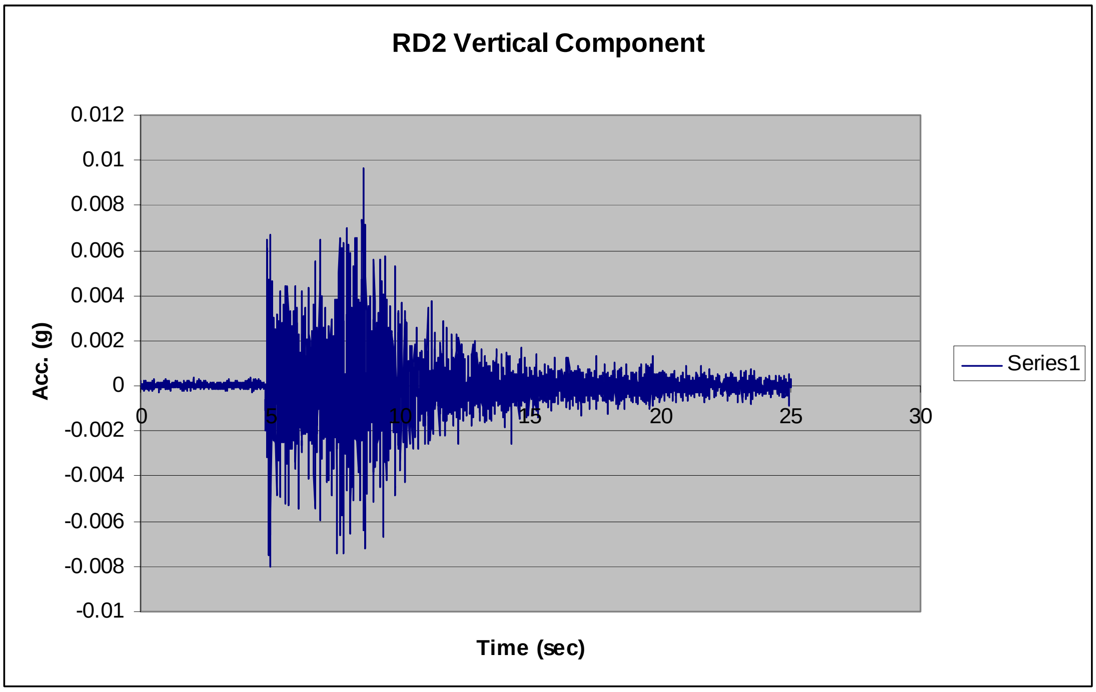


(a)



(b)

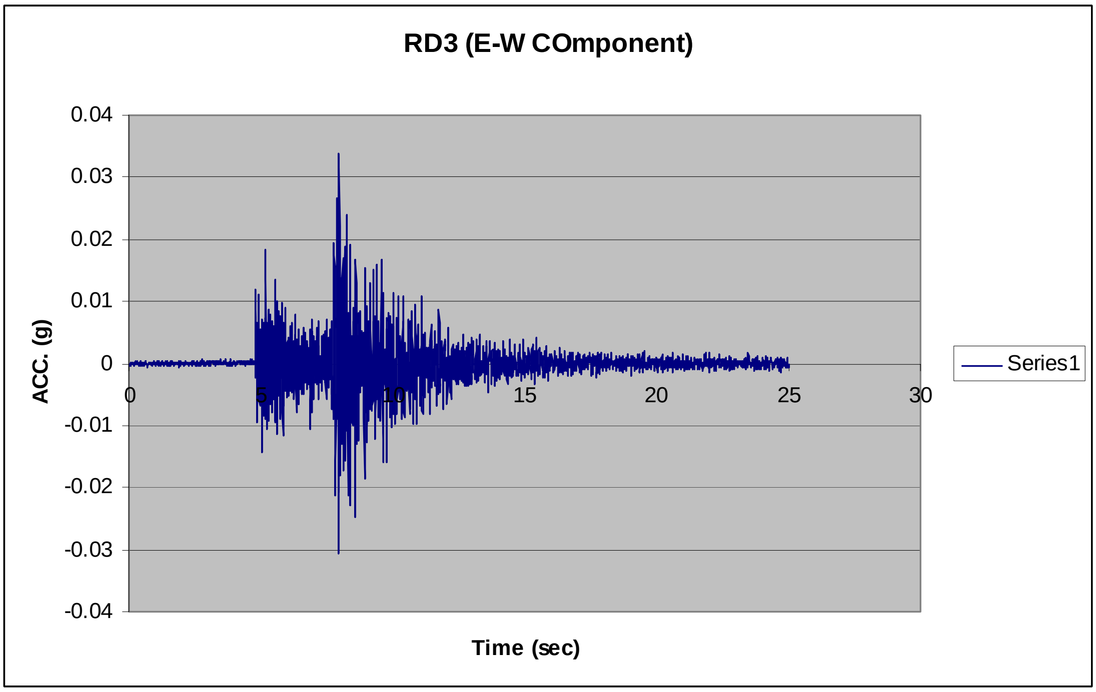
Figure7.35: Components of (RD2) Station Record; (a) E-W, (b) N-S components.



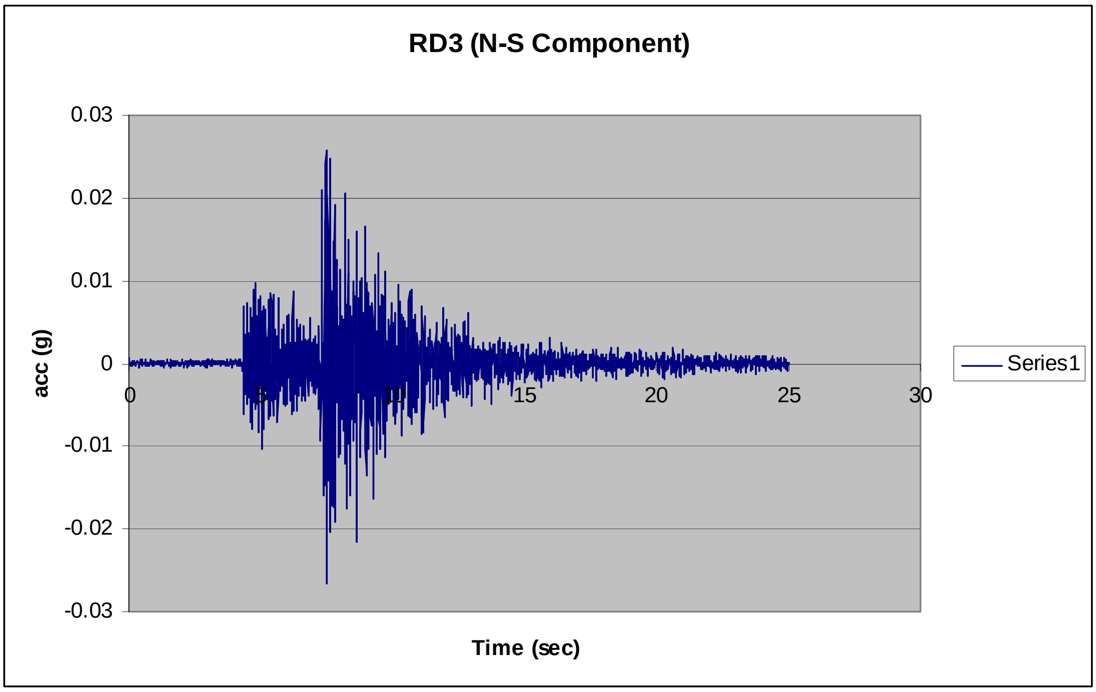
(c)

Figure7.35-continued: Components of (RD2) Station Record; (c) vertical component.

- Station: RD3:



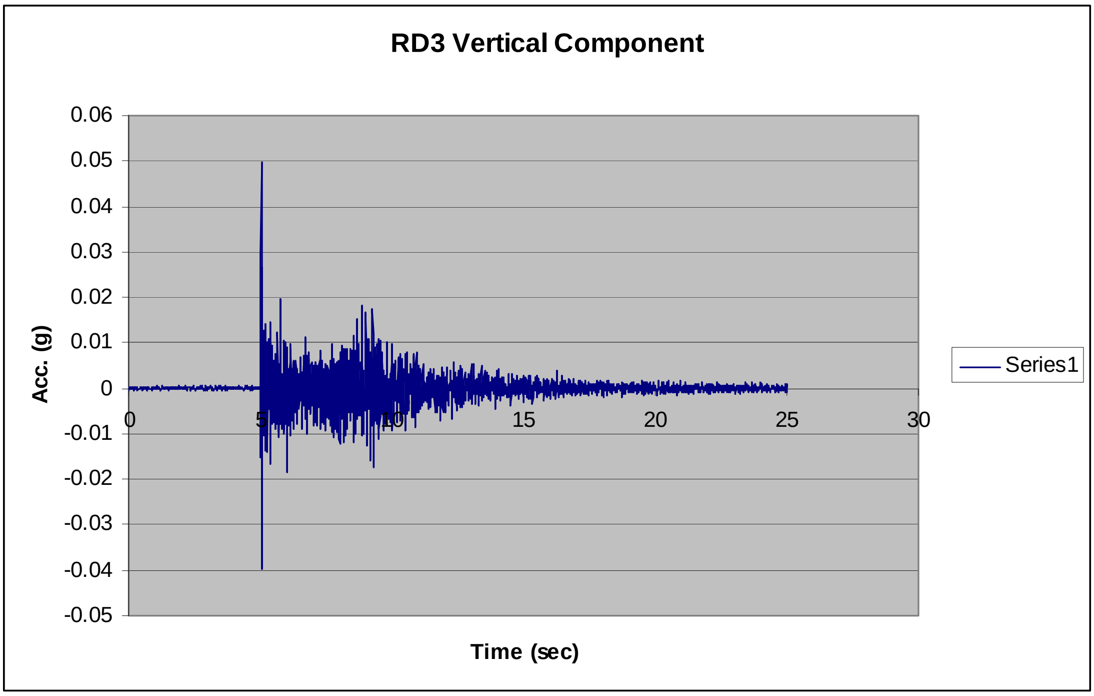
(a)



(b)

Figure 7.36: Components of (RD3) Station Record;

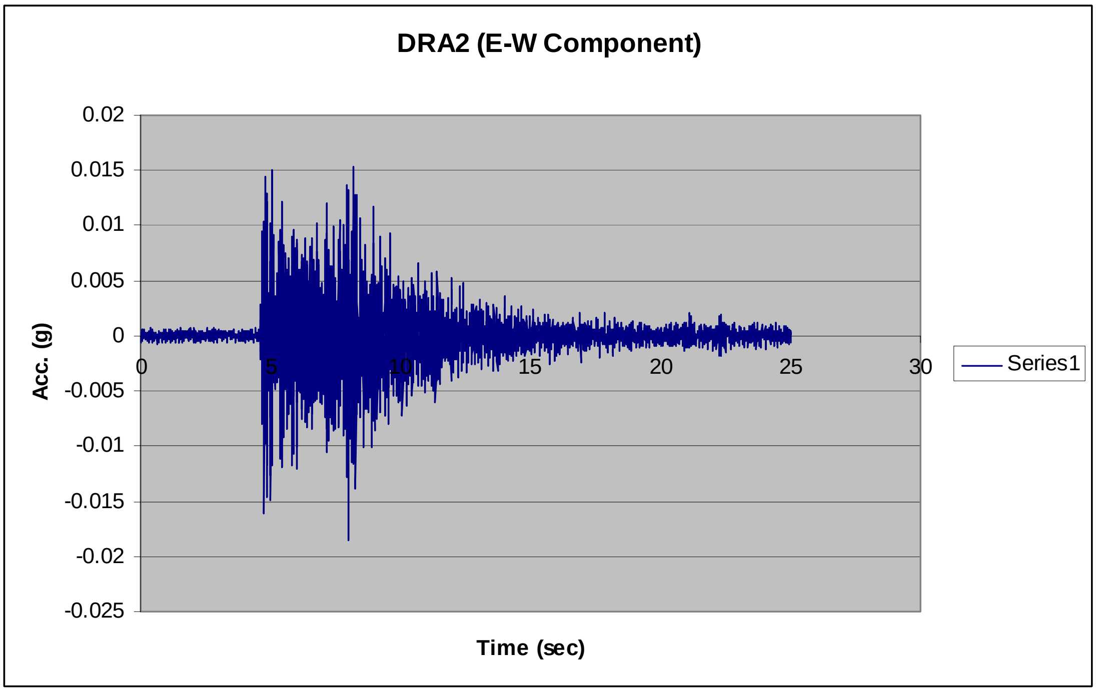
(a) E-W, (b) N-S components.



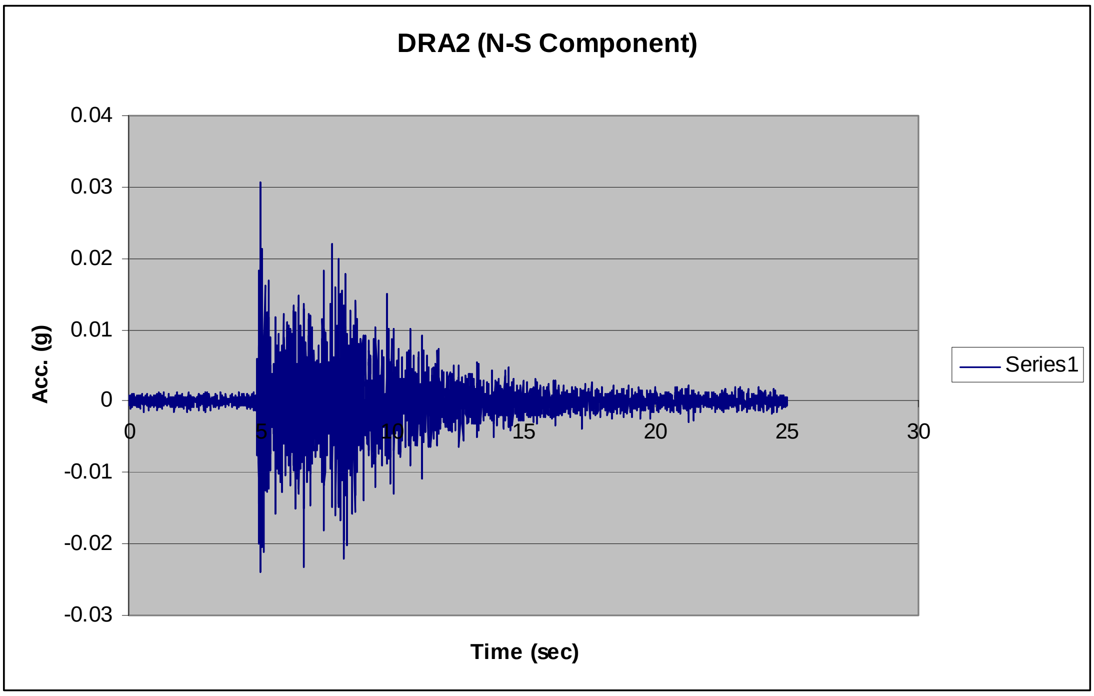
(c)

Figure 7.36-continued: Components of (RD3) Station Record;
(c) vertical component.

- Station: DRA2:

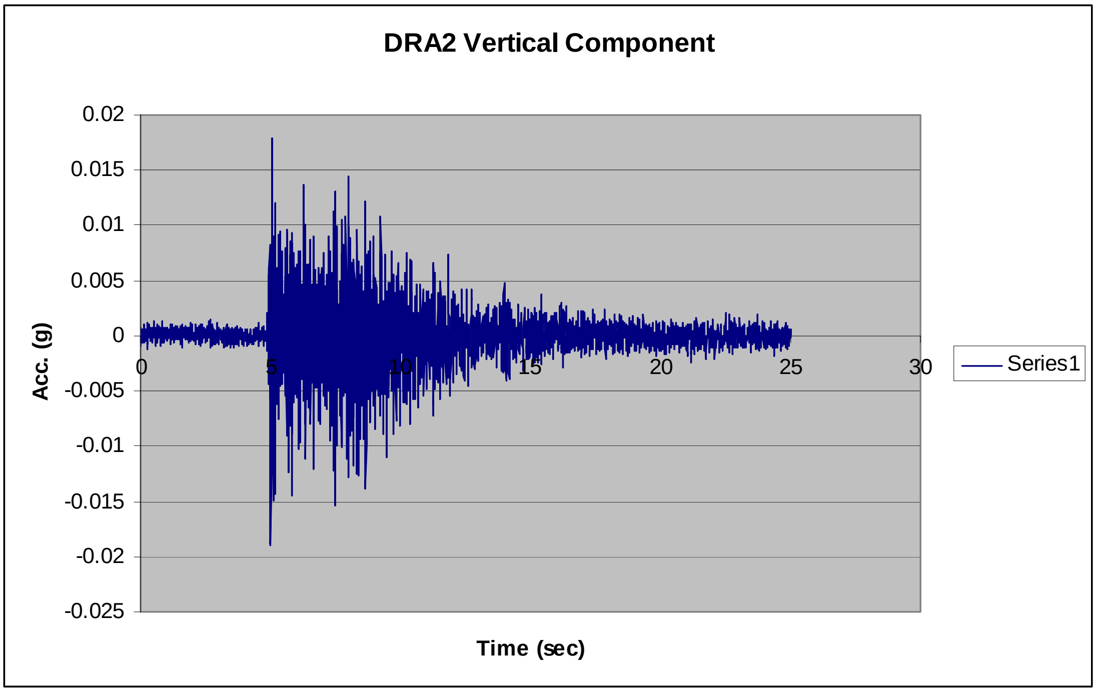


(a)



(b)

Figure 7.37: Components of (DRA2) Station Record; (a) E-W, (b) N-S components.



(c)

Figure 7.37-continued: Components of (DRA2) Station Record; (c) vertical component.

7.3.3 Microtremors Measurements

7.3.3a General

The effects of the presence of earthquakes within microtremors records were discussed in section (7.2.5a). The selected records segments for the seismic stations of the East-west array included the record of the actual earthquake. This caused the microtremors plots for these stations to be distorted and meaningless as can be seen from figures (7.35) and (7.36). Therefore, seismic analysis along the East-west Array was limited to dynamic site response analysis using the actual event only.

7.3.3b Microtremors Results

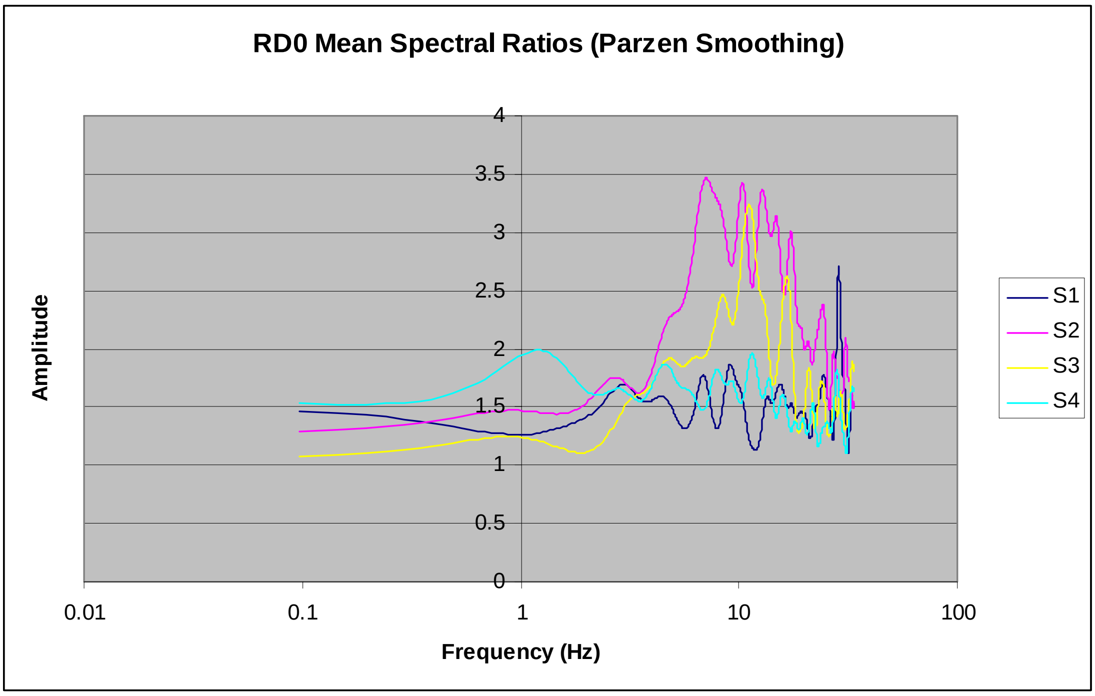


Figure 7.38: Microtremors plots for station RD0

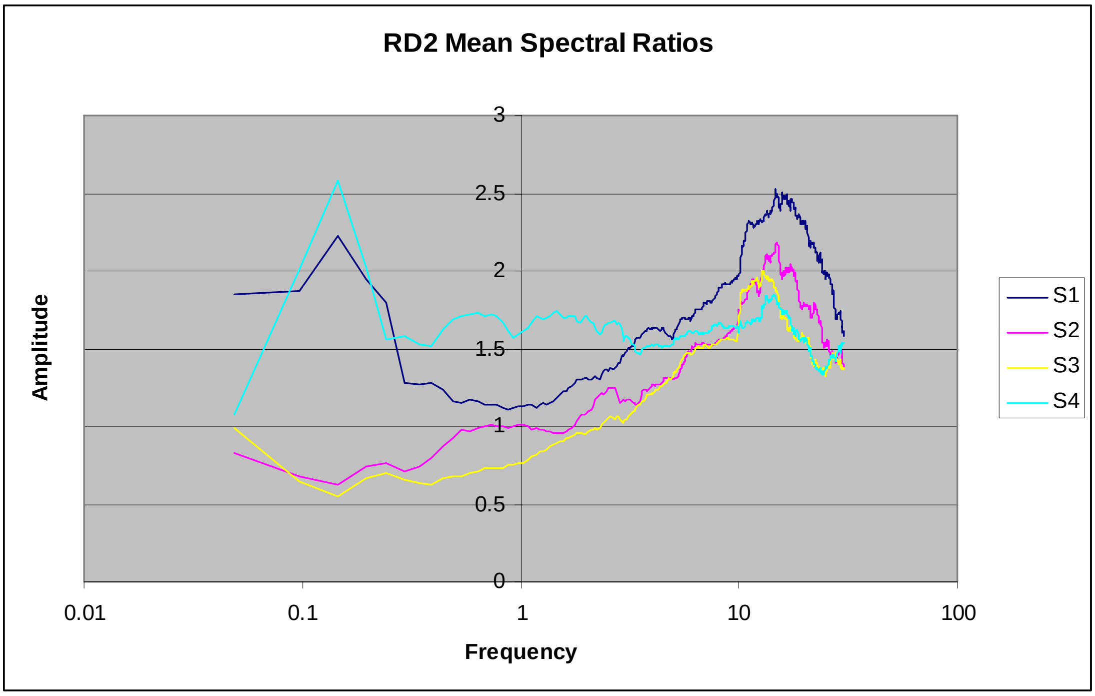


Figure 7.39: Microtremors plot for station RD2

Chapter8: Analytical Methods Fundamental Periods Results

8.1 General

Chapter 8 presents the results of the analytical methods for determining Al-Durrah fundamental periods (or frequencies) and the NEHRP short period acceleration, S_s and one second acceleration, S_1 for the Al-Durrah site. These results include the following:

1- Al-Durrah fundamental periods by the approximate method that was presented in Chapter 3:

$$T_S = \frac{4H}{\bar{v}_S}$$

2- Al-Durrah fundamental periods by performing dynamic site response analysis using ProShake

3- Al-Durrah site short period, S_s and one second period, S_1 accelerations from ProShake analysis. These values are then used in the generation of the site design response spectra

4- The effects of increasing bedrock depths on the site fundamental period by:

- Repeating the dynamic site response analysis (ProShake) on the Al-Durrah soil profiles with increasing bedrock depth

- Determining the fundamental period at increasing bedrock depths along the East-west seismic array by performing dynamic site response analysis using records of the actual earthquake.

Additional details are provided with the results of each method. The results however, are not discussed or analyzed in this chapter because of the relevance of some methods to one another or to other tests' results in Chapter 7. The results are regrouped and reproduced in Chapters 9,10, and 11 where they are discussed, analyzed, and when applicable correlated.

8.2 Al-Durrah Analytical Results

8.2.1 The Approximate Method

8.2.1a General

Using the NEHRP weighted averages of the shear velocity of each soil profile in Al-Durrah, and equation (3.2.7), reproduced here for convenience, Al-Durrah approximate fundamental periods were computed.

$$T_S = \frac{4H}{\bar{v}_S}$$

where $H = 30\ m$ (As defined by the NEHRP Provisions).

8.2.1b Al-Durrah Fundamental Periods and Frequencies by the Approximate Method

Table (8.1) presents the approximate values of the fundamental periods and frequencies for Al-Durrah soil cross-sections (or profiles). The soil cross-sectional shear wave velocity (SWV) profiles that were determined by the cross-hole (CH) tests, and the Controlled Source Spectral Analysis of Surface Waves (CXW), were used to calculate the average SWV ($\bar{v}_s$) in equation (3.2.7).

Test Type	Test Location	NEHRP Average SWV $\bar{v}_s$ (m/s)	**Site Fundamental Period** T_s *(sec)*	**Site Fundamental Frequency** f_s *(Hz)*
CXW	D1(A10)	420	0.2857	3.501
	D2(A6)	439	0.2733	3.658
	D3(A14)	410	0.2927	3.417
	D4(A11)	422	0.2844	3.517
	D5(A3a)	465	0.2581	3.875
	D5(A3b)	523	0.2294	4.358
	D6(A5)	333	0.3604	2.775
	D7(A13)	466	0.2575	3.883
	D8(A12)	424	0.2830	3.533
	D9(A4)	476	0.2521	3.967
	D11(A1)	371	0.3235	3.092
	D12(A7)	353	0.3399	2.942
	(A8)	392	0.3061	3.267
	(A9)	387	0.3101	3.225
Cross-hole	D5(CH)	315	0.3810	2.625
	D6(CH)	438	0.2740	3.650
	D11(CH)	381	0.3150	3.175
	D12(CH)	273	0.4396	2.275

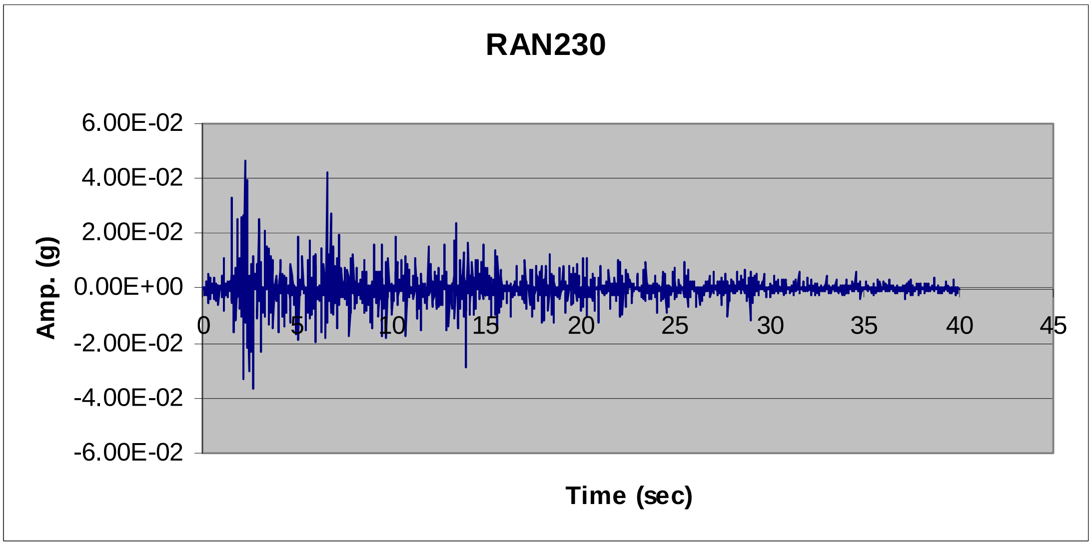
Table 8.1: Approximate Fundamental periods for Al-Durrah soil profiles.

8.2.2 Al-Durrah Dynamic Site Response Analysis Results

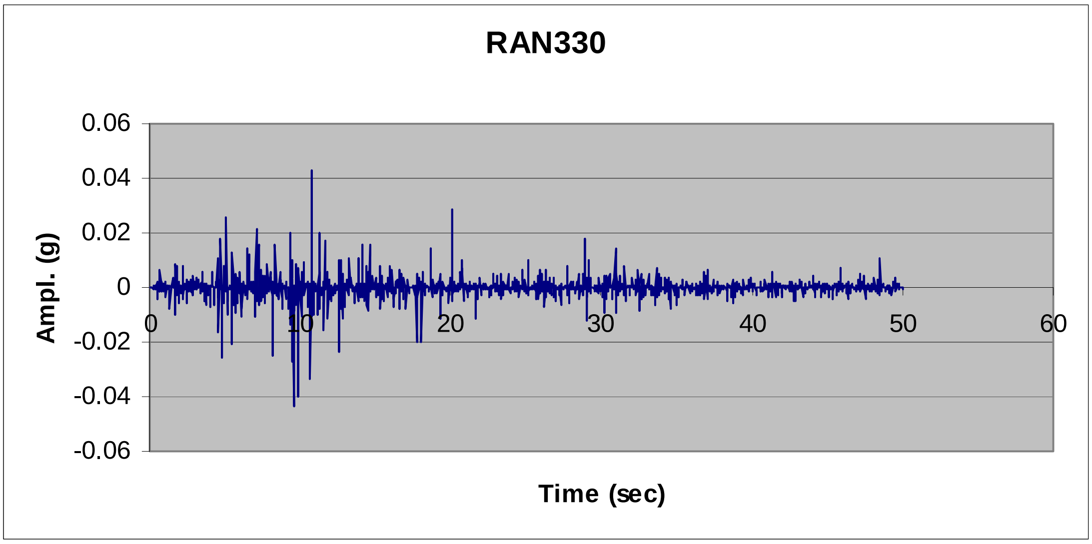
8.2.2a General

By the end of phase two of the research which was concluded by performing the field tests, no records of actual earthquakes for the Al-Durrah area were available. The work that became phase three (including recording of an actual event) was not planned at that time. Therefore, a synthetic earthquake was needed in order to carry out the dynamic site response analysis for the site. A previous study showed that the expected peak ground acceleration (PGA) for 10% probability of being exceeded in 50 and 100 years for the research area were about 0.2g and 0.3g respectively [27]. Therefore, any synthetic earthquake had to produce a PGA at Al-Durrah that is compatible with this value. ENSOL presented synthetic earthquake records that were based on the 1995 Gulf of Aqaba earthquake records in other countries in the region [16]. These earthquakes were used as a base to generate a number of random earthquakes. The random earthquakes were scaled down in amplitude to conform to the expected PGA of the site. Scaling techniques are presented in Appendix (G). The Random earthquakes were used in dynamic site response analysis (DSRA) for the Al-Durrah soil profiles, and the two earthquakes that produced the most reasonable PGA were selected. The selected earthquakes were designated as RAN230 and RAN330, and are shown in Figure (8.1).

8.2.2b Input Motions (Synthetic Earthquakes)



(a)



(b)

Figure 8.1: Synthetic earthquakes used in the DSRA; (a) RAN230, (b) RAN330

8.2.2c ProShake Analysis Results

The fundamental periods for all the soil profiles at Al-Durrah were determined by ProShake analysis. The basic analysis placed the bedrock depth at 100 ft (30m), as stipulated by NEHRP provisions. The results are presented in Table (8.2) and Figure (8.2). Detailed information on the dynamic analysis including assumptions, input profiles, soil properties, and output data is presented in Appendix (H).

Test Type	**SWV Profile location**	**Site Fundamental Periods (sec)**			
		Earthquake RAN230		Earthquake RAN330	
		5% Damping	10% Damping	5% Damping	10% Damping
CXW Tests	D1	0.064	0.064	0.098	0.088
	D2	0.054	0.054	0.098	0.098
	D3	0.2	0.077	0.2	0.078
	D4	0.088	0.064	0.098	0.098
	D5A	0.077	0.077	0.088	0.077
	D5B	0.064	0.064	0.25	0.064
	D6	0.064	0.054	0.32	0.098
	D7	0.088	0.088	0.098	0.098
	D8	0.077	0.077	0.098	0.11
	D9	0.077	0.077	0.077	0.077
	D11	0.077	0.077	0.098	0.098
	D12	0.064	0.054	0.077	0.054
Cross Hole Tests	D5CH	0.064	0.054	0.088	0.088
	D6CH	0.064	0.054	0.098	0.098
	D11CH	0.064	0.064	0.098	0.077
	D12CH	0.077	0.064	0.33	0.064

Table 8.2: ProShake dynamic analysis fundamental periods for Al-Durrah profiles (bedrock at NEHRP depth)

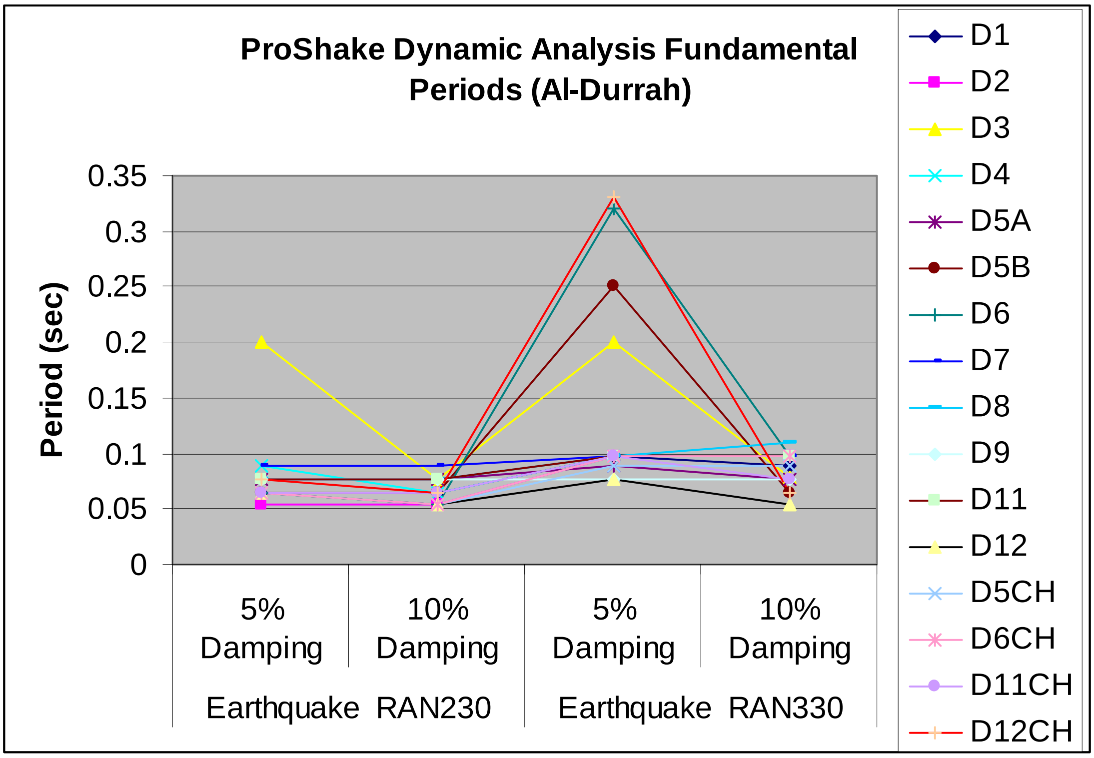


Figure 8.2: ProShake analysis fundamental periods distribution for Al-Durrah profiles (bedrock at NEHRP depth).

8.1.2d Short Period (S_s), and One Second (S_1), Accelerations for Al-Durrah Soil Profiles

The short period acceleration, S_S, and the one second acceleration, S_1, are defined by NEHRP provisions as the mapped values of the *5% damped* maximum considered earthquake spectral response accelerations at the periods of 0.2 second and 1.0 second respectively [3]. S_S and S_1 for a certain site are the two basic values that are needed for determining NEHRP design response spectra for that site. NEHRP maps 1 to 24 provide S_S and S_1 for the U.S. and its territories. The maps present the values of S_S and S_1 for site class B, which can be adjusted to other site classes in accordance with the procedure that was presented in Chapter 2. However, No similar maps are available for Saudi Arabia, including Al-Durrah. Although it is not the intent of this dissertation to establish S_S and S_1 maps for Al-Durrah, it is necessary to estimates their values for site class B in Al-Durrah in order to generate and compare design response spectra for different site classifications in Al-Durrah.

The dynamic site response analysis was performed for all of the soil profiles of Al-Durrah using the program ProShake. The analysis was performed using two earthquakes (RAN230 and RAN330), and two damping ratios of 5% and 10%. Each ProShake analysis of the Al-Durrah soil profiles yielded ground response spectra for the profile being analyzed. Values of Ss and S_1 with 5% damping were taken from each spectrum (to conform to the definition of Ss and S_1). These S_S and S_1 values do not necessarily correspond to site class B as is the case in NEHRP Provisions maps. However, for the purpose of this research, these values were assumed to correspond to site class B. This assumption is discussed further in Chapter 9. The S_S and S_1 values for all of the Al-Durrah soil profiles are shown in Table (8.7).

These values were obtained from the analysis of Al-Durrah soil profiles at a bedrock depth of 30 m (T_A), which corresponds to the NEHRP specified profile depth. A site is required to be classified by the NEHRP Provisions general procedure if ($Ss > 0.15$) or ($S_1 > 0.04$) [3]. S_s

values in Table (8.3) exceeded this limit once in earthquake RAN230 analysis at location D11CH, while S_1 values in both earthquakes analysis are far below the NEHRP limit of (0.04).

Test Designation	Earthquake RAN230		Earthquake RAN330	
	Ss	S1	Ss	S1
D1CXW	0.12	0.013	0.083	0.009
D2CXW	0.12	0.013	0.099	0.01
D3CXW	0.13	0.013	0.11	0.01
D4CXW	0.11	0.013	0.1	0.01
D5ACXW	0.15	0.013	0.1	0.01
D5CXW	0.1	0.013	0.09	0.009
D5CH	0.1	0.014	0.085	0.01
D6CXW	0.12	0.014	0.095	0.011
D6CH	0.12	0.013	0.091	0.01
D7CXW	0.15	0.013	0.096	0.01
D8CXW	0.14	0.013	0.095	0.009
D9CXW	0.12	0.013	0.093	0.009
D11CXW	0.11	0.014	0.1	0.01
D11CH	0.18	0.013	0.14	0.01
D12CXW	0.1	0.014	0.092	0.01
D12CH	0.1	0.014	0.11	0.013

Table 8.3: Short period (S_s), and one second (S_1), accelerations for Al-Durrah

8.2.2e Effects of Varying the Depth of Bedrock on the Site Fundamental Period

NEHRP Provisions limit the site-profiles to the top 100 ft (30 m) of the soil, even if the actual bedrock depth is much larger than 100 ft. To examine the effects of greater depths of bedrock on the site fundamental period, the bedrock depth in Al-Durrah was modeled at 5 different depths. The first selected depth is the actual depth (T_{AC}= 350 m) as estimated by the VES tests. The other four depths are (T_A= 30m), (T_B =100 m), (T_C =200 m), and (T_D =300 m). The depth T_A = 30 m corresponds to NEHRP depth. For each bedrock depth, a ProShake dynamic analysis using all of the soil profiles that were generated by the CXW and cross-hole tests, was completed. The analysis was repeated for each input earthquake twice using damping ratios of 5% and 10%. The resulting fundamental periods are then plotted versus depth, as shown in Tables (8.4) to (8.7) and Figures (8.3) to (8.6). Detailed information on the site dynamic response analysis including input profiles, soil properties, and output data is presented in Appendix (H).

1. Input Motion: RAN230

A) Damping Ratio: 5%

Bedrock Depth		TAC	TA	TB	TC	TD
Test Designation		Site Fundamental Periods (sec)				
CXW Tests	D1	0.069	0.064	0.077	0.054	0.054
	D2	0.09	0.054	0.077	0.088	0.077
	D3	0.13	0.2	0.077	0.088	0.14
	D4	0.079	0.088	0.077	0.077	0.077
	D5A	0.079	0.077	0.077	0.088	0.054
	D5B	0.057	0.064	0.054	0.054	0.054
	D6	0.069	0.064	0.064	0.054	0.054
	D7	0.12	0.088	0.17	0.077	0.14
	D8	0.13	0.077	0.16	0.064	0.054
	D9	0.069	0.077	0.054	0.077	0.054
	D11	0.079	0.077	0.078	0.064	0.077
	D12	0.069	0.064	0.069	0.054	0.054
Cross Hole Tests	D5CH	0.079	0.064	0.064	0.064	0.077
	D6CH	0.057	0.064	0.054	0.054	0.077
	D11CH	0.09	0.064	0.079	0.064	0.054
	D12CH	0.057	0.077	0.056	0.054	0.054

Table 8.4: Variation of the fundamental periods with the variation of the depth of bedrock for RAN230 at 5% damping

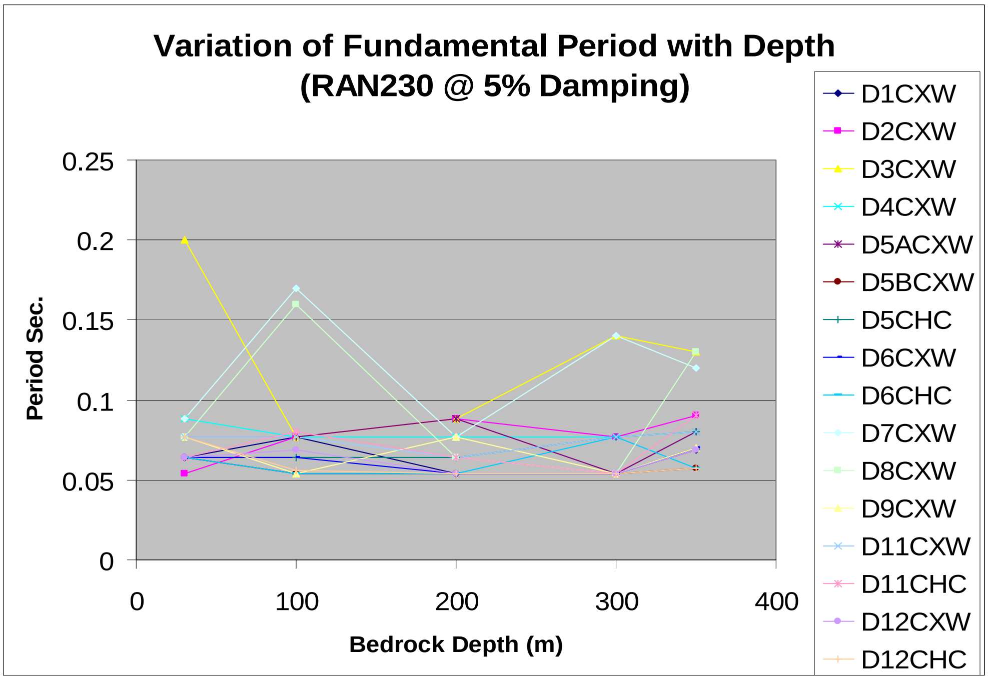


Figure 8.3: Variation of fundamental periods with depth of bedrock for earthquake RAN230 with 5% damping.

B) 10% Damping

Bedrock Depth		TAC	TA	TB	TC	TD
Test Designation		Site Fundamental Periods (sec)				
CXW Tests	D1	0.069	0.064	0.077	0.064	0.064
	D2	0.1	0.054	0.077	0.077	0.077
	D3	0.06	0.077	0.054	0.064	0.09
	D4	0.077	0.064	0.095	0.077	0.077
	D5A	0.069	0.077	0.077	0.064	0.054
	D5B	0.069	0.064	0.054	0.054	0.054
	D6	0.069	0.054	0.054	0.064	0.054
	D7	0.091	0.088	0.088	0.077	0.054
	D8	0.079	0.077	0.078	0.077	0.054
	D9	0.057	0.077	0.054	0.064	0.054
	D11	0.079	0.077	0.078	0.077	0.077
	D12	0.057	0.054	0.057	0.054	0.054
Cross Hole Tests	D5CH	0.069	0.054	0.054	0.064	0.054
	D6CH	0.057	0.054	0.054	0.054	0.064
	D11CH	0.069	0.064	0.079	0.054	0.064
	D12CH	0.069	0.064	0.057	0.054	0.054

Table 8.5: Variation of the fundamental periods with the variation of the depth of bedrock for RAN230 at 10% damping

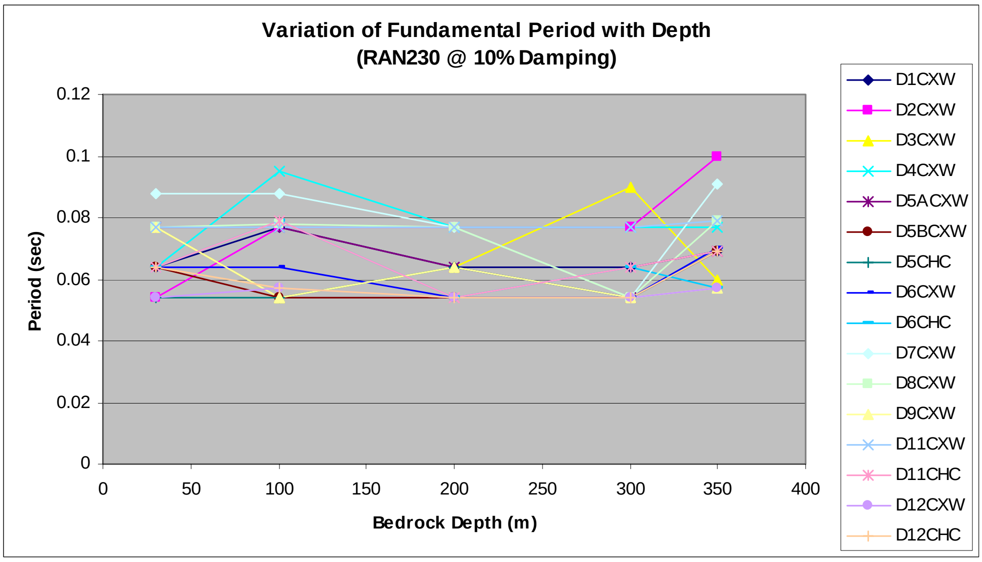


Figure 8.4: Variation of the fundamental periods with the variation of the depth of bedrock for RAN230 at 10% damping

2. Input Motion: RAN330

A) Damping Ratio: 5%

Bedrock Depth		TAC	TA	TB	TC	TD
Test Designation		Site Fundamental Periods (sec)				
CXW Tests	D1	0.079	0.098	0.088	0.077	0.077
	D2	0.11	0.098	0.11	0.088	0.1
	D3	0.11	0.2	0.16	0.16	0.1
	D4	0.27	0.098	0.26	0.27	0.1
	D5A	0.091	0.088	0.088	0.088	0.077
	D5B	0.054	0.25	0.05	0.077	0.1
	D6	0.079	0.32	0.29	0.054	0.1
	D7	0.17	0.098	0.098	0.098	0.11
	D8	0.17	0.098	0.15	0.11	0.17
	D9	0.079	0.077	0.1	0.11	0.077
	D11	0.1	0.098	0.079	0.077	0.077
	D12	0.1	0.077	0.077	0.11	0.11
Cross Hole Tests	D5CH	0.079	0.088	0.077	0.064	0.1
	D6CH	0.11	0.098	0.088	0.098	0.11
	D11CH	0.079	0.098	0.1	0.077	0.077
	D12CH	0.29	0.33	0.077	0.16	0.077

Table 8.6: Variation of the fundamental periods with the variation of the depth of bedrock for RAN330 at 5% damping

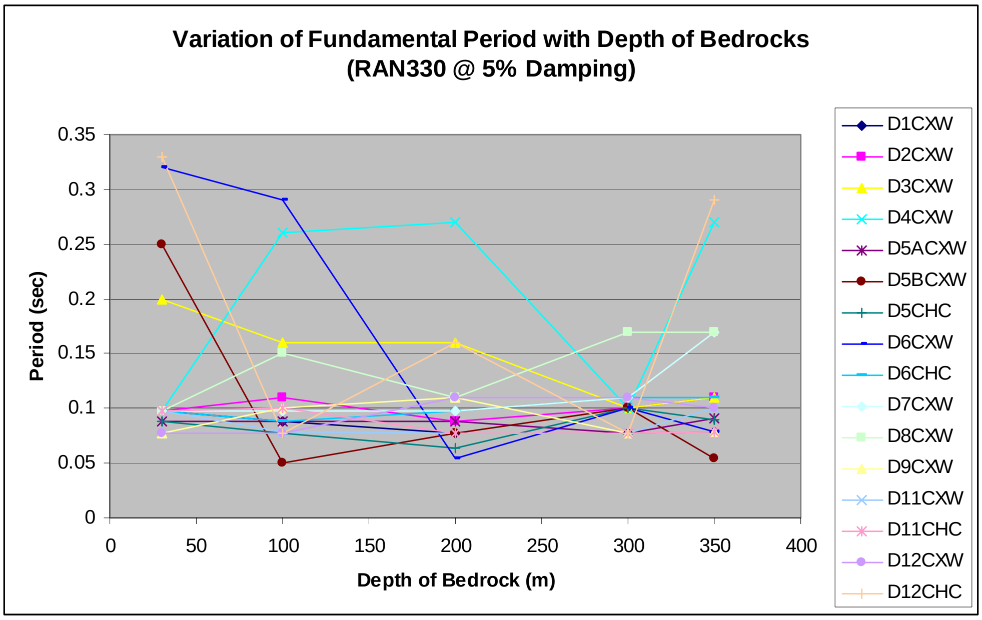


Figure 8.5: Variation of the fundamental periods with the variation of the depth of bedrock for earthquake RAN330 and 5% damping

B) 10% Damping:

Bedrock Depth		TAC	TA	TB	TC	TD
Test Designation		Site Fundamental Periods (sec)				
CXW Tests	D1	0.079	0.088	0.077	0.077	0.077
	D2	0.11	0.098	0.098	0.077	0.1
	D3	0.11	0.078	0.12	0.11	0.1
	D4	0.07	0.098	0.095	0.098	0.1
	D5A	0.091	0.077	0.098	0.077	0.077
	D5B	0.1	0.064	0.1	0.077	0.1
	D6	0.079	0.098	0.077	0.064	0.1
	D7	0.091	0.098	0.11	0.11	0.1
	D8	0.079	0.11	0.16	0.11	0.12
	D9	0.079	0.077	0.1	0.098	0.077
	D11	0.1	0.098	0.079	0.077	0.11
	D12	0.11	0.054	0.077	0.11	0.1
Cross Hole Tests	D5CH	0.079	0.088	0.054	0.054	0.1
	D6CH	0.1	0.098	0.077	0.098	0.1
	D11CH	0.11	0.077	0.1	0.09	0.077
	D12CH	0.1	0.064	0.054	0.11	0.077

Table 8.7: Variation of the fundamental periods with the variation of the depth of bedrock for RAN330 at 10% damping

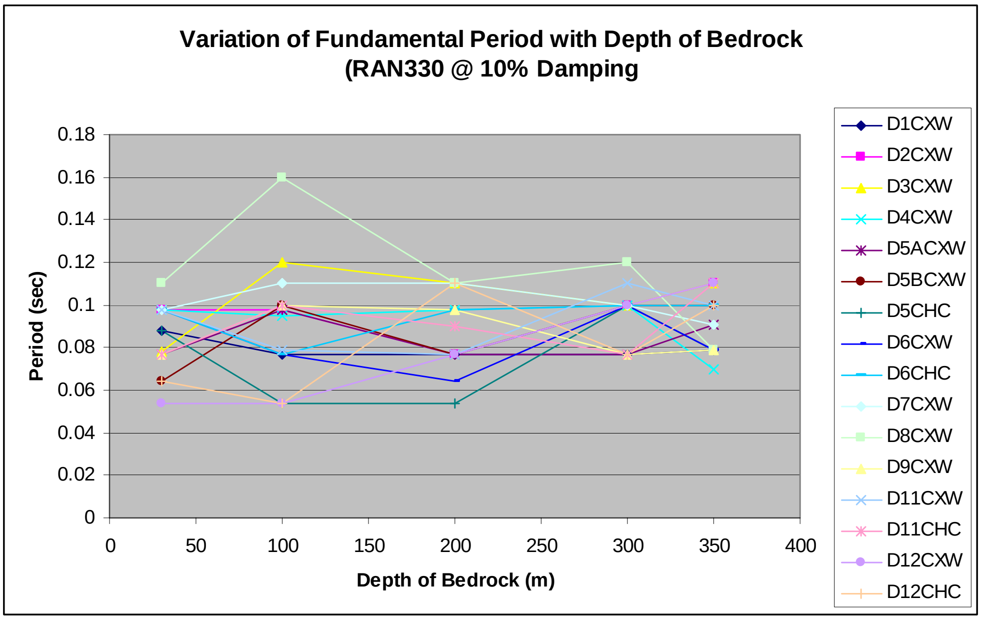


Figure 8.6: Variation of the fundamental periods with the variation of the depth of bedrock for RAN330 at 10% damping

8.2 East-West Seismic Array Results

8.2.1 General

The dynamic site response analysis of the seismic array was performed using the earthquake of magnitude 1.59 that was presented in Section (7.2.2). At each station, the two horizontal components of the earthquake that were recorded at the *rock outcrop* were used individually as the input motion in ProShake to determine the corresponding fundamental frequency (or period) at each station.

8.2.2 Soil Profile Modeling Assumptions

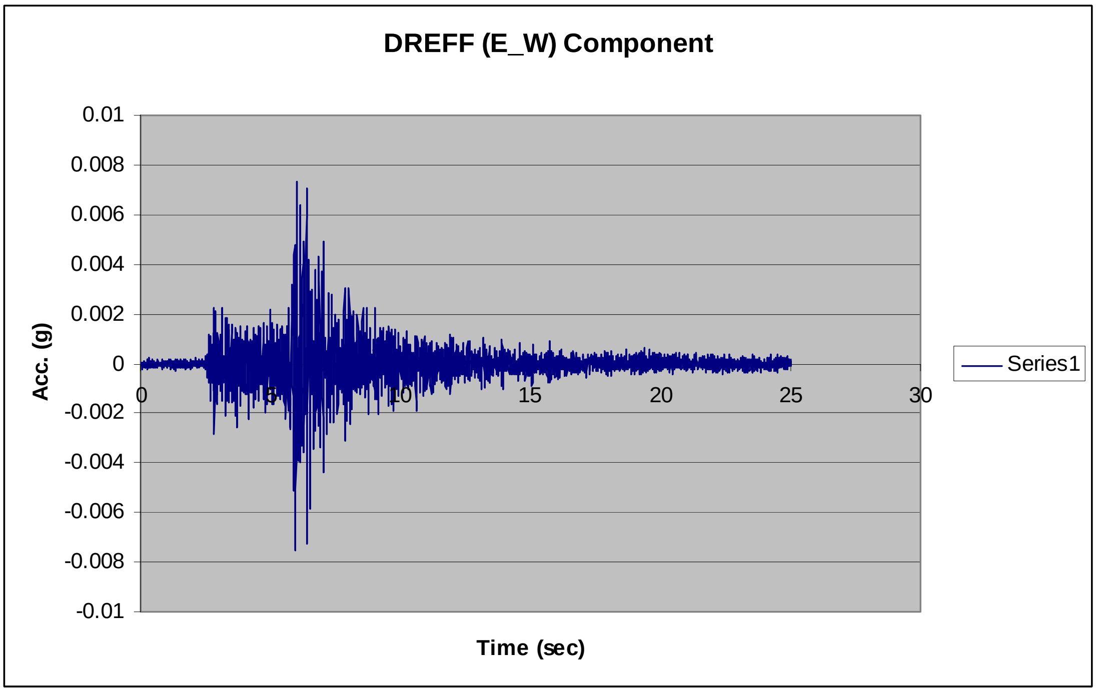
Apart from the Vertical Electric Sounding (VES) tests that established the bedrock depth at each station, no other information is available for the soil profiles along the East-west array, with the exception of station DRA2 which is part of the Al-Durrah site. The closest estimate to the area was the soil profiles in Al-Durrah. Therefore, the average minimum and maximum shear wave velocities were computed for all the profiles in Al-Durrah and used for profiles along the array. The top 30 m of each profile was divided into six equal layers. The top soil layer was assigned the average minimum SWV, while the last layer at the NEHRP depth of 30 m was assigned the average maximum SWV. The shear wave velocity for the intermediate layers within NEHRP depth increased linearly from top to bottom. All layers below NEHRP bedrock depth and above the actual bedrock were assigned the average maximum SWV. Complete input and output data for this analysis is presented in Appendix (H)

8.2.3a Seismic Array Stations Fundamental Periods

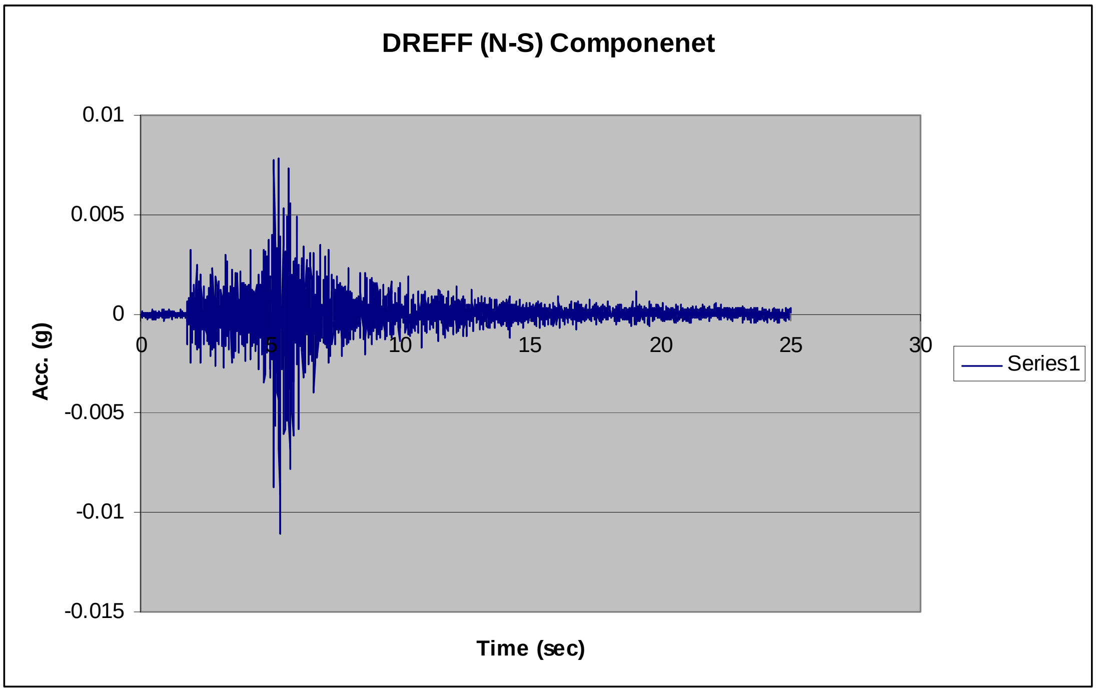
The fundamental period of the soil profile at each station of the seismic array was calculated twice. First, the fundamental periods were determined by performing a dynamic site response analysis using the rock outcrop earthquake record. The dynamic site response analysis was performed four times at each station using the earthquake east-west and north-south components, and two damping ratios of 5% and 10%. Second, the fundamental period at each seismic station was determined from the earthquake record at that station. The time domain earthquake records were converted to frequency domain records using the computer program ProShake. The fundamental period of each frequency domain record was determined at the maximum amplitude of the records.

1- The following ground response spectra are the result of performing dynamic site response analysis using ProShake for each seismic station along the East-west seismic array. The east-west and north-south components of the actual earthquake records of the *rock outcrop* were used individually in the analysis at each station. Each component was analyzed using damping ratios equal to 5% and 10%.

Input Motions: Rock outcrop (DREFF) earthquake components records



(a)



(b)

Figure 8.7: Input motion earthquakes of rock outcrop; (a) E-W component, and (b) N-S component

- Station: ARRAY RD0 :

Input Motion: DREFF (E-W) (5% Damping)

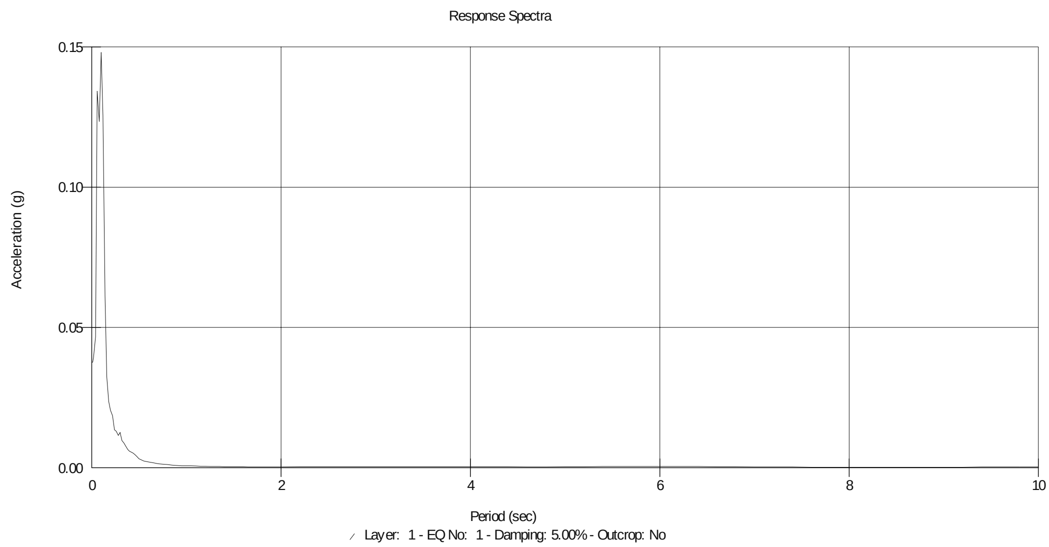


Figure 8.8: Ground response spectrum for RD0 (E-W) component; 5% damping.

T_s= *0.098 sec.*

Input Motion: DREFF (N-S) (5% Damping)

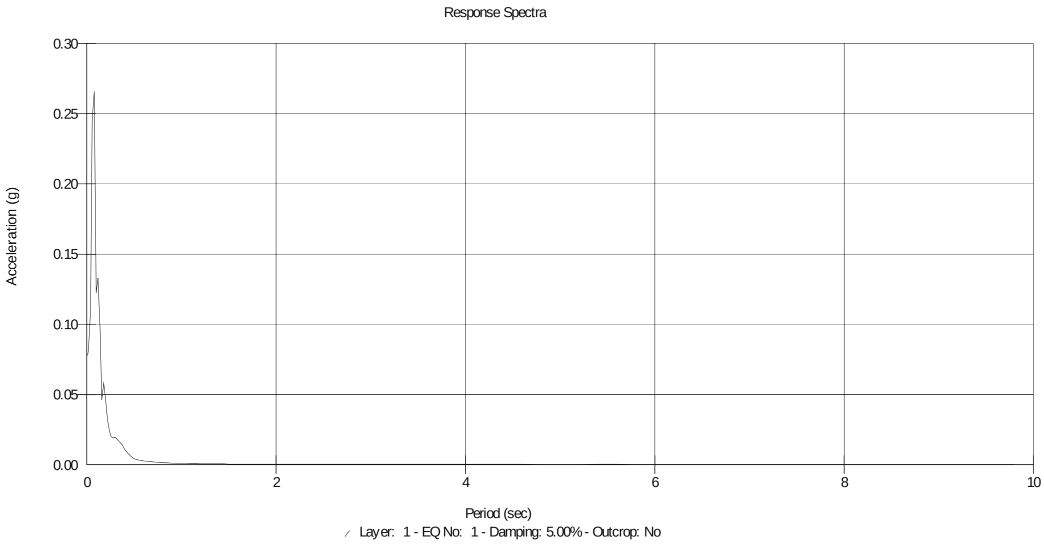


Figure 8.9: Ground response spectrum for RD0 (N-S) component; 5% damping.

T_s=0.077 sec.

Input Motion: DREFF (E-W) (10% Damping)

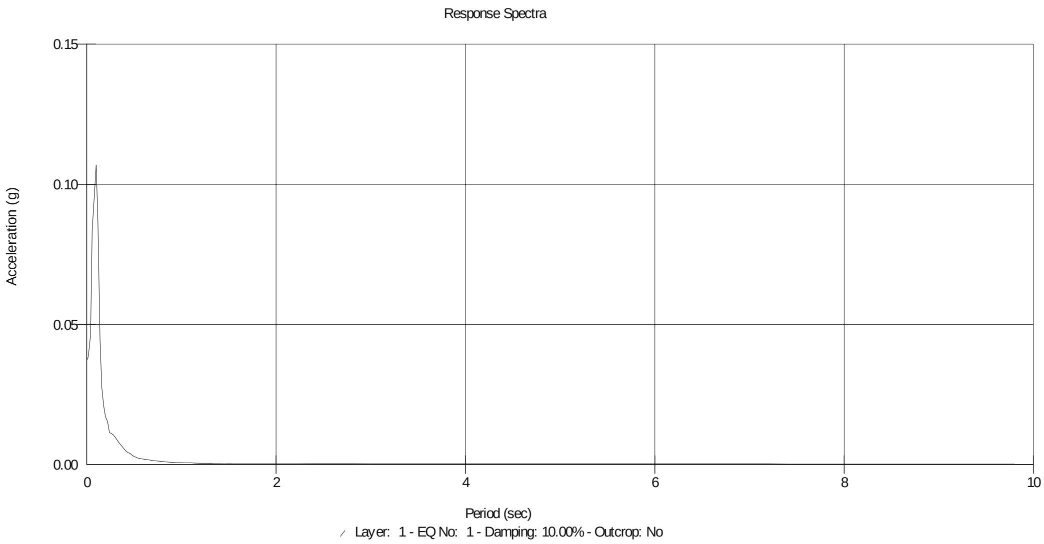


Figure 8.10: Ground response spectrum for RD0 (E-W) component; 10% damping.

T_s=0.11 sec

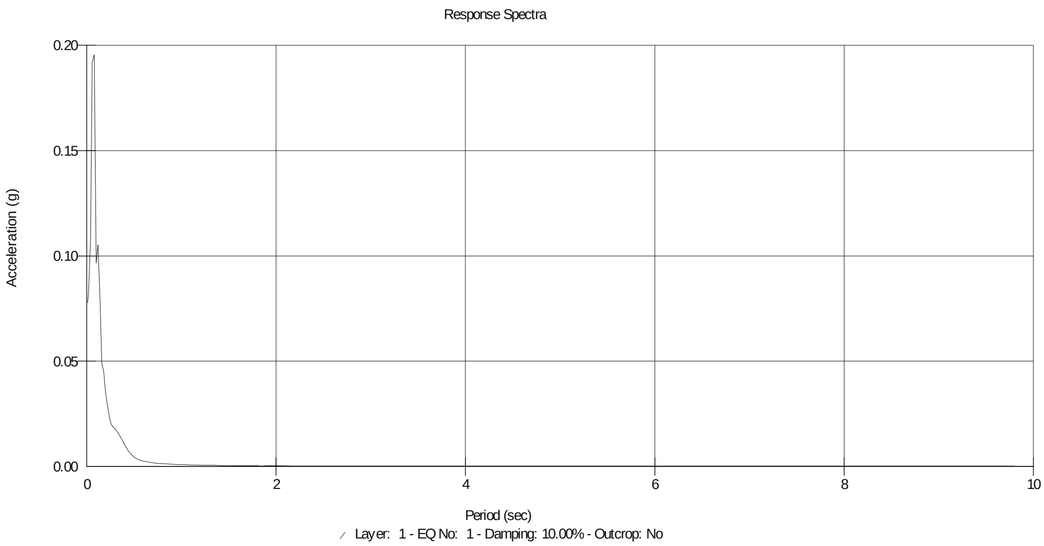


Figure 8.11: Ground response spectrum for RD0 (N-S) component; 10% damping.

To=0.077 sec

- Station Array RD2

Input Motion: DREFF (E-W) (5% Damping)

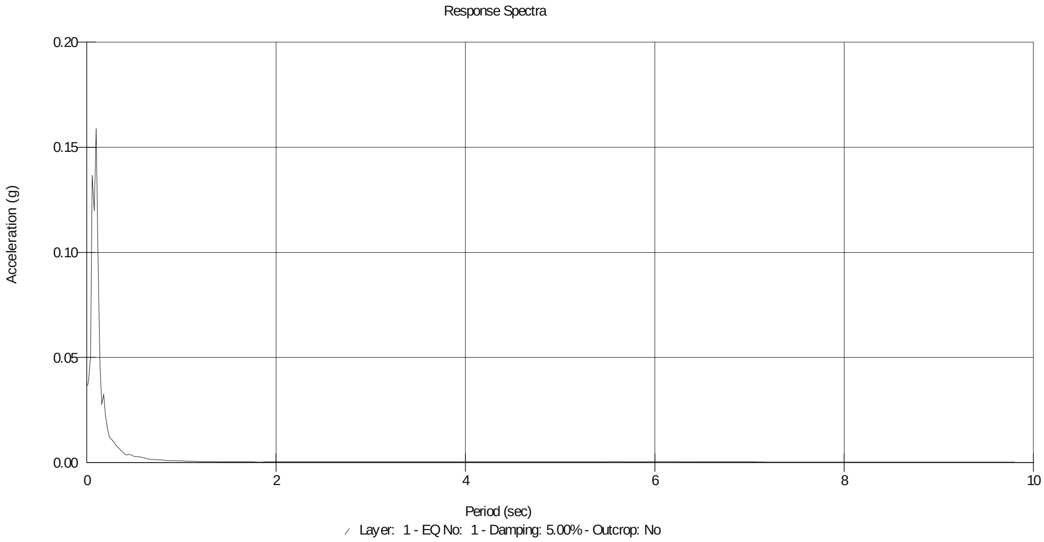


Figure 8.12: Ground response spectrum for RD2 (E-W) component; 5% damping.

T_s=0.098 sec

Input Motion: DREFF (N-S) (5% Damping)

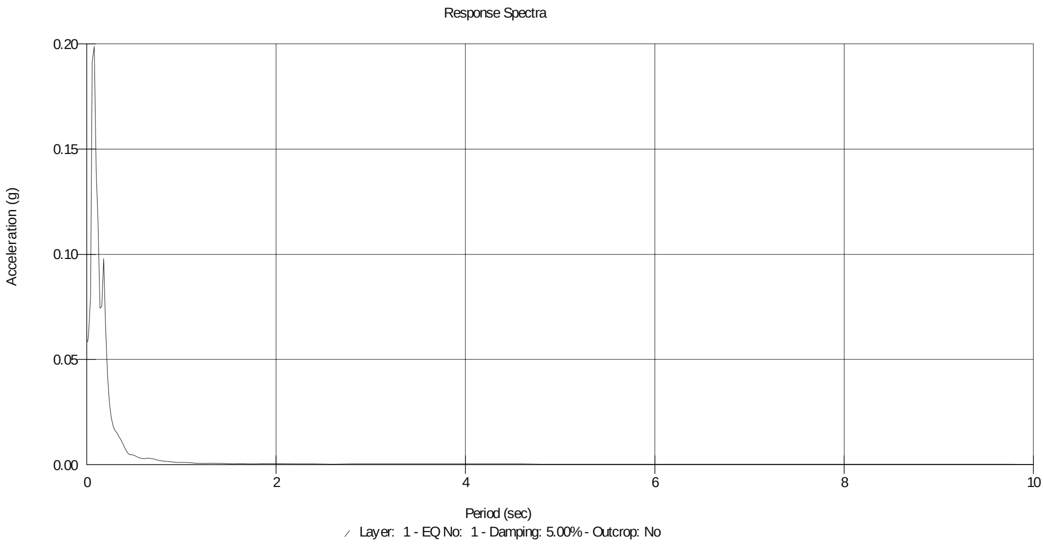


Figure 8.13: Ground response spectrum for RD2 (N-S) component; 5% damping.

T_s= 0.077 sec.

Input Motion: DREFF (E-W) (10% Damping)

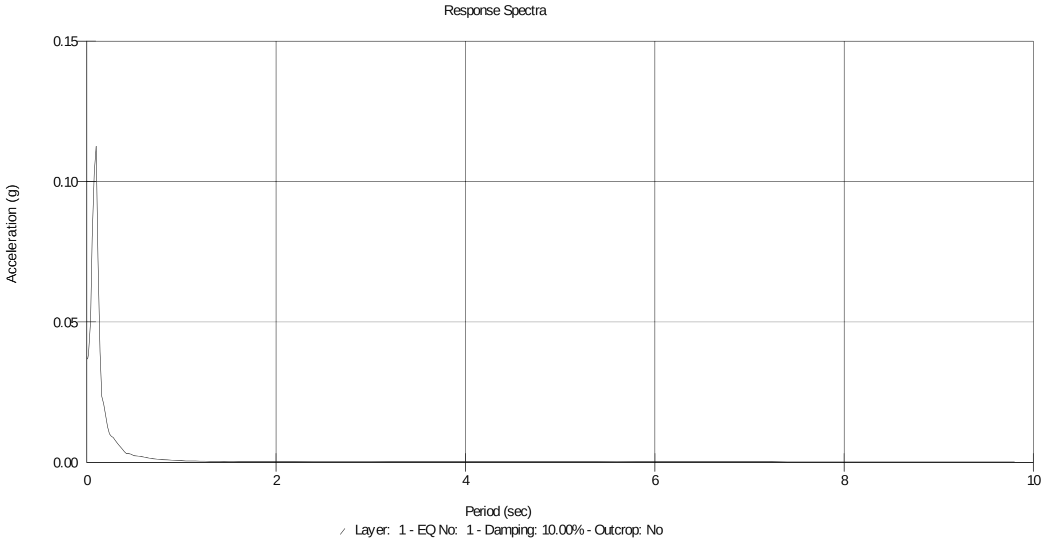


Figure 8.14: Ground response spectrum for RD2 (E-W) component; 10% damping.

T_s=0.11 sec

Input Motion: DREFF (N-S) (10% Damping)

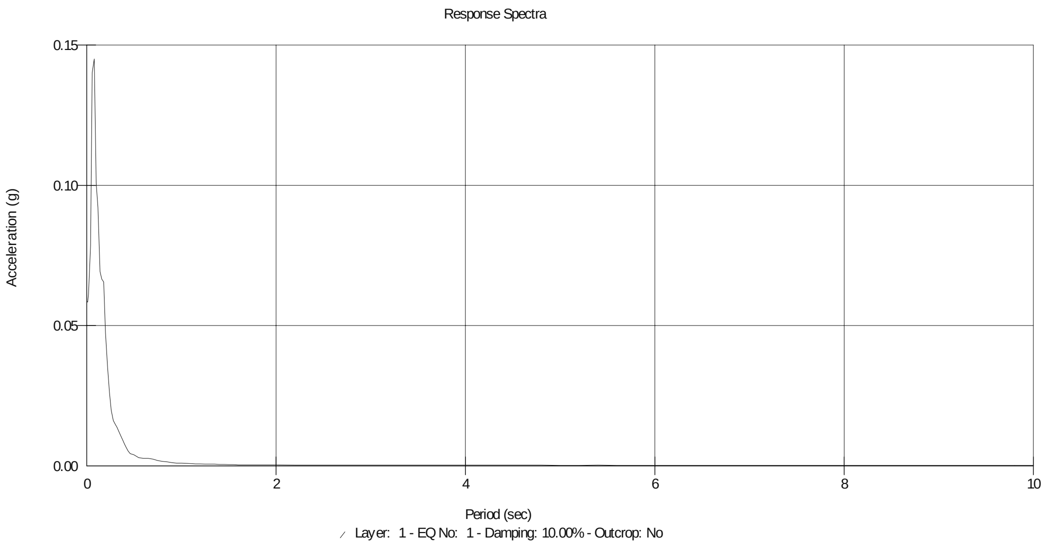


Figure 8.15: Ground response spectrum for RD2 (N-S) component; 10% damping.

T_s=0.077 sec

- Station Array RD3

Input Motion: DREFF (E-W) (5% Damping)

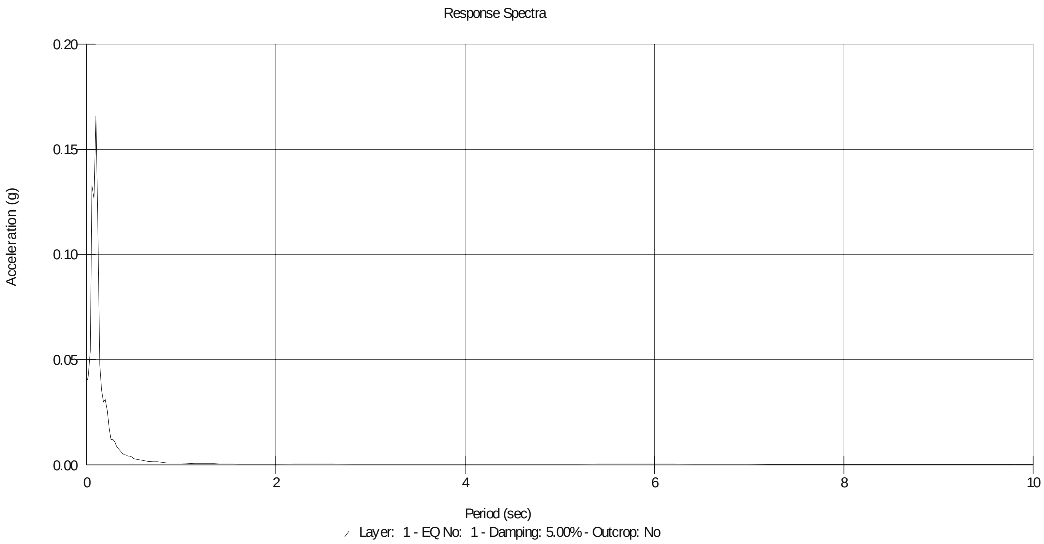


Figure 8.16: Ground response spectrum for RD3 (E-W) component; 5% damping.

T_s= 0.098 sec.

Input Motion: DREFF (N-S) (5% Damping)

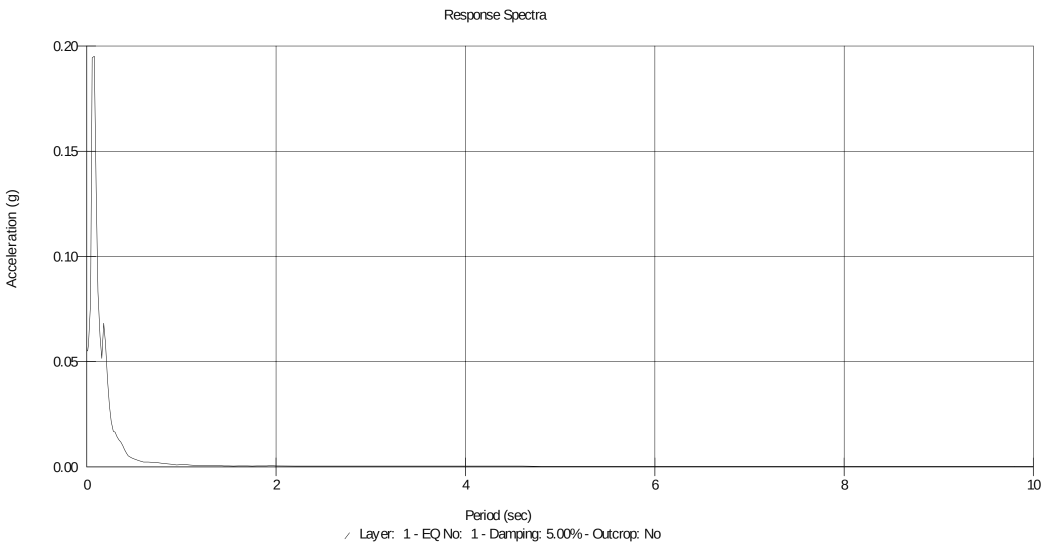


Figure 8.17: Ground response spectrum for RD3 (N-S) component; 5% damping.

T_s= 0.077 sec

Input Motion: DREFF (E-W) (10% Damping)

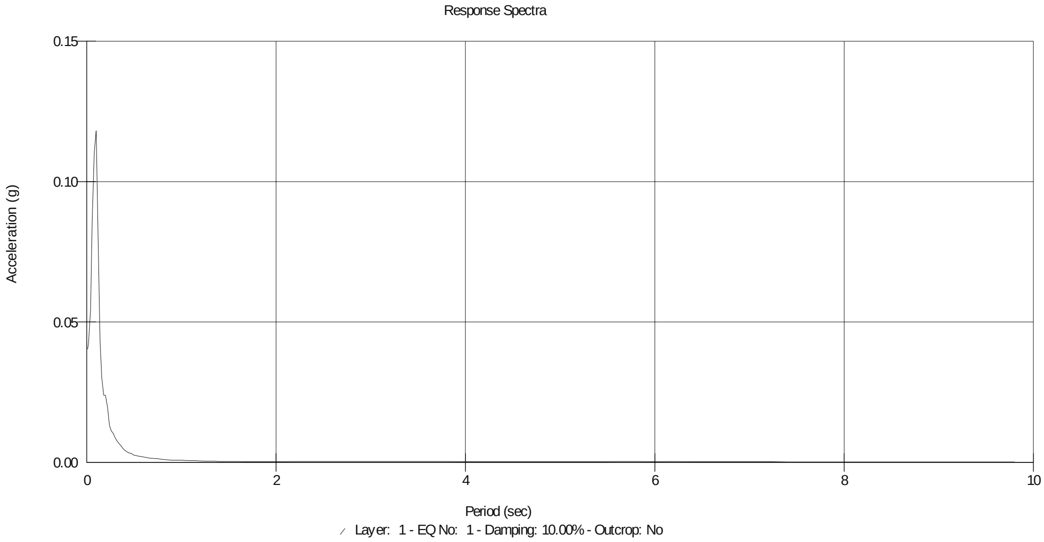


Figure 8.18: Ground response spectrum for RD3 (E-W) component; 10% damping.

T_s= *0.11 sec.*

Input Motion: DREFF (N-S) (10% Damping)

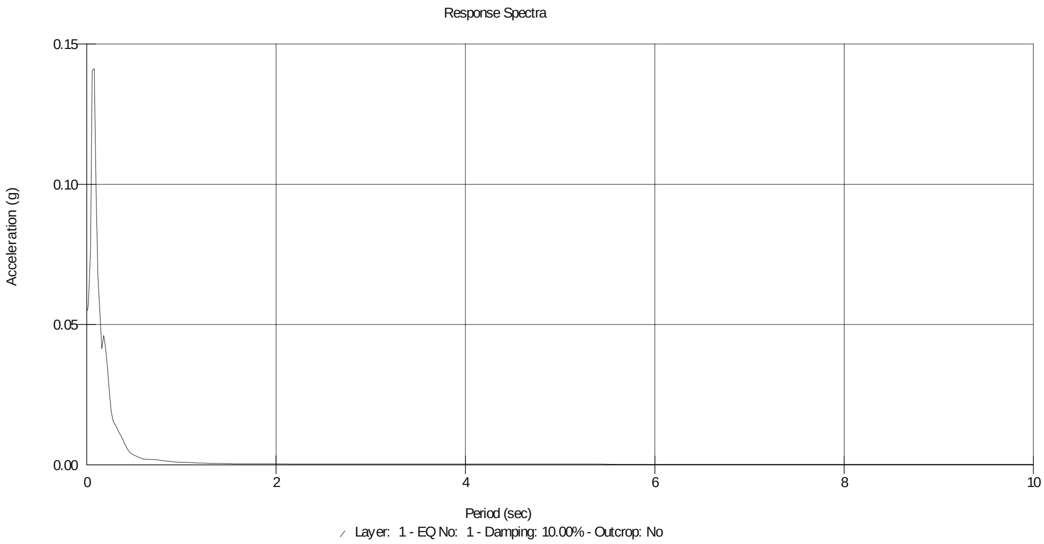


Figure 8.19: Ground response spectrum for RD3 (N-S) component; 10% damping.

T_s= *0077 sec.*

- Station Array DRA2

Input Motion: DREFF (E-W) (5% Damping)

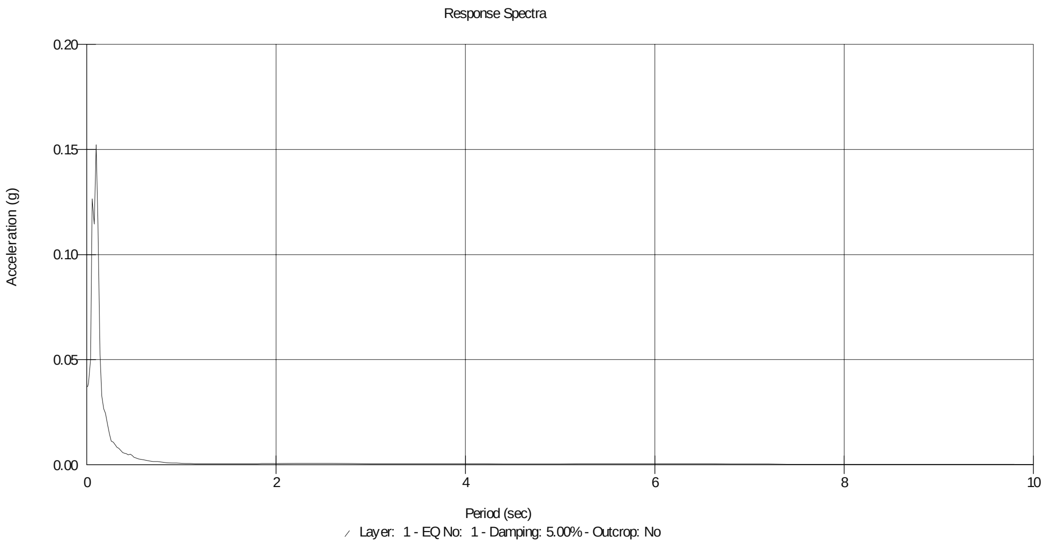


Figure 8.20: Ground response spectrum for DRA2 (E-W) component; 5% damping.

T_s= 0.098 sec.

Input Motion: DREFF (N-S) (5% Damping)

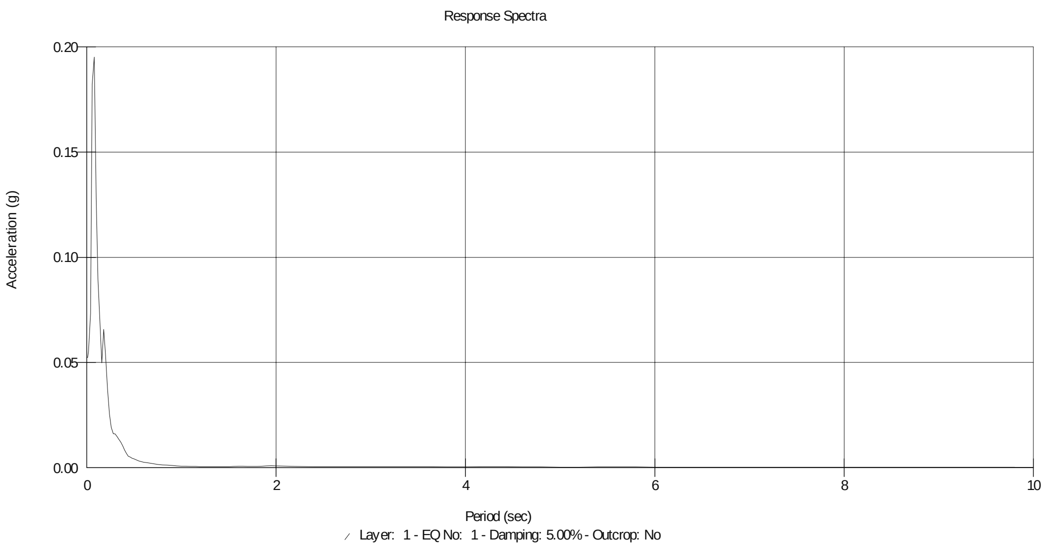


Figure 8.21: Ground response spectrum for DRA2 (N-S) component; 5% damping.

T_s=0.077 sec

Input Motion: DREFF (E-W) (10% Damping)

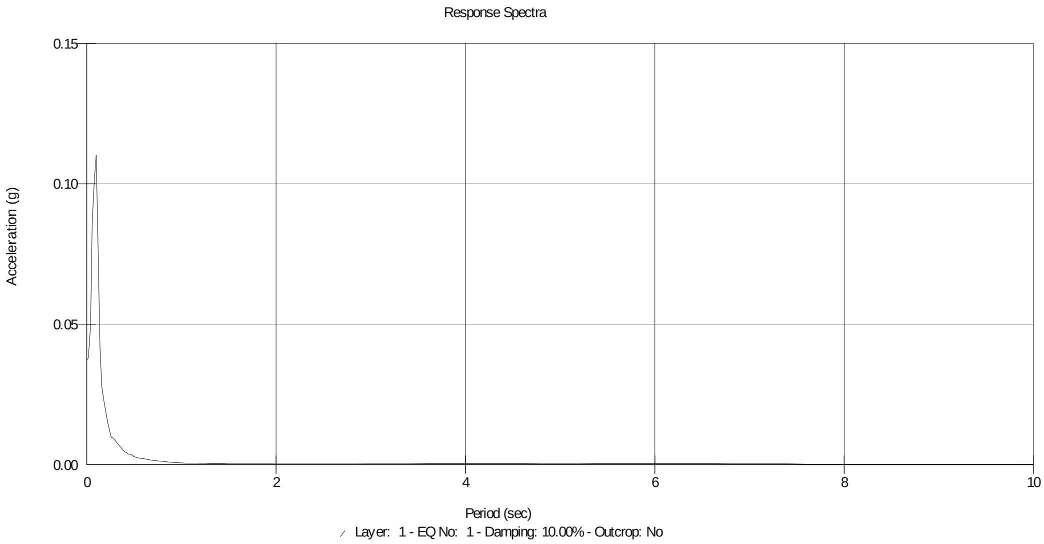


Figure 8.22: Ground response spectrum for DRA2 (E-W) component; 10% damping.

T_s= 0.11 sec.

Input Motion: DREFF (N-S) (10% Damping)

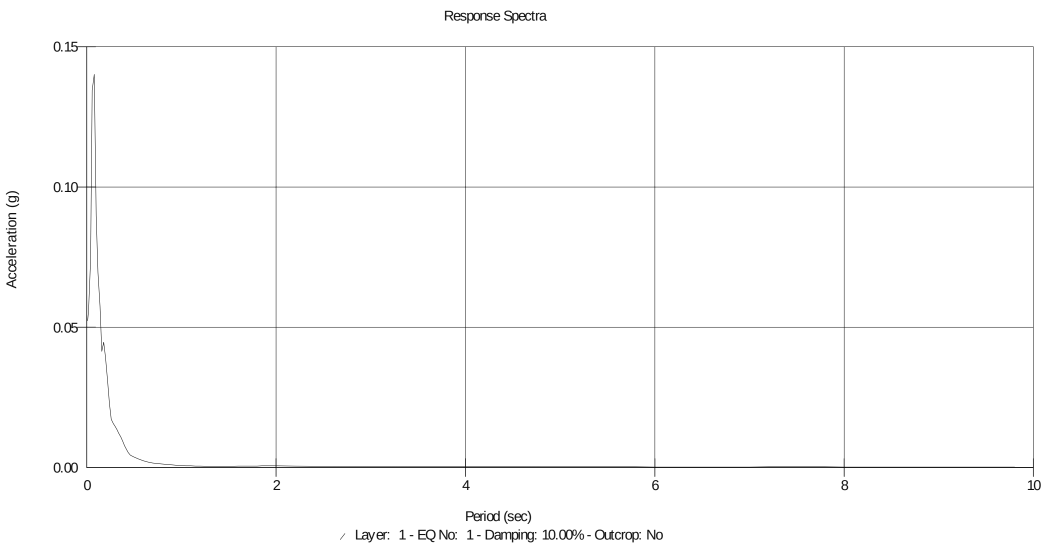
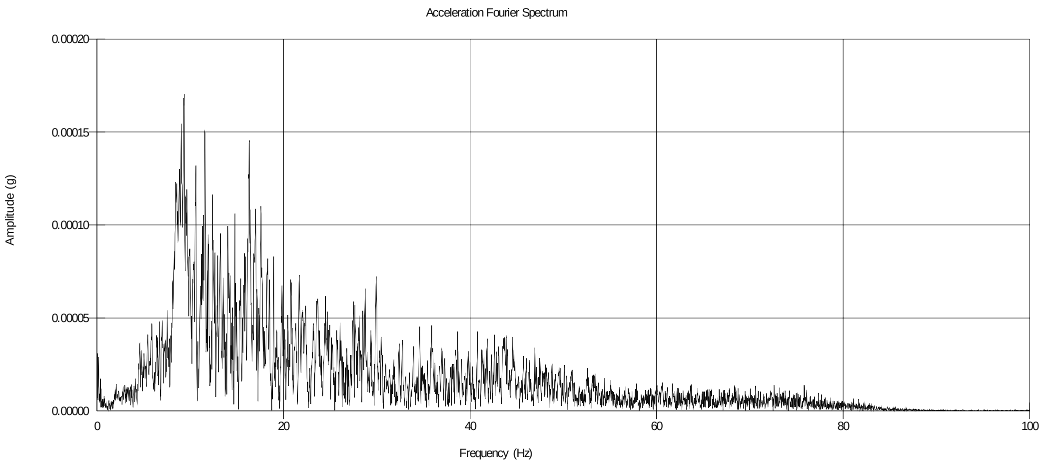


Figure 8.23: Ground response spectrum for DRA2 (N-S) component; 10% damping.

T_s=0.077 sec

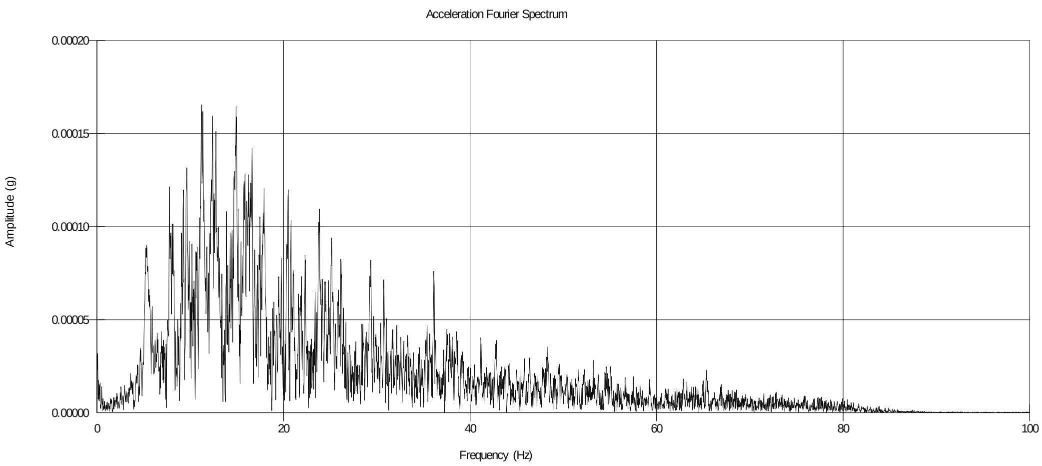
2. The following frequency domain spectra are the results of converting the earthquake records at each station from time domain to frequency domain

- Station DREFF



DREFFEW-FS f=9.37 T=0.107

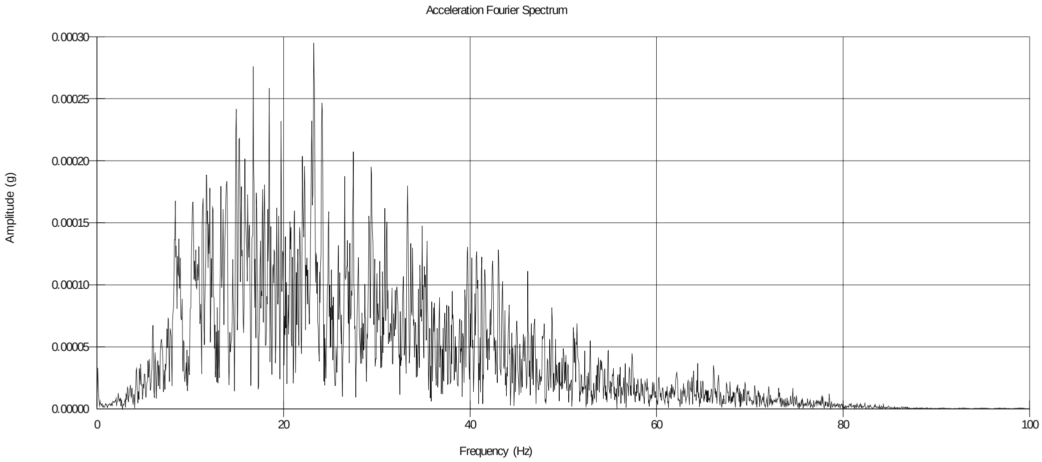
(a)



DREFFNS-FS f=11.22 T=0.089

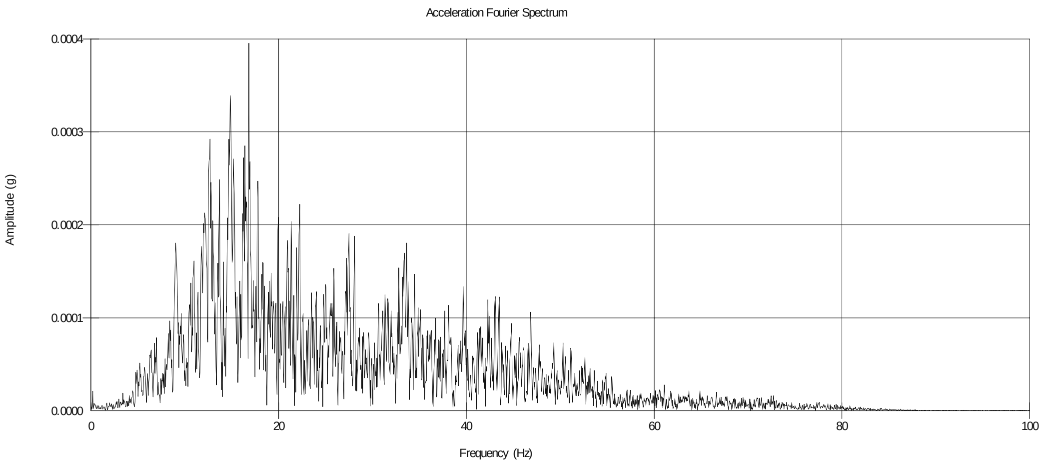
(b)

Figure 8.24: Frequency domain earthquake record of station DREFF; (a) (E-W) component, and (b) (N-S) component;



RD0EW f=22.24 T=0.043

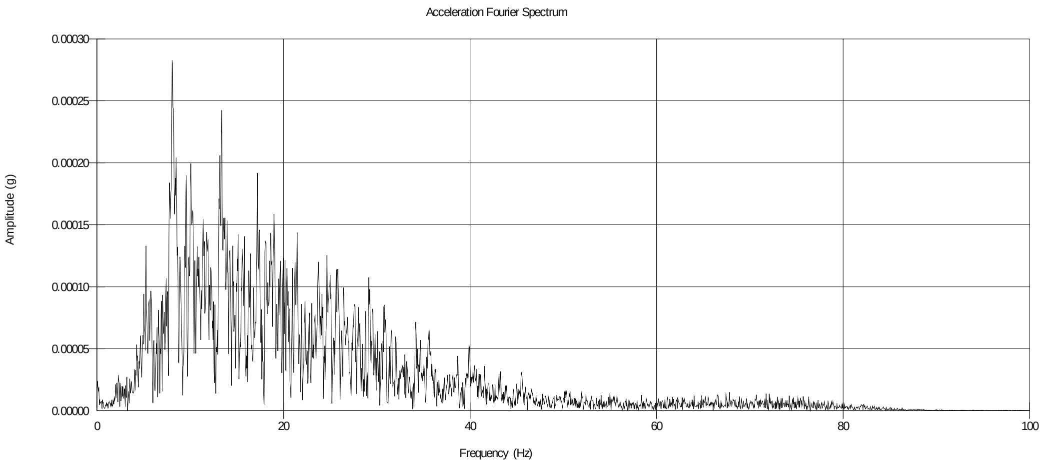
(a)



RD0NS f=16.84 T=0.059

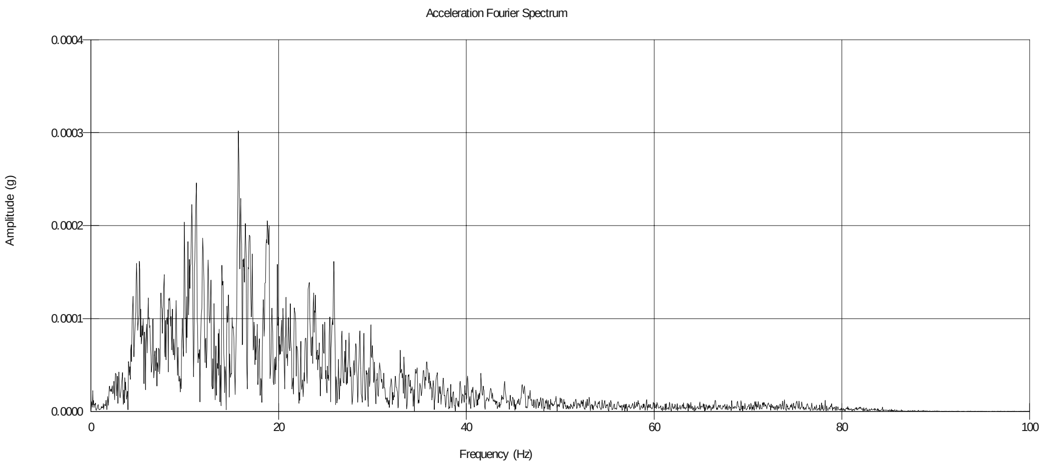
(b)

Figure 8.25: Frequency domain earthquake record of station RD0; (a) (E-W) component, and (b) (N-S) component;



RD2EW f=8.15 T=0.123

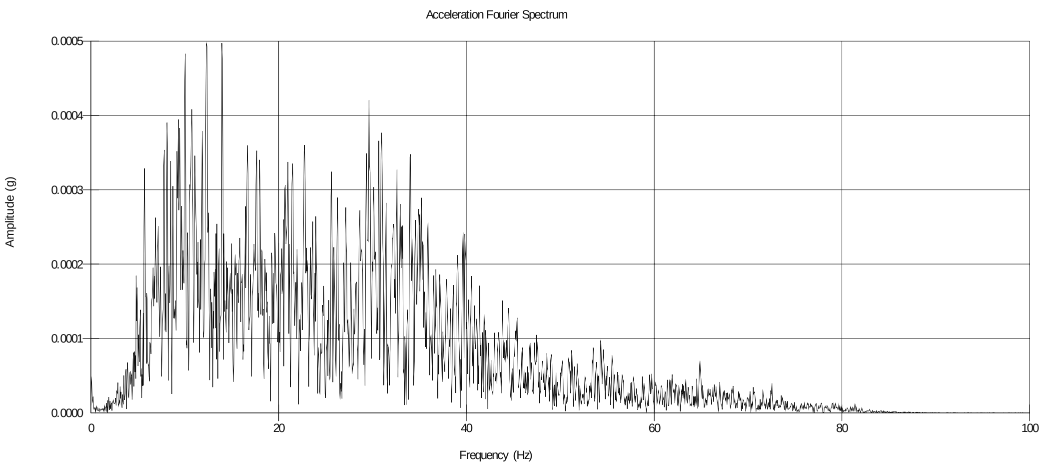
(a)



RD2NS f= 15.71 T=0.064

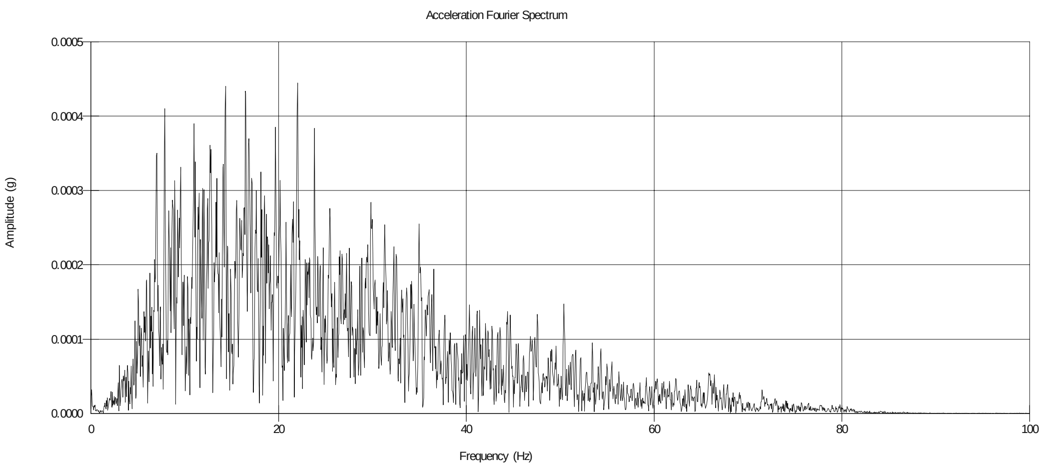
(b)

Figure 8.26: Frequency domain earthquake record of station RD2; (a) (E-W) component, and (b) (N-S) component;



RD3EW f=12.36 T= 0.081

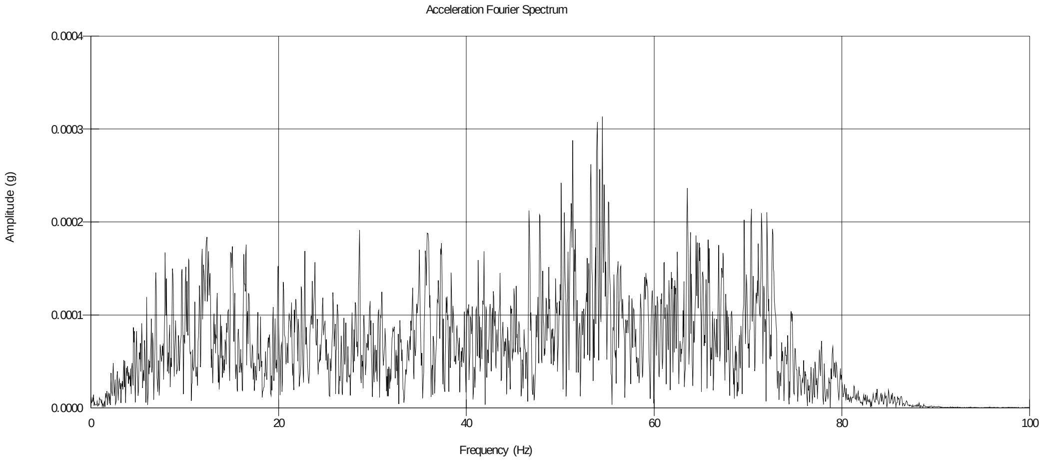
(a)



RD3NS f=22.05 T=0.046

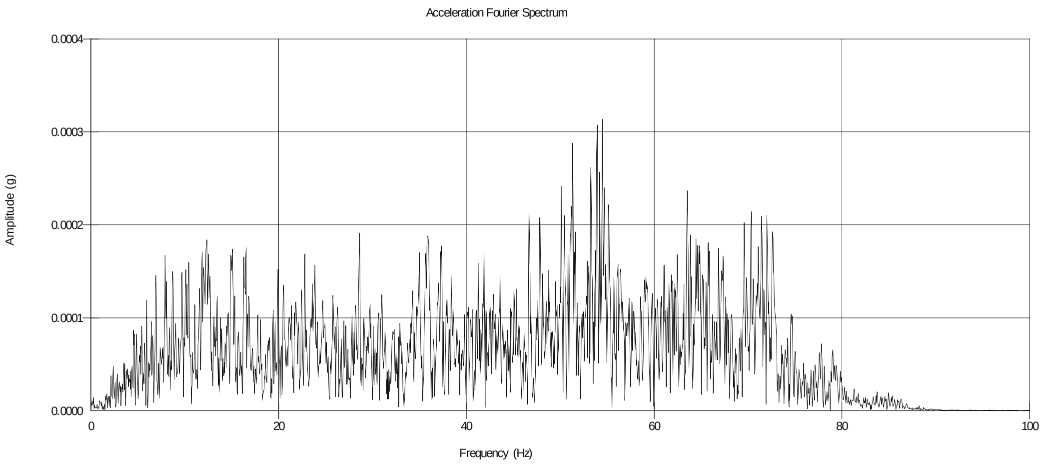
(b)

Figure 8.27: Frequency domain earthquake record of station RD3; (a) (E-W) component, and (b) (N-S) component;



DRA2EW f=54.48 t=0.018

(a)



DRA2NS f=59.78 T=0.017

(b)

Figure 8.28: Frequency domain earthquake record of station DRA2; (a) (E-W) component, and (b) (N-S) component;

8.2.3b Summary of the Results

1- Results of the Dynamic Site Response Analysis

Tables (8.8) to (8.11) present the site fundamental periods at each seismic station along the East-west array. These values were obtained from the ground response spectra that were generated by the dynamic site response analysis of the previous section.

A) East- west Components

- 5% Damping

Station	RD0	RD2	RD3	A2
Fund. Period (sec.)	0.098	0.098	0.08	0.08

Table 8.8: Fundamental periods for the east-west component of array earthquake (5% damping)

- 10% Damping

Station	RD0	RD2	RD3	A2
Fund. Period (sec.)	0.11	0.11	0.11	0.11

Table 8.9: Fundamental periods for the east-west component of Array earthquake (10% damping)

B) North-south Components

- 5% Damping

Station	RD0	RD2	RD3	A2
Fund. Period (sec.)	0.077	0.077	0.077	0.077

Table 8.10: Fundamental periods for the north-south component of array earthquake (5% damping)

- 10% Damping

Station	RD0	RD2	RD3	A2
Fund. Period (sec.)	0.077	0.077	0.077	0.077

Table 8.11: Fundamental periods for the north-south component of array earthquake (10% damping)

2- Frequency Domain Spectra Fundamental Periods

A) East-west Components

Station	DREFF	RD0	RD2	RD3	A2
Frequency Hz	9.37	23.24	8.15	12.36	54.48
Fundamental Period (sec.)	0.107	0.043	0.123	0.081	0.018

Table 8.12: Fundamental frequencies (and periods) for the north-south component of array earthquake

B) North-south Components

Station	DREFF	RD0	RD2	RD3	A2
Frequency Hz	11.22	16.84	15.71	22.05	59.78
Fundamental Period (sec.)	0.089	0.059	0.064	0.046	0.017

Table 8.13: Fundamental frequencies (and periods) for the north-south component of array earthquake

Chapter 9: Effects of Soil Cross-section Modeling Methods on Al-Durrah Design Response Spectra

9.1 General

In this Chapter the data analysis pertaining to the site soil information, NEHRP site classification, and the effects of site profiling on the design response spectra for the Al-Durrah site are presented. Other results that deal with the site fundamental period are presented and analyzed in Chapters 10 and 11. The Al-Durrah site data analysis presented in this Chapter includes the following:

1. Data from the SPT and the VES tests is analyzed to establish the Al-Durrah site soil characteristics and bed rock depth
2. Analysis and comparison of the NEHRP site classifications from the standard penetration tests (SPT), from the cross-hole (CH) tests, and from the Controlled Source Spectral Analysis of Surface Waves (CXW) tests
3. Determination and analysis of the Al-Durrah design response spectra based on the resulting different site classifications, As well as the data from the site dynamic response analysis (ProShake analysis).

9.2 Analysis of the Al-Durrah Standard Penetration Test (SPT) Results

9.2.1 The Al-Durrah site soil characteristics

Based on the SPT results that were presented in Table (7.1) and the soil testing of the disturbed samples from the SPT, the soils encountered in all borings were recent surfacial soils with occasional silt or sand. Local coralline limestone layers of different thickness were present at or near the surface of some borings. The soil deposits at Al-Durrah can be divided into two main categories based on the SPT blow counts (N):

1. Soil deposits with high N-values as in the case of borings D1, D2, D6, D8, and D12.
2. Soil deposits with medium to low N-values as in the case of borings D3, D4, D5, D7, D9, D10, and D11...

Comparison of borings D1 and D9 indicates that silty sand layers are dominant at depths ranging from 5 to 20 m below sea level. Figure (9.1) shows the main surfacial geological features of the Al-Durrah site, and Figure (9.2) shows a geological cross-section at Al-Durrah between borings D3 and D4.

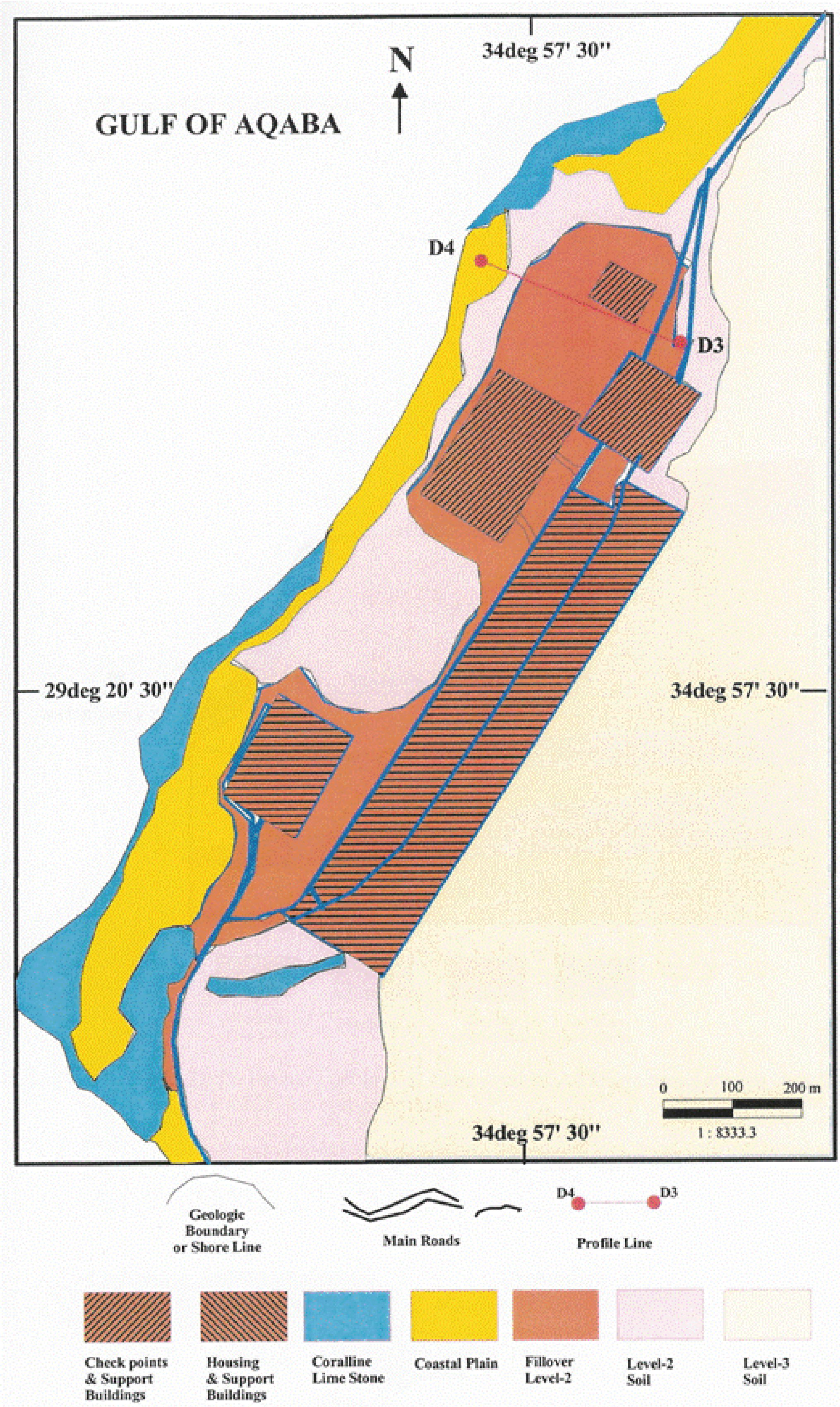


Figure 9.1: The main soil features of AL-Durrah

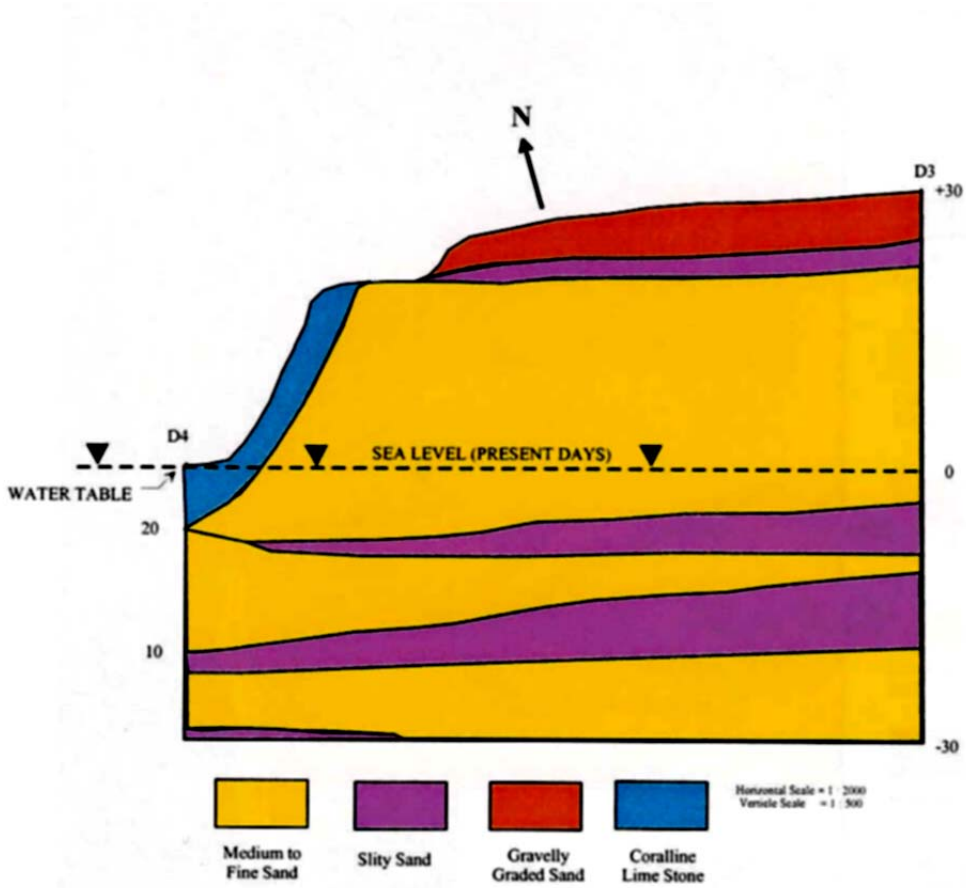


Figure 9.2: A geological cross-section of Al-Durrah between borings D3 and D4

9.2.2 Al-Durrah NEHRP-SPT Site Classification

NEHRP Provisions criteria for classifying sites according to the SPT results tests were introduced in Chapter (2). The criteria are presented again in Table (9.1) for convenience. Based on the results of the SPT borings' average number of blows ($\overline{N}$), that were presented in Table (7.2), the Al-Durrah soil site classifications are shown in Table (9.2)

.NEHRP Average SPT – Blows Number $\overline{N}$	Site Classification
$\overline{N} > 50$	C
$15 < \overline{N} < 50$	D
$\overline{N} < 15$	E

Table 9.1: NEHRP SPT-N value site classifications [3]

SPT Test location	NEHRP Average No. of blows	NEHRP Site Classification
D1	83.92	C
D2	67.57	C
D3	70.74	C
D4	34.48	D
D5	65.84	C
D6	80.84	C
D7	65.62	C
D8	92.85	C
D9	74.30	C
D10	43.76	D
D11	25.85	D
D12	92.01	C

Table 9.2: Summary of Al-Durrah NEHRP-SPT site classifications

Table (9.2) shows that Al-Durrah site has locations that can be classified as soil class C, and other locations that can be classified as soil class D. Twenty five percent of the SPT resulted in NEHRP site classification D, while the other seventy five percent resulted in site classification C. The difference between the two classes in terms of the response design acceleration can be significant. This is demonstrated when the design response spectra are constructed for Al-Durrah site subsequently.

9.3 The Controlled Source Spectral Analysis of Surface Waves (CXW) and the Cross-hole (CH) Tests Results

9.3.1 Comparison of the Shear Wave Velocities (SWV) Profiles from the CXW and CH Tests

SWV profiles were established for a number of locations within Al-Durrah by two different methods. Fourteen CXW and four CH tests were conducted at the site. Each of the CH tests was accompanied by one of the CXW tests and one of the SPT. The CH tests shear wave velocity (SWV) profiles were corrected for the presence of casing and/or voids around the casing according to the procedure that was presented in Chapter 7. Figures (9.3) to (9.7) show comparisons of the SWV profile obtained by cross-hole tests (both corrected and uncorrected), with the profiles obtained by CXW tests at the same locations. Figures (9.3) to (9.7) show that the cross-hole SWV profiles tend to be lower than those of the CXW, especially at shallow depths.

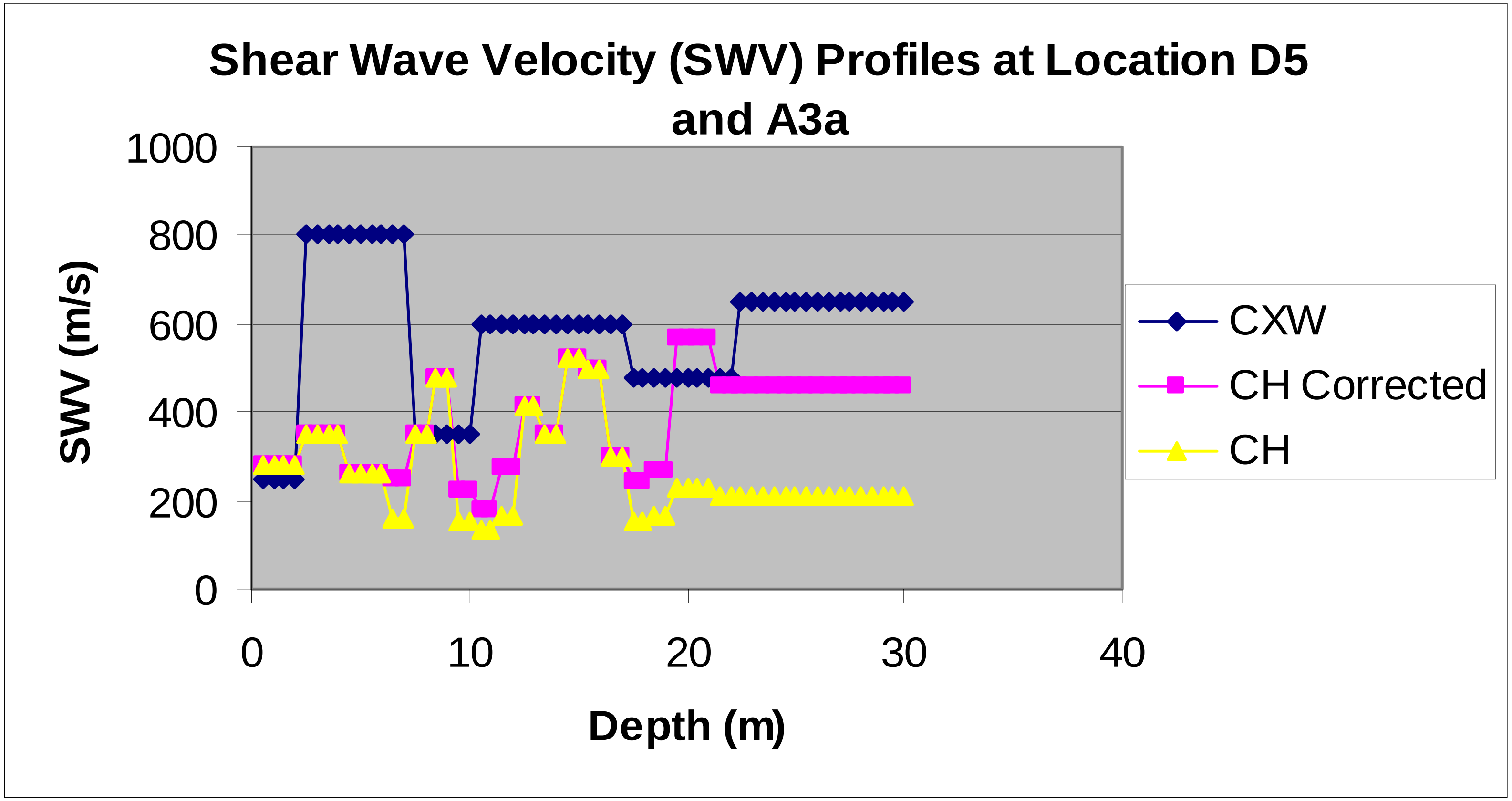


Figure 9.3: Comparison of shear wave velocity profiles for CXW, uncorrected CH, and corrected CH at D5 and A3a location

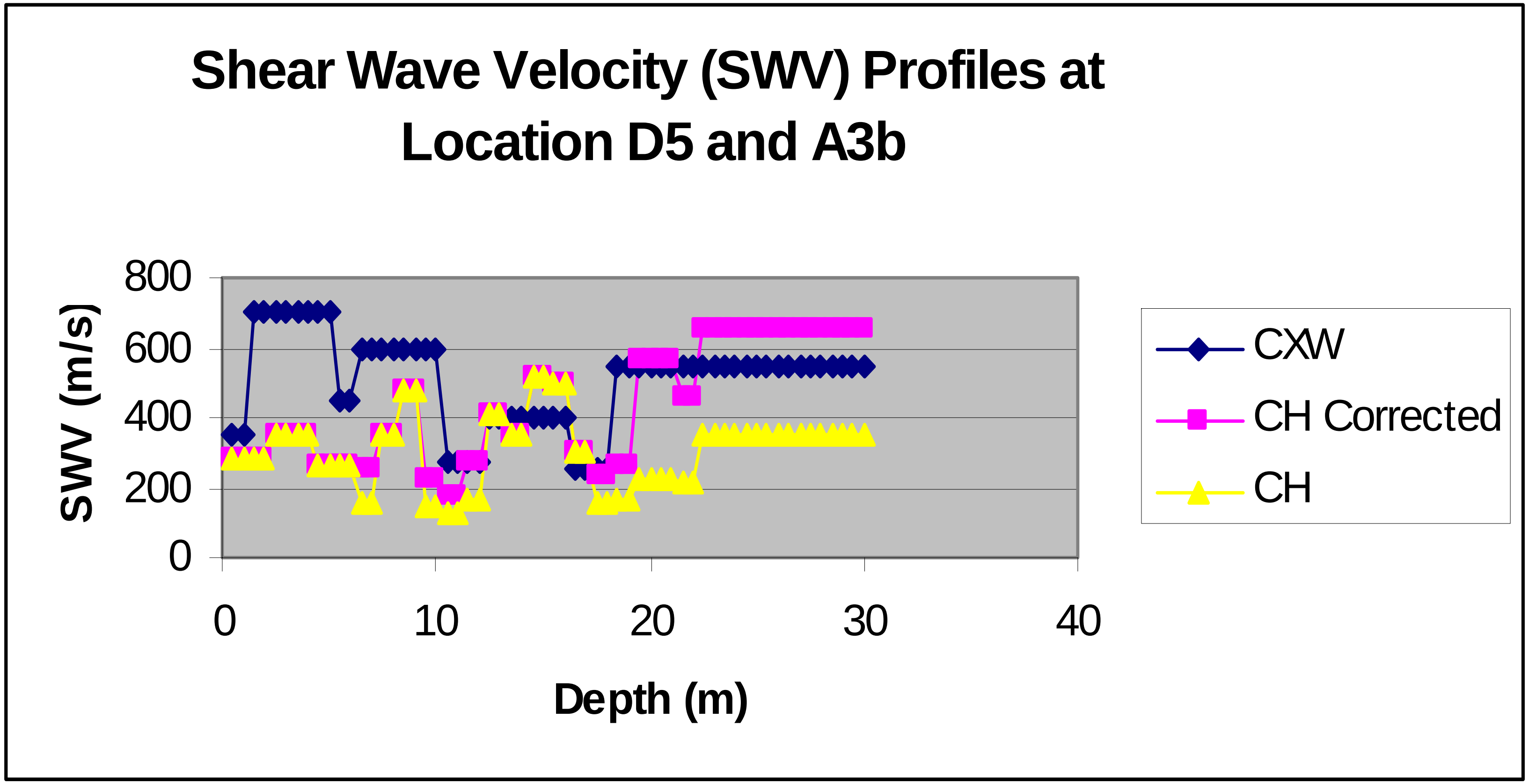


Figure 9.4: Comparison of shear wave velocity profiles for CXW, uncorrected CH, and corrected CH at D5 and A3b location

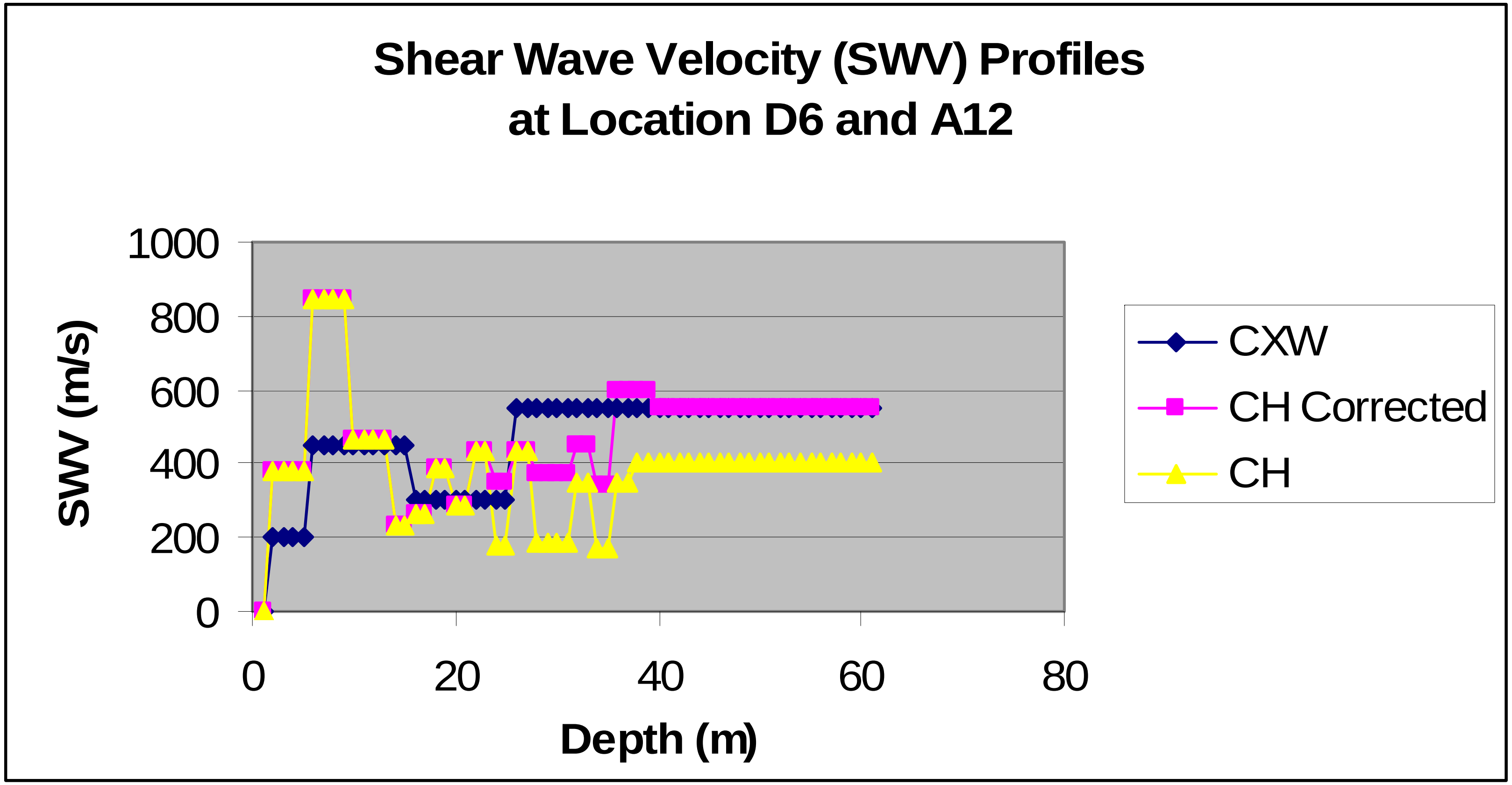


Figure 9.5: Comparison of shear wave velocity profiles for CXW, uncorrected CH, and corrected CH at D6 and A12 location

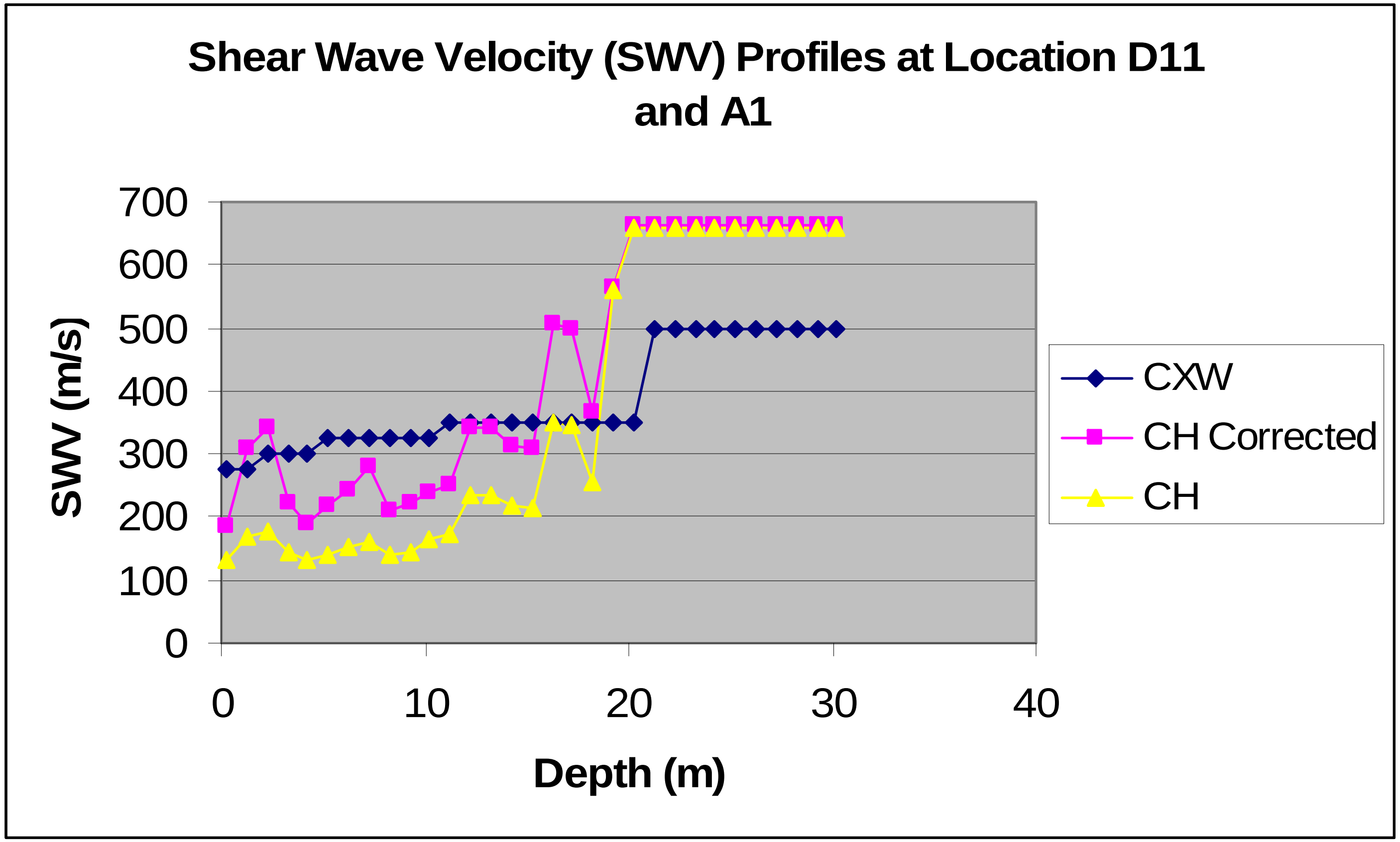


Figure 9.6: Comparison of shear wave velocity profiles for CXW, uncorrected CH, and corrected CH at D11 and A1 location

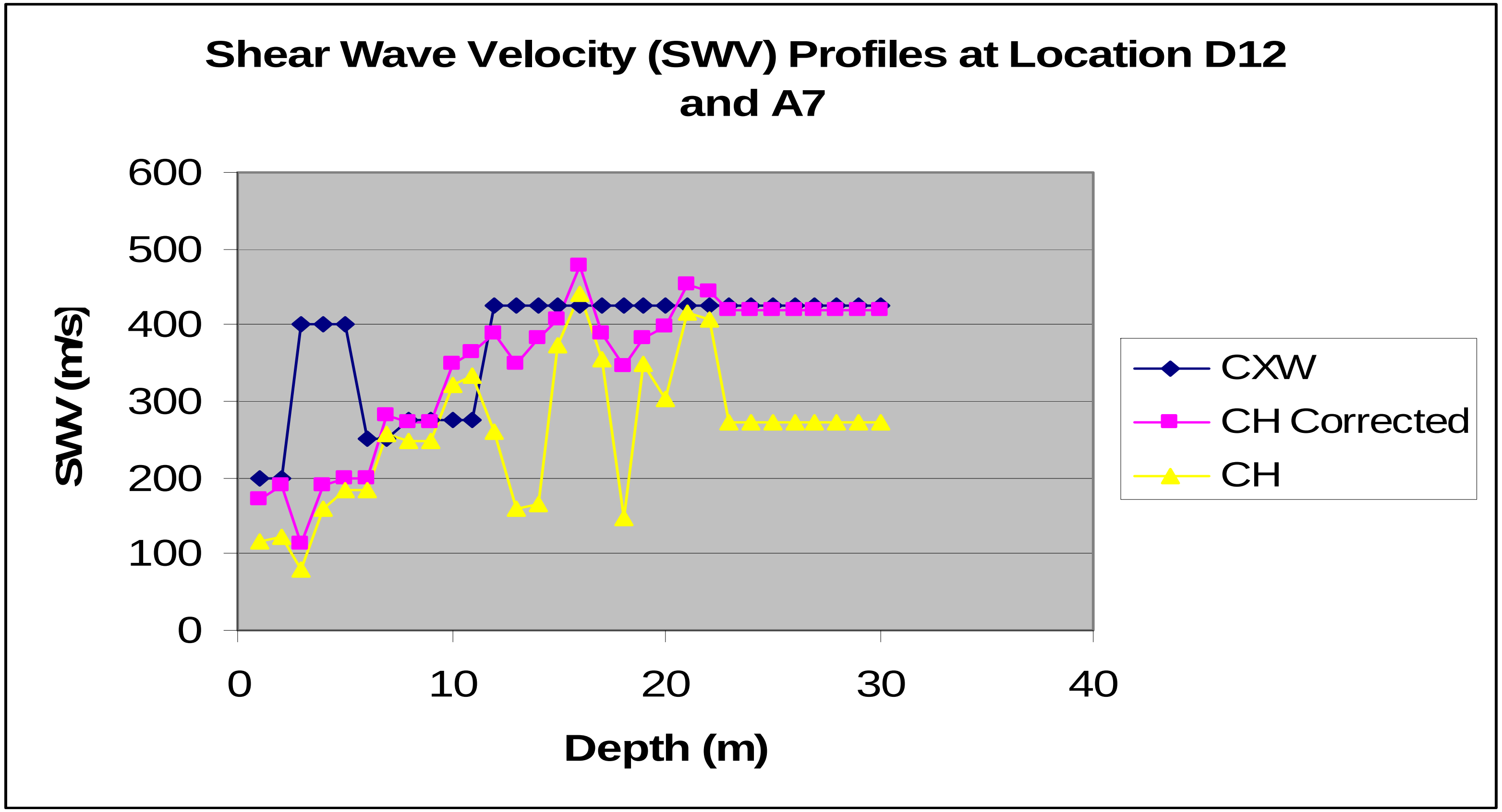


Figure 9.7: Comparison of shear wave velocity profiles for CXW, uncorrected CH, and corrected CH at D12 A7 location

9.3.2 The Al-Durrah Site Classification by the CXW and CH Sear Wave Velocity (SWV) Profiles

The average NEHRP SWV ($\overline{v}_s$) that was calculated in sections (7.1.2) and (7.1.3) for the cross-hole and CXW tests, respectively, are presented simultaneously in Table (9.3) for comparison. These values were used in accordance with NEHRP General procedure (section 2.1.1 of Chapter 2) to determine NEHRP site classification for each test location. Chapter (2) presented NEHRP provisions criteria for site classification according to the site average SWV. The criteria are shown in Table (9.4) again for convenience [3]. The resulting NEHRP site classification for the CXW, SPT, and the cross-hole tests are shown in Table (9.5).

Test Designation		NEHRP Average SWV (m/s)	
SPT	**CXW**	**CXW**	**Cross-Hole**
D1	A10	420.	
D2	A6	439	
D3	A14	410	
D4	A11	422	
D5	A3a	465	316
D5a	A3b	523	316
D6	A5	333	438
D7	A13	466	
D8	A12	424	
D9	A4	476	
D11	A1	371	381
D12	A7	353	223
N/A	A8	392	
N/A	A9	387	

Table 9.3: Al-Durrah NEHRP average SWV for the CXW and cross-hole tests

Site NEHRP Average SWV (m/s) $\bar{v}_s$	Site Classification
$\bar{v}_s > 1500$	A
$760 < \bar{v}_s \leq 1500$	B
$360 < \bar{v}_s \leq 760$	C
$180 \leq \bar{v}_s \leq 360$	D
$\bar{v}_s < 180$	E
Site specific evaluation	F

Table 9.4: NEHRP average SWV site classifications [3]

Test Designation		The Al-Durrah Site NEHRP Soil Classification		
SPT	**CXW**	**CXW**	**SPT**	**Cross-hole**
D1	A10	C	**C**	
D2	A6	C	**C**	
D3	A14	C	**C**	
D4	A11	C	***D***	
D5	A3a	C	**C**	*D*
D5a	A3b	C	**C**	*D*
D6	A5	*D*	**C**	C
D7	A13	C	**C**	
D8	A12	C	**C**	
D9	A4	C	**C**	
D10	N/A	N/A	***D***	
D11	A1	C	***D***	C
D12	A7	*D*	**C**	*D*
N/A	A8	C		
N/A	A9	C		

Table 9.5: Al-Durrah NEHRP site classifications by CXW, SPT, and CH tests

The SPT site classification results (Table 9.2) showed that SPT tests at different locations within the site can yield different soil classifications. Table (9.5) presents NEHRP site classification for the CXW, the SPT, and the CH tests. Two CXW tests, representing 14.3% of the tests, resulted in site classification D, while the other 12 tests, representing 85.7% of the tests resulted in site classification C. The corresponding percentages for the SPT tests are 25% and 75% respectively. The CH tests resulted in 50% of the tests yielding site Class C, and the other 50% yielding site class D (note that locations D5 and D5a have the same CH test). Table (9.5) indicates that performing different tests at one specific location could yield different soil classifications for that same location. The CXW and SPT tests results classified location D5 as NEHRP site class C, while the cross-hole test result classified the same location as site class D. Test locations D6, D11, and D12 also showed disagreement between the results of the three tests leading to soil classifications of both C and D at each location. The difference between soil class C and soil class D in terms of the site design response spectra is addressed in the following section.

9.4 Effects of Soil Cross-sectional Modeling Methods on the Site Design Response Spectra.

9.4.1 Introduction

The previous section demonstrated that performing different site soil cross-sectional modeling methods at one location can lead to different site classifications for that same location. This section examines the possible effects of this result on the site design response spectra. NEHRP Provisions procedure for generating a site design response spectra was presented in Chapter (2). The method is based on the site classification, its short period acceleration (S_S), and its one second acceleration (S_1). NEHRP Provisions maps provide S_S and S_1 for the U.S. and its territories. The values of S_S and S_1 in NEHRP maps are for site class B, which can be corrected for other site classes using NEHRP factors F_a and F_v that are provided by the Provisions. Tables (9.6) and (9.7) present the values of F_a and F_v, respectively.

Site Class	**Mapped Maximum Considered Earthquake Spectral Response Acceleration at Short Periods (S_S)**				
	$S_S \leq 0.25$	**$S_S = 0.50$**	**$S_S = 0.75$**	**$S_S = 1.00$**	**$S_S \geq 1.25$**
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9

Table 9.6: Values of NEHRP *Fa* [3]

Site Class	**Mapped Maximum Considered Earthquake Spectral Response Acceleration at 1 Second Periods (S_1)**				
	$S_1 \leq 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 1.00$	$S_1 \geq 0.5$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4

Table 9.7: Values of NEHRP *Fv* [3]

There are no equivalent maps for the Al-Durrah site. The site short period acceleration, S_S, and the one second acceleration, S_1, for Al-Durrah were determined from the site dynamic response analysis that was presented in section (8.1.2d). In order to follow NEHRP procedure for site classification correction, the Al-Durrah S_S and S_1 values were assumed to correspond to site class B to conform to NEHRP maps values. This assumption was made so that Al-Durrah S_S and S_1 can be used with NEHRP site correction factors for other site classes to illustrate the effects of a site classification on its design response spectra. This assumption is reasonable because the objective of this analysis is to examine the implications of selecting one site class over another, and not establish the actual values of S_S and S_1 of the Al-Durrah site.

9.4.2 Effects of the Al-Durrah Site soil cross-sectional modeling methods on its Design Response Spectra

Chapter (8) presented the dynamic site response analysis of Al-Durrah site that was performed using two synthetic earthquakes (RAN230 and RAN330). In addition, the results of the dynamic response analysis including the Al-Durrah S_S and S_1 values were also presented in Chapter (8.). The S_S and S_1 values for Al-Durrah site profiles are reproduced here in Table (9.8) for convenience. Table (9.8) presents the results of the dynamic site response analysis for each of the two synthetic earthquakes (RAN230 and RAN330) using two damping ratios of 5% and 10%.

Test Location	Earthquake RAN230		Earthquake RAN330	
	Ss	S1	Ss	S1
D1CXW	0.12	0.013	0.083	0.009
D2CXW	0.12	0.013	0.099	0.01
D3CXW	0.13	0.013	0.11	0.01
D4CXW	0.11	0.013	0.1	0.01
D5ACXW	0.15	0.013	0.1	0.01
D5CXW	0.1	0.013	0.09	0.009
D5CH	0.1	0.014	0.085	0.01
D6CXW	0.12	0.014	0.095	0.011
D6CH	0.12	0.013	0.091	0.01
D7CXW	0.15	0.013	0.096	0.01
D8CXW	0.14	0.013	0.095	0.009
D9CXW	0.12	0.013	0.093	0.009
D11CXW	0.11	0.014	0.1	0.01
D11CH	0.18	0.013	0.14	0.01
D12CXW	0.1	0.014	0.092	0.01
D12CH	0.1	0.014	0.11	0.013

Table 9.8: Short period (S_s), and one second (S_1), accelerations for Al-Durrah

Al-Durrah NEHRP site classification results from section (9.2.3) along with the values of S_S and S_1, were used to construct the Al-Durrah site design response spectra. NEHRP Provisions require a site to be classified by the general procedure if its short period acceleration S_s is greater than 0.15, or if its one second acceleration, S_1, is greater than 0.4. From Table (9.8), the values of S_S and S_1 for location D11CH under earthquake RAN230 and 5% damping were selected to be used in the NEHRP generalized method to determine Al-Durrah's NEHRP design response spectra. These values were selected because they include the largest S_S value of all the profiles (S_s = 0.18g), which also exceeds the NEHRP limit ($S_S > 0.15$) [3].

Al-Durrah NEHRP design response spectra for soil classes C and D were obtained following the procedure of NEHRP Provisions section 4.1.2.4 that were presented in Chapter 2, as follows:

From Table (9.8) and for test location D11CH under earthquake RAN330:

$S_s = 0.18$

$S_1 = 0.013$

These values were assumed to correspond to site class B. In order to adjust the values of S_S and S_1 for site classes C and D, the correction factors F_a for S_S, and F_v for S_1 were obtained from Tables (9.6) and (9.7). The proper values of F_a and F_v for site classes C and D were determined as follows [3]:

$S_s = 0.18 \leq 0.25$ (Table (9.6))

$S_1 = 0.013 \leq 0.1$ (Table (9.7))

From Table (9.6):

$(F_a)_C = 1.2$ for class C

and

$(F_a)_D = 1.6$ for class D

From Table (9.7):

$(F_v)_C = 1.7$ for class C

and

$(F_v)_D = 2.4$ for class D

The maximum considered earthquake spectral response acceleration for short period, S_{MS}, and at one second S_{M1}, adjusted for site class effects are defined as:

$S_{MS} = F_a S_s$

and

$S_{M1} = F_v S_1$

From NEHRP Provisions section 4.1.2.5, the design earthquake spectral response acceleration at short period, S_{DS}, and at one second, S_{D1}, are defined as:

$$S_{DS} = \frac{2}{3} S_{MS}$$

and

$$S_{D1} = \frac{2}{3} S_{M1}$$

The values of S_{DS} and S_{D1} for the soil classifications under consideration are:

- For soil class C: $S_{DS} = 0.144$

  And $S_{D1} = 0.0147$

- For soil class D: $S_{DS} = 0.192$

And $S_{D1} = 0.0208$

Defining the following parameters as:

T = The fundamental period of the structure

$T_0 = 0.2S_{D1}/S_{DS}$

$T_S = S_{D1}/S_{DS}$

For soil class C: $T_0 = 0.0204$ sec. and $T_S = 0.1013$ sec

For soil class D: $T_0 = 0.0217$ sec. and $T_S = 0.1083$ sec

The design response spectra, S_a curves for soil classes C and D are developed as follows [3]:

1. For periods equal or less than T_0:

$$S_a = 0.6\frac{S_{DS}}{T_0}T + 0.4\,S_{DS}$$

2. For periods equal to or greater than T_0 and less than or equal to T_S:

$$S_a = S_{DS}$$

3. For periods greater than T_S:

$$S_a = \frac{S_{D1}}{T}$$

The resulting design response spectra for soil classes C and D are shown in Figure (9.8).

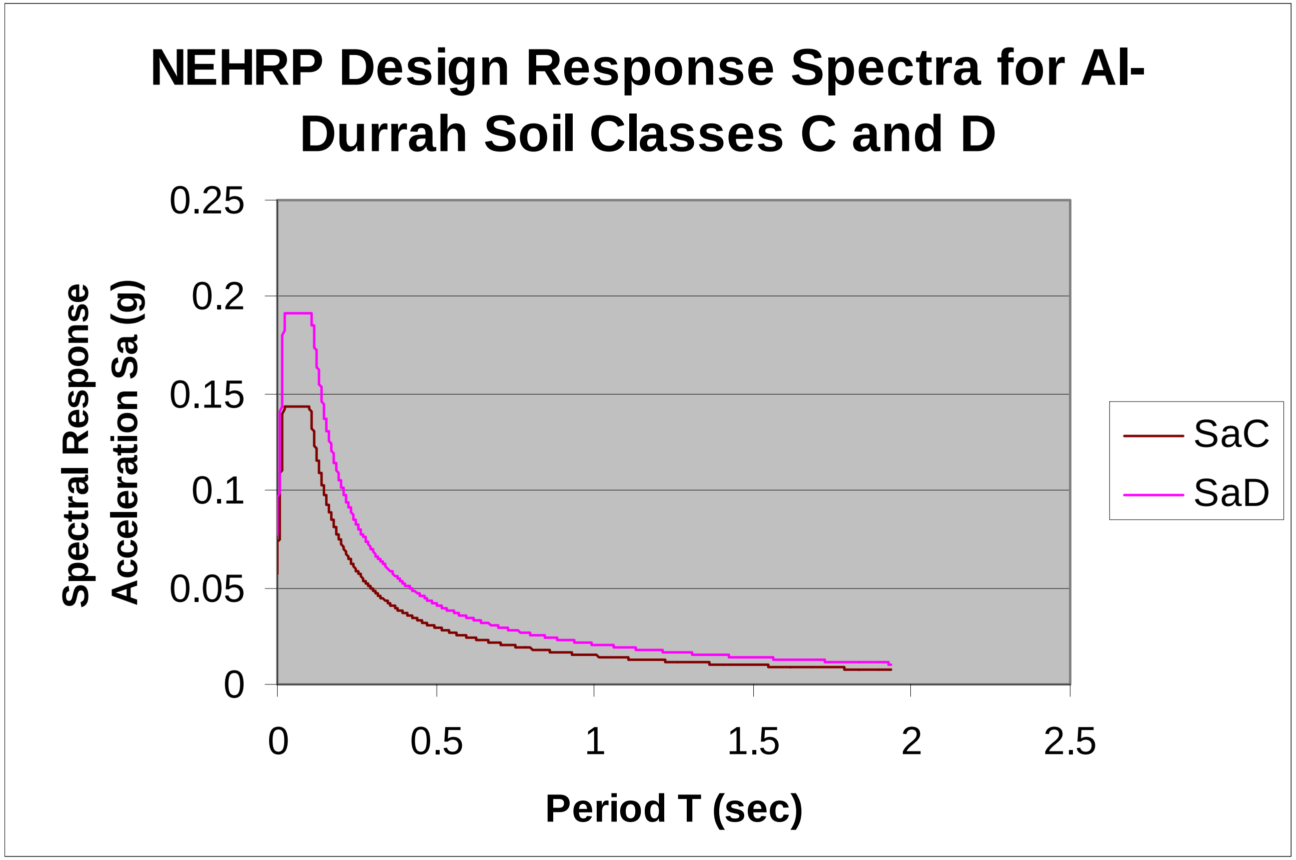


Figure 9.8: Al-Durrah NEHRP Design response spectra for soil classes C and D based on ProShake analysis results

The difference between the two spectra in terms of spectral response acceleration varies with the period. However, Figure (9.8) shows that the maximum difference in terms of spectral response acceleration occurs at: T= 0.1083 sec., which corresponds to T_s of site class D.

At this period:

$(Sa)_D$ = 0.192g

$(Sa)_C$ = 0.136 g

The Maximum difference between the two curves is:

$(Sa)_D - (Sa)_C = 0.192 - 0.136 = 0.056$ g

This maximum difference is the equivalent of 41% of the value of the spectral response acceleration $(S_a)_C$ of site class C.

9.4.3 Evaluation of the Results

To compare the results of the previous section with actual NEHRP sites, the same analysis for soil classes C and D was performed for two actual locations that were selected from NEHRP maps. The locations were selected so that both low and high values of S_S and S_1 are included. The first location was selected in Region 2 (the Mid-west), and has the following site information:

- Site location coordinates:

  Latitude: 40°

  Longitude: -113.5°

- Site mapped acceleration:

$$S_S = 0.29g$$

$$S_1 = 0.096$$

The design response spectra for site classes C and D for this location were obtained following the same NEHRP procedure that was undertaken for the Al-Durrah site. The Design response spectra for site classes C and D at this location are shown in Figure (9.9).

Figure (9.9) shows that the maximum difference in terms of spectral response acceleration occurs at:

T= 0.507 sec., which corresponds to T_s for class D.

The Maximum difference between the two curves is:

0.3031-0.2147 = 0.0884g

Again, this difference is the equivalent of 41% of the value of the spectral response acceleration of site class C at this location, which agrees with the Al-Durrah site results.

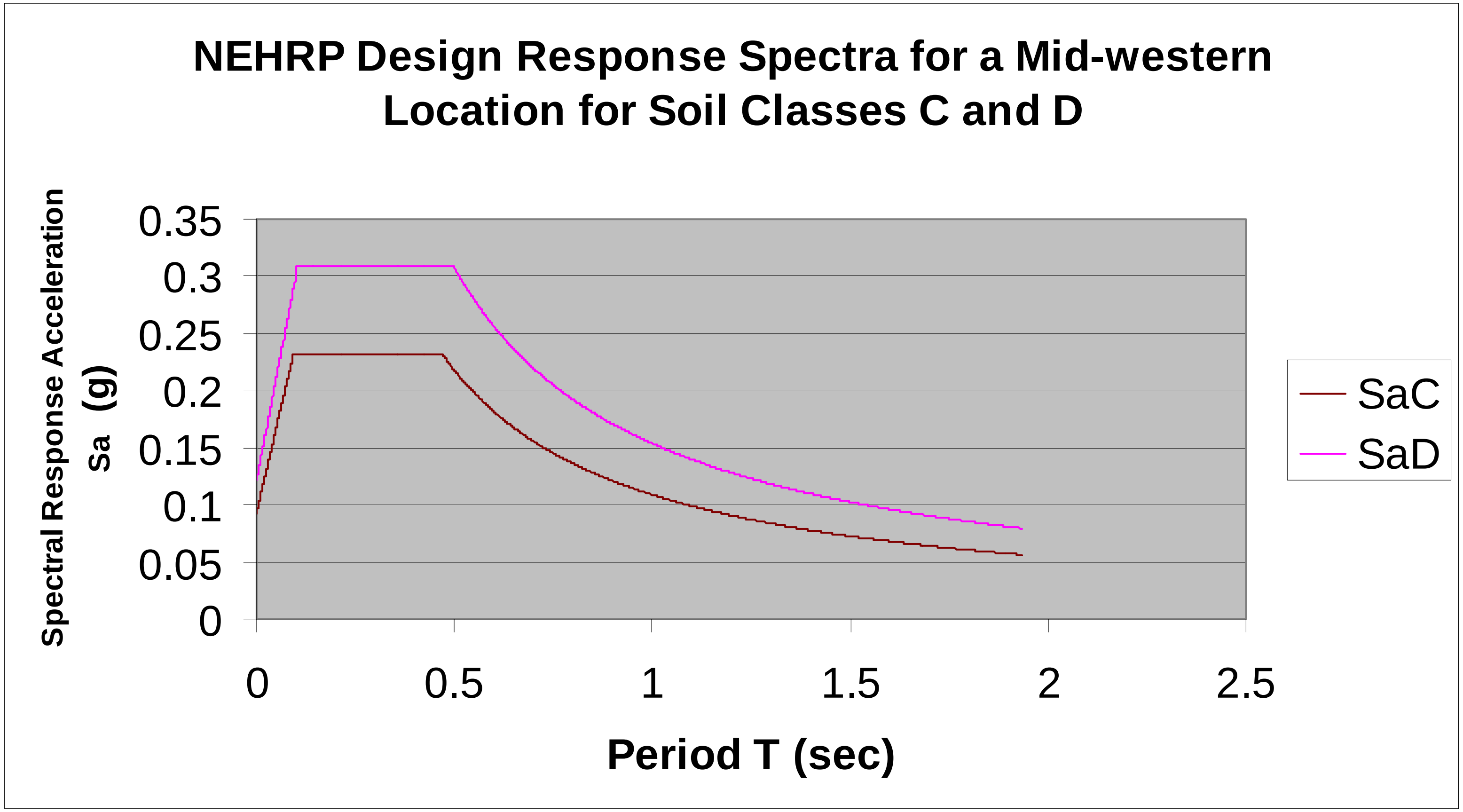


Figure 9.9: Design response spectra for site Classes C and D for a site in Region 2 of NEHRP maps

The second location was selected from NEHRP maps for Region 1 (Southern California). The site information is as follows:

- Site location coordinates:

  Latitude: = 33^{o}

  Longitude: -115^{o}

- Site mapped accelerations:

  $S_S = 0.97$g

  $S_1 = 0.303$g

The Design response spectra for site classes C and D for this location are shown in Figure (9.10).

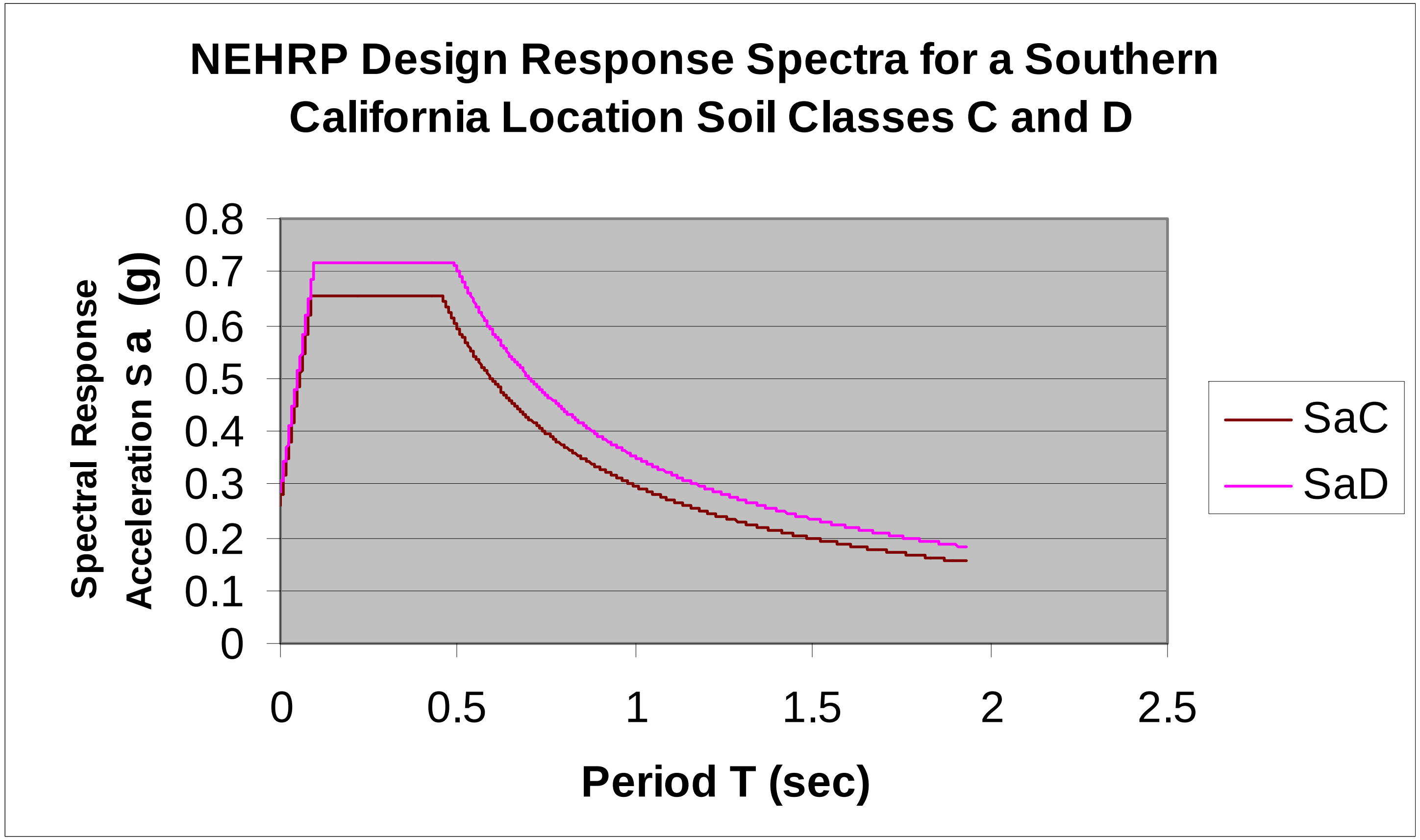


Figure 9.10: Design response spectra for site Classes C and D for a site in Southern California of NEHRP maps

Figure (9.10) shows that the maximum difference in terms of spectral response acceleration occurs at:

T= 0.489 sec., which corresponds to T_s for class D.

The Maximum difference between the two curves is:

0.719-0.607 = 0.112 g

This difference is the equivalent of over18% of the value of the spectral response acceleration of site class C at this location.

The maximum difference between each pair of curves in the previous examples reflects the largest possible increase in the value of (S_a) due to selecting site class D instead of site class C. It can be seen from Tables (9.6) and (9.7) that the design response spectrum for a given location depends on the site classification and the values of S_S and S_1 at the location. Since S_S and S_1 are allocated constants for each location within the NEHRP maps, site classification becomes the critical factor in determining a site design response spectrum.

Table (9.5) shows that different tests at the Al-Durrah site locations D4, D5, D6, D11, and D12, resulted in different site classifications for each location. Each test location can be classified as site class C or site class D. However, as demonstrated by the previous examples, the difference in the value of the spectral acceleration between classifications C and D can be as high as 41%. Different soil profiling methods at a specific location can lead to different NEHRP site classifications for the same specific location. Selecting one site classification over another for the same location can lead to a significant overestimation (or underestimation) of the value of the spectral response acceleration. This is a clear indication of the effects of different soil cross-sectional modeling methods on the site design response spectra. If no further soil testing is possible or desirable, then the lower site classification (such as site class D in Al-Durrah case) must be selected despite the implications of higher costs.

Chapter 10: Effects of Soil Cross-section Modeling Methods on Al-Durrah Site Fundamental Period

10.1 General

This Chapter examines the effects of the different soil cross-sectional modeling methods on the site fundamental period. The Al-Durrah site shear wave velocity (SWV) profiles were established by the following methods:

a). The Controlled Source Spectral Analysis of Surface Waves (CXW)

b). The cross-hole (CH) tests

These profiles were used to determine the site fundamental period by:

i. The approximate method

ii. The dynamic site response analysis (ProShake)

The Approximate Method background and procedure were presented in Chapter 3. The computer program (ProShake) that was used for Al-Durrah dynamic site response analysis, was also introduced in Chapter 3. The two synthetic earthquakes, designated as RAN230 and RAN330, that were used in the analysis were introduced in Chapter 8. In addition, the site fundamental period was estimated by the microtremors method. The microtremors method background and procedure were presented in Chapter 3, and the resulting plots of the Al-Durrah site microtremors records plots were presented in Chapter 7. The results of the three methods of determining the Al-Durrah site fundamental period including the approximate method, the microtremors ratio spectra, and the dynamic site response analysis are regrouped, tabulated, and analyzed in this Chapter. Initially, the results of the methods are analyzed separately. The objective of this part of the analysis is to examine the effects of modeling the soil cross-section at the same location by different methods, such as the .CH and CXW tests, on the values of the site fundamental periods. Following this analysis is a comparative analysis of all three methods. The objectives of this part of the analysis are to compare the results of the three methods, and the effects of using each method on the site fundamental period.

10.2 The Al-Durrah Site Fundamental Period

10.2a The Al-Durrah Site Cross-section Modeling

The results of the Standard Penetration Test (SPT), the Vertical Electric Sounding (VES), and the Shear Wave Velocity (SWV) tests were used for developing the site profiles for the Al-Durrah site. The SWV tests included the CXW and the CH tests. The VES interpretation results that were presented in Chapter 7 indicated that the bedrock depth at the Al-Durrah site was 350 m to 375 m. The VES interpretation result is reproduced here for convenience, Figure (10.1).

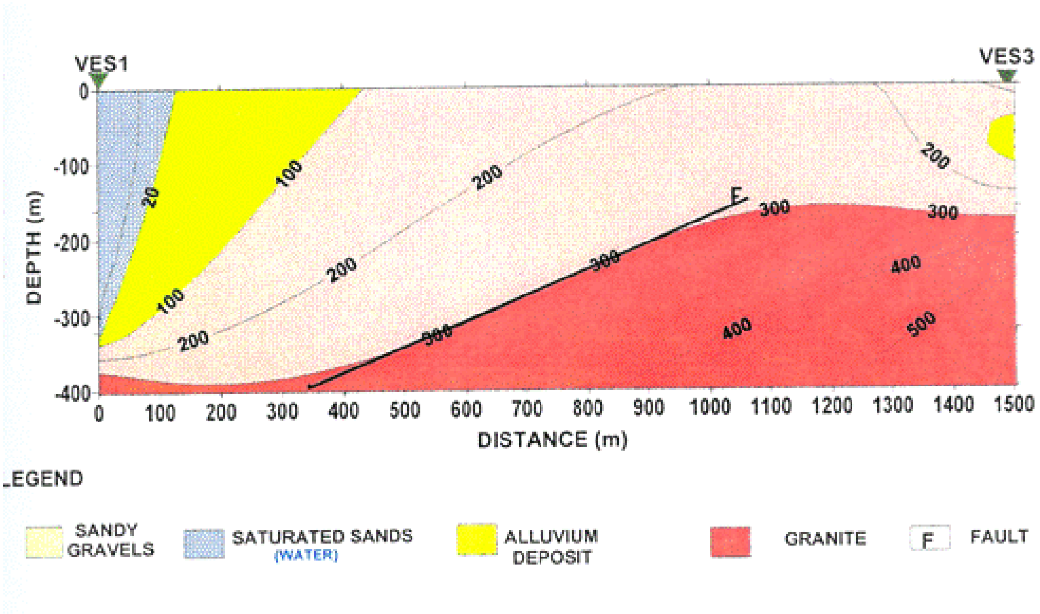


Figure 10.1 Al-Durrah site VES cross-section

NEHRP Provisions requires the profiling of the top 30 m (100 ft) of the site. Therefore, for the purpose of determining the Al-Durrah site fundamental period by the approximate method and by the dynamic site response analysis, each test location was modeled to a depth of 30 m regardless of the actual depth of the bedrock.

10.2b The Al-Durrah Site Fundamental Period by the Approximate Method

The Al-Durrah site approximate fundamental periods were calculated as follows:

$$T_S = \frac{4H}{\bar{v}_S}$$

where:

T_S = the site approximate fundamental period

H = NEHRP defined bedrock depth ≡ 30 m

$\bar{v}_s$ = NEHRP weighted site average SWV as defined in Chapter 2

The results of the Al-Durrah site approximate fundamental periods (or frequencies) were calculated in Chapter 8, and reproduced here (Table10.1), for comparison with the results of the other methods subsequently.

Test Type	Test Location	NEHRP Average SWV $\bar{v}_s$ (m/s)	**Site Fundamental Period** T_s *(sec)*	**Site Fundamental Frequency** f_s *(Hz)*
CXW	D1(A10)	420	0.2857	3.501
	D2(A6)	439	0.2733	3.658
	D3(A14)	410	0.2927	3.417
	D4(A11)	422	0.2844	3.517
	D5(A3a)	465	0.2581	3.875
	D5(A3b)	523	0.2294	4.358
	D6(A5)	333	0.3604	2.775
	D7(A13)	466	0.2575	3.883
	D8(A12)	424	0.2830	3.533
	D9(A4)	476	0.2521	3.967
	D11(A1)	371	0.3235	3.092
	D12(A7)	353	0.3399	2.942
	(A8)	392	0.3061	3.267
	(A9)	387	0.3101	3.225
Cross-hole	D5(CH)	315	0.3810	2.625
	D6(CH)	438	0.2740	3.650
	D11(CH)	381	0.3150	3.175
	D12(CH)	273	0.4396	2.275

Table10.1: The approximate values of the fundamental periods of Al-Durrah soil profiles

The average fundamental period, and the standard deviation for the values of Table (10.1) were calculated and rearranged into the following subgroups:

Tests Subgroup	Average Fundamental Period (sec)	Standard Deviation (sec)
All Profiles (1)	0.304	0.051
All CXW (2)	0.290	0.036
All CH (3)	0.352	0.073
All CXW at CH (4)	0.302	0.056

Table 10.2: Average values and standard deviations of the approximate values of the fundamental periods of Table10.1a

(1). The average value of the fundamental periods of all the profiles

(2). The average value of the fundamental periods of all the CXW profiles

(3). The average value of the fundamental periods of all the CH profiles

(4). The average value of the fundamental periods of the CXW profiles that were performed at the same location of the CH tests

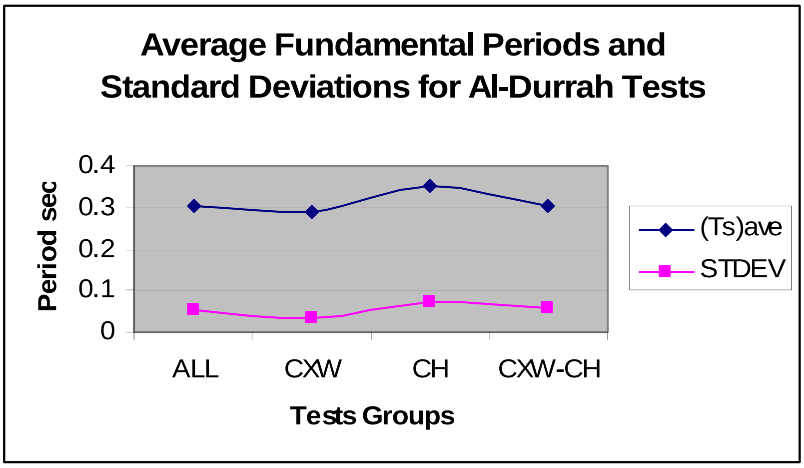


Figure 10.2: Average fundamental periods and standard deviations For the results of the approximate method

Table (10.2) presents the average value and the standard deviation for each subgroup's fundamental period, and Figure (10.2) show plots of these values for each group of tests. The average site approximate fundamental period for the CH tests is 21% higher than that of the entire CXW tests. However, if the average CH fundamental period is compared with the average fundamental period of only the CXW tests that were performed at CH tests' locations, then the difference decreases to about 17%. If the value of the fundamental period of each CH test is compared with the value of the fundamental period for the corresponding CXW at the same location, then the differences can be much higher. Table (10.3) shows that the difference between the values of the fundamental periods of the two tests at each location can be as high as 66% (expressed as a percentage of the lower fundamental period value).

Test Location	CH Test Approximate Fundamental Periods(sec)	CXW Test Approximate Fundamental Periods (sec)	Fundamental Period Difference as %
D5A	0.381	0.2581	47.6
D5B	0.381	0.2294	66.1
D6	0.274	0.3604	31.5
D11	0.315	0.3235	2.7
D12	0.4396	0.3399	29.3

Table 10.3: Differences between the approximate fundamental periods of the CH tests and the corresponding CXW tests

This indicates that different soil cross-section modeling methods at specific location can yield *different fundamental periods* for the same location. These results are similar to the results of the site classifications of Chapter 9, in which different soil cross-section modeling methods at one location resulted in different NEHRP site classifications for the same location, and different design response spectra as was presented in Chapter (9).

10.2c The Al-Durrah Site Fundamental Period by the Microtremors Method

Microtremors were recorded at four locations within the Al-Durrah site. Those locations were designated as DRA1 and DRA2 on level A of the site, and DRB1 and DRB3 on level B of the site (Figure 10.3). The record of DRA2 could not be used due to the presence of a significant earthquake within the record. The effects of the presence of an earthquake within a microtremors record was addressed in Chapter 7.

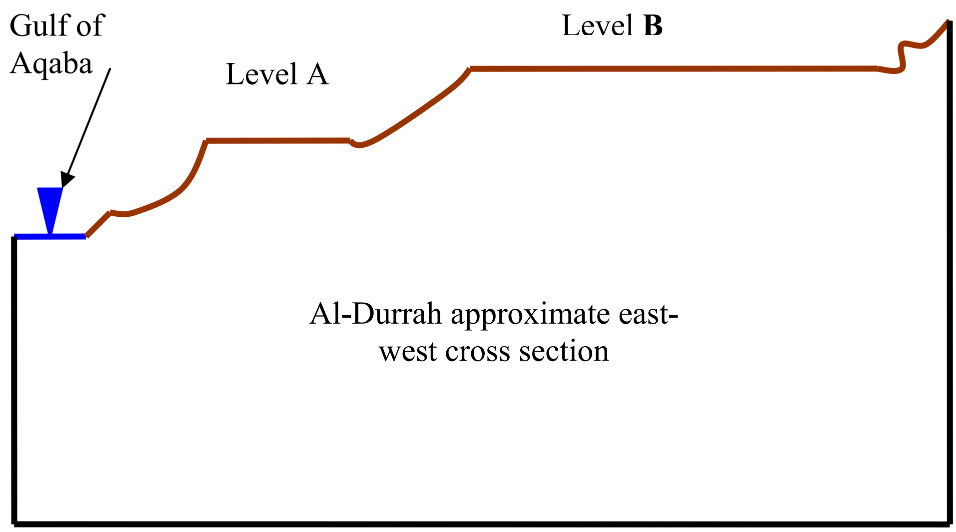


Figure 10.3: The Al-Durrah site approximate east-west cross-section

Two types of microtremors plots were presented in Chapter 7. The first type was generated from the ratios of the square root of the sum of the squares of the horizontal components of the microtremors to the vertical component. The second type of plots was generated by simply taking separate ratios of the east-west component and the north-south component to the vertical component of the microtremors and plotting the generated curves simultaneously. The Al-Durrah site fundamental periods as determined by the microtremors method are summarized in Table (10.4a), (10.4b), and (10.4c) for comparison with the results of the other methods subsequently. Table (10.5) and Figure (10.4) present the average fundamental periods of the three microtremors records.

Al-Durrah Record Location	DRA1	DRA2	DRB1	DRB3
Fundamental Frequency (Hz)	3.4	N/A	6.3	14.11
Fundamental Period (sec)	0.294	N/A	0.159	0.070872

Table 10.4a: Al-Durrah site fundamental periods of the microtremors mean ratios

Al-Durrah Record Location	DRA1	DRA2	DRB1	DRB3
Fundamental Frequency (Hz)	3.1	N/A	6.4	18.7
Fundamental Period (sec)	0.323	N/A	0.156	0.053

Table 10.4b: Al-Durrah site fundamental periods of the microtremors simple ratios (east-west component)

Al-Durrah Record Location	DRA1	DRA2	DRB1	DRB3
Fundamental Frequency (Hz)	3.3	N/A	6.4	14.3
Fundamental Period (sec)	0.303	N/A	0.156	0.070

Table 10.4c: Al-Durrah site fundamental periods of the microtremors simple ratios (north-south component)

Microtremors Plot Type	Record Location		
	DRA1	DRB1	DRB3
Mean Spectra	0.294	0.159	0.0709
Simple Spectra E-W	0.323	0.156	0.053
Simple Spectra N-S	0.303	0.156	0.07
Average Fund. Period	0.307	0.157	0.065

Table 10.5: Al-Durrah site fundamental periods summary and averages

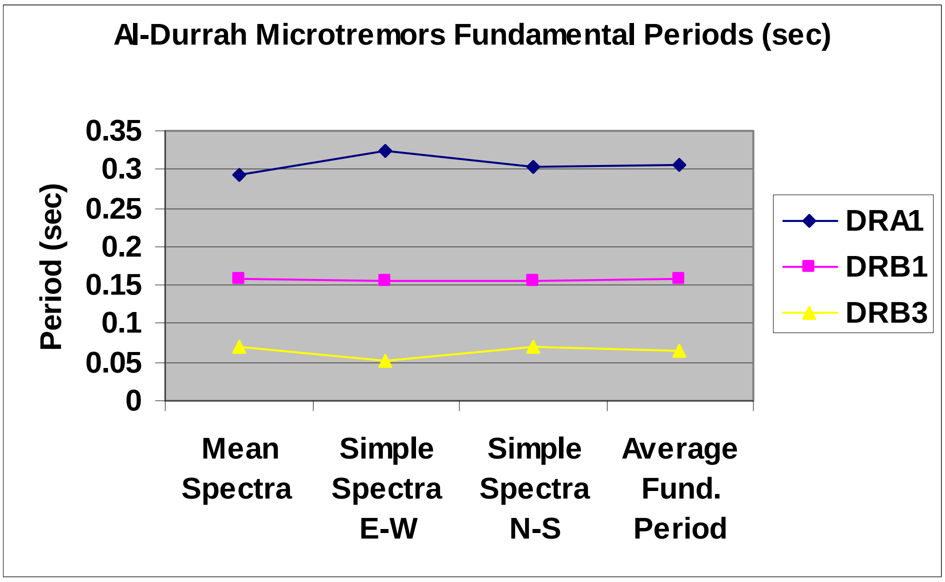


Figure 10.4: Al-Durrah site microtremors spectra fundamental periods

The large difference between DRA1 fundamental period values and those of DRB1 and DRB3 can be attributed to the site level difference of test group A and test group B (Figure 10.2). These results are used in the comparative analysis of all three methods, subsequently.

10.2d The Al-Durrah Site Fundamental Period by the Dynamic Site Response Analysis Method

From the results of the dynamic site response analysis of the Al-Durrah site that were presented in Chapter 8, the fundamental periods were obtained from the ground response spectra of each soil profile. Each soil profile was subjected to the two synthetic earthquakes, RAN230 and RAN330. The analysis of each earthquake was performed twice using 5% and 10% damping ratios. The results are reproduced in

Table (10.5) and Figure (10.2) for analysis and comparison with the results of the other methods.

Test Type	Test Location	Site Fundamental Periods (sec)			
		Earthquake RAN230		Earthquake RAN330	
		5% Damping	10% Damping	5% Damping	10% Damping
CXW Tests	D1	0.064	0.064	0.098	0.088
	D2	0.054	0.054	0.098	0.098
	D3	0.2	0.077	0.2	0.078
	D4	0.088	0.064	0.098	0.098
	D5A	0.077	0.077	0.088	0.077
	D5B	0.064	0.064	0.25	0.064
	D6	0.064	0.054	0.32	0.098
	D7	0.088	0.088	0.098	0.098
	D8	0.077	0.077	0.098	0.11
	D9	0.077	0.077	0.077	0.077
	D11	0.077	0.077	0.098	0.098
	D12	0.064	0.054	0.077	0.054
Cross Hole Tests	D5CH	0.064	0.054	0.088	0.088
	D6CH	0.064	0.054	0.098	0.098
	D11CH	0.064	0.064	0.098	0.077
	D12CH	0.077	0.064	0.33	0.064

Table 10.6: Al-Durrah site fundamental periods by the dynamic site response analysis

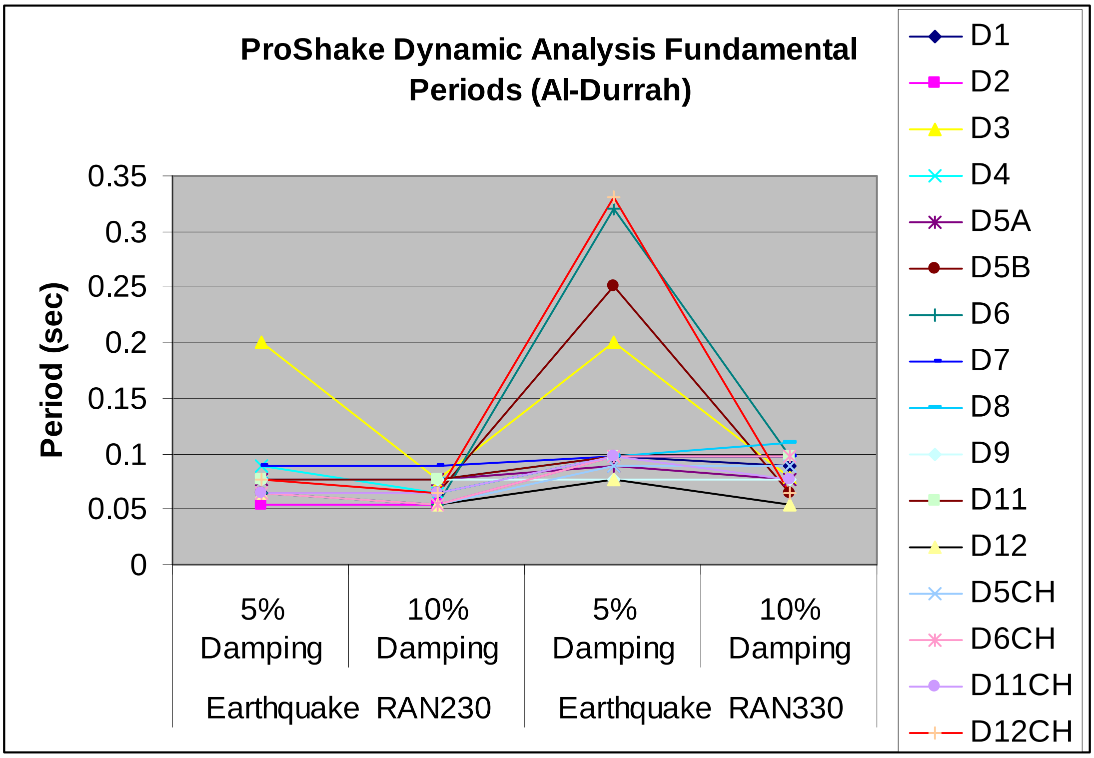


Figure10.5: ProShake analysis fundamental periods distribution for Al-Durrah profiles (bedrock at NEHRP depth).

Figure (10.5) shows the variation in the values of the fundamental periods of the entire profiles at the Al-Durrah site. The values of the fundamental period show better agreement at 10% damping for both earthquakes. The results of Table (10.6) were averaged and rearranged into the following subgroups:

- The average value of the fundamental periods of all the profiles
- The average value of the fundamental periods of all the CXW profiles
- The average value of the fundamental periods of all the CH profiles

- The average value of the fundamental periods of the CXW profiles that were performed at the same location of the CH tests

The average values of the fundamental periods and the standard deviations for the subgroups are presented in Table (10.7), which shows that the standard deviations for the 10% damping analysis of RAN230 and RAN330 (for all profiles) are 0.011 and 0.016 respectively. This is a much lower value than the standard deviation values corresponding to the same two groups at 5% damping, which are 0.034 and 0.086 respectively. Figure (10.5) indicates that the main contribution to the increase in the value of the standard deviation for earthquake RAN230 at 5% damping comes from the relatively large value of the fundamental period of profile D3CXW. D3CXW refers to the profile generated by the CXW test at the location of boring D3. Similarly, the larger increase in the value of the standard deviation of earthquake RAN330 at 5% damping can be attributed to profiles D3CXW, D5BCXW, D6CXW, and D12CH. Figures (10.6a) and (10.6b) present plots of the average fundamental periods and the standard deviations for each group of tests in Table (10.7).

	Al-Durrah Site Average Fundamental Period and Standard Deviations (sec)			
	Earthquake RAN230		Earthquake RAN330	
	5% Damping	10% Damping	5% Damping	10% Damping
Average of all Profiles fund. period	0.078938	0.066438	0.1384	0.0853
Standard Dev	0.033688	0.011033	0.0863	0.0158
Average of CXW fund. period	0.082364	0.068917	0.133333	0.0865
Standard Dev	0.040173	0.011405	0.079081	0.0166
Average of CH tests fund. period	0.06725	.059	0.1535	0.0818
Standard Dev	0.0065	.0058	0.1178	0.0146
Average of fund. periods of CXW tests at CH locations	0.0692	.0652	0.1666	0.0782
Standard Dev	0.00712	0.01152	0.11113	0.019829

Table10. 7: Al-Durrah site fundamental period averages and standard deviations for the results of dynamic site response analysis

Table (10.8) shows the variation in the average values of the fundamental periods of the CH and CXW tests (in terms of percentage of the lower value of each pair). The difference in the value of the *average* fundamental period between all the CXW tests and all the CH tests ranges from a minimum of about 6% under earthquake RAN330 (10% damping) to a maximum of about 22.5% under earthquake RAN230 (5% damping). However, Table (10.8) shows that if the average fundamental periods of only CXW tests that were performed at CH locations are considered, the range of the differences becomes from 3% (under RAN230-5% damping) to 10.5% (under AN230-10% damping) respectively.

Percentages of the Difference Between the Average Values of the Fundamental Periods of the CXW and CH tests				
Values of fund. Periods being Compared	Earthquake RAN230		Earthquake RAN330	
	5% Damping	10% Damping	5% Damping	10% Damping
Average of all CH Versus average of All CXW	22.5	16.8	15.1	5.7
Average of all CH Versus average of CXW at CH	2.9	10.5	8.5	4.6

Table 10.8: Percentages of the differences between the average values of the fundamental periods of the CH and CXW tests

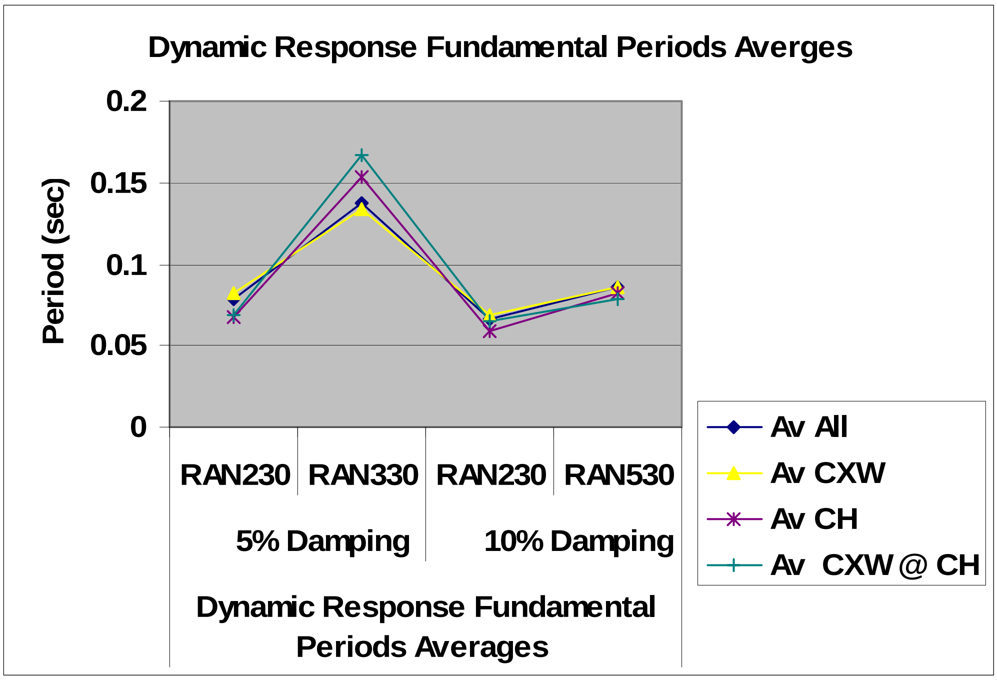


Figure 10.6a: Al-Durrah site average fundamental periods of the dynamic site response Analysis

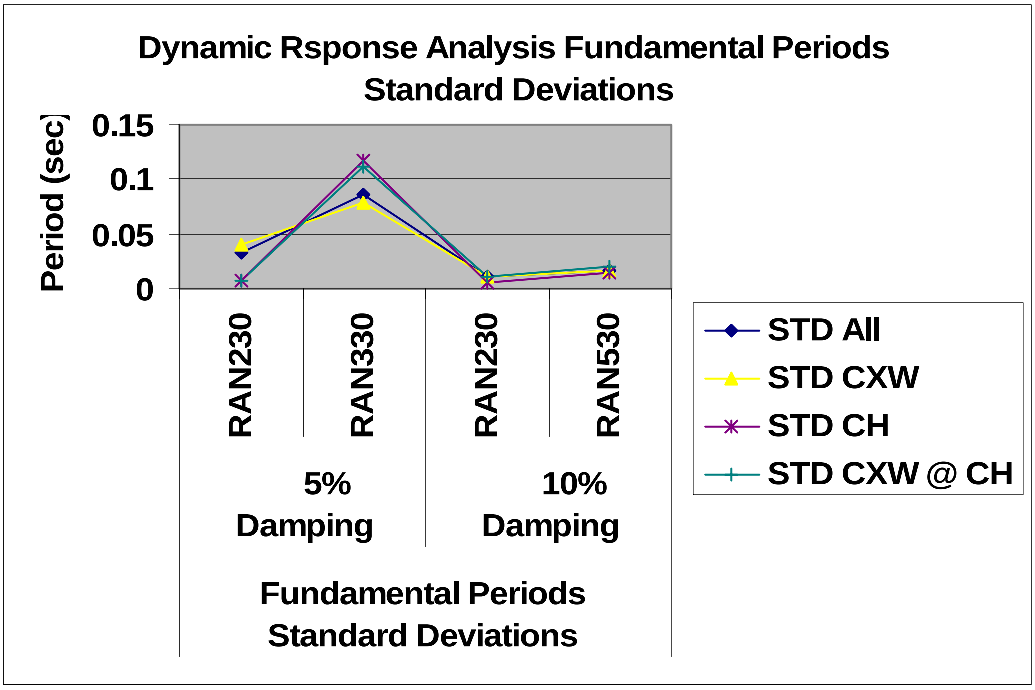


Figure 10.6b: Al-Durrah site fundamental periods standard deviations

Comparison of each individual result of the CH test with the corresponding result of the CXW tests that was performed at the same location led to more significant variations as shown in Table (10.9) and Figure (10.7). Each pair of values from the CH and the CXW tests was compared, and the difference is expressed as a percentage of the value of the lower fundamental period. The difference between the results of the two tests ranges from 0% to 328%. Table (10.9) indicates that in 6 cases there was no difference in the values of the fundamental period as determined by a CH test or a CXW test. This represents 30% of all the cases of Table (10.8). Eleven cases representing 55% of all the cases had a difference in the value of the fundamental period of two tests that ranged from 14% to 42.5%. The remaining three cases that represent 15% of all the cases, showed a difference in the value of the fundamental period that ranged from 184% to 328.5%.

Test Location	Earthquake RAN230		Earthquake RAN330	
	5% Damping	10% Damping	5% Damping	10% Damping
D5A	20.3	42.5	0	14.2
D5B	0	18.5	184.0	37.5
D6	0	0	226.5	0
D11	20.3	20.3	0	27.2
D12	20.3	18.5	328.5	18.5

Table10.9: The difference between the values of the fundamental periods of the CH and CXW tests that were performed at the same locations (expressed as percentage of the lower value)

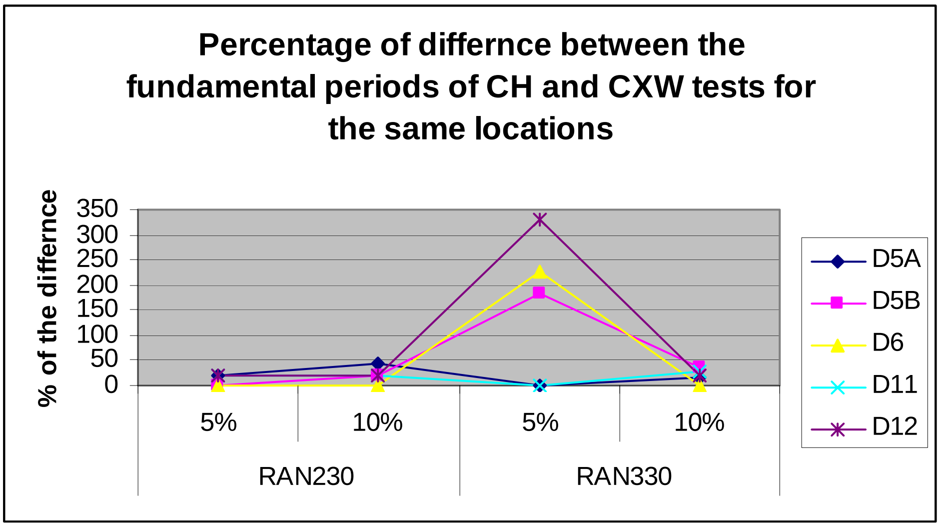


Figure 10.7: The difference between the values of the fundamental periods of the CH and CXW tests that were performed at the same locations (expressed as percentage of the lower value)

These results show that modeling a soil cross-section at a specific location by two different methods can result in a significantly different fundamental period for the same location.

10.2e The Al-Durrah Site Fundamental Period Comparative Analysis

This section presents the comparative analysis of the Al-Durrah fundamental periods from the results of the approximate method, the microtremors method, and the dynamic site response analysis method. In the dynamic site response analysis, the soil damping ratio value must be selected for each profile's analysis. The dynamic site response analysis was performed four times using the two synthetic earthquakes (RAN230 and RAN330), and the two damping ratios of 5% and 10% with each earthquake analysis. Therefore, there are four sets of results from the dynamic site response analysis, and only one set for each of the approximate method and the microtremors method. In order to compare the four sets of results from the four dynamic analyses with the results of the approximate method and the microtremors method, the comparison was repeated four times. Each comparison included the same values of the average fundamental periods from the approximate method and microtremors method, and one of the results of the dynamic analysis. The results of the approximate method and the dynamic site response analysis were divided into subgroups.

These subgroups include:

- The average value of the fundamental periods of all the profiles
- The average value of the fundamental periods of all the CXW profiles
- The average value of the fundamental periods of all the CH profiles
- The average value of the fundamental periods of the CXW profiles that were performed at the same location of the CH tests

Tables (10.10) to (10.13) and Figures (10.8a) to (10.11a) show the values of each comparison including the values for the subgroups of each method. The four sets of comparisons are presented next:

I. Comparison of the results of the approximate method, the microtremors, and the dynamic response analysis with the synthetic earthquake RAN230 and 5% damping:

Table (10.10) and Figure (10.8a) present the values of the average fundamental period for each method with the results of the dynamic response analysis of *RAN230 and 5%* damping. It can be seen from Figure (10.8a) that the values of the average fundamental period of microtremors record DRB3 and the dynamic response analysis are very close with a value range of 0.07 to 0.08 second. The values of the average fundamental period by the approximate method and its subgroups are much higher than the dynamic response analysis and DRB3.

However, the average fundamental period of microtremors record DRA1 and the average fundamental periods of two subgroups of the approximate method showed good agreement. The two subgroups are (the average of all the approximate method) and (the average of all the CXW- approximate method). To visually illustrate the differences between the values of the average fundamental period of the three methods, the ratios of the average fundamental periods of each method over the average fundamental periods of the other two methods were taken and plotted as shown in Figure (10.8b). The ratios of the approximate method average fundamental periods to those of the microtremors ranged from 1 to about 5. The ratios of the average fundamental periods of the microtremors to those of the dynamic response analysis are ranged from 1 to about 4.5.

	Approximate Method				Microtremors			Dynamic Site Response Analysis *RAN230 at 5% damping*			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental Period (sec)	0.313	0.302	0.352	0.337	0.307	0.157	0.065	0.079	0.082	0.067	0.069

Table 10.10: Comparison of the average values of the fundamental periods at Al-Durrah

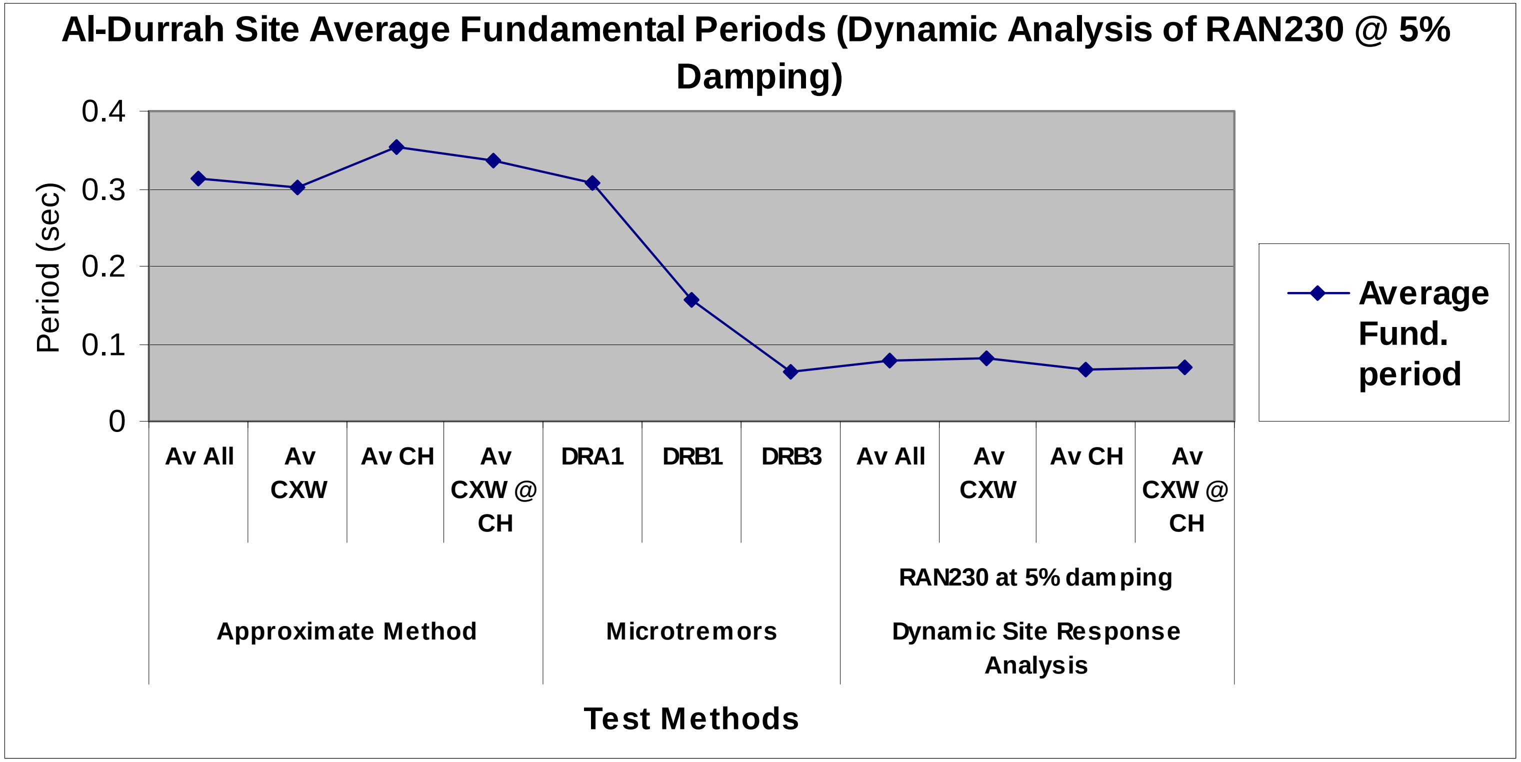


Figure 10.8a: Plots of the average values of Al-Durrah fundamental periods

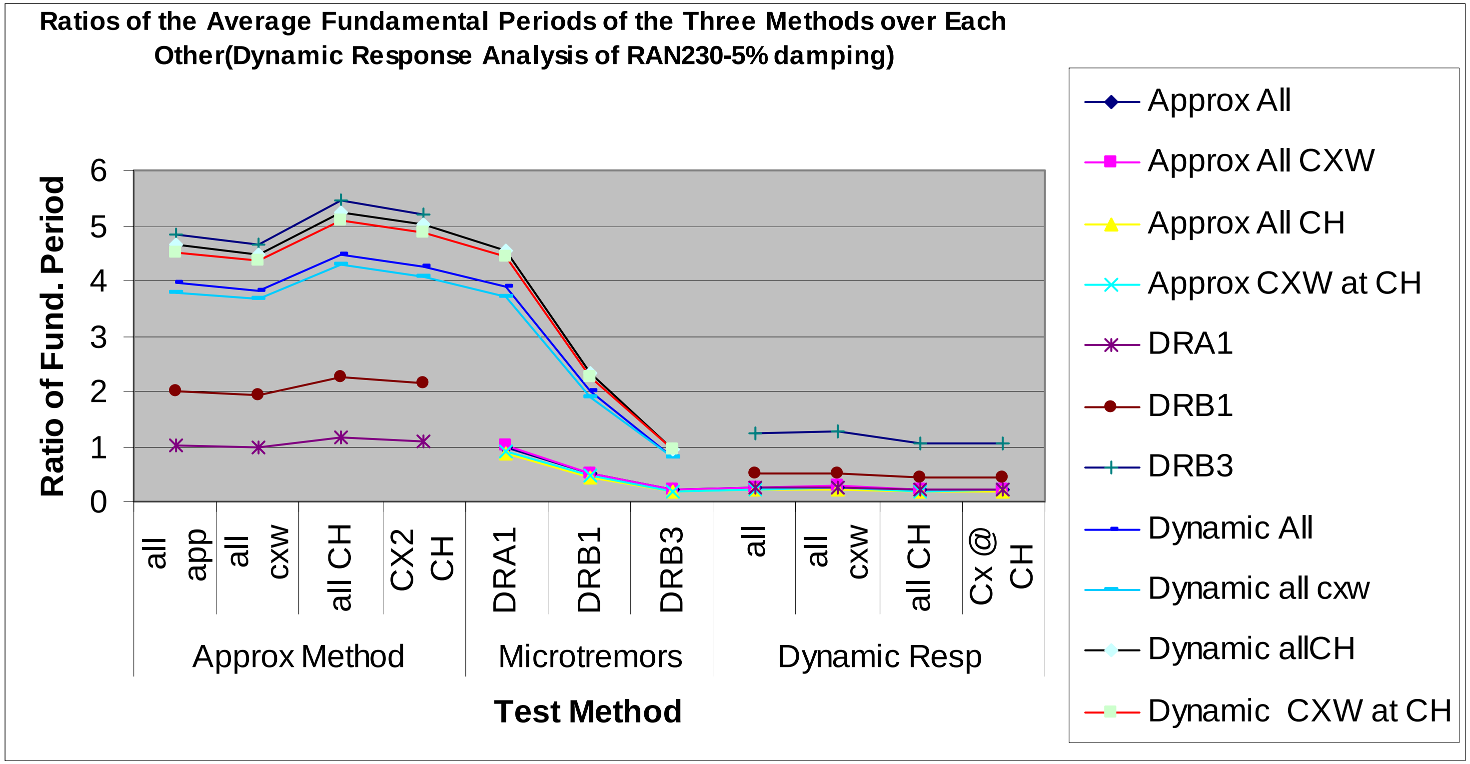


Figure 10.8b: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

II. Comparison of the results of the approximate method, the microtremors, and the dynamic response analysis with RAN330 and 5% damping:

Table (10.11) and Figure (10.9a) present the values of the average fundamental period for each method with the dynamic response analysis of *RAN330 and 5%* damping. There are no changes in the values of average fundamental periods of the approximate and microtremors methods. Figure (10.9a) shows that the values of the average fundamental period of microtremors record DRA1 shows good agreement with the values of the approximate method, while the value of microtremors record DRB1 shows good agreement with the dynamic analysis results. Figure (10.9b) shows plots of the ratios of the values of each method over the other two. The ratios of the average fundamental periods of the approximate method over those of the microtremors method ranged from 1 to about 5, and the ratios of the approximate method values to the dynamic analysis values ranged from 1.8 to 2.5. The ratios of the dynamic analysis values over the microtremors values ranged from 0.5 to 2.5.

	Approximate Method				**Microtremors**			**Dynamic Site Response Analysis** ***RAN330 at 5% damping***			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental period (sec)	0.313	0.302	0.3524	0.337	0.307	0.157	0.065	0.138	0.133	0.154	0.167

Table 10.11: Comparison of the average values of the fundamental periods at Al-Durrah

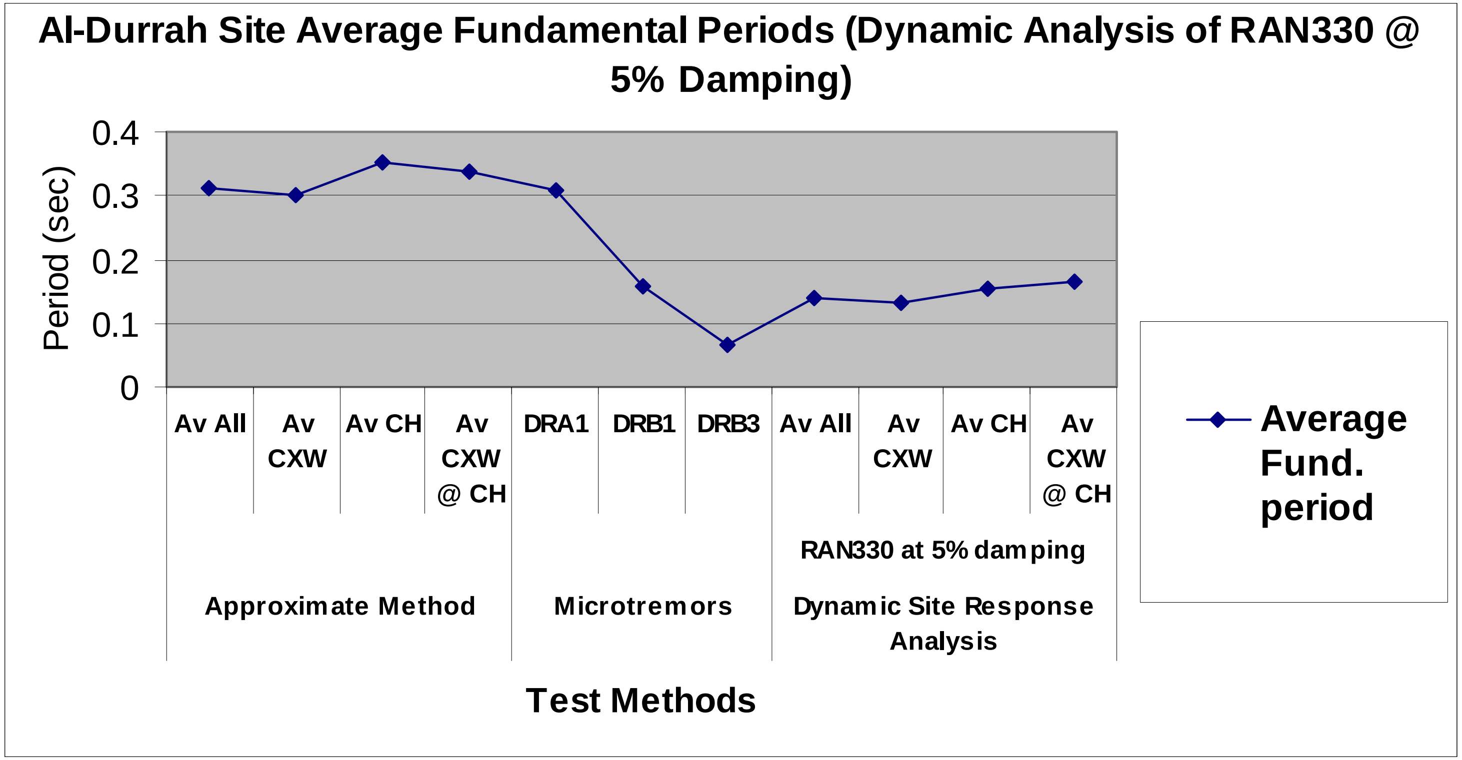


Figure 10.9a: Plots of the average values of Al-Durrah fundamental periods

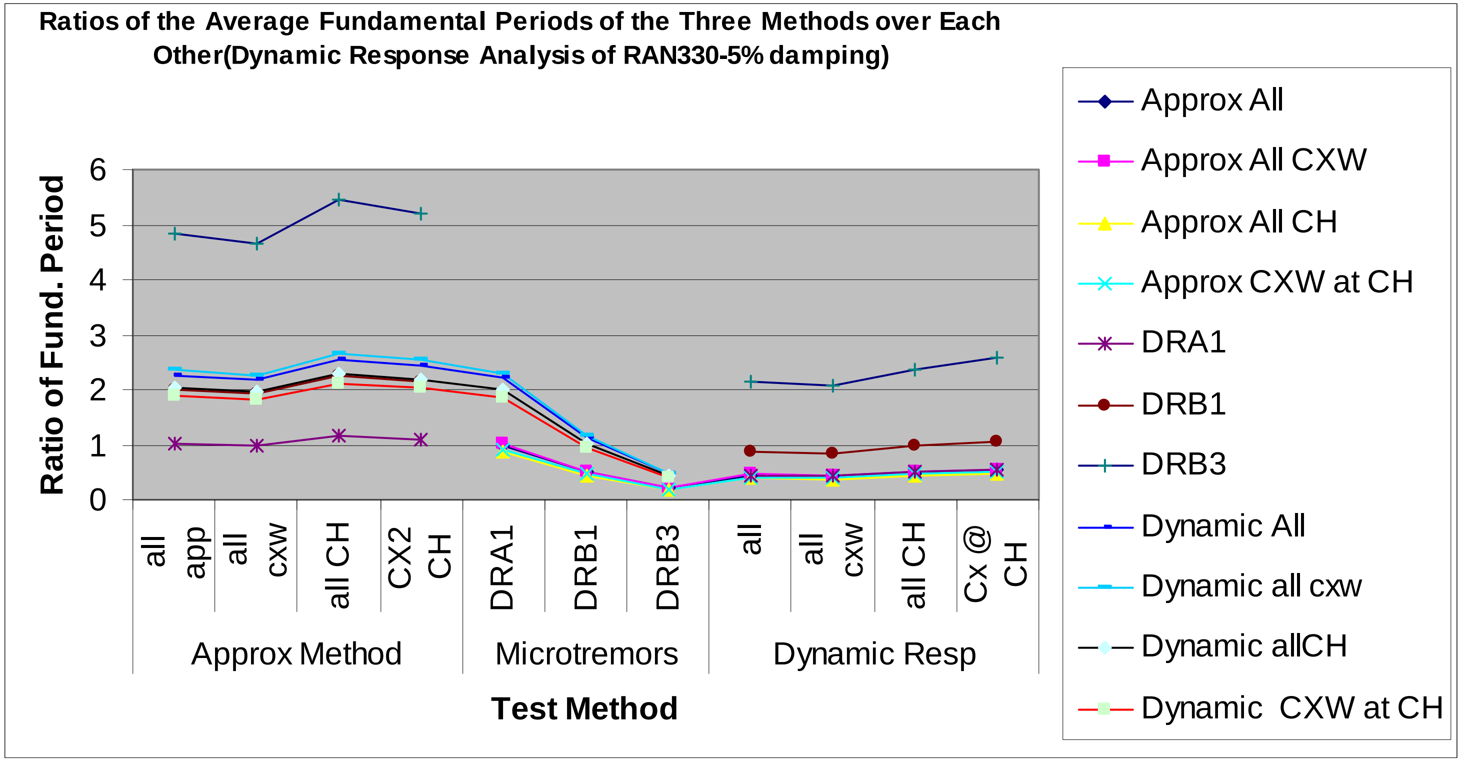


Figure 10.9b: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

III. Comparison of the results of the approximate method, the microtremors, and the dynamic response analysis with RAN230 and 10% damping:

Table (10.12) and Figure (10.10a) present the values of the average fundamental period for each method with the dynamic response analysis of *RAN230 and 10%* damping. There are no changes in the values of average fundamental periods of the approximate and microtremors methods. It can be seen from Figure (10.10a) that the values of the average fundamental period of microtremors record DRB3 and the dynamic response analysis are very close with a value range of 0.06 to 0.07 second. Figure (10.10b) shows plots of the ratios of the values of each method over the other two. The ratios of the average fundamental periods of the approximate method over those of the microtremors method ranged from 1 to 5, and the ratios of the approximate method values to the dynamic analysis values ranged from 4.5 to 6.0. The ratios of the dynamic analysis values over the microtremors values ranged from 0.2 to1.

	Approximate Method				**Microtremors**			**Dynamic Site Response Analysis** *RAN230 at 10% damping*			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental l period (sec)	0.313	0.302	0.352	0.337	0.307	0.157	0.065	0.066	0.069	0.059	0.065

Table 10.12: Comparison of the average values of the fundamental periods at Al-Durrah

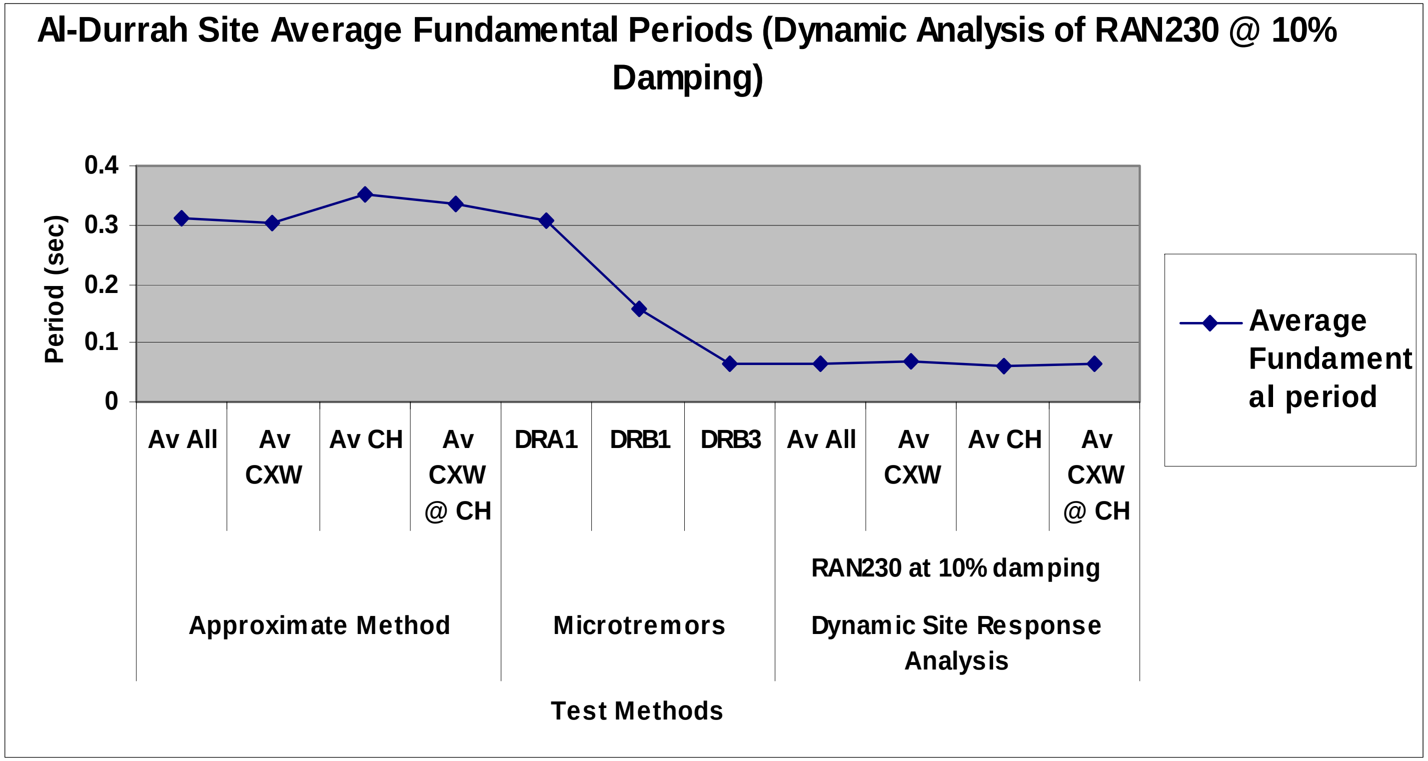


Figure 10.10a: Plots of the average values of Al-Durrah fundamental periods

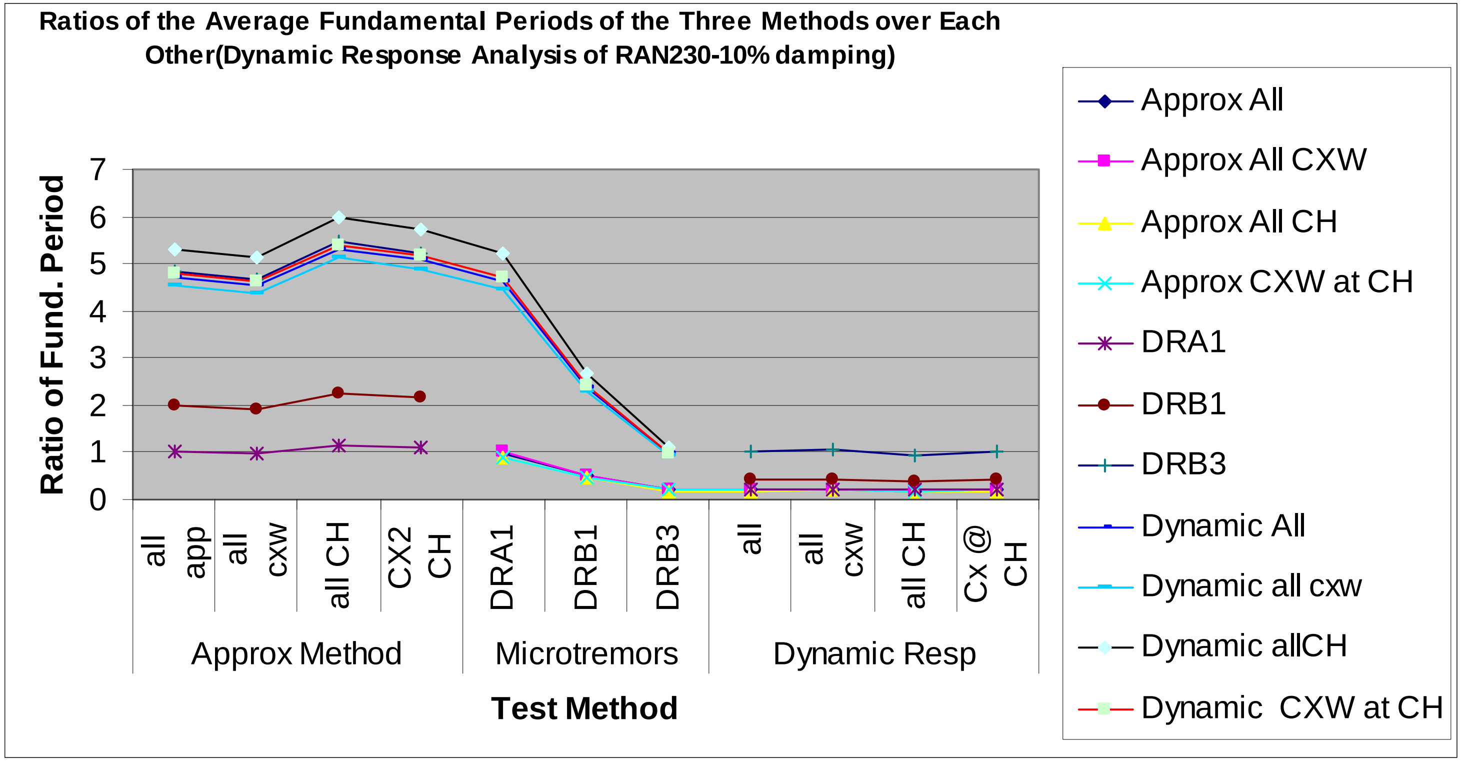


Figure 10.10b: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

IV. Comparison of the results of the approximate method, the microtremors, and the dynamic response analysis with RAN330 and 10% damping:

Table (10.13) and Figure (10.11a) present the values of the average fundamental period for each method with the dynamic response analysis of *RAN330 and 10%* damping. There are no changes in the values of average fundamental periods of the approximate and microtremors methods. It can be seen from Figure (10.11a) that the values of the average fundamental period microtremors record DRB3 and the dynamic response analysis are very close. Figure (10.11b) shows plots of the ratios of the values of each method over the other two. The ratios of the average fundamental periods of the approximate method over those of the microtremors method range from 1to about 5, and the ratios of the approximate method values to the dynamic analysis values ranged from 3.5 to 4.5. The ratios of the dynamic analysis values over the microtremors values ranged from 0.25 to 1.3.

	Approximate Method				**Microtremors**			**Dynamic Site Response Analysis *RAN330 at 10% damping***			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental period (sec)	0.313	0.302	0.352	0.337	0.307	0.157	0.065	0.085	0.087	0.082	0.078

Table 10.13: Comparison of the average values of the fundamental periods at Al-Durrah

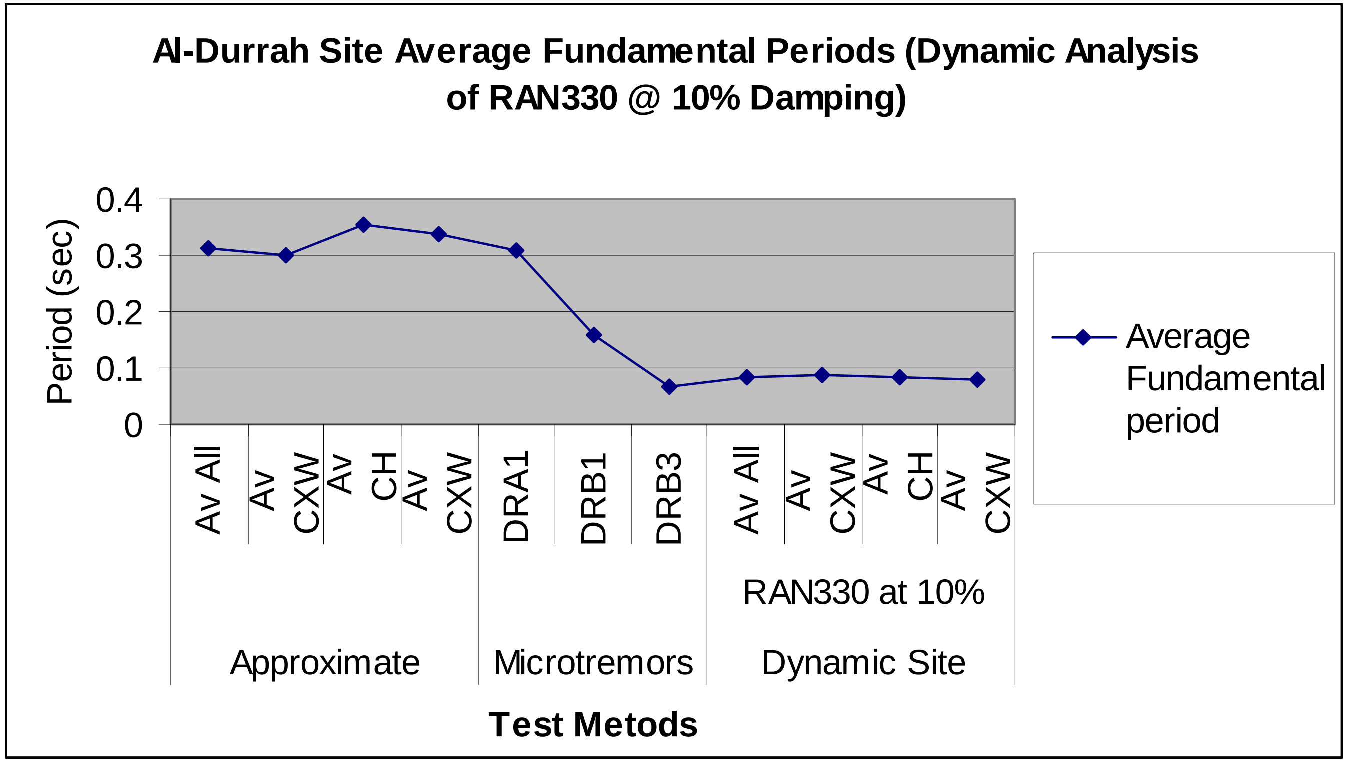


Figure 10.11a: Plots of the average values of Al-Durrah fundamental periods

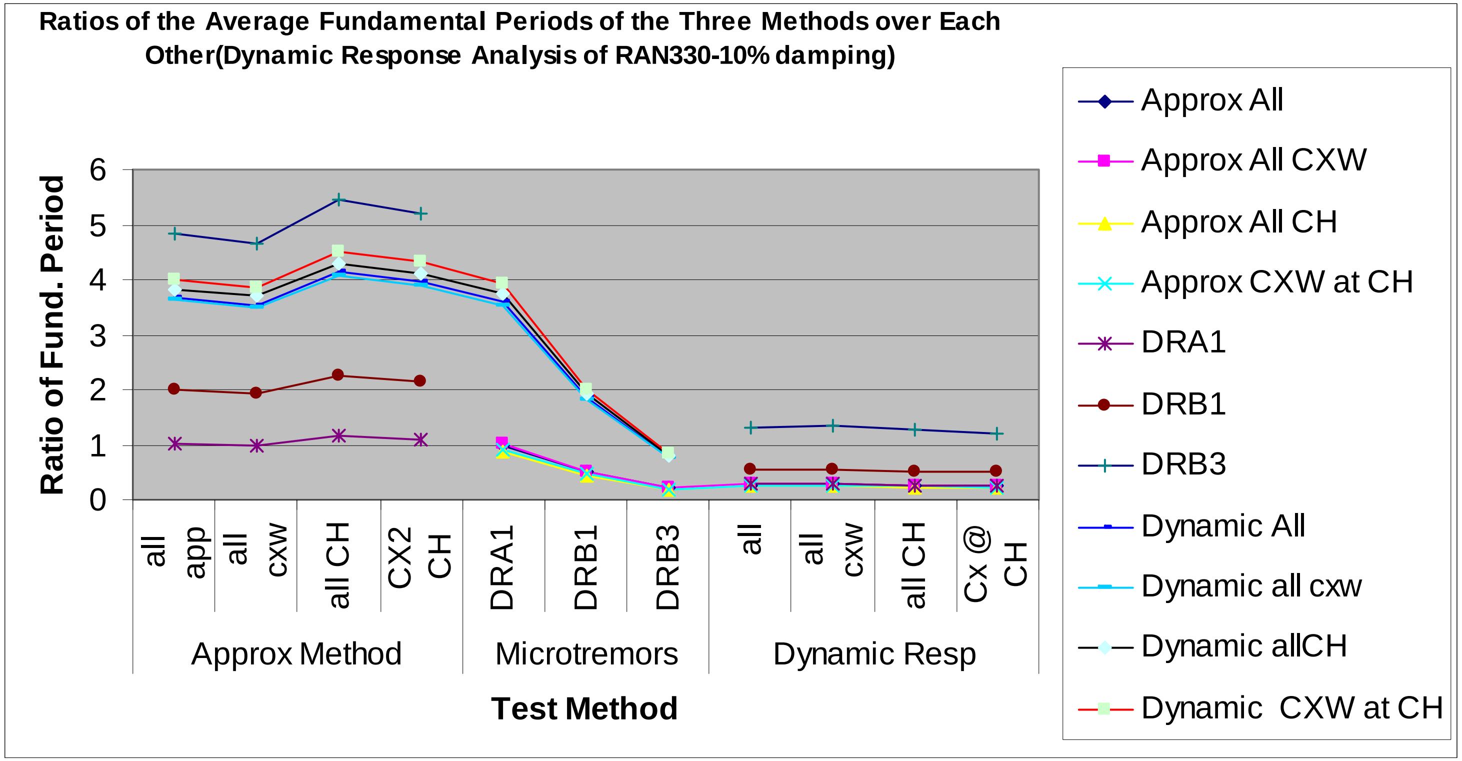


Figure 10.11b: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

In all four rounds of comparisons, the ratios of the approximate method average fundamental periods to those of the dynamic site response analysis ranged from 2 to5. This significant difference may be attributed to the over simplifications of the approximate method. Examples of these over simplifications include ignoring the effects of embedded soft soil layers within the profile, and ignoring the effects of the damping ratio.   The effects of the presence of soft layers within the soil profile are discussed and analyzed in Chapter 11.

To illustrate the difference between the approximate method and the dynamic site response analysis method, an ideal soil profile in which the SWV increases incrementally with depth was established. The profile has the NEHRP depth of 30 m, Figure (10.12) and Table (10.14).

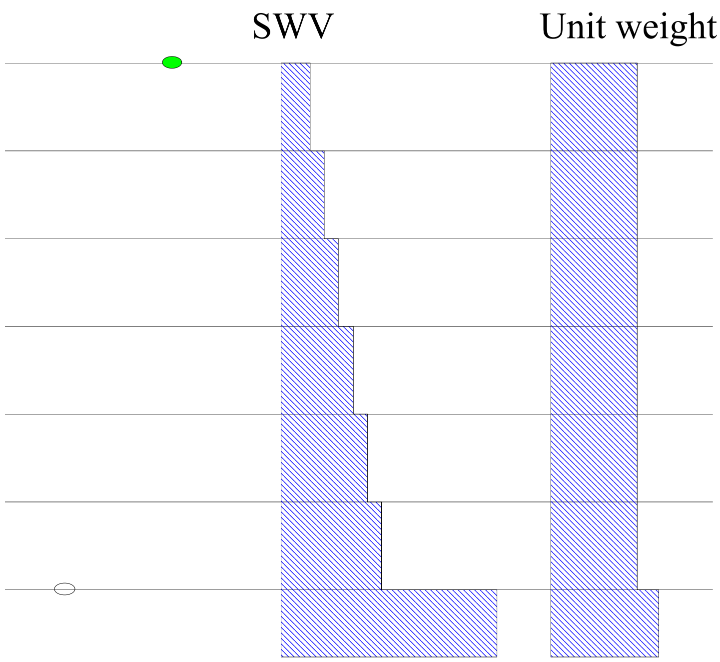


Figure 10.12: Ideal profile

Layer Number	Layer Thickness	Layer SWV
1	5	200
2	5	300
3	5	400
4	5	500
5	5	600
6	5	700
7 (Bedrock)	Infinite	1500

Table 10.14: Properties of the ideal profile's layers

Analysis of this profile by the approximate method and the dynamic site response analysis (earthquake RAN230 at 5% damping) yielded:

The approximate method fundamental period, T = 0.318 sec.

The dynamic site response analysis fundamental period, T= 0.0636 sec.

If the properties of the profile layers were kept the same, but the sequence of the layers was rearranged so that stiffer layers are on top of softer layers such as shown in Figure (10.13), then the fundamental periods by the two methods became:

The approximate method fundamental period, T = 0.318 sec.

The dynamic site response analysis fundamental period, T= 0.42 sec.

The fundamental period by the approximate method remained the same while the fundamental period by the dynamic site response analysis increased by 560%. This illustrates the lack of sensitivity of the approximate method to the presence of softer layers beneath the stiffer one

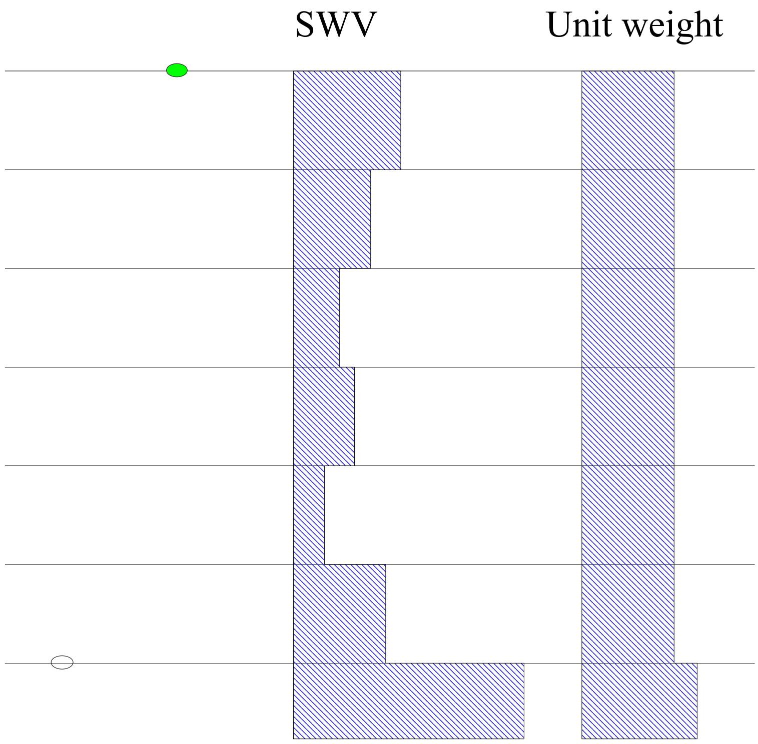


Figure 10.13: Re-arranged layers of ideal profile

The variation in the value of the fundamental periods of DRA1 on one hand and DRB1 and DRB3 on the other hand, might be due to the difference in the site level, Figure (10.3). The difference between levels A and B of the Al-Durrah site is 15 to 20 m. However, there is no apparent explanation for the difference in values of the fundamental period of DRB1 and DRB3. The fundamental period of DRA1 was very close to the fundamental periods of the approximate method, while the fundamental period of DRB3 was very close to Dynamic site response analysis fundamental period.

From the previous analyses, it can be seen that the fundamental periods of the Al-Durrah site soil profiles are influenced by the following:

1 The soil cross-sectional modeling method
2 The input earthquake
3 The damping ratio of the soil

The effects of the different profiling methods are obvious from Tables (10.2) and (10.7). Different profiling methods could lead to different fundamental periods of the same location. In the case of the Al-Durrah site, the difference was as high as 66% for the approximate method, and 328% for the dynamic response analysis.

The second source of influence, which is the input earthquake, can be seen by comparing the fundamental periods of earthquakes RAN230 and RAN330. In earthquake RAN230 analysis only one soil profile (D3CXW) showed a significant variation in the value of the fundamental period compared with the rest of profiles. The analysis of earthquake RAN330 with 5% damping shows significant variations in the values of the fundamental period of profiles D3CXW, D5BCXW, D6 CXW, and D12CH.

The influence of the damping ratio is demonstrated by comparing the fundamental periods at the 5% and 10 % damping ratios of each earthquake. The fundamental periods associated with both earthquakes show significant variations at the 5% damping ratio and no significant variations at the 10% damping ratio.

Chapter 11: The Effects of Bedrock Depth Variation on the Al-Durrah Site Fundamental Periods

11.1 General

The general procedure of NEHRP Provisions for generating a site design response spectrum was presented in Chapter 2. The method requires the modeling of the soil cross-section of the site top 30 m (100 ft). Therefore, the method in effect places the bedrock at a depth of 30m even if the actual bedrock depth is much larger. The implications of limiting the soil profile to the top 100 ft (30 m) of the site by NEHRP Provisions are examined in this Chapter. This analysis includes the examination of the effects of increasing the bedrock depth on the site fundamental period. This part of the analysis is based on the results of the dynamic site response analysis of the Al-Durrah site and the East-west seismic array. The dynamic site response analysis was performed using the computer program ProShake, which was introduced in chapter 3. The results of the dynamic site response analysis for the Al-Durrah site as well as the East-west seismic array were presented in Chapter 8. Finally, and as an extension of this analysis, the effects of the presence of an embedded soft soil layers within a soil profile are also examined.

11.2 Effects of Increasing the Bedrock Depth on the Al-Durrah Site Fundamental Period

11.2a Dynamic Site Response Analysis Input Information

The computer program ProShake, which was introduced in Chapter 3, was used in the analysis of the effects of increasing the bedrock depth at the Al-Durrah site. The two synthetic earthquakes RAN230 and RAN330 that were introduced in Chapter 8 were also used in this analysis. Each earthquake analysis was performed twice using damping ratios of 5% and 10%. The soil shear wave velocity (SWV) profiles that were used in the analysis are the same profiles that were generated by the Controlled Source Spectral Analysis of Surface Waves (CXW) and the cross-hole (CH) tests, which were presented in Chapter 7. The only difference is that for this analysis the bedrock depth was increased in increments from NEHRP specified depth of 30 m up to the actual depth of 350m. Each profile's name indicates the boring location of the profile and the type of SWV test that was performed at that location. As an example, D6CXW refers to the SWV profile of the CXW test at boring number 6.

The vertical electric sounding (VES) results that were presented in Chapter 8 are shown in Figure 11.1 for convenience. The VES result indicates that the bedrock depth at the Al-Durrah site is 350 m to 375 m.

For the purpose of this part of the analysis the bedrock depth was assumed to be at 350m.

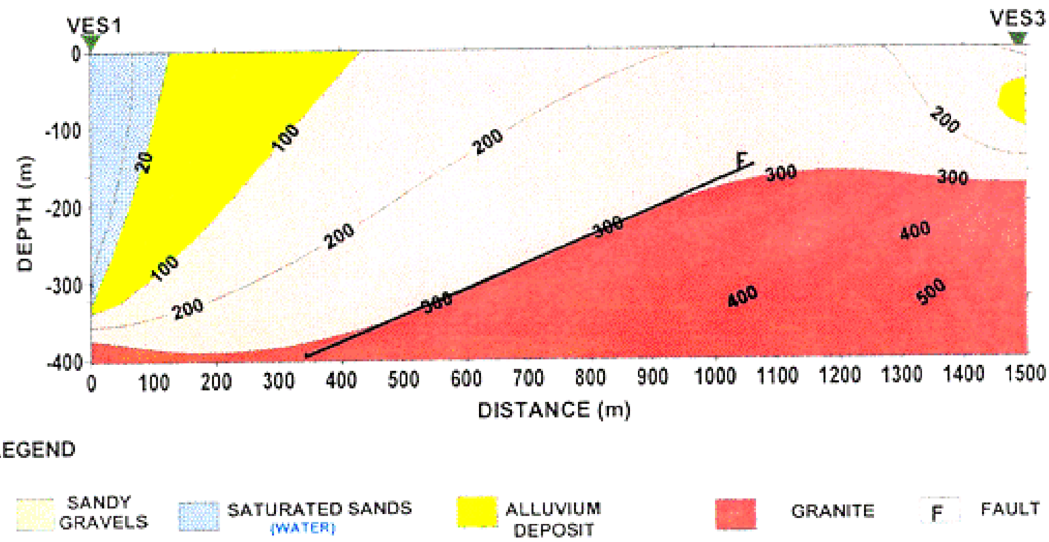


Figure 11.1 Al-Durrah site VES cross-section

11.2b Effects of Increasing the Depth of Bedrock on the Al-Durrah Site Fundamental Period

To examine the effects of increasing the bedrock depth on the site fundamental period, each SWV profile from the CXW and CH was assigned five different bedrock depths. These depths ranged from the NEHRP depth of 30 m to the estimated actual depth of 350 m. The five selected depths are shown in Table (11.1). The SWV for soil depths larger than 30 m were assumed to be equal to the SWV of the soil at NEHRP depth of 30 m, and remained constant up to the selected bedrock depth. Each SWV profile was analyzed at each depth four times using the two synthetic earthquakes and the two damping ratios of 5% and 10%.

Bedrock Depth Designation	**Bedrock Depth (m)**
T_{AC}	Actual Depth = 350
T_A	NEHRP Depth = 30
T_B	100
T_C	200
T_D	300

Table 11.1: Definitions of bedrock depths for the dynamic site response analysis

The results of the analysis are presented in four parts based on the synthetic earthquake being used and the damping ratio:

I. Earthquake *RAN230* and *5%* Damping

Table (11.2) and Figures (11.2) and (11.3) show the results of the dynamic site response analysis for the Al-Durrah site SWV profiles at the selected depths. Profiles D3CXW, D7CXW, and D8CXW showed the largest fluctuations in the values of the site fundamental period with the variation of the bedrock depth. This is evident from the relatively large standard deviations associated with these three profiles.

The rest of the profiles showed much smaller variations. The three profiles that showed large variations in the values of the fundamental period with the variation in the depth of the bedrock are examined in the next section.

		Ground Response Spectra Peak Periods RAN230 @ 5% Damping						
Test Location		TAC	TA	TB	TC	TD	Average	STDEV
CXW Test	D1	0.069	0.064	0.077	0.054	0.054	0.0636	0.009915
	D2	0.09	0.054	0.077	0.088	0.077	0.0772	0.014307
	D3	0.13	0.2	0.077	0.088	0.14	0.127	0.048806
	D4	0.079	0.088	0.077	0.077	0.077	0.0796	0.004775
	D5A	0.079	0.077	0.077	0.088	0.054	0.075	0.01259
	D5B	0.057	0.064	0.054	0.054	0.054	0.05725	0.004336
	D6	0.069	0.064	0.064	0.054	0.054	0.061	0.006708
	D7	0.12	0.088	0.17	0.077	0.14	0.119	0.037974
	D8	0.13	0.077	0.16	0.064	0.054	0.097	0.045815
	D9	0.069	0.077	0.054	0.077	0.054	0.0662	0.011606
	D11	0.079	0.077	0.078	0.064	0.077	0.075	0.006205
	D12	0.069	0.064	0.069	0.054	0.054	0.062	0.007583
Cross Hole Tests	D5CH	0.079	0.064	0.064	0.064	0.077	0.0696	0.007701
	D6CH	0.057	0.064	0.054	0.054	0.077	0.0612	0.009731
	D11CH	0.09	0.064	0.079	0.064	0.054	0.0702	0.01422
	D12CH	0.057	0.077	0.056	0.054	0.054	0.0596	0.009813

Table 11. 2: Variation of the peak periods of the Ground response spectra with depth using earthquake RAN230 at 5% damping

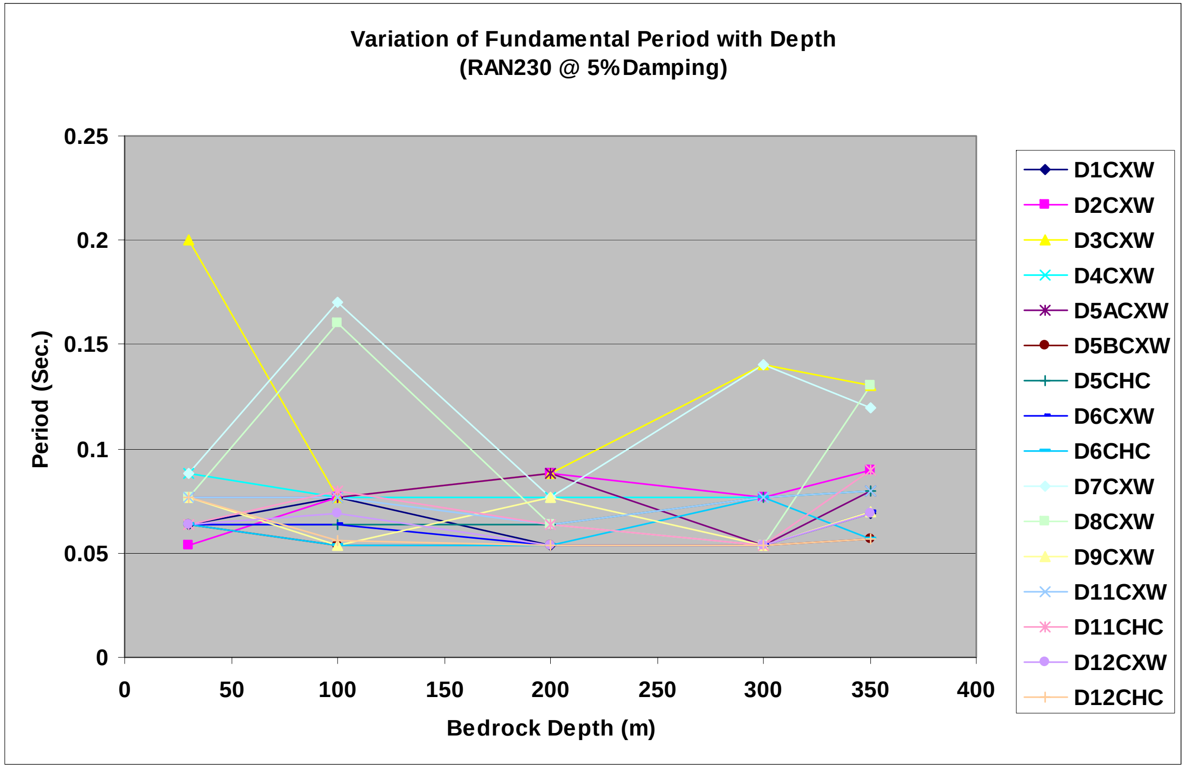


Figure 11.2: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN230 at 5% damping

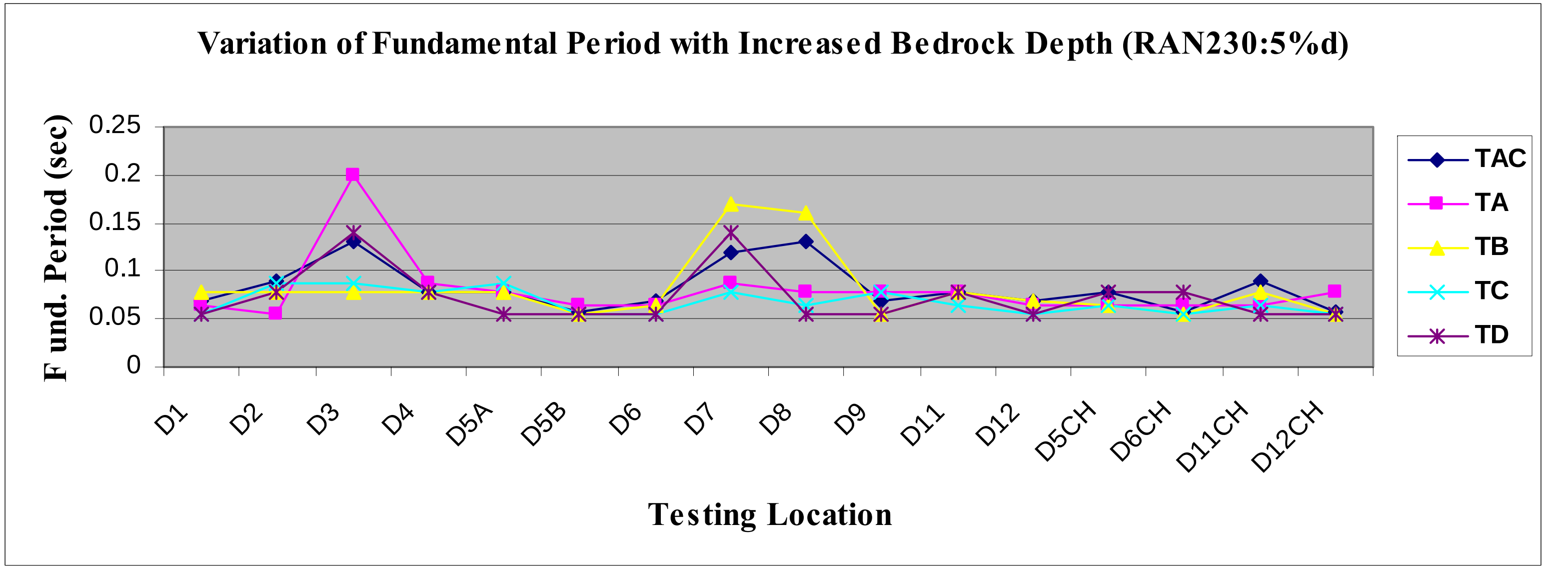


Figure 11.3: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN230 at 5% damping

II. Earthquake *RAN230* and *10%* Damping

Table (11.3) and Figures (11.4) and (115) show the results of the dynamic site response analysis for the Al-Durrah site SWV profiles at the selected depths. Profiles D2CXW, D3CXW, D4CXW, D7CXW, and D8CXW showed the largest fluctuations in the values of the site fundamental period with the variation of the bedrock depth, which are less than the fluctuations at 5% damping ratios. These profiles are examined in the next section.

		Ground Response Spectra Peak Periods RAN230 @ 10% Damping						
Test Location		TAC	TA	TB	TC	TD	Average	STDEV
CXW Test	D1	0.069	0.064	0.077	0.064	0.064	0.0676	0.005683
	D2	0.1	0.054	0.077	0.077	0.077	0.077	0.016263
	D3	0.06	0.077	0.054	0.064	0.09	0.069	0.014457
	D4	0.077	0.064	0.095	0.077	0.077	0.078	0.011045
	D5A	0.069	0.077	0.077	0.064	0.054	0.0682	0.00968
	D5B	0.069	0.064	0.054	0.054	0.054	0.059	0.007071
	D6	0.069	0.054	0.054	0.064	0.054	0.059	0.007071
	D7	0.091	0.088	0.088	0.077	0.054	0.0796	0.015274
	D8	0.079	0.077	0.078	0.077	0.054	0.073	0.010654
	D9	0.057	0.077	0.054	0.064	0.054	0.0612	0.009731
	D11	0.079	0.077	0.078	0.077	0.077	0.0776	0.000894
	D12	0.057	0.054	0.057	0.054	0.054	0.0552	0.001643
Cross Hole Tests	D5CH	0.069	0.054	0.054	0.064	0.054	0.059	0.007071
	D6CH	0.057	0.054	0.054	0.054	0.064	0.0566	0.004336
	D11CH	0.069	0.064	0.079	0.054	0.064	0.066	0.009083
	D12CH	0.069	0.064	0.057	0.054	0.054	0.0596	0.006656

Table 11. 3: Variation of the peak periods of the Ground response spectra with depth using earthquake RAN230 at 10% damping

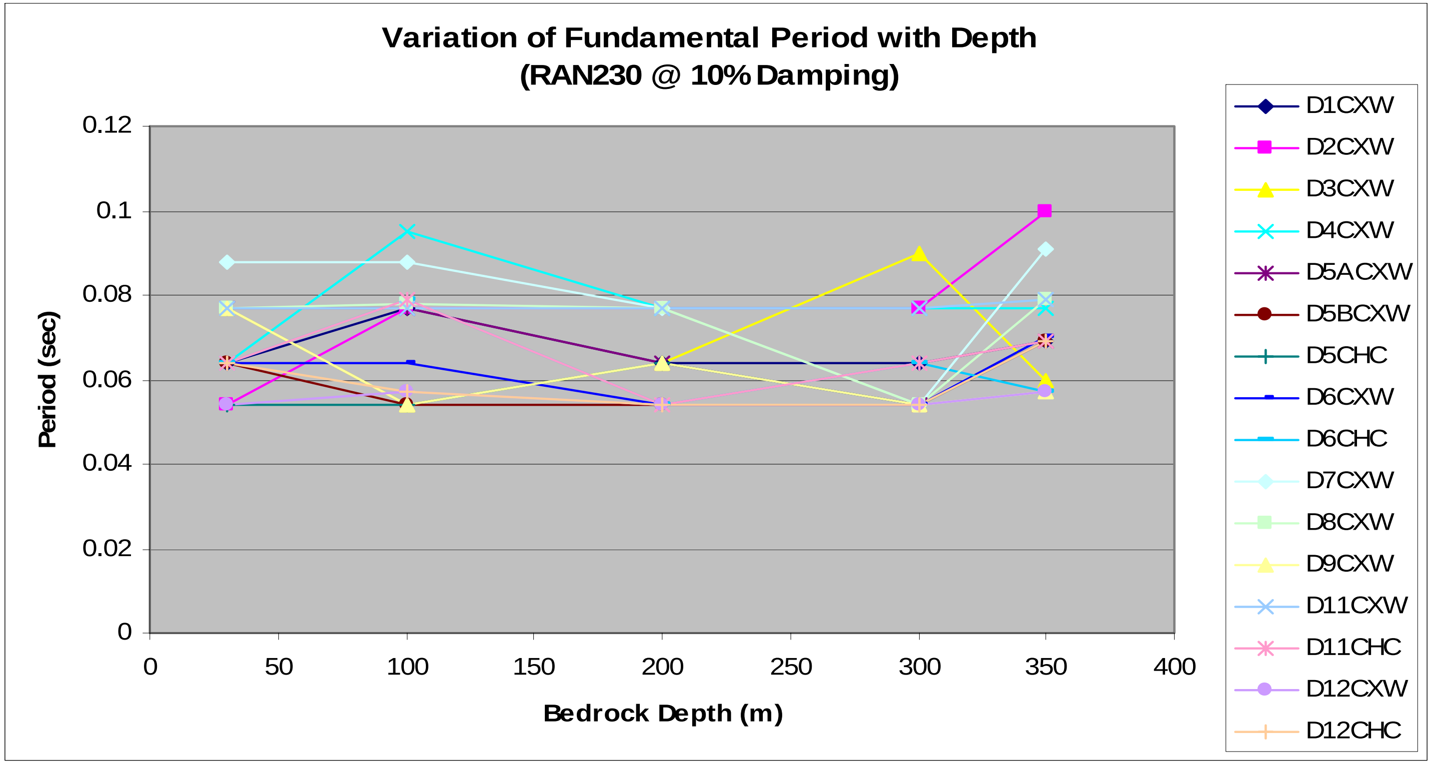


Figure 11.4: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN230 at 10% damping

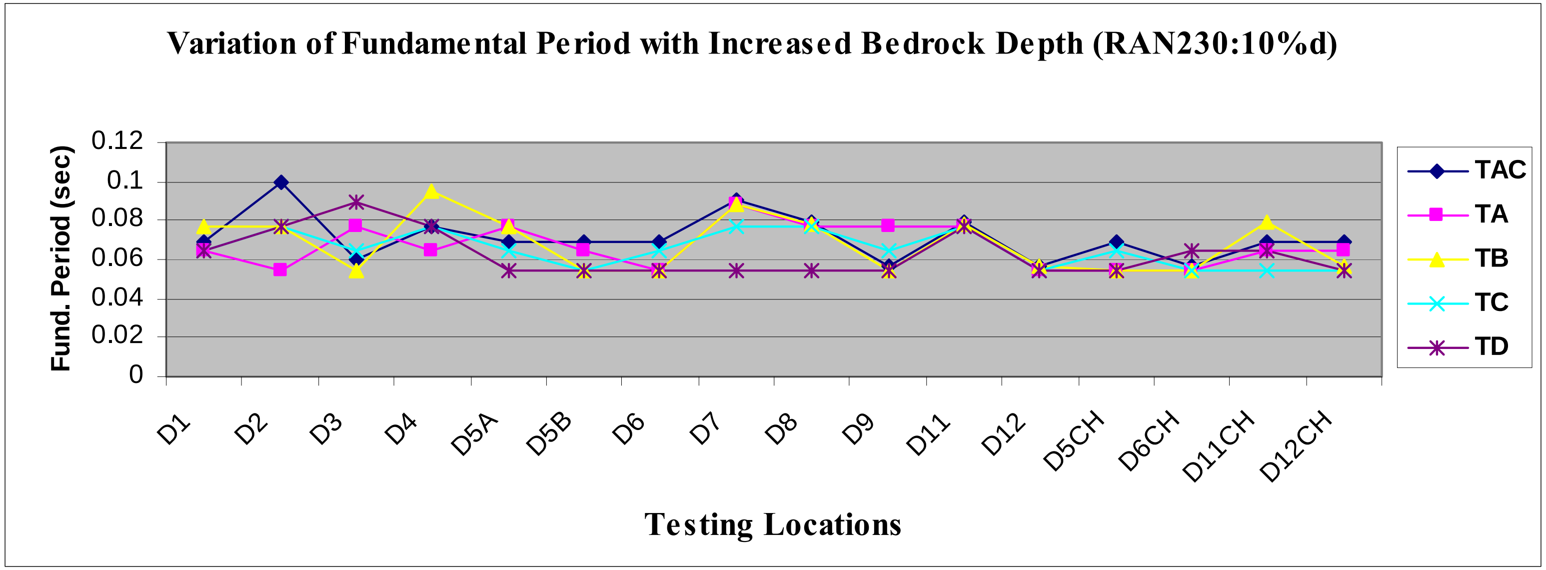


Figure 11.5: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN230 at 10% damping

III. Earthquake *RAN330* and *5%* Damping

Table (11.4) and Figures (11.6) and (11.7) show the results of the dynamic site response analysis for the Al-Durrah site SWV profiles at the selected depths. Profiles D3CXW, D4CXW, D5bCXW, D6CXW, D7CXW, D8CXW, and D12CH showed the largest fluctuations in the values of the site fundamental period with the variation of the bedrock depth. This is evident from the relatively large standard deviations associated with these three profiles.

The rest of the profiles showed much smaller variations. The profiles that showed large variations in the values of the fundamental period with the variation in the depth of the bedrock are examined in the next section.

		Ground Response Spectra Peak Periods RAN330 @ 5% Damping						
Test Location		TAC	TA	TB	TC	TD	Average	STDEV
CXW Tests	D1	0.079	0.098	0.088	0.077	0.077	0.0838	0.009149
	D2	0.11	0.098	0.11	0.088	0.1	0.1012	0.00923
	D3	0.11	0.2	0.16	0.16	0.1	0.146	0.040988
	D4	0.27	0.098	0.26	0.27	0.1	0.1996	0.091928
	D5A	0.091	0.088	0.088	0.088	0.077	0.0864	0.005413
	D5B	0.054	0.25	0.05	0.077	0.1	0.1062	0.082844
	D6	0.079	0.32	0.29	0.054	0.1	0.1686	0.126023
	D7	0.17	0.098	0.098	0.098	0.11	0.1148	0.031292
	D8	0.17	0.098	0.15	0.11	0.17	0.1396	0.033776
	D9	0.079	0.077	0.1	0.11	0.077	0.0886	0.015405
	D11	0.1	0.098	0.079	0.077	0.077	0.0862	0.011735
	D12	0.1	0.077	0.077	0.11	0.11	0.0948	0.016754
Cross Hole Tests	D5CH	0.079	0.088	0.077	0.064	0.1	0.0816	0.01339
	D6CH	0.11	0.098	0.088	0.098	0.11	0.1008	0.009338
	D11CH	0.079	0.098	0.1	0.077	0.077	0.0862	0.011735
	D12CH	0.29	0.33	0.077	0.16	0.077	0.1868	0.118308

Table 11.4: Variation of the peak periods of the Ground response spectra with depth using earthquake RAN330 at 5% damping

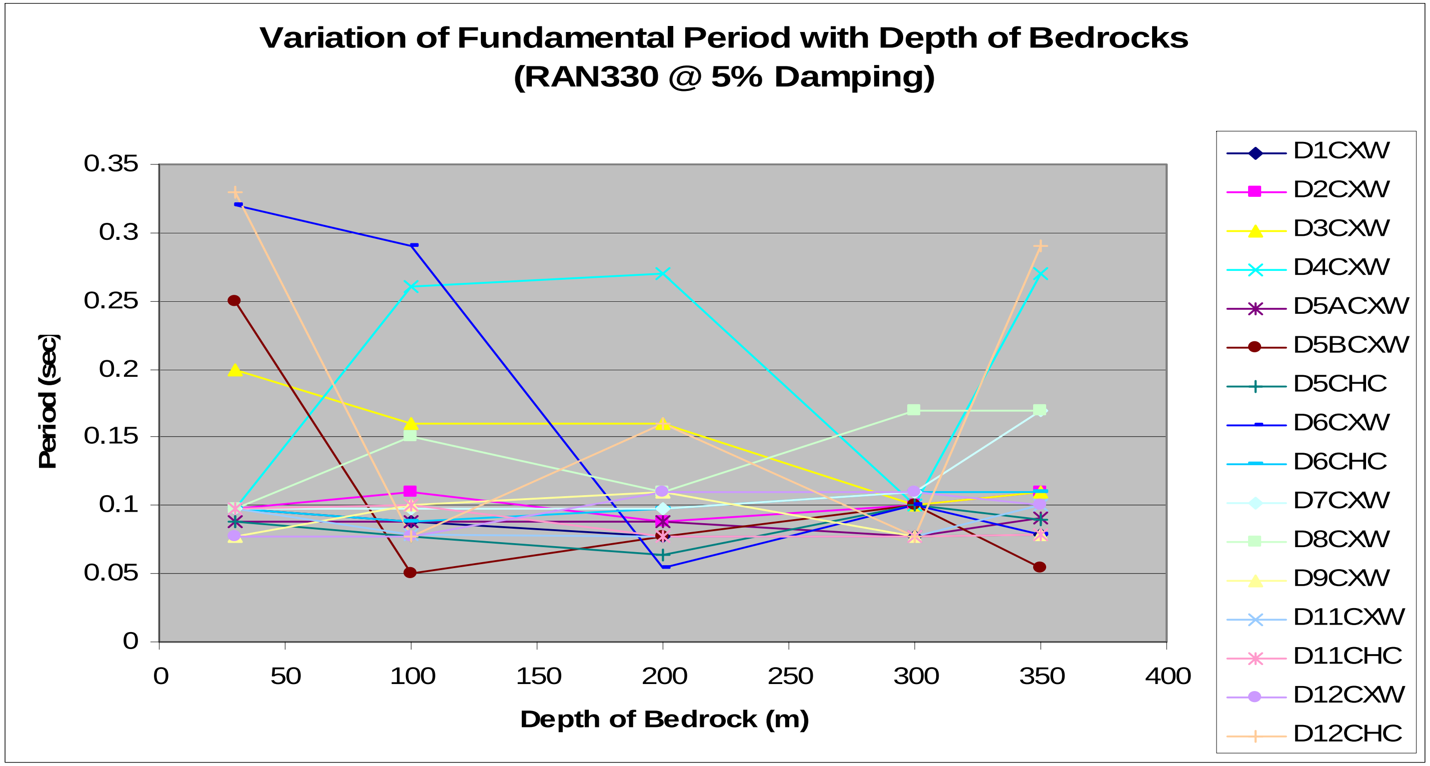


Figure 11.6: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN330 at 5% damping

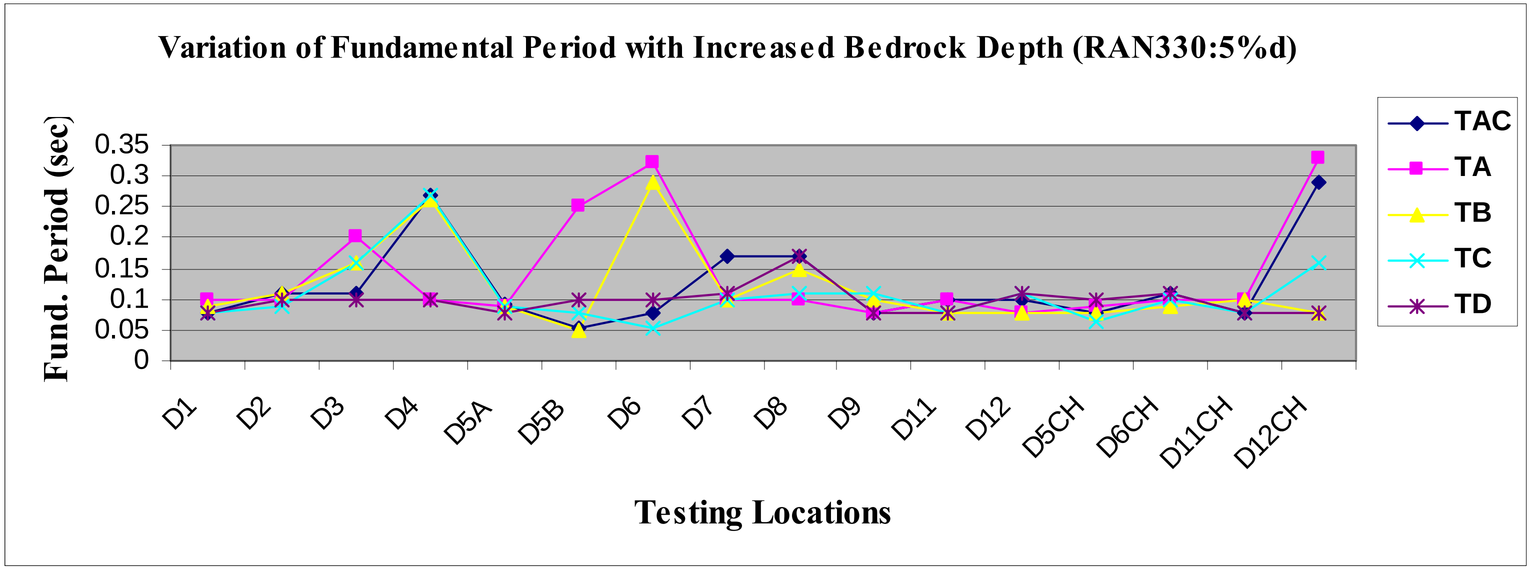


Figure 11.7: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN330 at 5% damping

IV. Earthquake *RAN330* and *10%* Damping

Table (11.5) and Figures (11.7) and (11.8) show the results of the dynamic site response analysis for Al-Durrah site SWV profiles at the selected bedrock depths. Profiles D8CXW, D12CXW, and D12CH showed the largest fluctuations in the values of the site fundamental period with the variation of the bedrock depth. This is evident from the relatively large standard deviations associated with these three profiles. The overall magnitude of the fluctuations in the values of the fundamental period is much less than the magnitude at 5% damping ratio.

The rest of the profiles showed much smaller fluctuations in the values of the fundamental periods as a result of increasing the bedrock depth. The profiles that showed large variations in the values of the fundamental period with the variation in the depth of the bedrock are examined in the next section.

		Ground Response Spectra Peak Periods RAN330 @ 10% Damping						
Test Location		TAC	TA	TB	TC	TD	Average	STDEV
CXW Tests	D1	0.079	0.088	0.077	0.077	0.077	0.0796	0.004775
	D2	0.11	0.098	0.098	0.077	0.1	0.0966	0.012033
	D3	0.11	0.078	0.12	0.11	0.1	0.1036	0.015962
	D4	0.07	0.098	0.095	0.098	0.1	0.0922	0.012538
	D5A	0.091	0.077	0.098	0.077	0.077	0.084	0.009899
	D5B	0.1	0.064	0.1	0.077	0.1	0.0882	0.016799
	D6	0.079	0.098	0.077	0.064	0.1	0.0836	0.015209
	D7	0.091	0.098	0.11	0.11	0.1	0.1018	0.008198
	D8	0.079	0.11	0.16	0.11	0.12	0.1158	0.029124
	D9	0.079	0.077	0.1	0.098	0.077	0.0862	0.011735
	D11	0.1	0.098	0.079	0.077	0.11	0.0928	0.014272
	D12	0.11	0.054	0.077	0.11	0.1	0.0902	0.024315
Cross Hole Tests	D5CH	0.079	0.088	0.054	0.054	0.1	0.075	0.020567
	D6CH	0.1	0.098	0.077	0.098	0.1	0.0946	0.009889
	D11CH	0.11	0.077	0.1	0.09	0.077	0.0908	0.014446
	D12CH	0.1	0.064	0.054	0.11	0.077	0.081	0.023643

Table 11.5: Variation of the peak periods of the Ground response spectra with depth using earthquake RAN330 at 10% damping

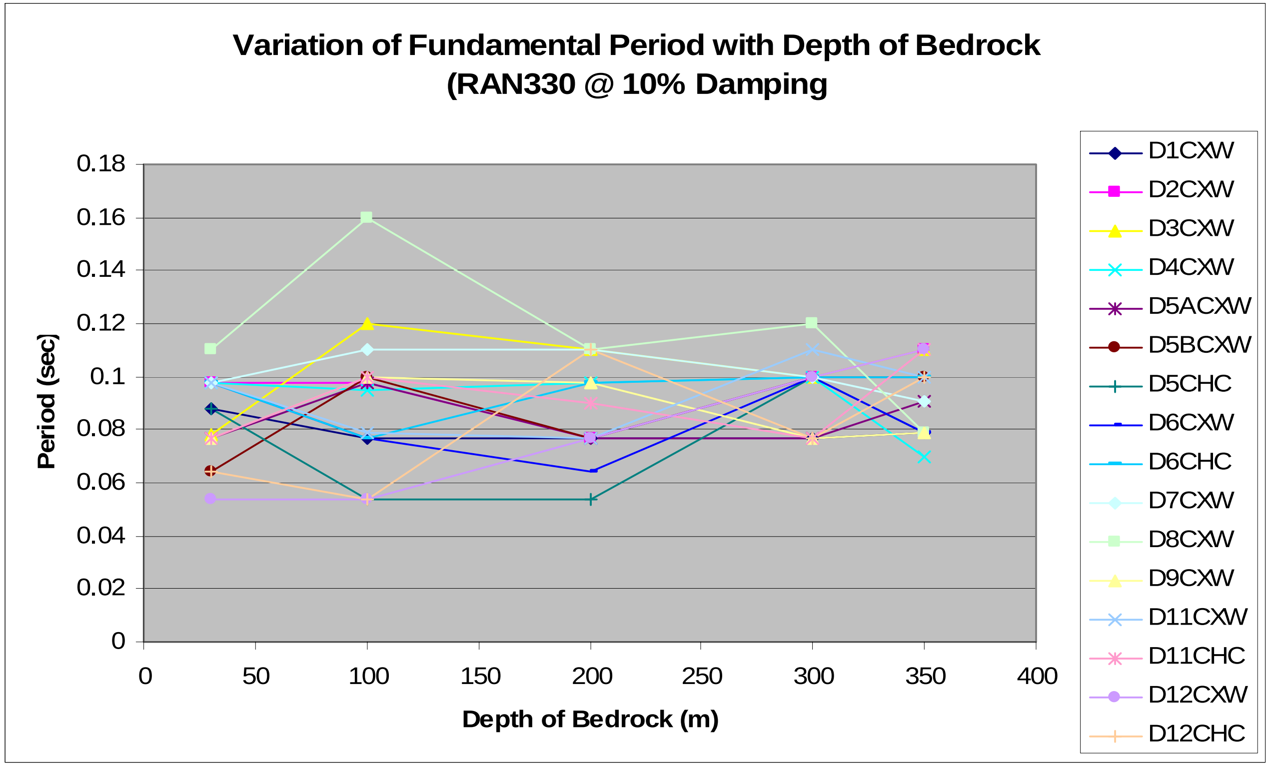


Figure 11.8a: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN330 at 10% damping

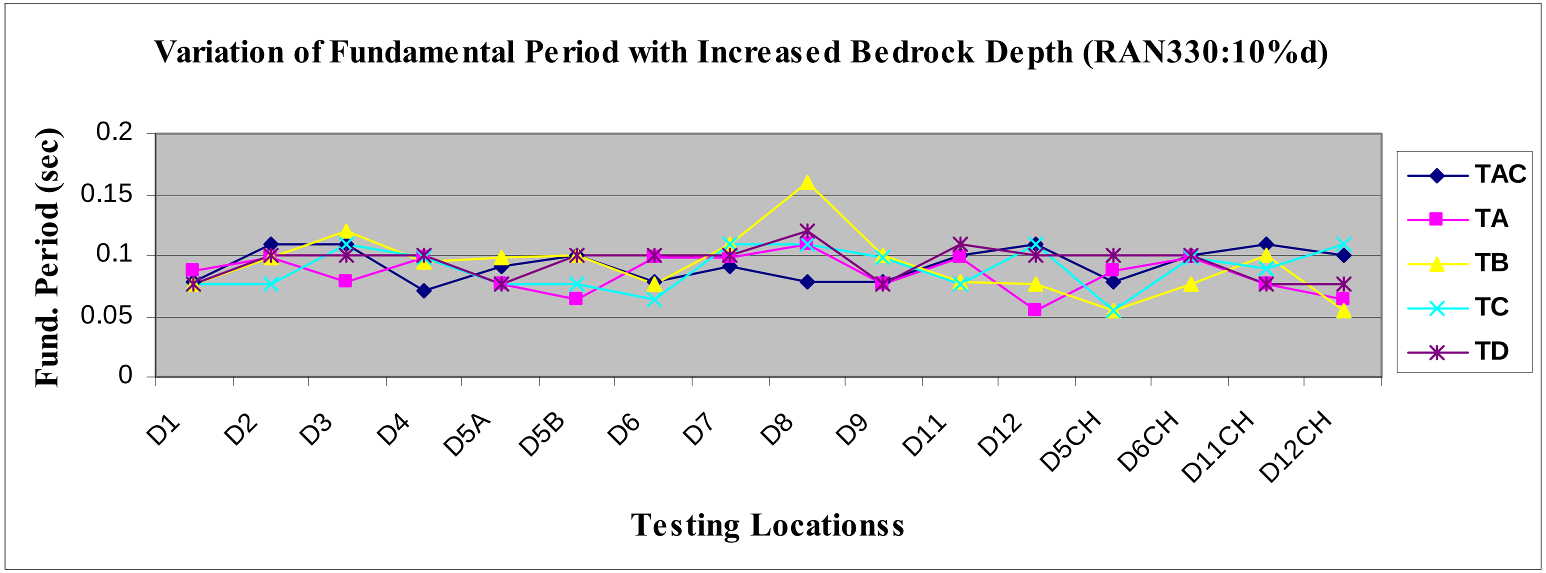


Figure 11.8b: Variation of Al-Durrah fundamental periods with increasing depth of bedrock for earthquake RAN330 at 10% damping

11.2c Analysis of the Soil Profiles with Significantly Variable Fundamental Periods

The results of the previous section showed that the site fundamental period values of certain soil profiles at the Al-Durrah site were influenced by the increased depth of the bedrock. Different profiles exhibited different fluctuations in the values of the fundamental period depending on the selection of the synthetic earthquake and the damping ratio that were used in the dynamic site response analysis.

The fluctuations in the values of the fundamental periods with the increased depth of the bedrock ranged from very insignificant change in some cases, to very significant changes in others. In order to categorize these fluctuations into significant and insignificant fluctuations, a criterion was selected. The average value of the fundamental period of a profile in Tables (11.2) to (11.5) represents the average of all fundamental periods of that profile at the various selected depths. The best statistical tool that characterizes fluctuation for a certain variable is its coefficient of variation (COV), which is defined as [28]:

COV = (The standard deviation ÷ the mean) X 100

COV is commonly expressed as a percentage. Higher COV values indicate higher fluctuations in the values of the data being analyzed. The COV of fundamental periods in Tables (11.2) to (11.5) were calculated.

The results are summarized in Table (11.6) and plotted in Figure (11.9). A COV limit of 20% was selected to separate profiles with significant fluctuations from those with no significant fluctuations. If the COV of the fundamental period at a certain soil profile is less than 20%, then the fundamental period at this profile is assumed *not* to be influenced by increasing the bedrock depth. On the other hand, a COV of more than 20% was considered to indicate significant fluctuation in the value of the fundamental period due to increased bedrock depth. This assumption was applied to all profiles that had a ratio of more than 20% under any analysis of the two synthetic earthquakes. Based on this criterion, Table (11.6) and Figure (11.9) show that the following profiles had significant fluctuations in the values of the fundamental period as a result of increasing the bedrock depth:

D2CXW, D3CXW, D4CXW, D5BCXW, D6CXW, D7CXW, D8CXW, D12CXW, D5CH, and D12CH.

Coefficient of Variation (COV) of the Fundamental Period (%)					
		Earthquake RAN230		Earthquake RAN330	
Test Type	Test Location	5% Damping	10% Damping	5% Damping	10% Damping
CXW	**D1**	15.59	8.41	10.92	6.00
	D2	18.53	21.12	9.12	12.46
	D3	38.43	20.95	28.07	15.41
	D4	6.00	14.16	46.06	13.60
	D5A	16.79	14.19	6.26	11.79
	D5B	7.57	11.98	78.01	19.05
	D6	11.00	11.98	74.75	18.19
	D7	31.91	19.19	27.26	8.05
	D8	47.23	14.59	24.19	25.15
	D9	17.53	15.90	17.39	13.61
	D11	8.27	1.15	13.61	15.38
	D12	12.23	2.98	17.67	26.96
CH	**D5**	11.06	11.98	16.41	27.42
	D6	15.90	7.66	9.26	10.45
	D11	20.00	13.76	13.61	15.91
	D12	16.47	11.17	63.33	29.19

Table 11.6: Coefficient of Variation (COV) of the fundamental periods (as a percentage)

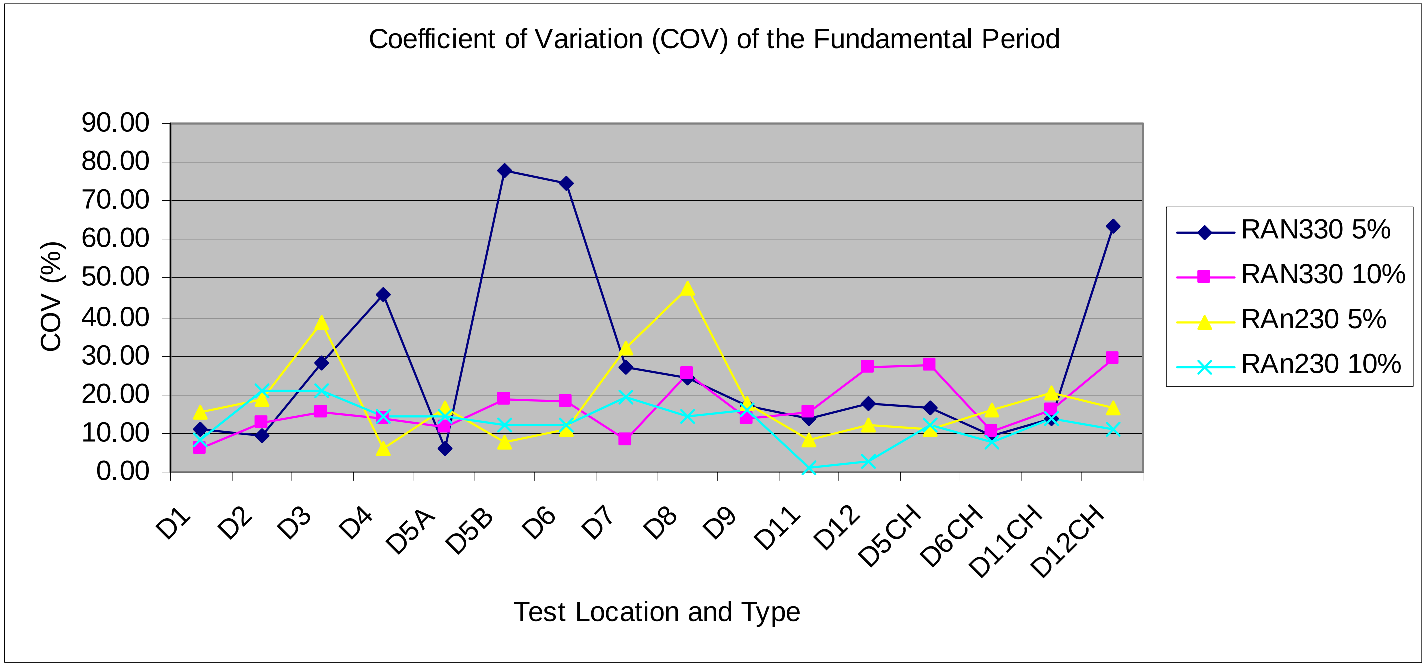


Figure 11.9: Coefficients of Variation of the fundamental periods of Al-Durrah (as a percentage)

The next step is to determine the soil characteristics that cause the fundamental period of some profiles to vary with increasing bedrock depth. Table (11.7) presents a summary of the Al-Durrah field tests results for each soil profile and its corresponding site classifications. These results were presented in Chapter 7. The last column of Table (11.7) identifies the profiles that exhibited significant fundamental period fluctuation due the bedrock depth variation. The field tests results and their corresponding NEHRP site classifications do not provide any indications on whether a profile's fundamental period will be influenced by the bedrock depth variation. For example, test location D11 with a NEHRP SPT average blow count of 25.85 did not exhibit any fluctuation in the fundamental period as a result of bedrock depth variation, while test location D7 with a NEHRP SPT average blow count of 92.85 did exhibit fluctuation. Similarly, test location D11 with a CXW average SWV of 371 (m/s) did not exhibit any fluctuation in the fundamental period with the variation of the bedrock depth, while test location D5b with a CXW average SWV of 523 (m/s) did. Similar cases can also be found in the cross-hole test results. No definite conclusions can be made about the relationship between a profile's NHERP site classifications, NEHRP average SWV, and its fundamental period fluctuation with increased bedrock depth. Therefore, it is necessary to look for other factors that cause some of the soil profiles to exhibit significant fundamental period fluctuation with increasing bedrock depth, while not having the same effect on other *softer* profiles.

Test Location	NEHRP SPT Average No. of blows	NEHRP SPT Site Classification	CXW Average SWV	CXW NEHRP Site Classification	Cross-Hole Average SWV	Cross-hole NEHRP Site Classification	Sig. Fundamental Period Fluctuation
D1	83.92	C	420.	C			No
D2	67.57	C	439	C			Yes
D3	70.74	C	410	C			Yes
D4	34.48	D	422	C			Yes
D5A	65.84	C	465	C	316	*D*	No
D5b	65.84	C	523	C	316	*D*	Yes (CXW)
D6	80.84	C	333	*D*	438	C	Yes (CXW)
D7	65.62	C	466	C			Yes
D8	92.85	C	424	C			Yes
D9	74.30	C	476	C			No
D11	25.85	D	371	C	381	C	No
D12	92.01	C	353	*D*	223	*D*	Yes (CXW & CH)

Table 11.7: Summary of Al-Durrah soil cross-section average SPT, NEHRP SWV, and effect of bedrock depth variation

Figures (11.10a) to (11.10p) show the SWV of each of the Al-Durrah soil profiles that were used in the dynamic site response analysis. These profiles were generated by the computer program ProShake, based on the input SWV of each profile. The input SWV profiles were based on the results of the CXW and the CH field tests. *All* of the profiles that showed significant fundamental period fluctuations are characterized by the presence of embedded soft layers that are sandwiched by stiffer layer(s). On the other hand, embedded soft layers were also present in some of the profiles that did not show significant fluctuations. This suggests That the presence of embedded soft layers may cause significant fluctuations in the value of the fundamental period due to variation in the bedrock depth. In order to determine the factors that cause embedded soft layers to influence the fundamental period, further dynamic site response analysis was performed. In this analysis, the effects of increasing the thickness and the SWV of an embedded soft layer on the fundamental period were examined. The results of the analysis are presented in the next section.

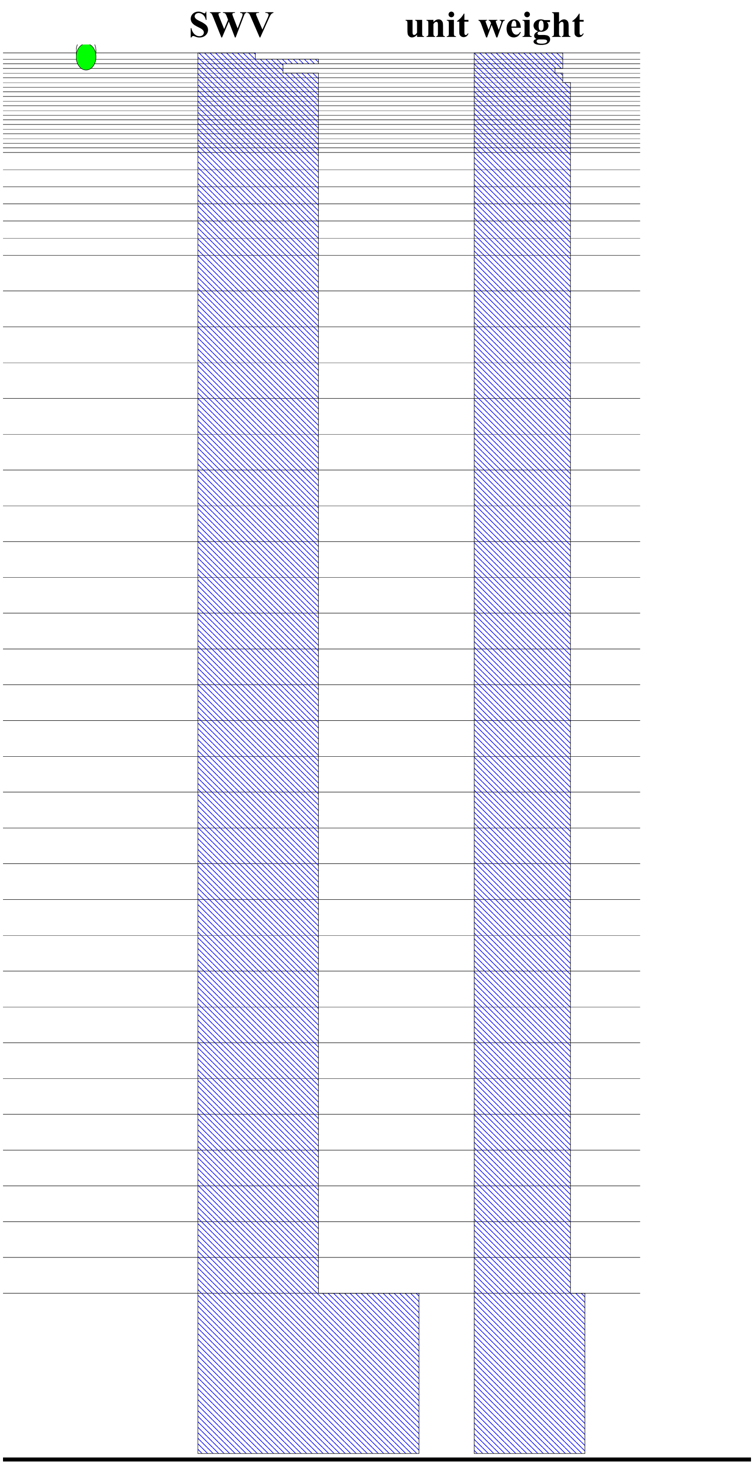


Figure 11.10a: Location D1-CXW test soil profile

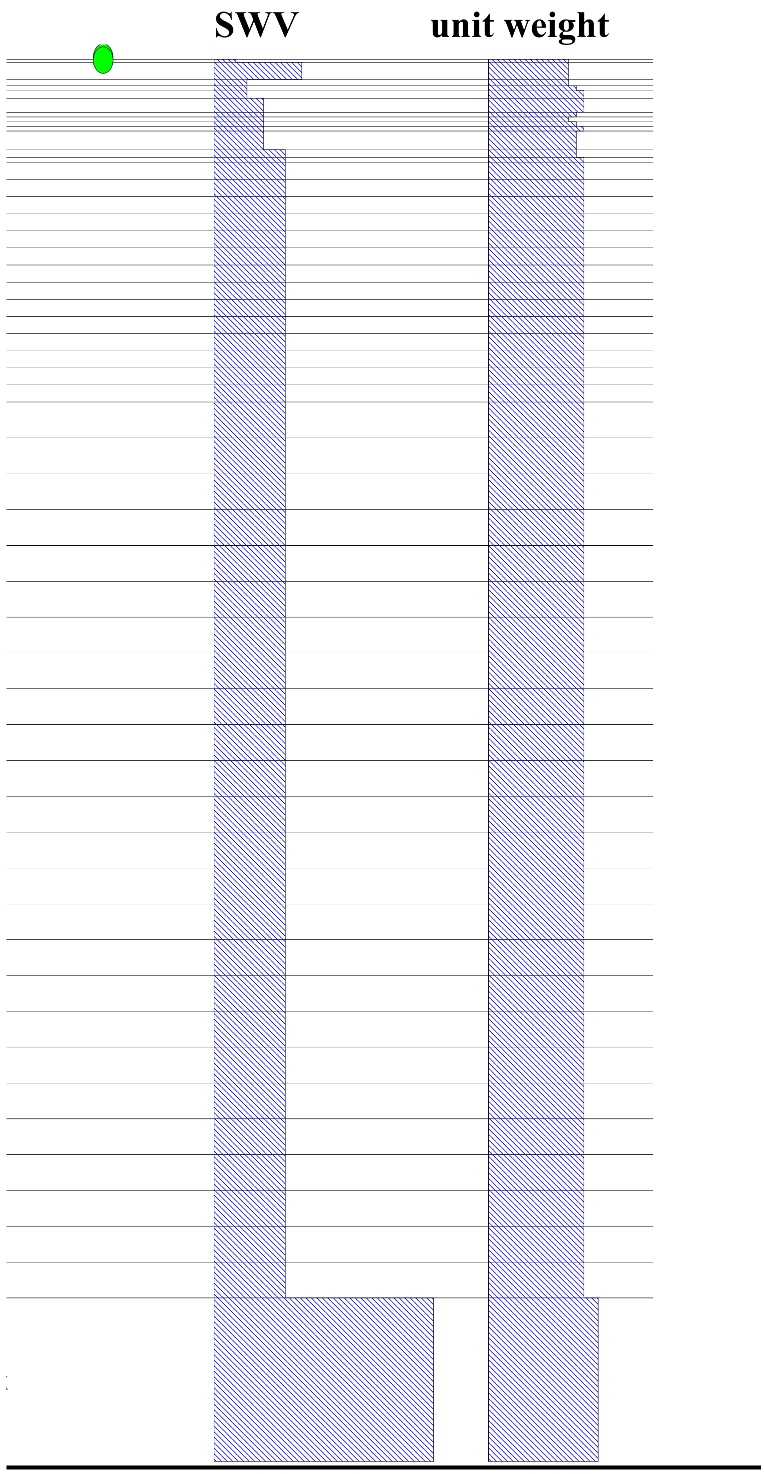


Figure 11.10b: Location D2-CXW test soil profile

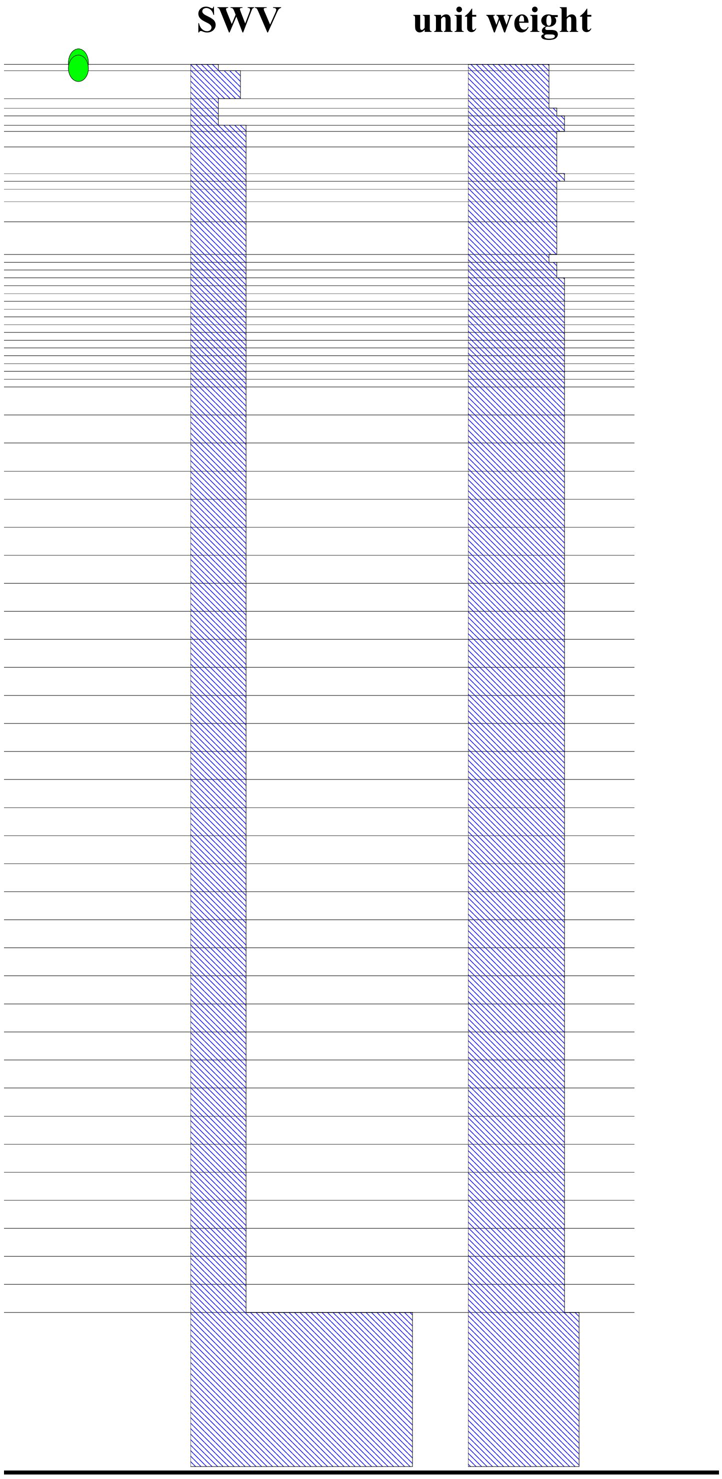


Figure 11.10c: Location D3-CXW test soil profile

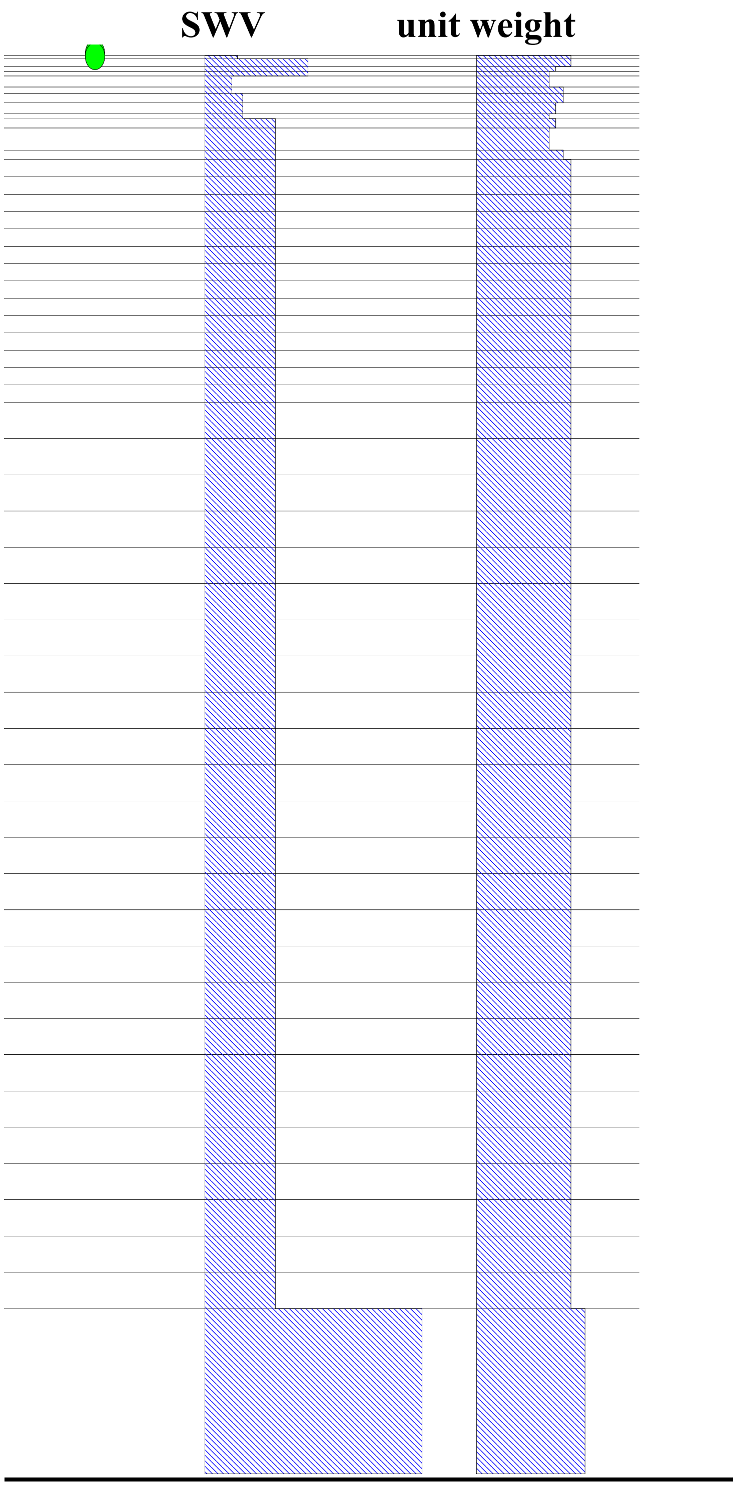


Figure 11.10d: Location D4-CXW test soil profile

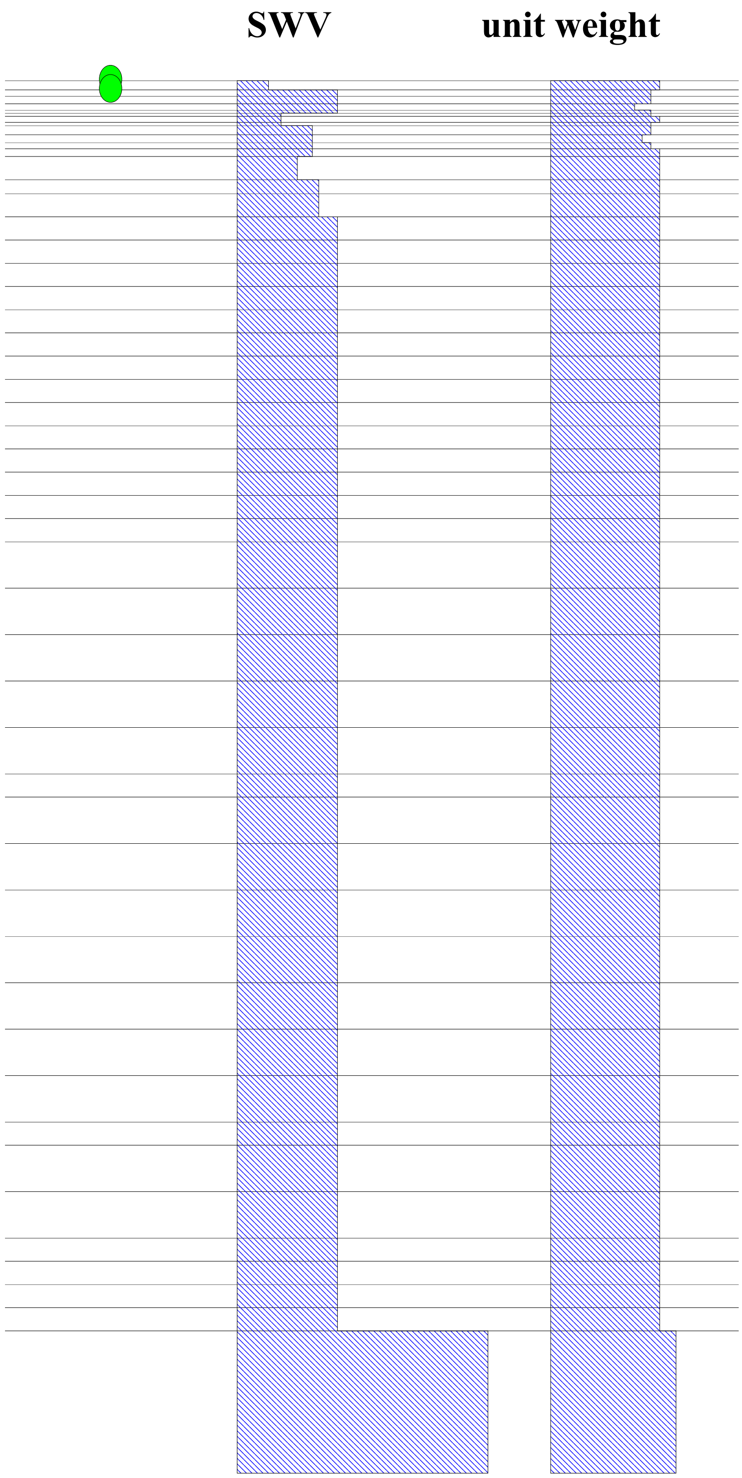


Figure 11.10e: Location D5-CXW test soil profile

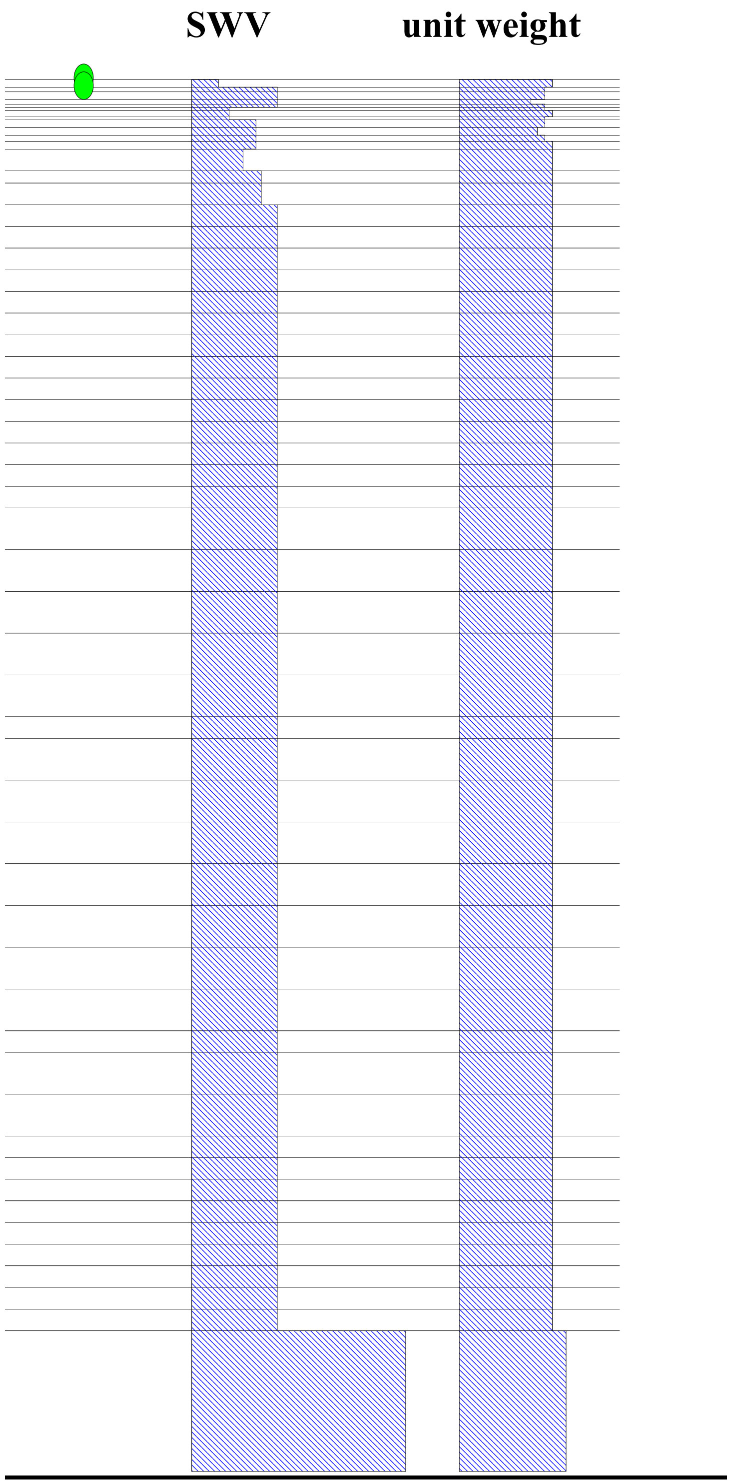


Figure 11.10f: Location D5b-CXW test soil profile

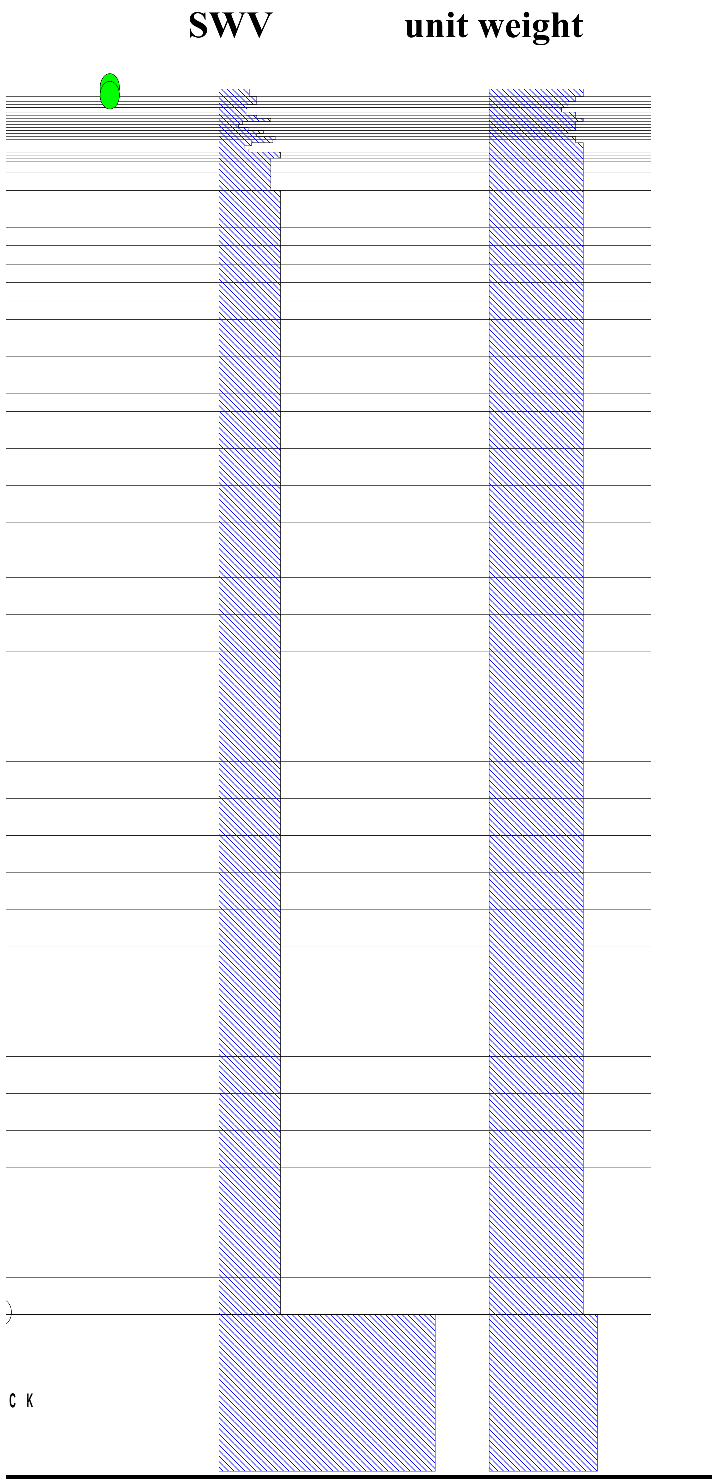


Figure 11.10g: Location D5-CH test soil profile

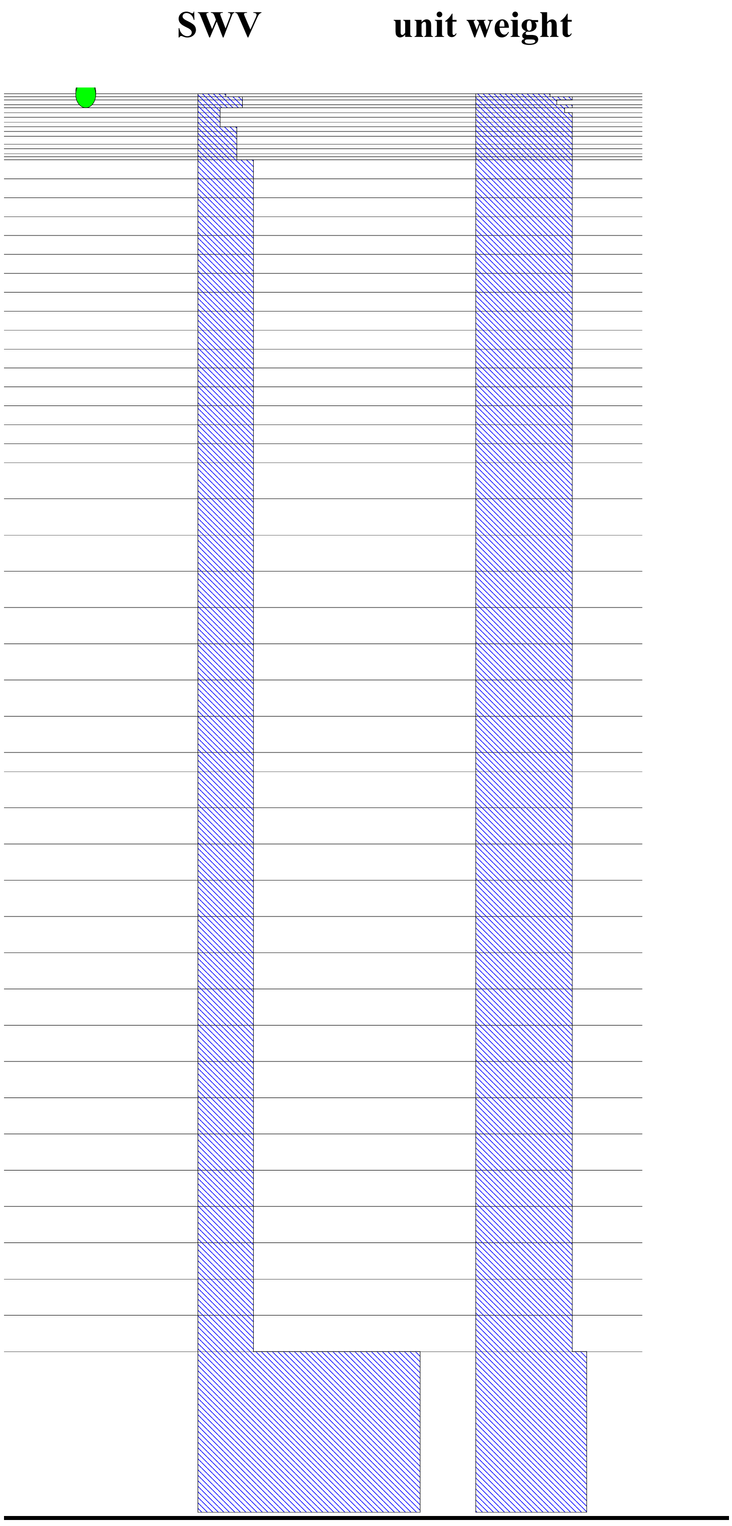


Figure 11.10h: Location D6-CXW test soil profile

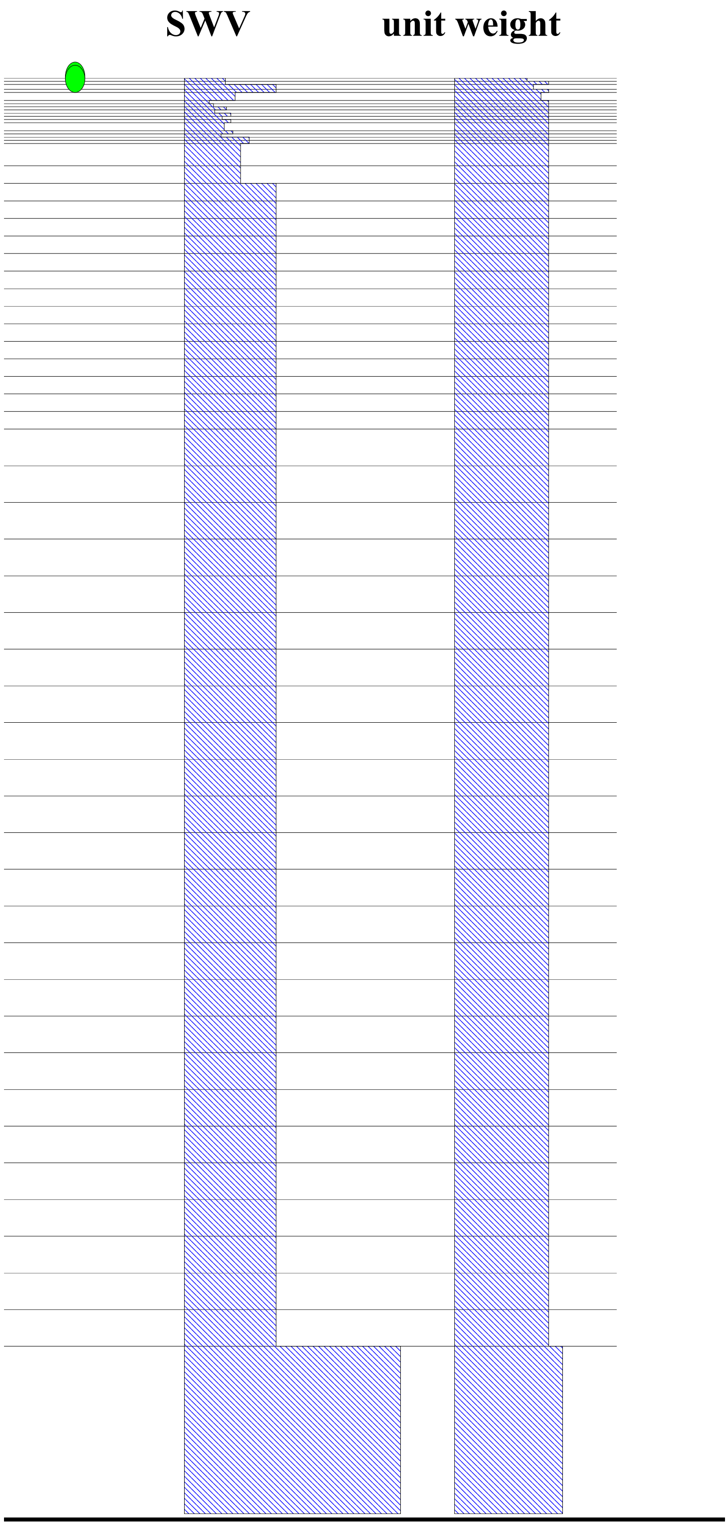


Figure 11.10i: Location D6-CH test soil profile

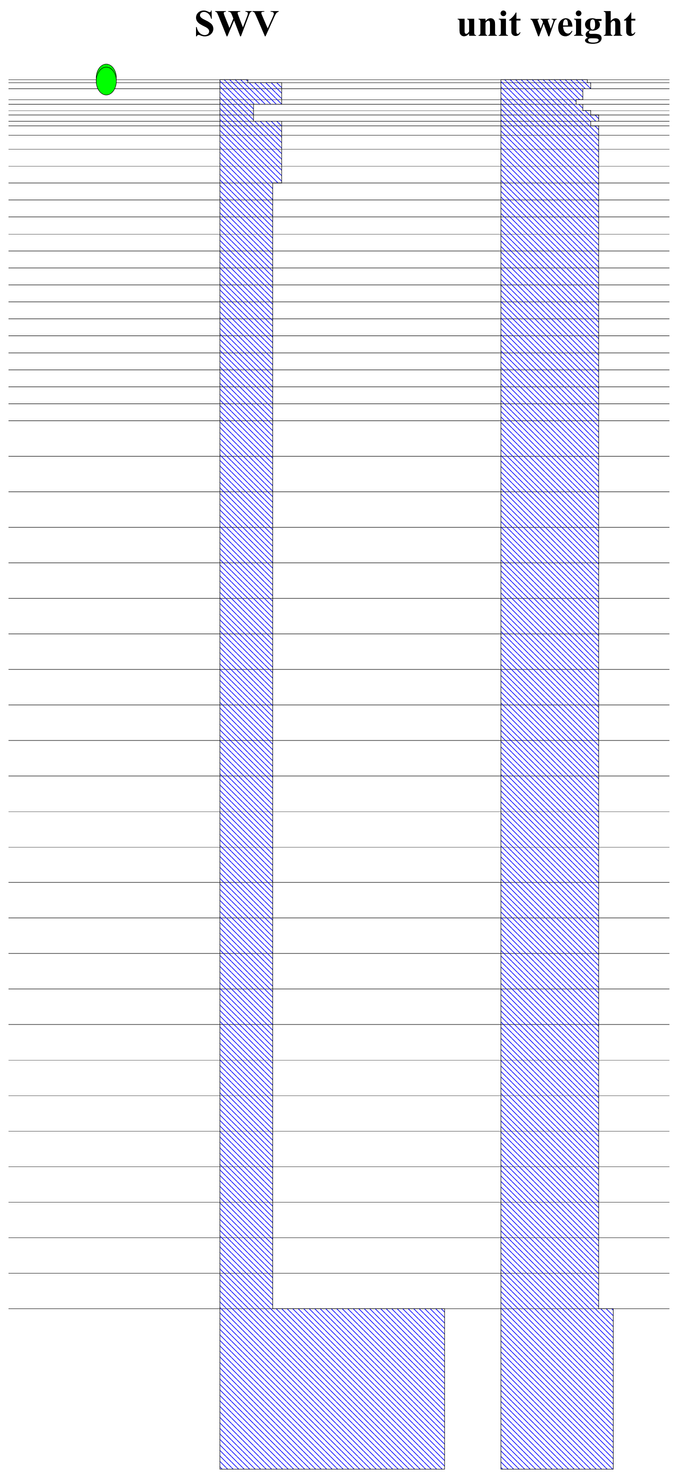


Figure 11.10j: Location D7-CXW test soil profile

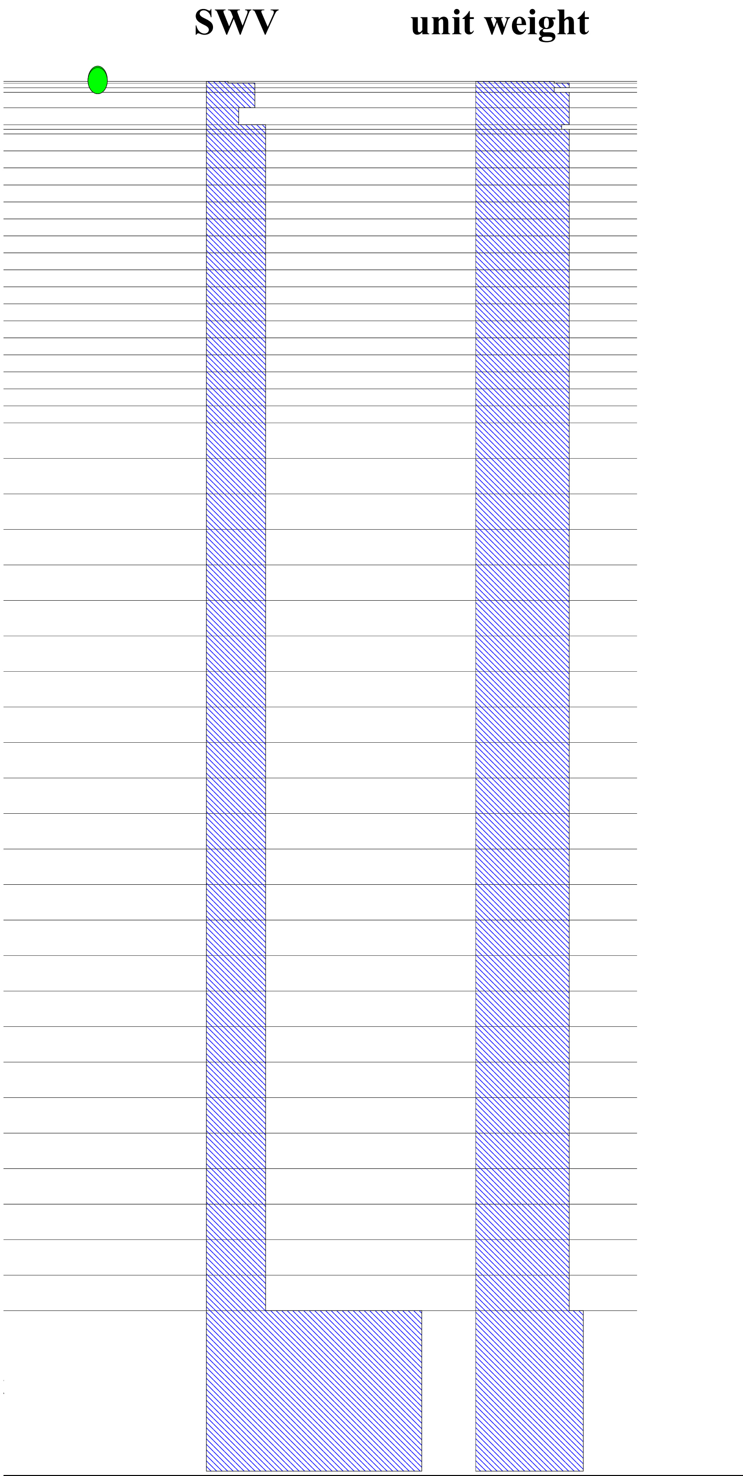


Figure 11.10k: Location D8-CXW test soil profile

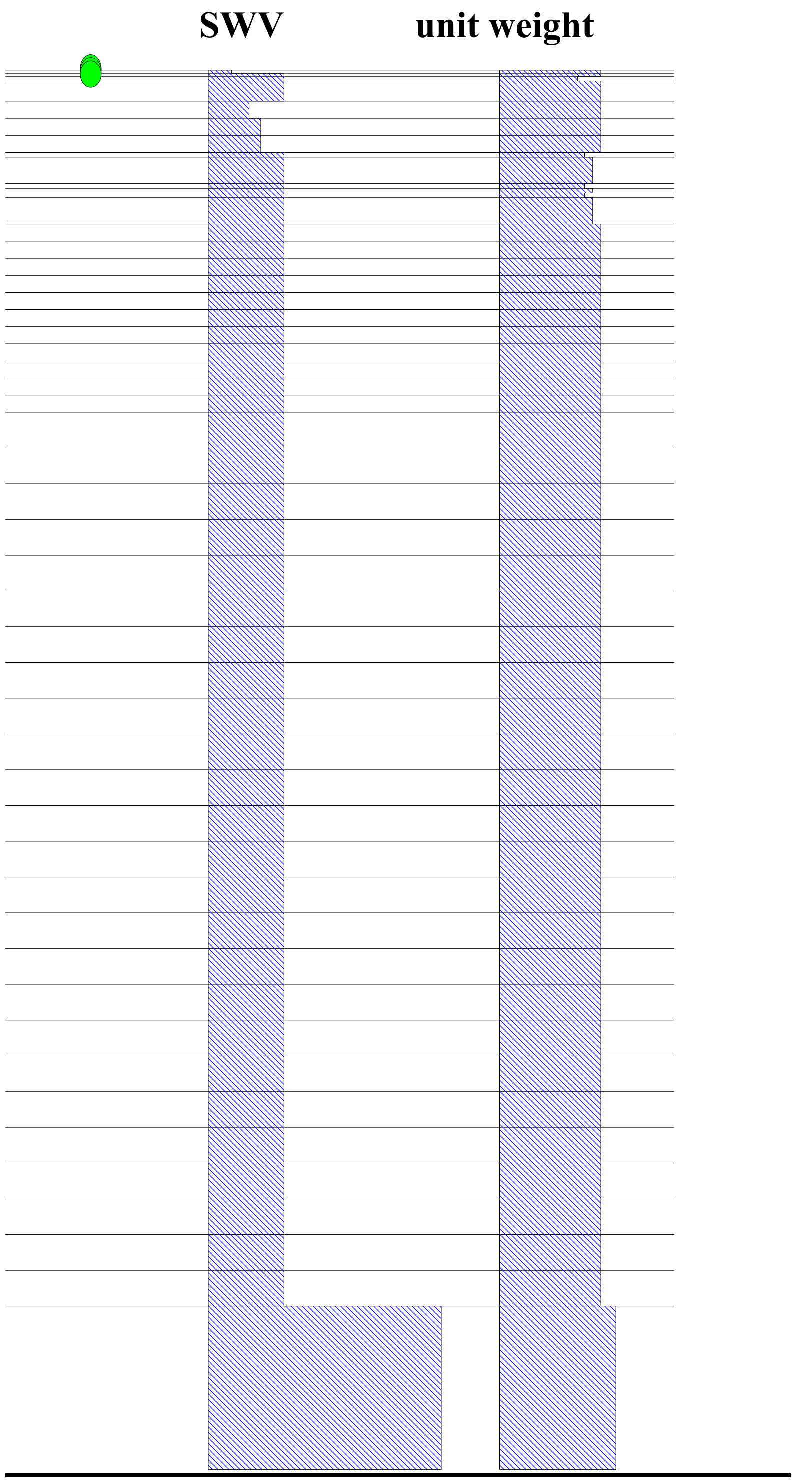


Figure 11.10l: Location D9-CXW test soil profile

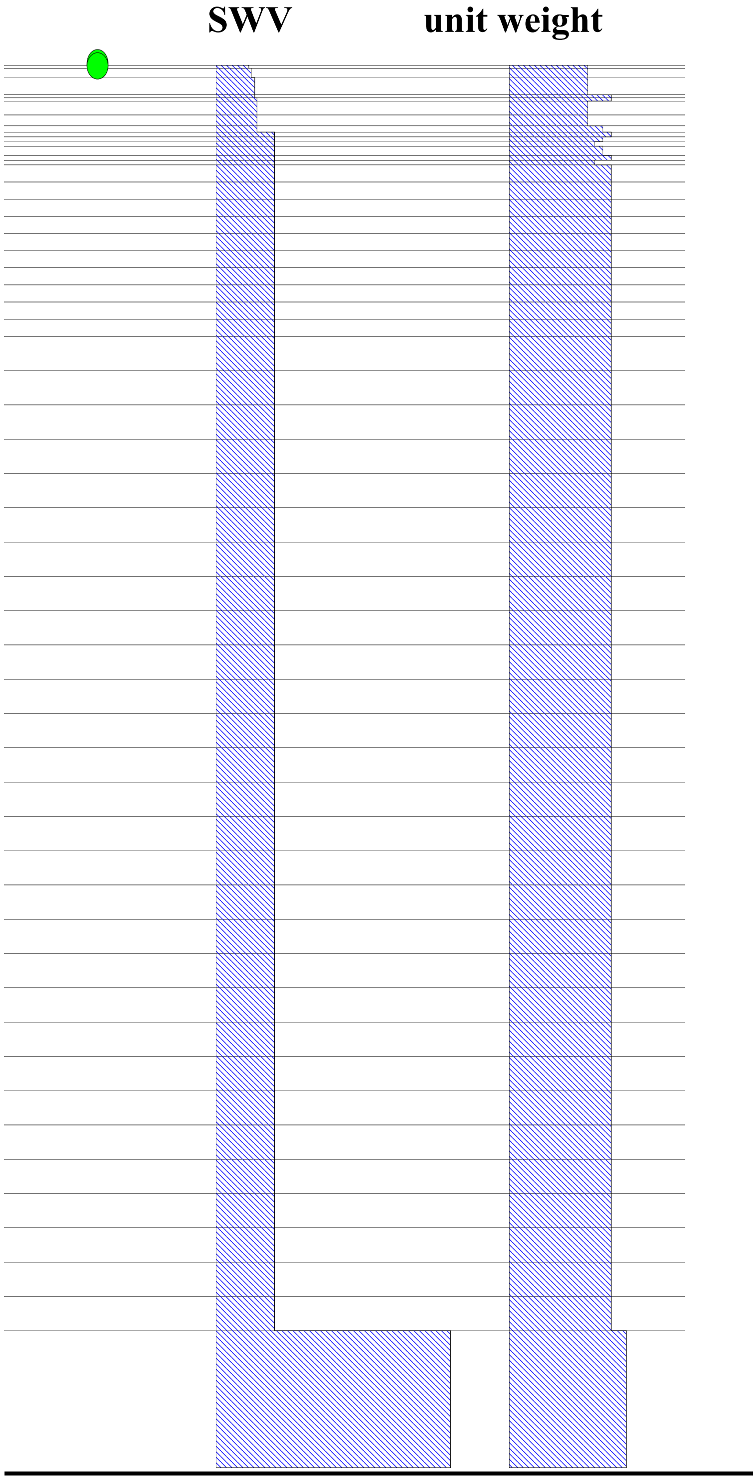


Figure 11.10m: Location D11-CXW test soil profile

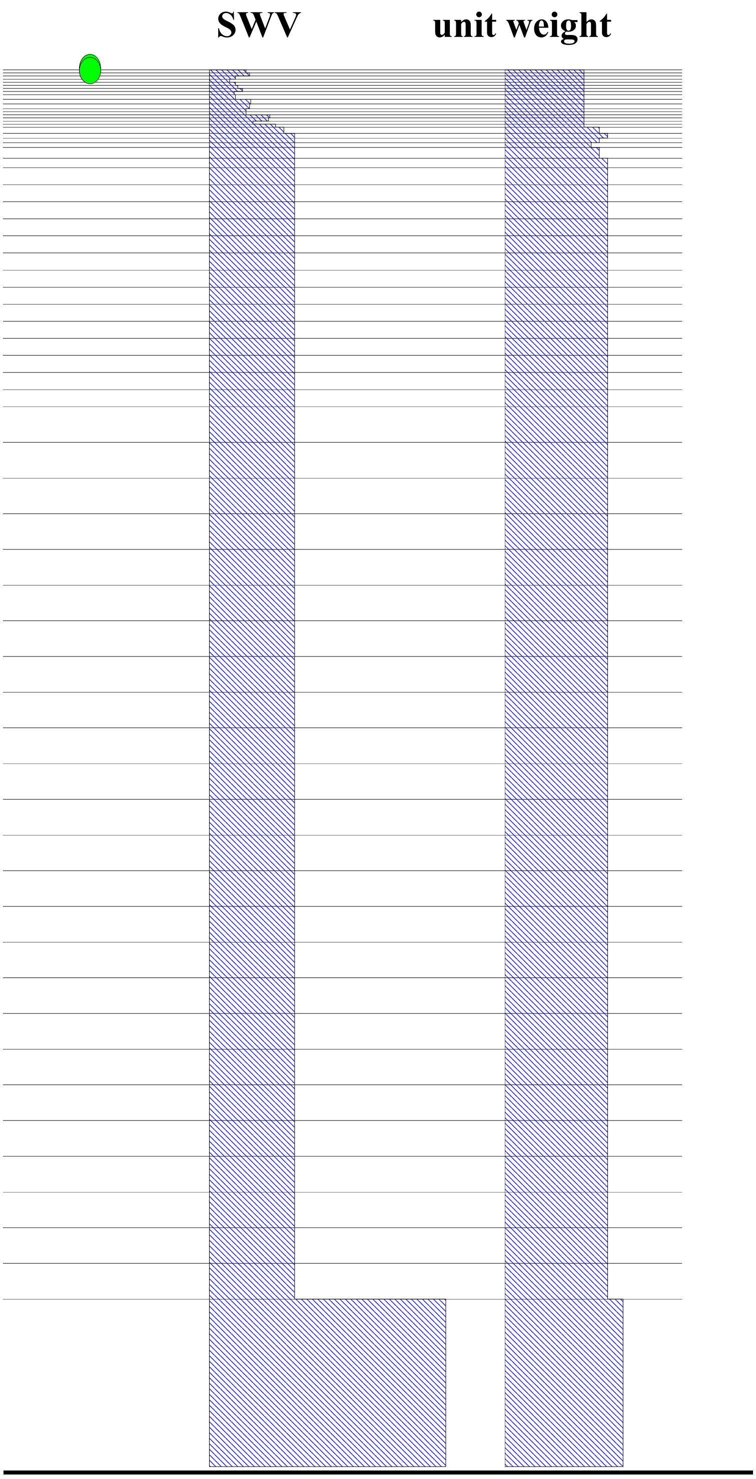


Figure 11.10n: Location D11-CH test soil profile

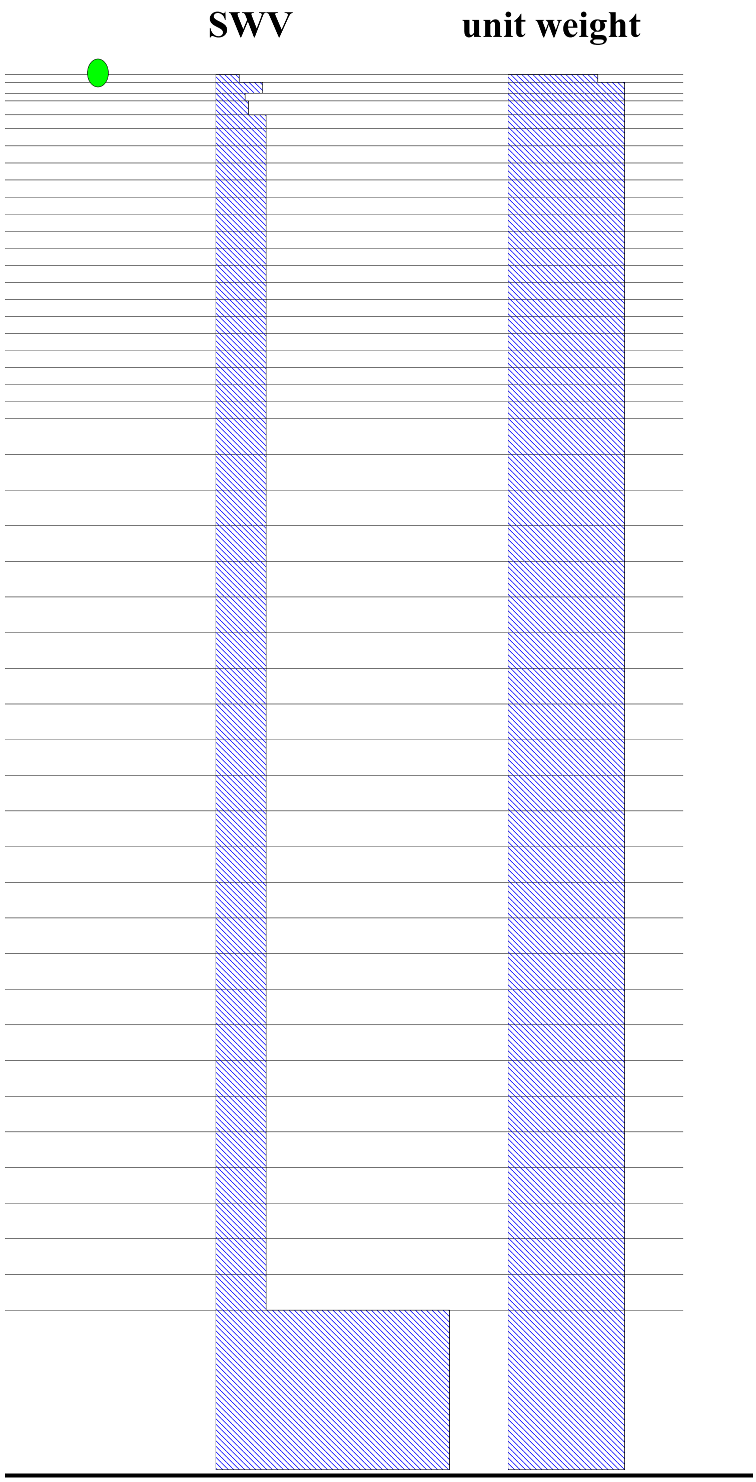


Figure 11.10o: Location D12-CXW test soil profile

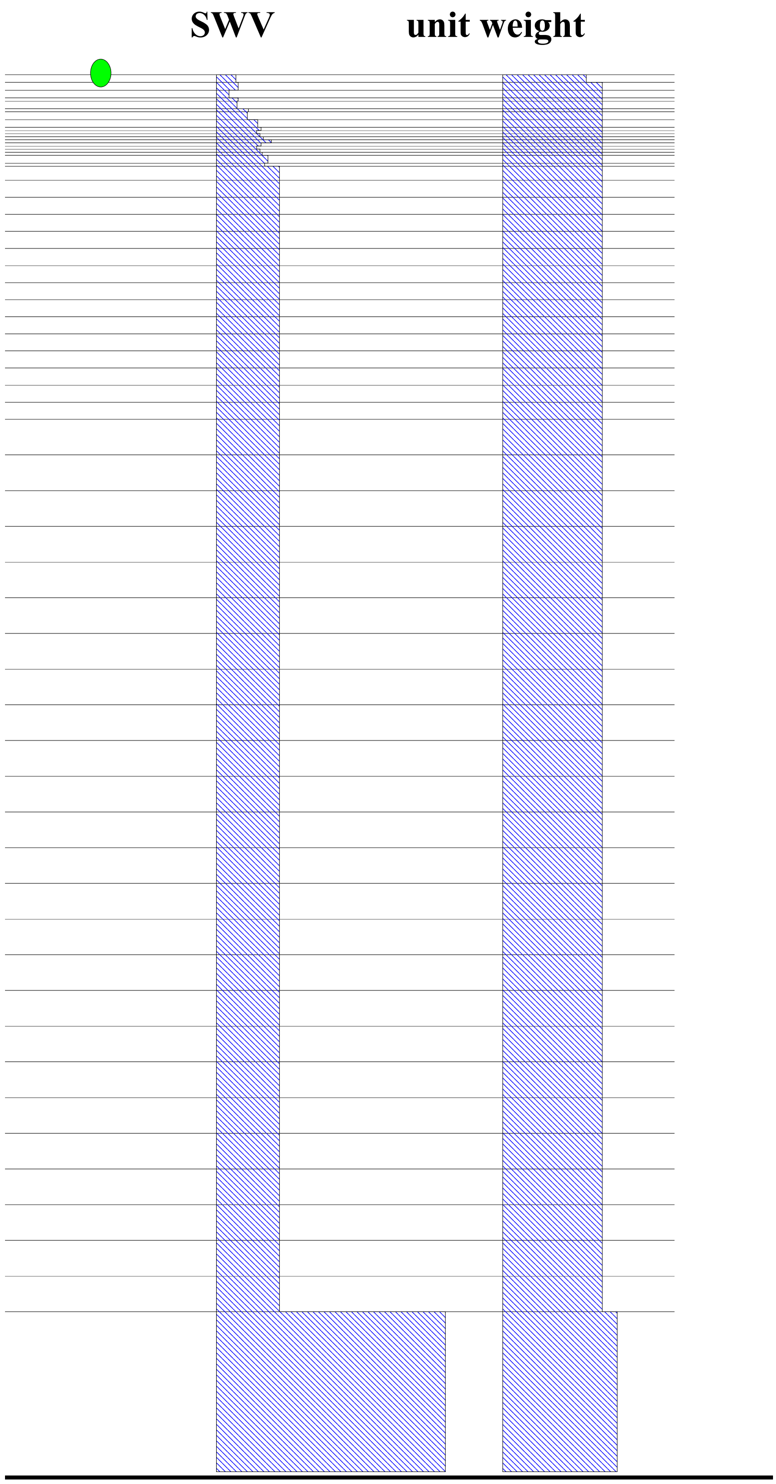


Figure 11.10p: Location D12-CH test soil profile

11.2d Effects of Embedded Soft Layers on the Fundamental Period

The effects of the presence of an embedded soft layer within a soil profile are examined in this section. The effects are analyzed in conjunction with increasing the bedrock depth. The soil profile D1CXW that is shown in Figure (11.10a) was used in this analysis. This profile was selected because it did not show significant fluctuation in the values of the fundamental period with increasing bedrock depth. The original profile had a very thin soft layer at the ground surface, and another one beginning at a depth of 3.25 m. However for the purpose of this analysis, both layers were removed initially and the profile was assumed to have a constant SWV of 500 m/s. The bedrock depth was placed at NEHRP depth of 30 m, and the profile was designated as D1N.

Another profile identical to D1N with the exception of the bedrock depth was also established and designated as D1ac. The bedrock depth of profile D1ac was placed at the estimated actual depth of 350 m. The analysis was performed using the program ProShake and the synthetic earthquake RAN330 with two damping ratios of 5% and 10%.

The relationship between the thickness of an embedded soft layer, the depth of bedrock, and the site fundamental period is presented next. The dynamic site response analysis was performed repeatedly for both profiles with varying soft layer thickness and SWV. In each analysis, the soft layer thickness was increased incrementally from 3 to 15 m. At each damping ratio, the analysis was repeated four times using four values of the SWV of the soft layer including 350, 300, 250, 200 m/s. The embedded soft layer was placed at a depth of 3.25m in both profiles, similar to the original profile of D1CXW. The results of the analysis are presented in Table (11.8) and Figures (11.11) and (11.12). Details of the analysis including input and output data are presented in Appendix (H).

Figures (11.11a) to (11.11d) show the results of the analysis at 5% damping ratio. At the lower values of the soft layer thickness, there was little or no variation in the fundamental period. At soft layer thickness of 7 m and higher, the four Figures clearly show that the variation in the fundamental period between the two profiles increases with increasing soft layer thickness. The variation of the fundamental period also increased with decreasing the SWV of soft layer.

Figures (11.12a) to (11.12d) show the results of the analysis at 10% damping ratio. Again, at the lower values of the soft layer thickness, there was little or no variation in the fundamental period. Figures (11.12a, b, and c) show that the variation of the fundamental period starts increasing at the soft layer thickness of 5m, then starts decreasing after reaching the thickness of 9m. Figure (11.12d) which has a soft layer SWV of 200 m/s, shows that the variation of the fundamental period increased with increasing soft layer thickness. All of the four figures indicate that the variation of the fundamental period between the two profiles increased with decreasing the SWV of the soft layer.

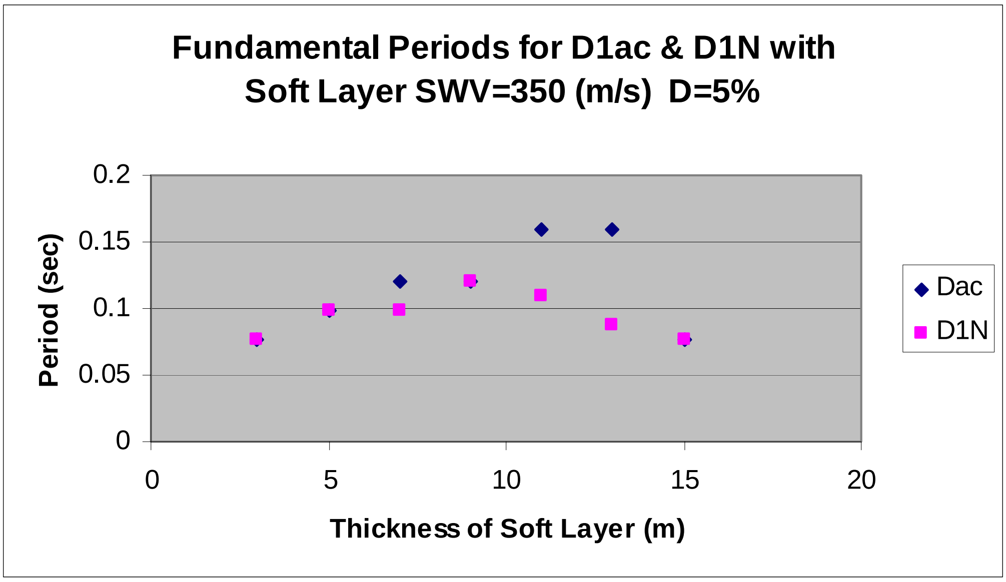
The analyses that were presented in Sections 11.2c and 11.2d suggest that the presence of soft embedded layers of significant thickness within a soil profile makes the fundamental period sensitive to the depth of the bedrock. If no significant soft layers are embedded within a profile, then the depth of the bedrock becomes irrelevant to the site fundamental period. The effects of the presence of embedded soft soil layers on a soil cross-section's fundamental period will depend on the soft layers' thickness, SWV, location, and the damping ratio of the soil. To verify these findings, the analysis of the East-west seismic array is presented in the following section.

Soft Layer Thickness (m)	Soft Layer SWV (m/s)							
	350	**350**	**300**	**300**	**250**	**250**	**200**	**200**
	Dac	D1N	Dac	D1N	Dac	D1N	Dac	D1N
3	0.077	0.077	0.077	0.077	0.098	0.098	0.12	0.098
5	0.098	0.098	0.098	0.098	0.12	0.12	0.16	0.14
7	0.12	0.098	0.13	0.12	0.16	0.14	0.16	0.31
9	0.12	0.12	0.14	0.12	0.16	0.33	0.077	0.077
11	0.16	0.11	0.16	0.33	0.077	0.077	0.29	0.098
13	0.16	0.088	0.077	0.077	0.077	0.088	0.33	0.098
15	0.077	0.077	0.077	0.077	0.28	0.098	0.35	0.077

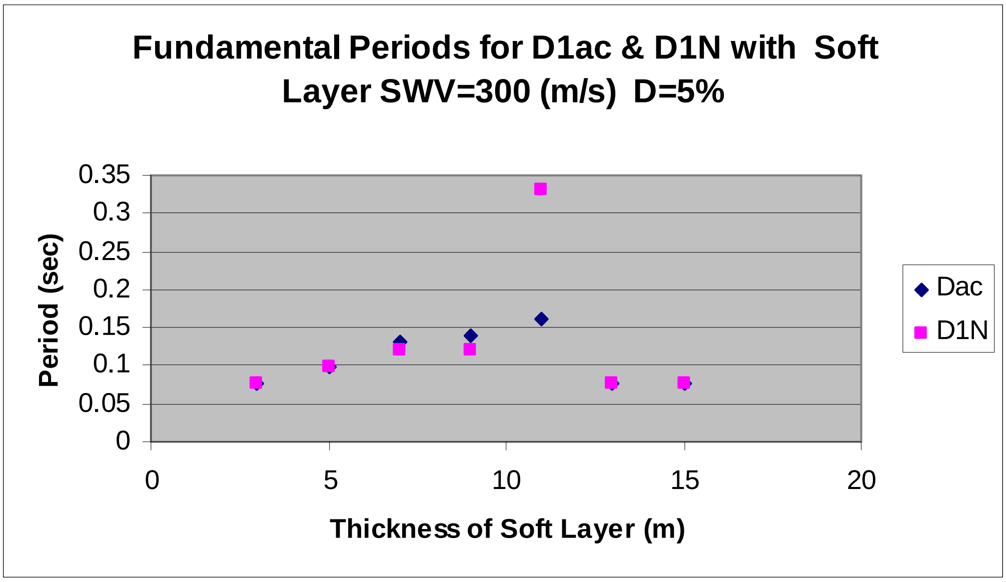
Table 11.8a: Results of the dynamic response analysis of Profiles D1ac and D1N With damping ratio of 5%

Soft Layer Thickness (m)	Soft Layer SWV (m/s)-							
	350	**350**	**300**	**300**	**250**	**250**	**200**	**200,**
	Dac	D1N	Dac	D1N	Dac	D1N	Dac	D1N
3	0.077	0.077	0.077	0.077	0.098	0.077	0.12	0.098
5	0.098	0.077	0.1	0.088	0.12	0.077	0.16	0.14
7	0.12	0.098	0.13	0.077	0.16	0.077	0.19	0.27
9	0.12	0.077	0.12	0.077	0.098	0.098	0.077	0.077
11	0.11	0.077	0.098	0.098	0.077	0.077	0.27	0.054
13	0.099	0.088	0.077	0.077	0.088	0.077	0.35	0.077
15	0.098	0.098	0.077	0.077	0.077	0.098	0.34	0.077

Table 11.8b: Results of the dynamic response analysis of Profiles D1ac and D1N With damping ratio of 10%

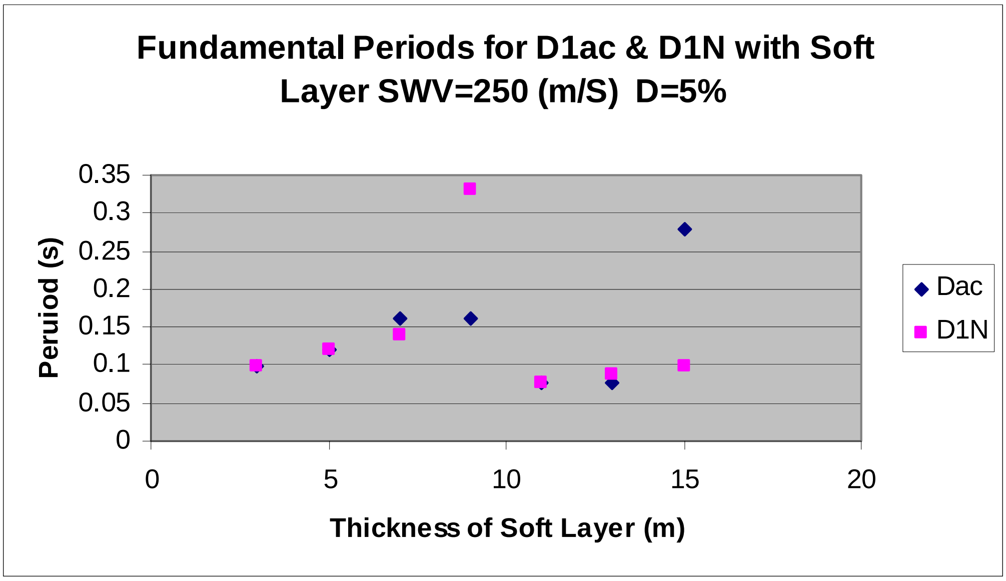


(a)

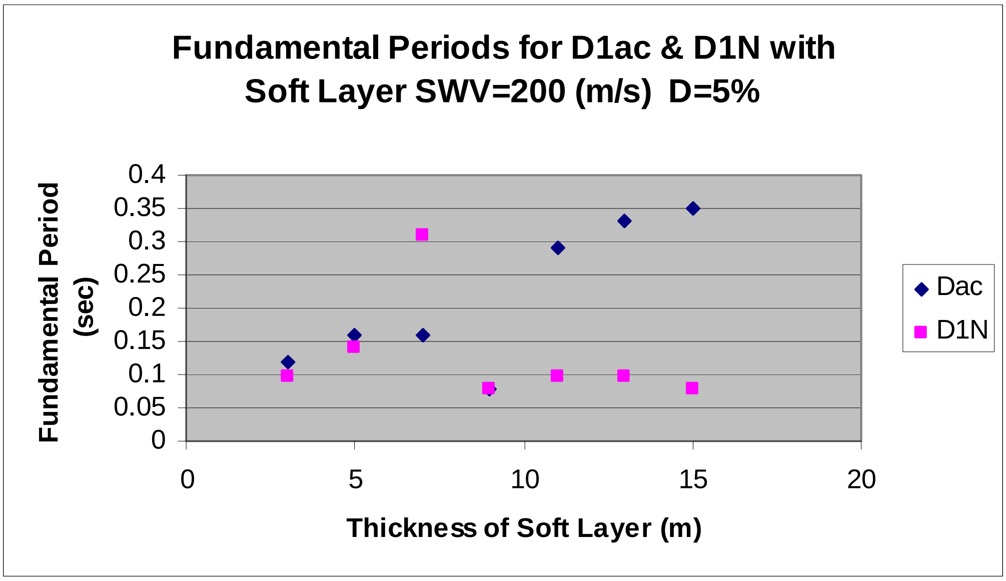


(b)

Figure 11.11: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (5% damping)

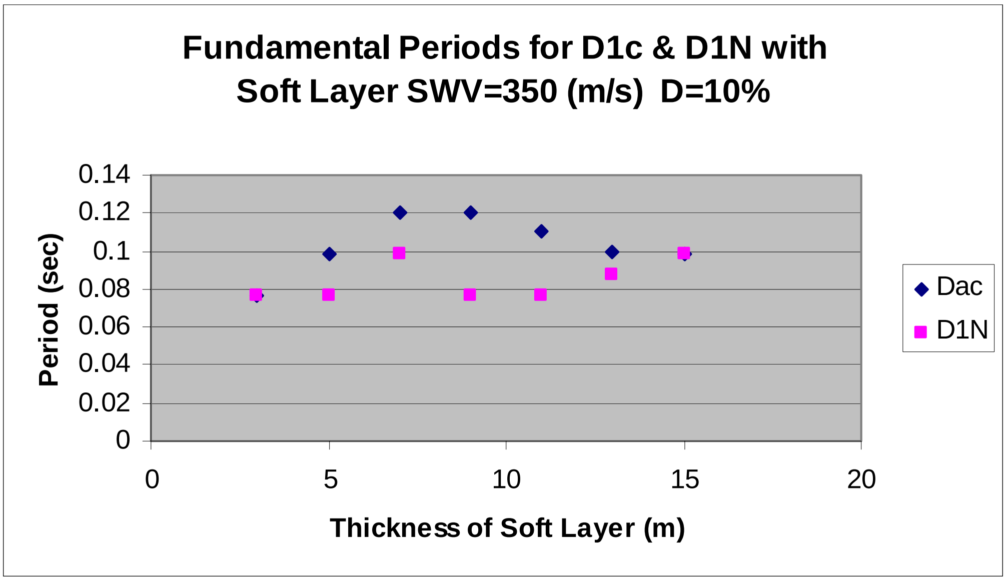


(c)

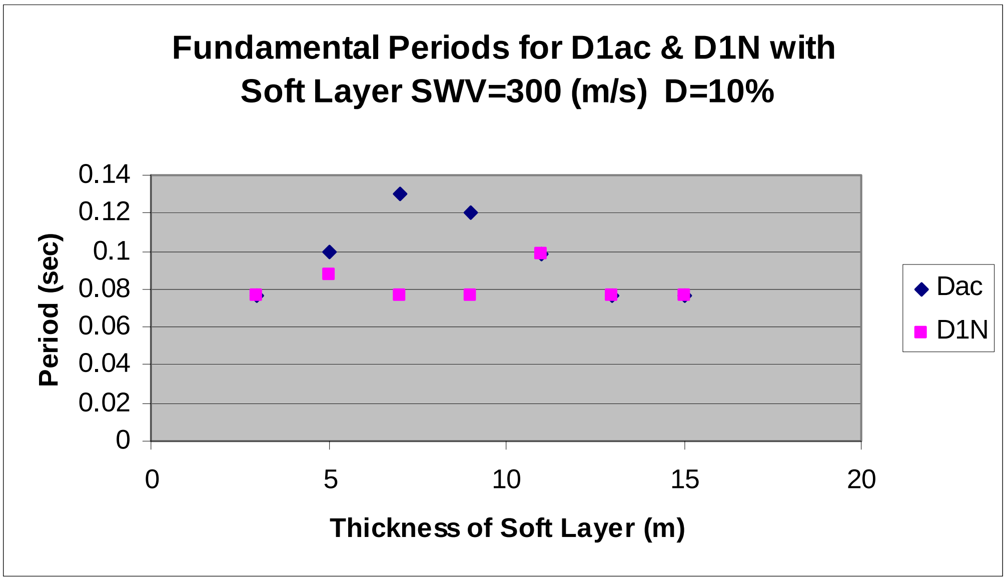


(d)

Figure 11.11-continued: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (5% damping)

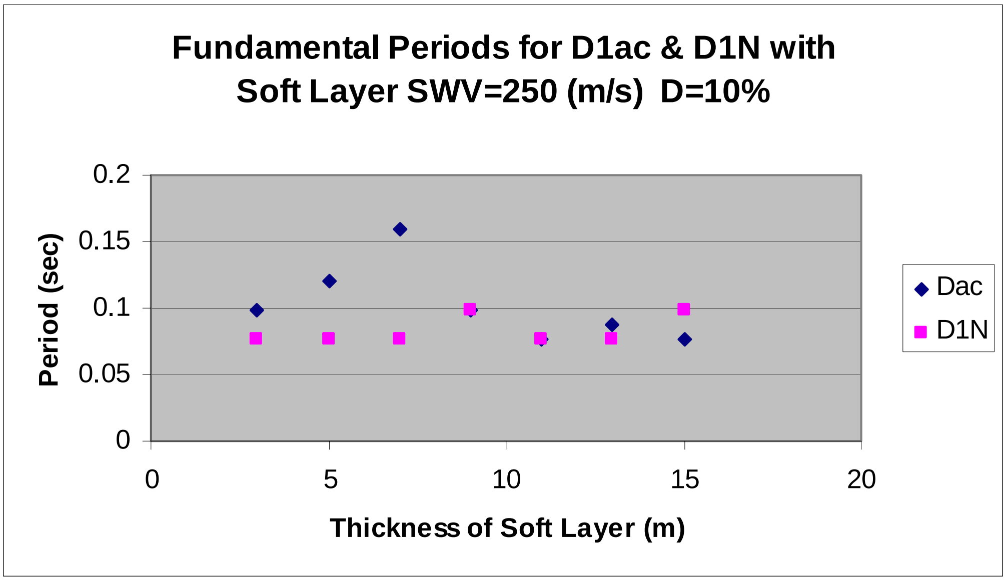


(a)

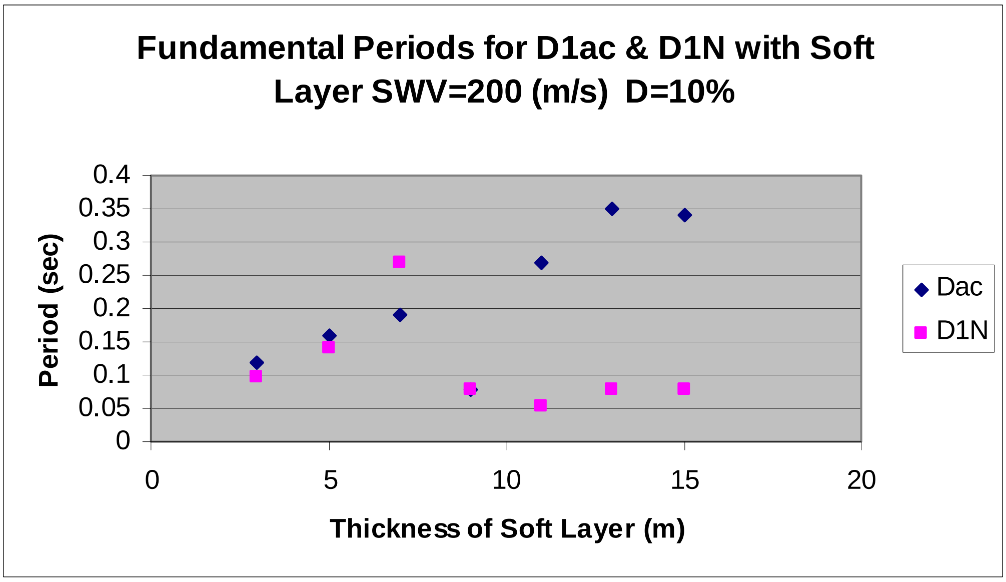


(b)

Figure 11.12: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (10% damping)



(c)



(d)

Figure 11.12-continued: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (10% damping)

11.2e Analysis of the East-west Seismic Array

The East-west seismic array was presented in Chapter 7. The array extended from the Al-Durrah site to the first rock outcrop located 6 miles east of Al-Durrah. The array illustration that was shown in Chapter 7 is reproduced in Figure (11.13) for convenience. Five collinear seismic stations including a rock outcrop at the eastern end of the array were established using the advanced global positioning system. The bedrock depth at each station was estimated by vertical electric sounding (VES) tests. Table (11.9) summarizes the bedrock depth at each station. An actual earthquake was recorded simultaneously at all four stations as well as on the rock outcrop, and the earthquake records were presented in Chapter 7. The magnitude and epicenter information of the earthquake were also presented in Chapter 7. The fundamental period at each station was determined by two methods. First, using the earthquake record of the rock outcrop as the input motion, a dynamic site response analysis was performed at the other four stations and from the results of these analyses the fundamental period of each station was determined. Second, the time domain earthquake records at each station were converted into a frequency domain records, and the fundamental period was determined at the maximum amplitude. The results of these two methods are presented in the following two sections.

1- Analysis of the results of the Dynamic Site Response Analysis

Apart from the VES tests that established the bedrock depth at each station, no other information was available for the soil profiles along the East-west seismic array, with the exception of station DRA2 which was part of the Al-Durrah site. The closest estimate to the soil properties at the array stations was the soil properties of the Al-Durrah soil profiles. Therefore, the average minimum and maximum shear wave velocities were computed for all the profiles in the Al-Durrah site. These values were then used for the soil profiles of the seismic stations along the array. The top 30 m of each profile was divided into six equal layers. The top soil layer was assigned the average minimum SWV, while the last layer at the NEHRP depth of 30 m was assigned the average maximum SWV. The shear wave velocity for the intermediate layers within NEHRP depth increased linearly from top to bottom. All layers below NEHRP bedrock depth and above the actual bedrock were assigned the average maximum SWV. The analysis was repeated for 5% and 10% damping ratios. The results of the analysis were presented in Chapter 8, and reproduced here in Tables (11.10) for the east-west component of the earthquake, and in Table (11.11) for the north-south component.

Location	Bedrock Depth (m)
RD0	35-40
RD2	≈ 170
RD3	≈ 225
DRA2	≈ 350

Table 11.9: Seismic stations of the East-west seismic array and their bedrock depths

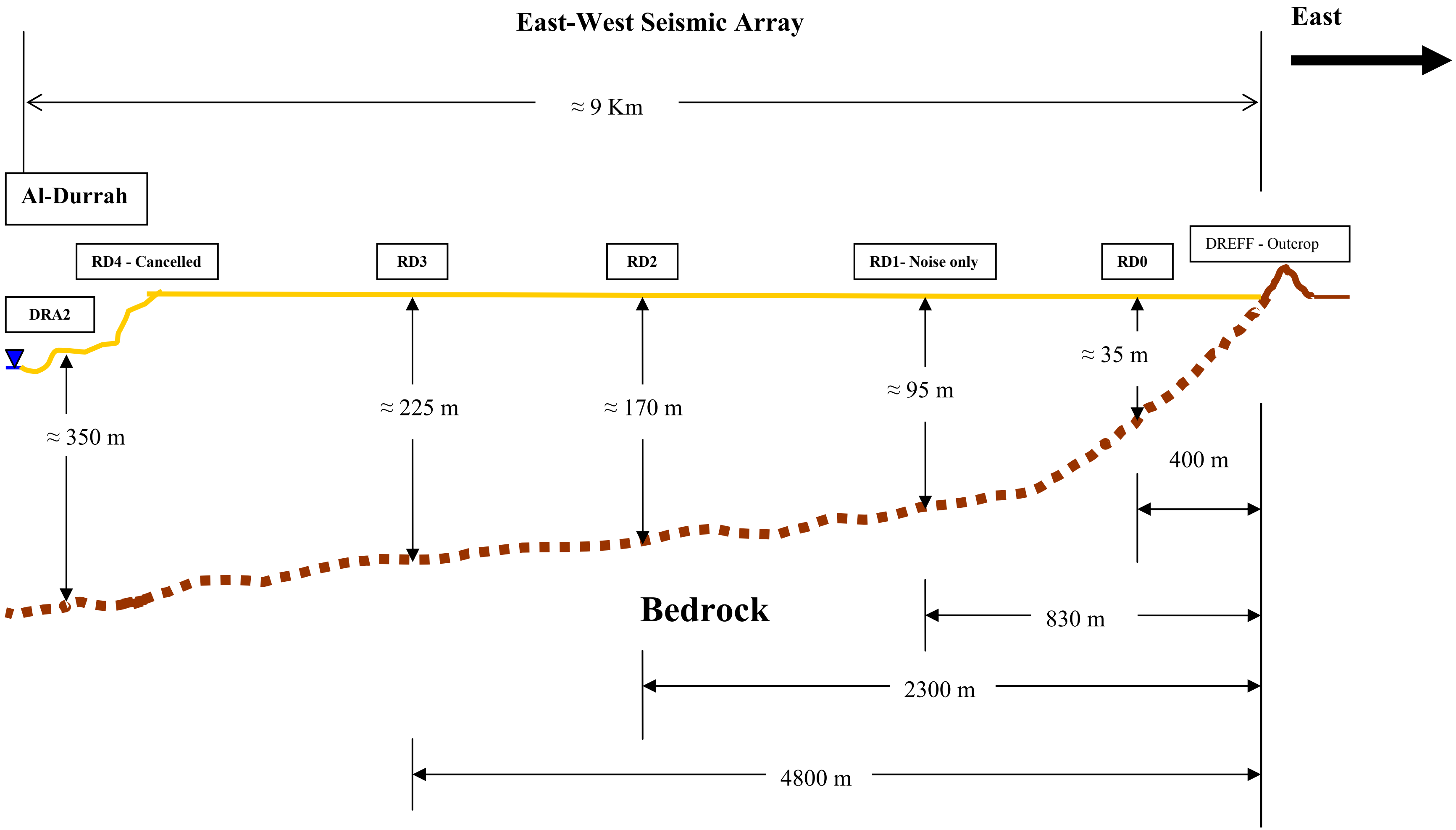


Figure 11.13: East-west seismic array

A) East- west Components

- 5% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.098	0.098	0.08	0.08

Table 11.10: Fundamental periods for the east-west component of array earthquake (5% damping)

- 10% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.11	0.11	0.11	0.11

Table 11.11: Fundamental periods for the east-west component of Array earthquake (10% damping)

B) North-south Components

- 5% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.077	0.077	0.077	0.077

Table 11.12: Fundamental periods for the north-south component of array earthquake (5% damping)

- 10% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.077	0.077	0.077	0.077

Table 11.13: Fundamental periods for the north-south component of array earthquake (10% damping)

Table (11.10) shows that the dynamic site response analysis for the *east-west* component of the earthquake at both damping ratios and at all four stations resulted in site fundamental periods of 0.098 and 0.11 second. Table (11.11) shows that the dynamic site response analysis for the *north-south* component of the earthquake at both damping ratios and at all four stations resulted in a site fundamental period of 0.077 second.

The dynamic site response analysis of the East-west seismic array was performed with the assumption that no embedded soft layers were present in any of the stations' profiles. The results confirm that if no embedded soft layers are present in the profile, the bedrock depth is irrelevant to the site fundamental period.

2- Frequency Domain Spectra Fundamental Periods

A) East-west Components

Station	DREFF	RD0	RD2	RD3	A2
Frequency Hz	9.37	23.24	8.15	12.36	54.48
Fundamental Period (sec.)	0.107	0.043	0.123	0.081	0.018

Table 11.14: Fundamental frequencies (and periods) for the East-west component of array earthquake

B) North-south Components

Station	DREFF	RD0	RD2	RD3	A2
Frequency Hz	11.22	16.84	15.71	22.05	59.78
Fundamental Period (sec.)	0.089	0.059	0.064	0.046	0.017

Table 11.15: Fundamental frequencies (and periods) for the north-south component of array earthquake

Tables (11.14) and (11.15) present the fundamental periods based on the frequency domain records of the earthquake at each station. Contrary to the results of the dynamic site response analysis, the frequency domain fundamental periods show variations in the values of the fundamental period with increased bedrock depth. In the dynamic site response analysis, the soil cross-sectional models were assumed to be *"normal"*, meaning that their shear wave velocity increased with depth and there were no embedded soft soil layers. However, the results of the frequency domain fundamental period suggest that the soil profiles at the stations may not be *“normal”*. Since the only subsurface soil information at the stations’ locations is that of the vertical electric sounding, the only certain way to verify the characteristics of the soil profiles is to conduct soil explorations similar to the ones that were performed at the Al-Durrah site including standard penetration tests (SPT) and cross-hole (CH) tests.

Chapter 12: Conclusions and Recommendations of the Dissertation

12.1 General

Chapters 1 through 11 presented the problem statement, the objectives of the dissertation, field tests and their equipment, tests results, analysis of the data, and the results of the analyses. The contents of each chapter are summarized in the next section followed by the conclusions and recommendations of the dissertation. However, the main objectives of the dissertation are reintroduced here for convenience. These objectives are:

1. Examine the effects of the different soil cross-sectional modeling methods on the site NEHRP classification and the site design response spectra.
2. Examine the effects of the different soil cross-section modeling methods on the site fundamental period.
3. Examine the effects of increasing the bedrock depth beyond NEHRP 30 m depth, on the site fundamental period
4. Examine the effects of the presence of an embedded soft layer within the soil profile in conjunction with increasing the bedrock depth, on the site fundamental period.

12.2 Chapters Review

The following is a brief description of the contents of Chapters 1 through 11 of the dissertation.

- Chapter 1 presented general information about earthquakes, their magnitude scales, and other related definitions. Chapter 1 also introduced the dissertation problem statement, the dissertation objectives, and the methodology for achieving these objectives. As stated in the chapter, earthquakes are the most powerful natural disaster. Forces that are induced by earthquakes into the ground must be taken into consideration by design engineers. The most important tools in earthquake engineering are the site design response spectra and the site fundamental period. A site design response spectrum indicates the magnitude of the ground acceleration as a function of the period or frequency of the structures, while a site fundamental period indicates the resonance period of that site. The determination of a site design response spectrum or fundamental period requires the determination of the site soil cross-sectional models. The National Earthquake Hazard Reduction Program (NEHRP) Provisions require the soil cross-sectional modeling of only the top 30 m of a site. In addition the Provisions allow the soil cross-section model to be established by a number of tests. The soil cross-sectional modeling tests that were performed for this dissertation included:

i. The cross-hole (CH) test
ii. The Controlled Source Spectral Analysis of Surface Waves (CXW)
iii. The standard penetration test (SPT).

Additional tests were also conducted for other site information including:

i. Vertical electric sounding test (VES) for estimating the actual bedrock depth
ii. Seismic recordings of microtremors and actual earthquake events to verify the results of the other tests.

Details of these tests and their theoretical background were presented in Chapter 5. The results of these tests were used in different analyses for achieving the objectives of the dissertation.

- Chapter 2 presented the general procedure of NEHRP Provisions for site classification and determining the design response spectra for the design of structures. The method requires the determination of the soil cross-section model for the top 30 m (100 ft) of the site of the structure [3]. The NEHRP general procedure then classifies the site based on its soil cross-section model (or profile). The soil cross-section model can be determined by one of the following tests:

1. The site weighted average shear wave velocity (SWV) ($\bar{v}_s$).
2. The site weighted average standard penetration test (SPT) uncorrected blow counts ($\overline{N}$).
3. The site weighted average undrained shear strength ($\bar{S}_u$).

NEHRP Provisions also provide 24 maps to establish two accelerations, (S_s and S_1) values for the site being studied. These values are then used in conjunction with the site classification to establish the site design response spectra. NEHRP maps are allocated for the U.S. and its territories, but there are no equivalent maps for Saudi Arabia.

- Chapter 3 presented the three methods that were used to determine the site fundamental period. These methods were the approximate method, the microtremors spectral ratio method, and the dynamic site response analysis method. The theoretical background and the procedure of each method were presented in detail in this Chapter. The approximate method and the dynamic site response analysis method were designated as the analytical methods to be used. The site fundamental period was determined by the analytical methods using the soil cross-sectional models that were used for determining the site design response spectrum by the NEHRP general procedure. These soil cross-sectional models were based on the results of the CXW, and the CH tests.

- Chapter 4 presented the selected site location, its geological information, and its seismic background. The field tests and seismic recordings were performed at two separate locations. The first location is called Al-Durrah, which is located in the northwest of Saudi Arabia along the coast of the Gulf of Aqaba. All the conventional tests including the SPT, CH, CXW, and VES test, as well as microtremors recordings were performed at this location. The second location is the East-west seismic array. This array extended eastward from Al-Durrah for approximately 6 miles, where it reaches the first rock outcrop. Five seismic stations were installed along this array, and the bedrock depth at these stations ranged from zero m at the rock outcrop to 350 m at Al-Durrah. The bedrock depth at each seismic station was estimated by VES tests. An actual earthquake was recorded simultaneously by all five stations. The objective of the seismic array was to verify the effects of increasing the bedrock depth beyond NEHRP depth of 30 m, on the site fundamental period.

- Chapter 5 presented the field tests theoretical background and procedures. These tests included the SPT, CH, CXW, and VES. In addition, this chapter presented the seismic data acquisition methods and systems that were used in the recording of microtremors and actual earthquake events in the field.
- Chapter 6 presented the chronological order of the field work and its phases. In addition, third parties' participation in the field work were also highlighted in this chapter. Third parties that participated in the field work included equipment technicians, field work contractors and field work consultants. This chapter also presented additional information on the field testing equipment.
- Chapter 7 presented the results of the field tests including the SPT, CH, CXW, VES, the microtremors, and the actual earthquake records. The results of these tests were not analyzed in this chapter due to the relevance of the results of other analyses and methods that were presented in Chapter 8.
- Chapter 8 presented the results of the analytical methods including the approximate method and the dynamic site response analysis method. The dynamic site response analysis results were for the Al-Durrah site as well as the East-west seismic array. The results of these methods were not analyzed in this Chapter due to the need

to regroup the results of Chapters 7 and 8, which were rearranged and reproduced in Chapters 9, 10, and 11, where they were discussed and analyzed.

- Chapter 9 presented the analysis of the effects of the different site soil cross-section modeling methods on the site NEHRP classification, and the site design response spectra.
- Chapter 10 presented the results of the analyses of the effects of the different site soil cross-section modeling methods on the site fundamental period.
- Chapter 11 presented the results of the analysis of the effects of increasing the bedrock depth on the site fundamental period. In addition, Chapter 11 showed the effects of the presence of an embedded soft soil layer within the soil cross-section model in conjunction with increasing the bedrock depth, on its fundamental period. Furthermore, this chapter presented the results and analysis of the East-west seismic array.

12.3 Results and Conclusions of the Dissertation Objectives

12.3a Effects of the Different Soil Cross-section Modeling Methods on the Site Classification and the Site Design Response Spectra

The results of Chapter 9 showed that using the same test for determining the soil cross-sectional models at different locations within the same site could yield different NEHRP site classifications. Different NEHRP classifications for different locations within the same site can be attributed to soil variations throughout the site. However, the results also showed that performing different tests such as the CXW, CH, and SPT at the same location can also yield different NEHRP site classifications for that location. In the case of the AL-Durrah site, the tests yielded site soil classifications C and D simultaneously in many locations. The procedure for generating a site design response spectrum was presented in Chapter 2. Chapter 9's analyses of the Al-Durrah site showed that the maximum difference between the design response spectra for soil classes C and D in terms of ground response spectral acceleration can be as high as 41%, Figure (12.1).

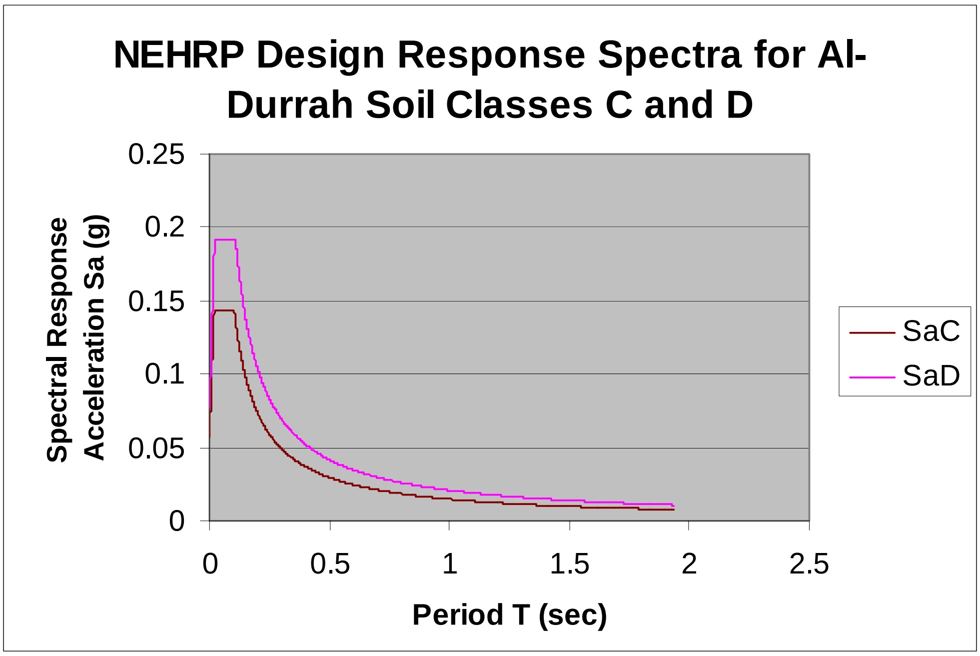


Figure 12.1: Al-Durrah design response spectra for soil class C and D

To study the effects of earthquake magnitude on such differences in design response spectral accelerations, two random locations on NEHRP maps were selected. The first location was in Region 2, and had NEHRP map accelerations *Ss* and S_1, that were comparable to Al-Durrah accelerations. In this site, the maximum difference between the design response spectra for soil classes C and D in terms of ground response spectral acceleration was also 41%, which was similar to the result obtained at the Al-Durrah site. The second site was selected from NEHRP maps Region 1, and has NEHRP map accelerations S_s and S_1, that are much higher than the Al-Durrah accelerations. In this site, the maximum difference between the design response spectra for soil classes C and D in terms of ground response spectral acceleration was over 18%.

Although the difference between the design response spectra of soil classes C and D tended to decrease with increasing earthquake magnitudes, it is important to note that the vast majority of earthquakes have small to medium magnitudes [29]. This indicated that the difference between the spectra of the two soil classes will more likely be significant for most sites.

These results lead to the following conclusions:

- Different soil cross-section modeling methods can yield different site classifications for the same location, which leads to different design response spectra.
- Selecting one site classification over another can lead to a significant overestimation or underestimation of the value of the spectral response acceleration. This is a clear indication of the effects of different soil cross-section modeling methods on the site design response spectra.
- If no further soil testing is possible or desirable, then the lower (or softer) site classification (such as site class D in Al-Durrah's case instead of class C) must be selected despite the implications of higher costs.

12.3b Effects of the Different Soil Cross-section Modeling Methods on the Site Fundamental Period

Chapter 10 presented the analysis of the effects of the different soil cross-section modeling methods on the site fundamental period. Al-Durrah site's fundamental period was calculated by the following methods:

i. The approximate method
ii. The microtremors method
iii. The dynamic site response analysis.

The theoretical backgrounds as well as the procedures of the three methods were presented in Chapter 3. The analysis of the results was conducted in two steps. First, the results of each method were analyzed independently from the results of the other two methods. Second, the results of all three methods were examined in a comparative analysis.

I. Conclusions of the Methods' Individual Analyses

i. The approximate method

For the purpose of the individual analysis, averages of the fundamental periods of the approximate method were recalculated to establish the following fundamental period subgroups:

(1). The average value of the fundamental periods of all the soil cross-section models

(2). The average value of the fundamental periods of all the CXW soil cross-section models

(3). The average value of the fundamental periods of all the CH soil cross-section models

(4). The average value of the fundamental periods of the CXW soil cross-section models that were performed at the same locations at the CH tests

The results are reproduced in Table (12.1) for convenience.

Tests Subgroup	**Average Fundamental Period (sec)**	**Standard Deviation (sec)**
All Profiles (1)	0.304	0.051
All CXW (2)	0.290	0.036
All CH (3)	0.352	0.073
All CXW at CH (4)	0.302	0.056

Table 12.1: Average values and standard deviations of the approximate values of the fundamental periods

Comparison of subgroups (2) and (3) showed that the average fundamental period of the CH tests was 21% higher than that of the entire CXW tests. Comparison of subgroups (3) and (4), which represent the fundamental periods of the CH tests and the CXW tests that were performed at the CH tests' locations, showed a decrease in the difference of the average fundamental period to 17%. However, individual comparison of the actual fundamental period of each CH test with the corresponding fundamental period of the CXW test that was performed at the same location showed differences as high as 66% in the value of the fundamental period of the two tests. These results are reproduced in Table 12.2

Test Location	CH Test Approximate Fundamental Periods (sec)	CXW Test Approximate Fundamental Periods (sec)	Fundamental Period Difference as % (Absolute Value)
D5A	0.381	0.2581	47.6
D5B	0.381	0.2294	66.1
D6	0.274	0.3604	31.5
D11	0.315	0.3235	2.7
D12	0.4396	0.3399	29.3

Table 12.2: Differences between the approximate fundamental periods of the CH tests and the corresponding CXW tests

This is a clear indication of *the effects of the different soil cross-section modeling methods* on the site fundamental period. These results are similar to the results of the site classifications of Chapter 9, in which different soil cross-section modeling methods at one location resulted in different NEHRP site classifications, and different design response spectra for the same location. These results lead to the following conclusions:

- Different soil cross-section modeling methods at a specific location can yield significantly different approximate site fundamental period for that specific location.
- The results of this part of the analysis agree with the results of the NEHRP site classification and design response spectra analysis that were presented in Section (12.3a).
- If no further testing is possible or desirable, then the most *critical fundamental period* (i.e., the fundamental period that is the closest to the period of the structure) must be taken as the site fundamental period despite the implications of higher costs.

ii. The microtremors method

Two types of microtremors' plots were generated from microtremors records at the Al-Durrah site. These included mean spectra and simple ratio spectra plots. Both plot types were introduced in Chapter 3. The results of the microtremors method were presented in Chapter 7, and included two sets of stations. The first set included stations DRA1 and DRA2 that were records on the lower level (level A) of the Al-Durrah site. However, record DRA2 could not be used because it included the record of an actual earthquake. The effects of the presence of an earthquake within a microtremors record were presented in Chapter 7. The second set included stations DRB1 and DRB3. The results of DRA1, DRB1, and DRB3 are reproduced in Table 12.3. These values were used in the comparative analysis of the three methods, which is presented subsequently.

Microtremors Plot Type	Record Location		
	DRA1	DRB1	DRB3
Mean Spectra Period (sec)	0.294	0.159	0.0709
Simple Spectra E-W Period (sec)	0.323	0.156	0.053
Simple Spectra N-S Period (sec)	0.303	0.156	0.07
Average Fund. Period (sec)	0.307	0.157	0.065

Table 12.3: Al-Durrah site fundamental periods summary and averages

The results of the microtremors spectra analysis, lead to the following conclusions:

- The results of the microtremors method were not consistent.
- The variation in the value of the fundamental periods of DRA1 on one hand and DRB1 and DRB3 on the other hand, might be due to the difference in their site levels. The difference between levels A and B of Al-Durrah site is 15 to 20 m.
- There is no apparent explanation for the difference in values of the fundamental period of DRB1 and DRB3, except the fact that the two stations were located far apart within the site.

iii. The dynamic site response analysis method

The results of the dynamic site response analysis were presented in Chapter 8. The analysis was performed using the computer program ProShake and the two synthetic earthquakes that were designated

RAN230 and RAN330, which were also presented in Chapter 8. Each earthquake analysis was performed twice using two soil damping ratios of 5% and 10%. The site soil cross-section models that were determined for the site design response spectra by the CH and CXW tests were used in this analysis. The fundamental periods were determined four times for each soil cross-section model using the two earthquakes and the two soil damping ratios. The fundamental periods of each earthquake analysis, were then averaged and grouped into the same subgroups as the approximate method. These subgroups included:

(1). The average value of the fundamental periods of all the soil cross-section models

(2). The average value of the fundamental periods of all the CXW soil cross-section models

(3). The average value of the fundamental periods of all the CH soil cross-section models

(4). The average value of the fundamental periods of the CXW soil cross-section models that were performed at the same location as the CH tests

These subgroups are reproduced in Table (12.4) for convenience. Table (12.5) shows the variation of the average values of the fundamental periods of the CH and CXW tests (in terms of percentage of the lower value of each pair). The difference in the value of the *average* fundamental period between all the CXW tests and all the CH tests ranges from a minimum of about 6% under earthquake RAN330 (10% damping) to a maximum of about 22.5% under earthquake RAN230 (5% damping).

	Al-Durrah Site Average Fundamental Period and Standard Deviations (sec)			
	Earthquake RAN230		Earthquake RAN330	
	5% Damping	10% Damping	5% Damping	10% Damping
Average of all Profiles fund. Period (1)	0.078938	0.066438	0.1384	0.0853
Standard Dev	0.033688	0.011033	0.0863	0.0158
Average of CXW fund. Period (2)	0.082364	0.068917	0.133333	0.0865
Standard Dev	0.040173	0.011405	0.079081	0.0166
Average of CH tests fund. Period (3)	0.06725	.059	0.1535	0.0818
Standard Dev	0.0065	.0058	0.1178	0.0146
Average of fund. periods of CXW tests at CH locations (4)	0.0692	.0652	0.1666	0.0782
Standard Dev	0.00712	0.01152	0.11113	0.019829

Table 12.4: Al-Durrah site fundamental period averages and standard deviations for the results of dynamic site response analysis

Percentages of the Difference Between the Average Values of the Fundamental Periods of the CXW and CH tests				
Fund. Periods being Compared	Earthquake RAN230		Earthquake RAN330	
	5% Damping	10% Damping	5% Damping	10% Damping
Average of all CH Versus average of All CXW	22.5	16.8	15.1	5.7
Average of all CH Versus average of CXW at CH	2.9	10.5	8.5	4.6

Table 12.5: Percentages of the differences between the average values of the fundamental periods of the CH and CXW tests

Comparison of each individual fundamental period of the CH test with the corresponding fundamental period of the CXW tests that were performed at the same location led to more significant variations as shown in Table (12.6). Each pair of values of fundamental periods from the CH and CXW tests were compared, and the difference was expressed as a percentage of the value of the lower fundamental period. The difference between the results of the two tests ranged from 0% to 328%. Table (12.6) indicates that in 6 cases there was no difference in the values of the fundamental period as determined by a CH test or a CXW test. This represents 30% of all the cases of Table (12.6). Eleven cases representing 55% of all the cases had a difference in the value of the fundamental period of the two tests ranging from 14% to 42.5%. The remaining three cases representing 15% of all the cases, showed a difference in the value of the fundamental period ranging from 184% to 328.5%.

Test Location	Earthquake RAN230		Earthquake RAN330	
	5% Damping	10% Damping	5% Damping	10% Damping
D5A	20.3	42.5	0	14.2
D5B	0	18.5	184.0	37.5
D6	0	0	226.5	0
D11	20.3	20.3	0	27.2
D12	20.3	18.5	328.5	18.5

Table 12.6: The difference between the values of the fundamental periods of the CH and CXW tests that were performed at the same locations (expressed as percentage of the lower value)

These results lead to following conclusions:

- Modeling a soil cross-section at a specific location by different methods can result in *significantly* different fundamental periods for the same location.
- The dynamic site response analysis of the fundamental periods of Al-Durrah site soil profiles were influenced by the following:
    - The soil cross-section modeling method
    - The input earthquake of the dynamic site response analysis
    - The damping ratio of the soil
- The results of this part of the analysis are compatible with the results of the site classification and design response spectra analysis that was presented in Section (12.3a), as well as the results from the approximate method.

- If no further testing is possible or desirable, then the most *critical fundamental period* (i.e. the fundamental period that is the closest to the period of the structure) must be taken as the site fundamental period despite the implications of higher costs.

II. Conclusions of the Results of the Comparative Analysis of the Fundamental Periods of the Three Methods

This section presents a comparative analysis of Al-Durrah's fundamental periods from the results of the approximate method, the microtremors method, and the dynamic site response analysis method. In the dynamic site response analysis, the soil damping ratio value must be selected for each soil profile's analysis. The dynamic site response analysis was performed four times using the two synthetic earthquakes (RAN230 and RAN330), and the two soil damping ratios of 5% and 10% with each earthquake analysis. Therefore, there were four sets of results from the dynamic site response analysis, and only one set for each of the approximate method and the microtremors method. In order to compare the four sets of results from the four dynamic analyses with the results of the approximate method and the microtremors method, the comparison was repeated four times. Each comparison included the same values of the average fundamental periods from the approximate method and microtremors method, and one of the results of the dynamic analysis. The results of the approximate method and the dynamic site response analysis were averaged and regrouped into the following subgroups:

1. The average value of the fundamental periods of all the soil cross-section models
2. The average value of the fundamental periods of all the CXW soil cross-section models
3. The average value of the fundamental periods of all the CH soil cross-section models
4. The average value of the fundamental periods of the CXW soil cross-section models performed at the same location as the CH tests.

These subgroups are presented in Tables (12.7) to (12.10), and their values and ratios are plotted in Figures (12.2) to (12.9). The ratio plots show the ratios of the fundamental periods of each method over the values of the fundamental periods of the other two methods.

	Approximate Method				**Microtremors**			**Dynamic Site Response Analysis** ***RAN230 at 5% damping***			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental period(sec)	0.313	0.302	0.352	0.337	0.307	0.157	0.0646	0.079	0.082	0.067	0.069

Table 12.7: Comparison of the average values of the fundamental periods at Al-Durrah

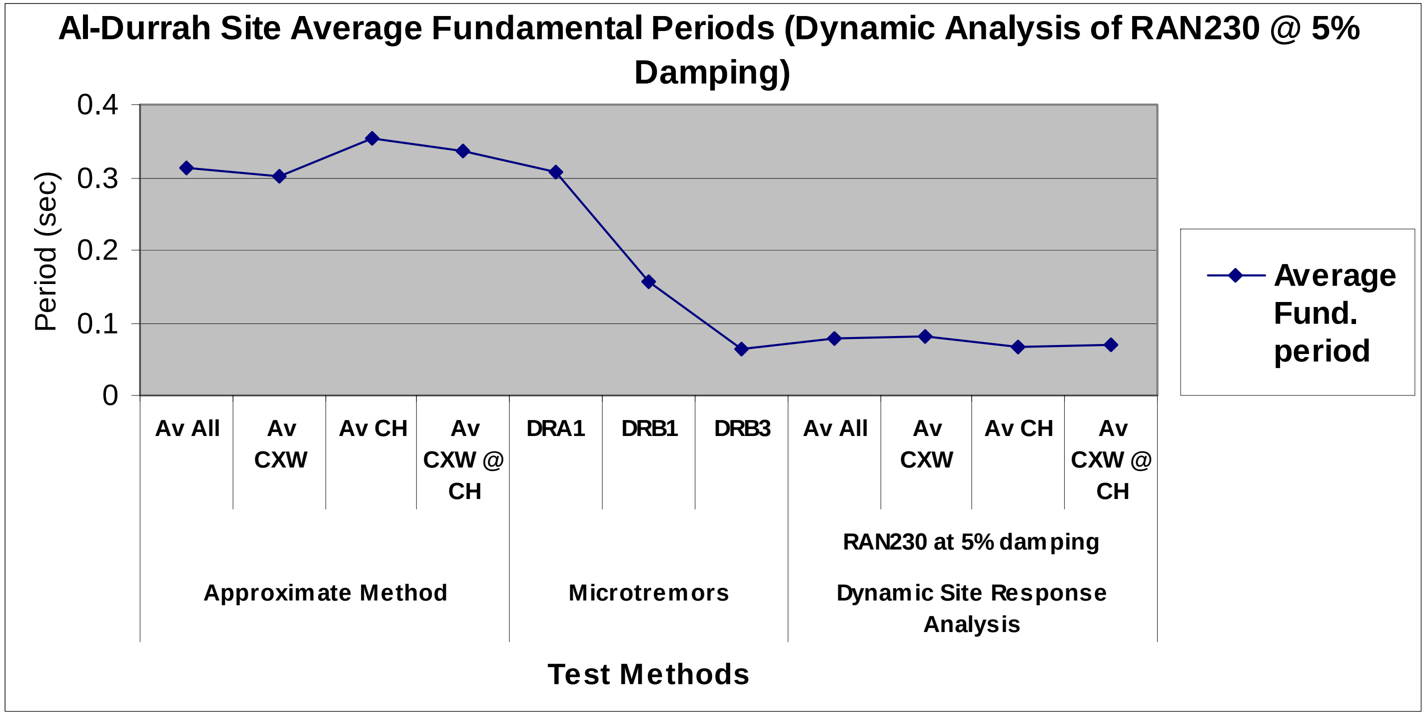


Figure 12.2: Plots of the average values of Al-Durrah fundamental periods

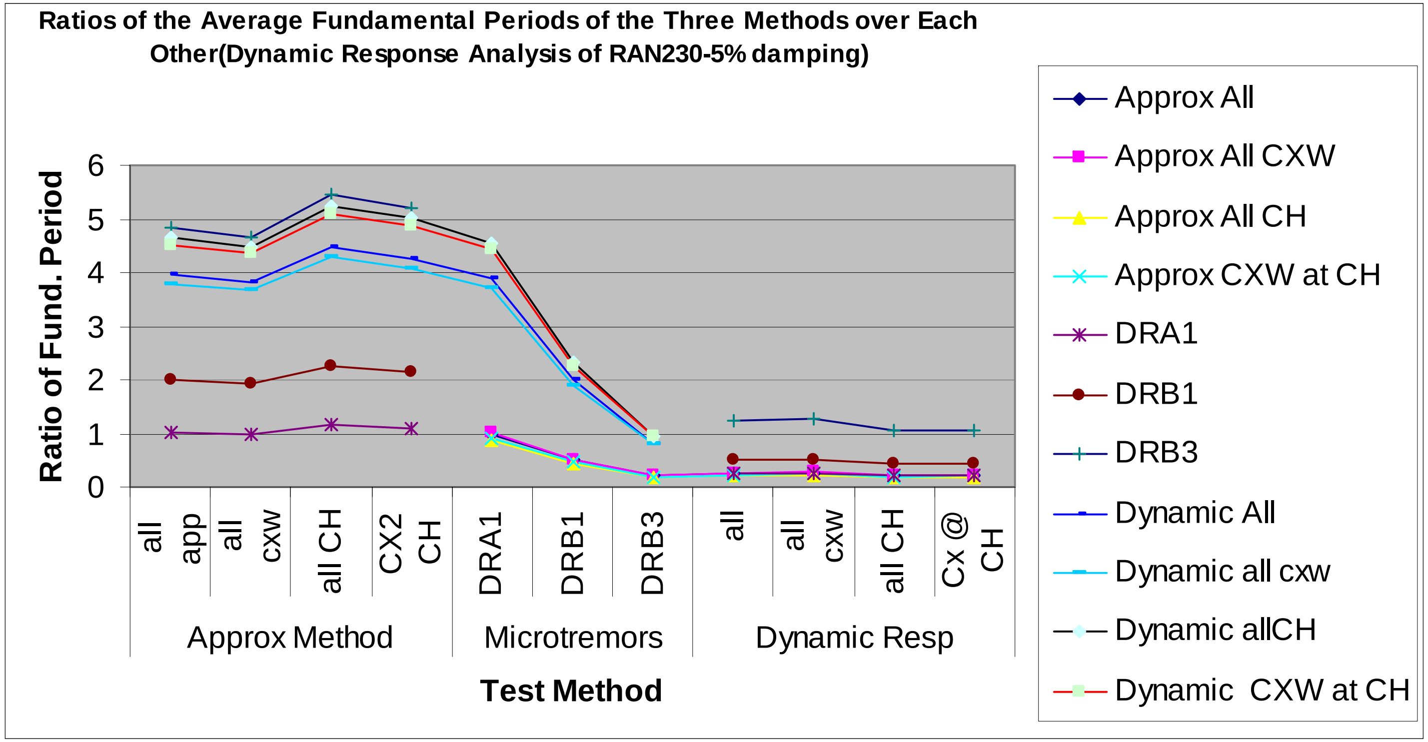


Figure 12.3: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

	Approximate Method				Microtremors			Dynamic Site Response Analysis *RAN330 at 5% damping*			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental Period (sec)	0.313	0.302	0.3524	0.337	0.307	0.157	0.064	0.138	0.133	0.154	0.167

Table 12.8: Comparison of the average values of the fundamental periods at Al-Durrah

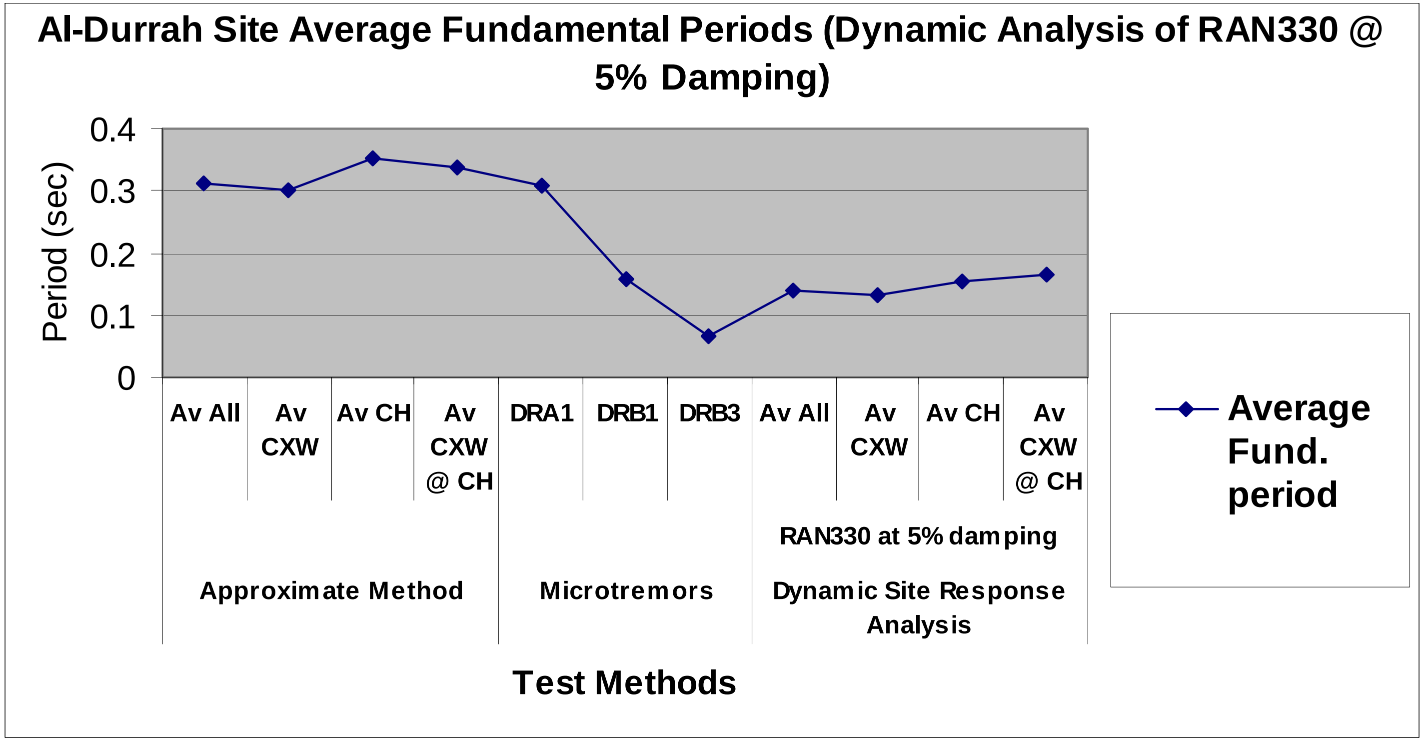


Figure 12.4: Plots of the average values of Al-Durrah fundamental periods

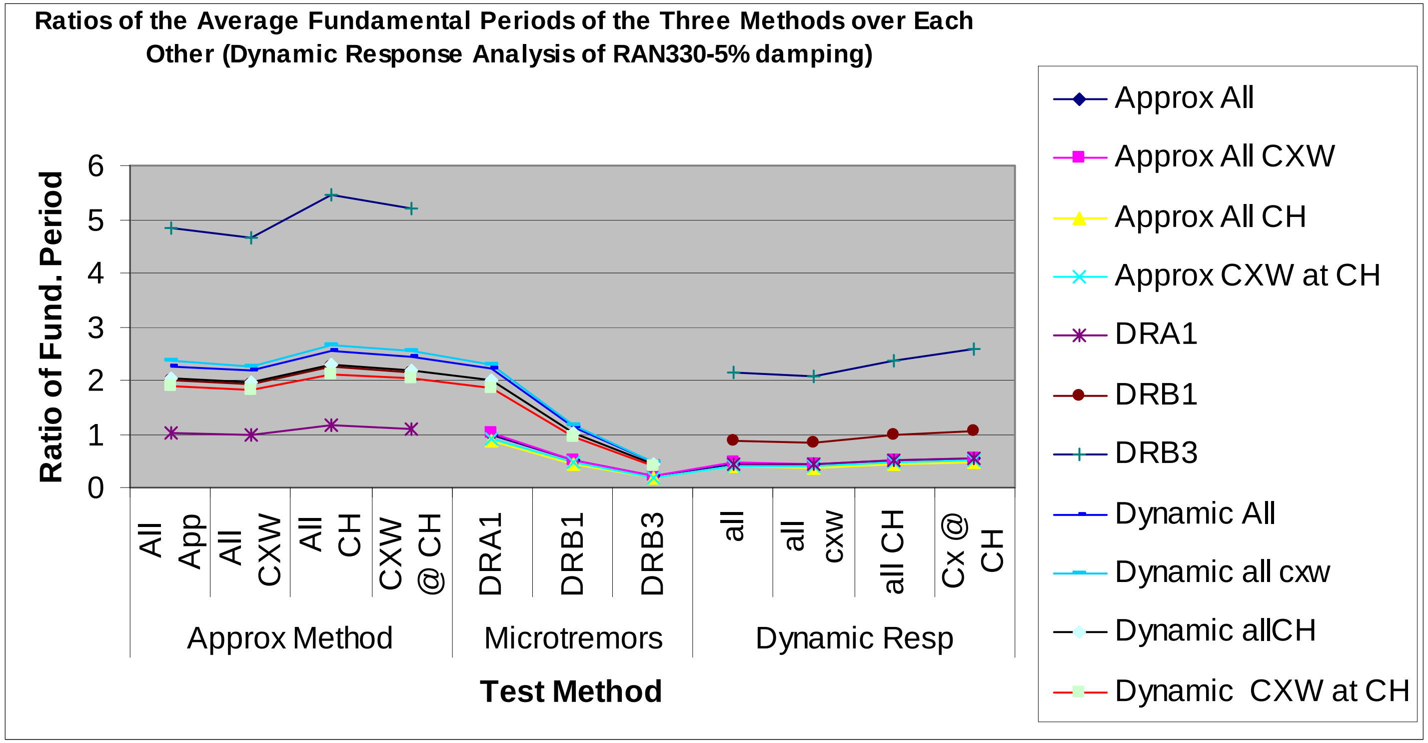


Figure 12.5: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

	Approximate Method				Microtremors			Dynamic Site Response Analysis *RAN230 at 10% damping*			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental Period (sec)	0.313	0.302	0.352	0.337	0.307	0.157	0.065	0.066	0.069	0.059	0.065

Table 12.9: Comparison of the average values of the fundamental periods at Al-Durrah

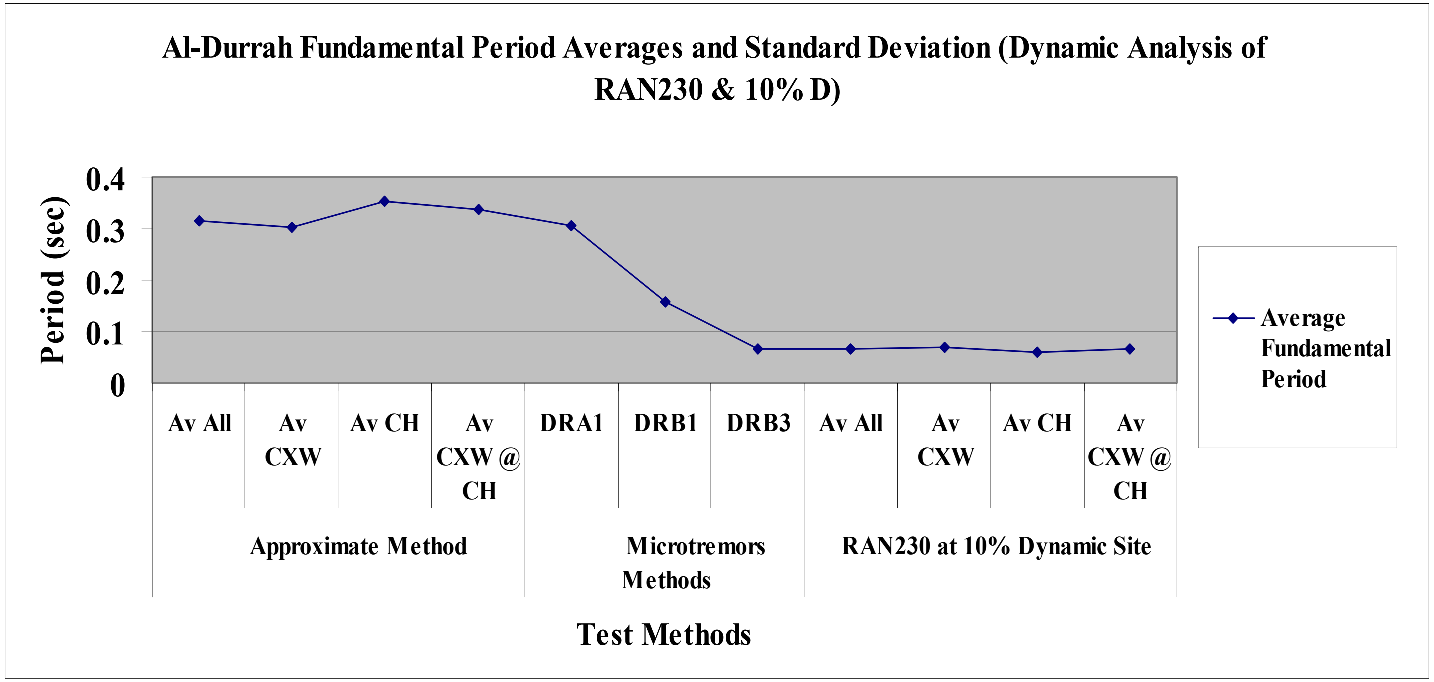


Figure 12.6: Plots of the average values of Al-Durrah fundamental period

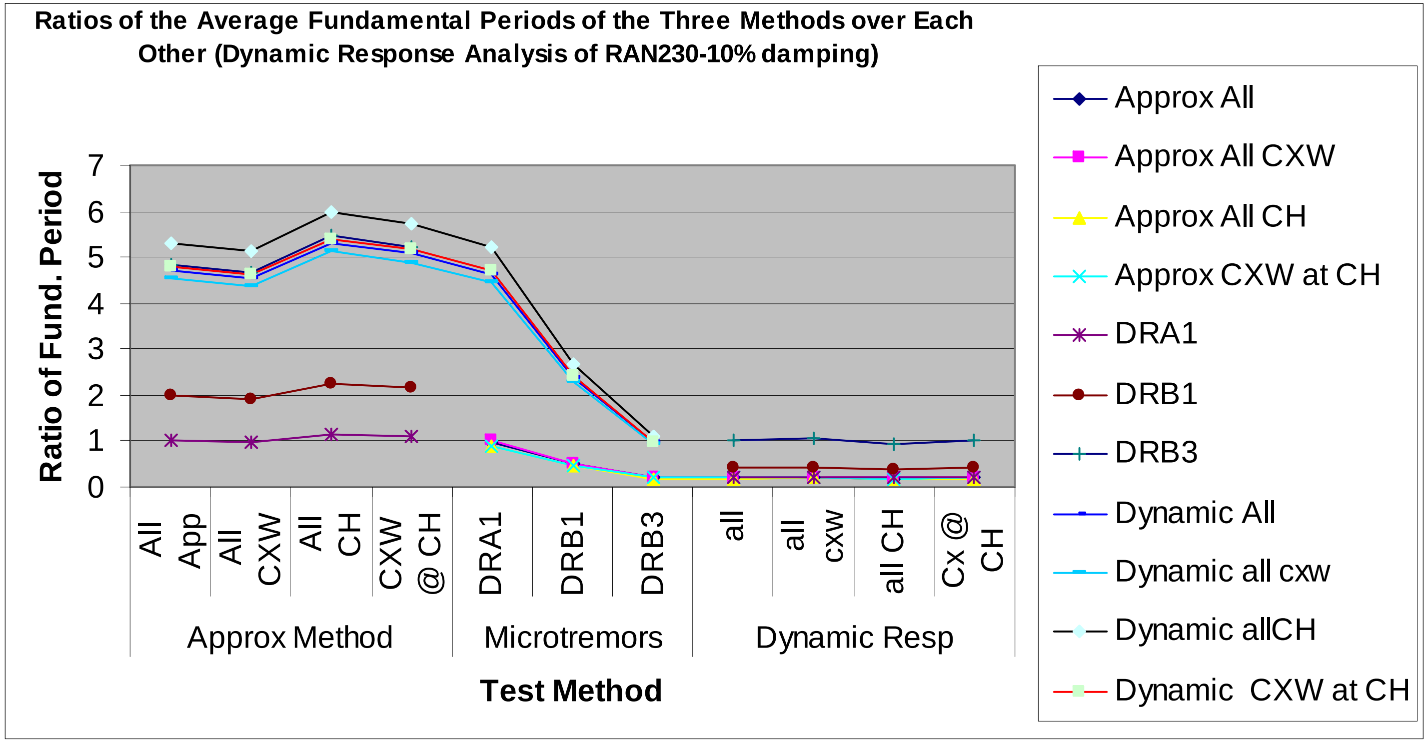


Figure 12.7: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

	Approximate Method				Microtremors			Dynamic Site Response Analysis *RAN330 at 10% damping*			
	Av All	Av CXW	Av CH	Av CXW @ CH	DRA1	DRB1	DRB3	Av All	Av CXW	Av CH	Av CXW @ CH
Average Fundamental period (sec)	0.313	0.302	0.3524	0.337	0.306667	0.157	0.064633	0.0853	0.0865	0.0818	0.0782

Table 12.10: Comparison of the average values of the fundamental periods at Al-Durrah

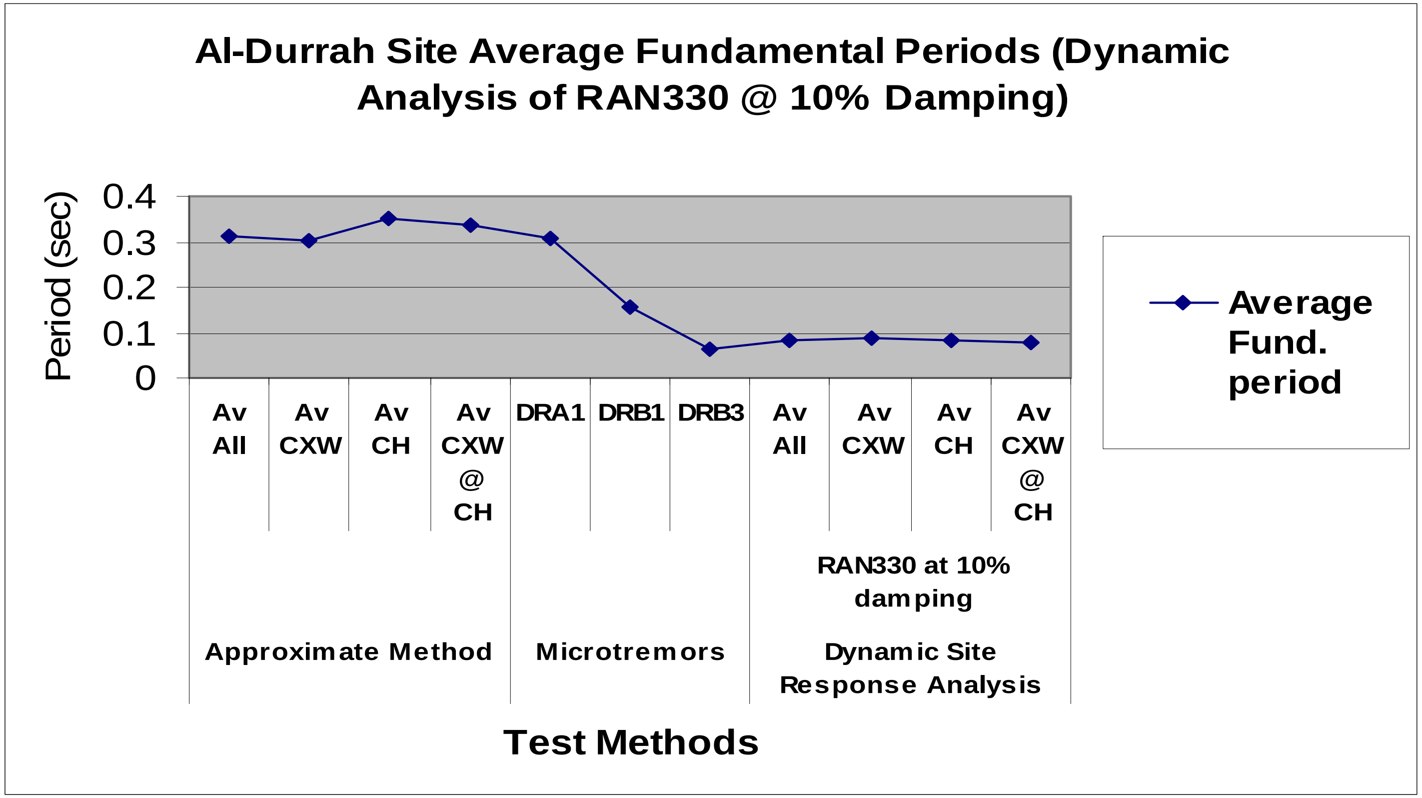


Figure 12.8: Plots of the average values of Al-Durrah fundamental periods

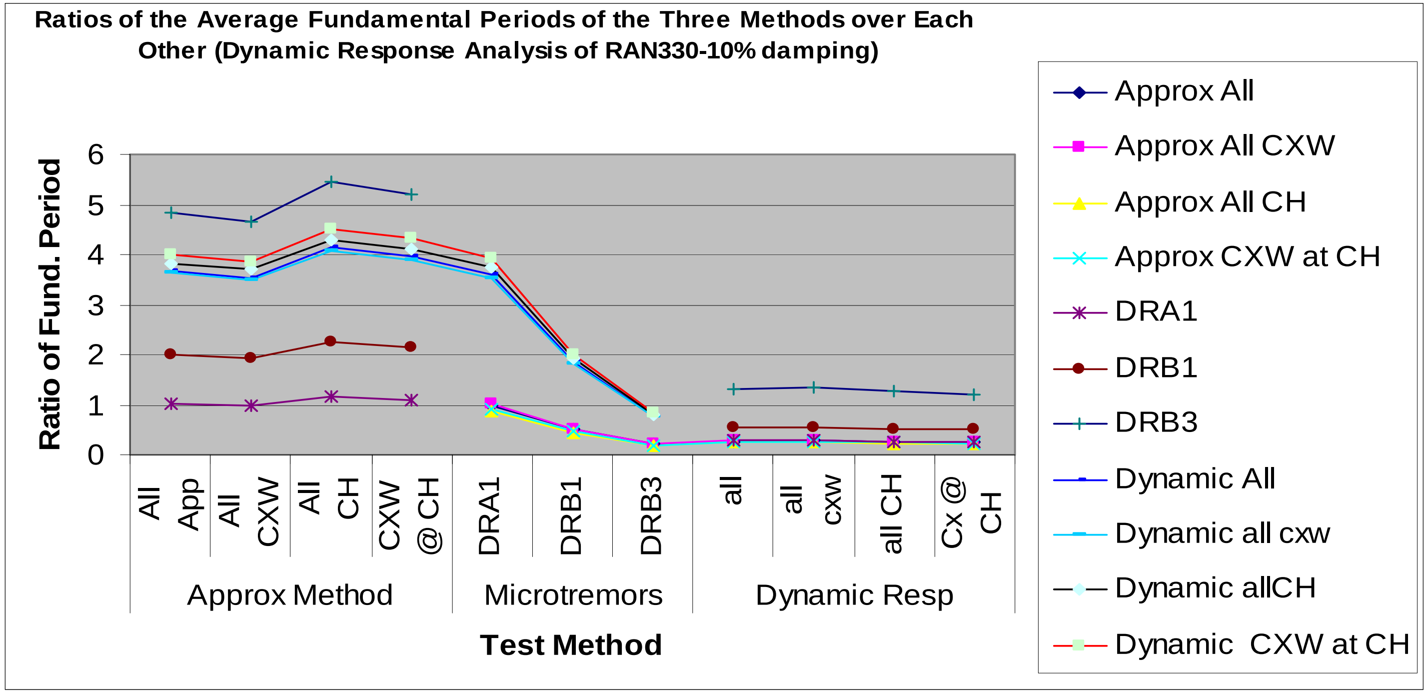


Figure 12.9: Plots of the ratios of average fundamental periods of each method over the fundamental periods of the other two methods

Each method's subgroup average fundamental periods were compared with the average fundamental periods of the other two methods. The previous analyses lead to the following conclusions:

- In all four rounds of comparisons, the ratios of the approximate method subgroups average fundamental periods to those of the dynamic site response analysis ranged from 2 to 5.
- This significant difference may be attributed to over simplifications of the approximate method. Examples of these over simplifications include ignoring the effects of the presence of embedded soft soil layers within the soil cross-section model, and ignoring the effects of the damping ratio.

To illustrate the difference between the approximate method and the dynamic site response analysis method, an ideal soil profile in which the SWV increases incrementally with depth was established. The profile has the NEHRP depth of 30 m, Figure (12.10) and Table (10.11).

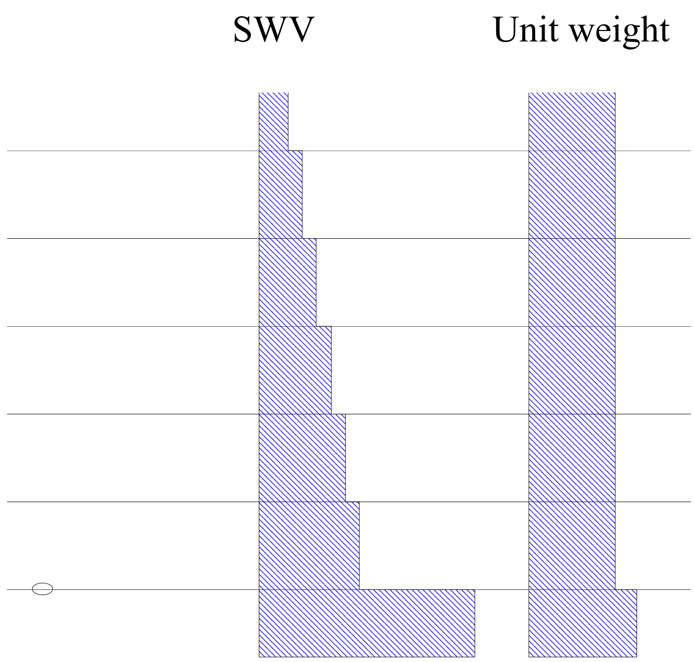


Figure 12.10: Ideal profile

Layer Number	Layer Thickness	Layer SWV
1	5	200
2	5	300
3	5	400
4	5	500
5	5	600
6	5	700
7 (Bedrock)	Infinite	1500

Table 12.11: Properties of the ideal profile

Analysis of this profile by the approximate method and the dynamic site response analysis (ProShake with earthquake RAN230 at 5% damping) yield:

The approximate method fundamental period, $T = 0.318$ sec.

The dynamic site response analysis fundamental period, T= 0.0636 sec.

If the properties of the profile's layers are kept the same, but the sequence of the layers is rearranged so that stiffer layers are on top of softer layers such as shown in Figure (10.13), then the fundamental periods by the two methods are:

The approximate method fundamental period, T = 0.318 sec.

The dynamic site response analysis fundamental period, T= 0.42 sec.

The fundamental period by the approximate method remains the same while the fundamental period by the dynamic site response analysis increased by 560%. This illustrates the lack of sensitivity of the approximate method to the presence of softer layers beneath stiffer one

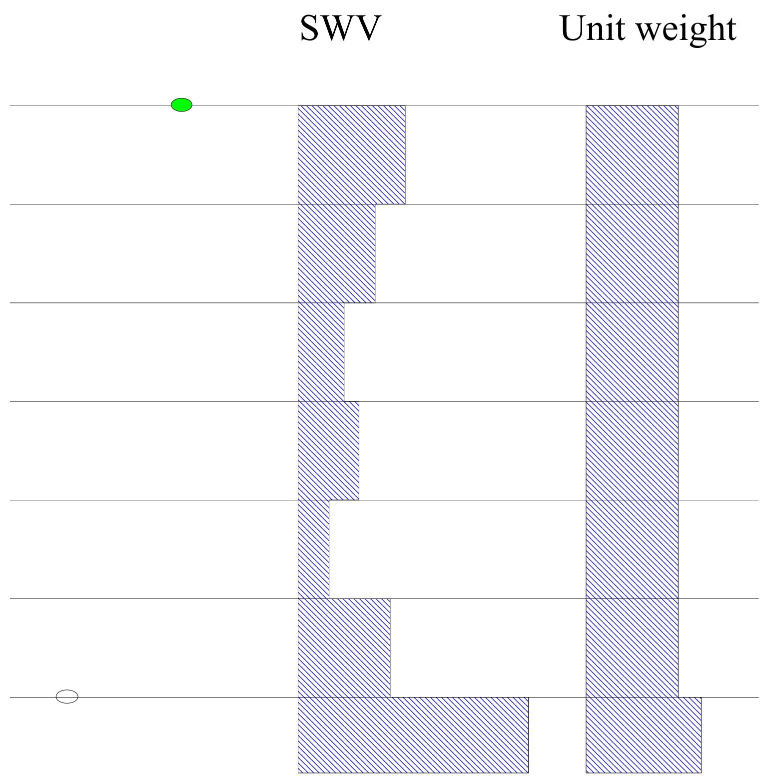


Figure 12.11: Ideal profile

- The fundamental period of microtremors at station DRA1 was very close to the fundamental periods of the approximate method, while the fundamental period of microtremors at station DRB3 was very close to dynamic site response analysis fundamental period. However, since the dynamic site response analysis results showed good agreement with the results of the East-west seismic array, then the dynamic site response analysis results are considered to be more accurate than the results of the approximate and microtremors methods.

12.3c Effects of Increasing the Bedrock Depth beyond NEHRP 30 m Depth, on the Site Fundamental Period

a). General

The NEHRP Provisions General Method for determining a site design response spectra requires the modeling of the soil cross-section of the site's top 30 m (100 ft). Therefore, the method, in effect, places the bedrock at a depth of 30 m even if the bedrock is at a much greater depth. The implications of limiting the soil profile to the top 30 m of the site by NEHRP Provisions were examined in Chapter 11. The analysis examined the effects of increasing the bedrock depth on the site fundamental period. This part of the analysis was based on the results of the dynamic site response analysis of the Al-Durrah site and the East-west seismic array. The dynamic site response analysis was performed using the computer program ProShake, which was introduced in Chapter 3. The results of the dynamic site response analysis for Al-Durrah site as well as the East-west seismic array were presented in Chapter 8.

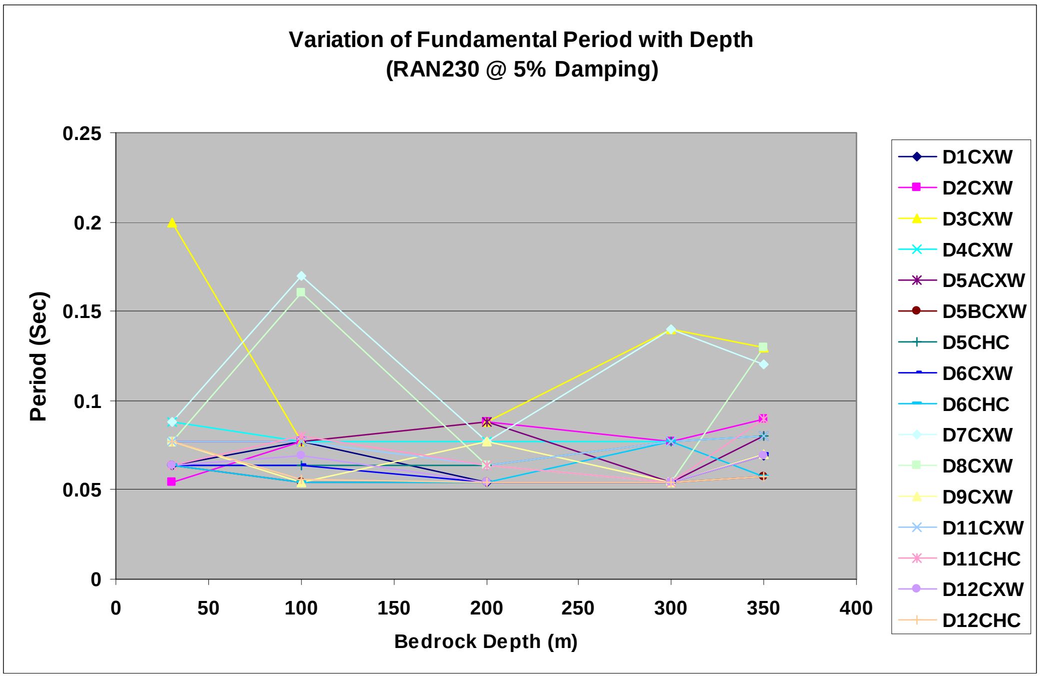
The two synthetic earthquakes, RAN230 and RAN330 that were introduced in Chapter 8 were used in this analysis. Each earthquake analysis was performed twice using soil damping ratios of 5% and 10%. The vertical electric sounding (VES) results were presented in Chapter 8, and indicated that the bedrock depth at Al-Durrah site was 350m to 375 m. For the purpose of this part of the analysis the bedrock depth was assumed to be at 350 m. The soil shear wave velocity (SWV) profiles that were used in this analysis are the same profiles that were generated by the CXW and the CH tests, which were presented in Chapter 7. The only difference is that for this analysis the bedrock depth was increased in increments from the NEHRP specified depth of 30 m to the bedrock actual depth of 350m. Each profile's name indicates the boring location of the profile and the type of SWV test that was performed at that location. As an example, D6CXW refers to the SWV profile of the CXW test at boring number 6.

b). Summary of the results of the analyses of the effects of increasing the Depth of Bedrock on Al-Durrah Site Fundamental Period

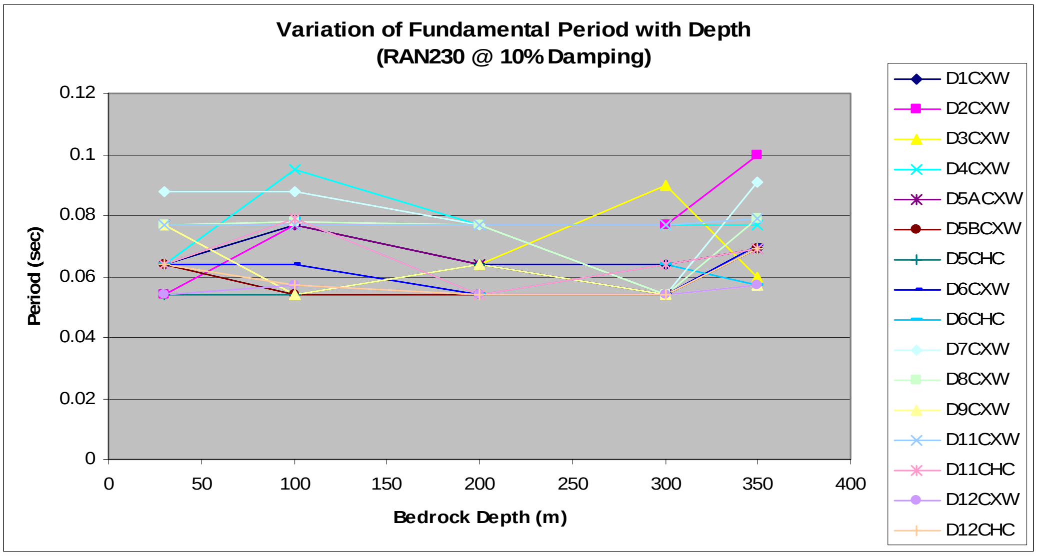
To examine the effects of increasing the bedrock depth on the site's fundamental period, each SWV profile from the CXW and CH was assigned five different bedrock depths. These depths ranged from the NEHRP depth of 30 m to the estimated actual depth of 350 m. The five selected depths are shown in Table (12.12). The SWV for soil depths greater than 30 m were assumed to be equal to the SWV of the soil at NEHRP depth of 30 m, and remained constant to the selected bedrock depth. Each SWV profile was analyzed at each depth four times using the two synthetic earthquakes and the two damping ratios of 5% and 10%. The results of the analyses are reproduced in Figures (12.12) and (12.13)

Bedrock Depth Designation	**Bedrock Depth (m)**
T_{AC}	Actual Depth = 350
T_A	NEHRP Depth = 30
T_B	100
T_C	200
T_D	300

Table 12.12: Definitions of bedrock depths for the dynamic site response analysis

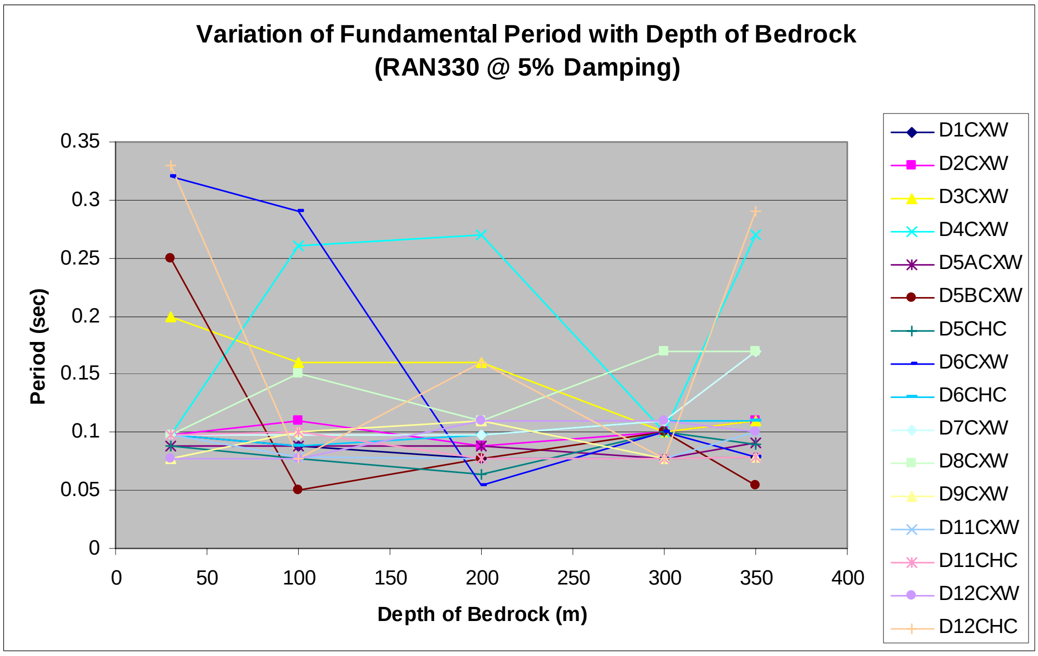


(a)

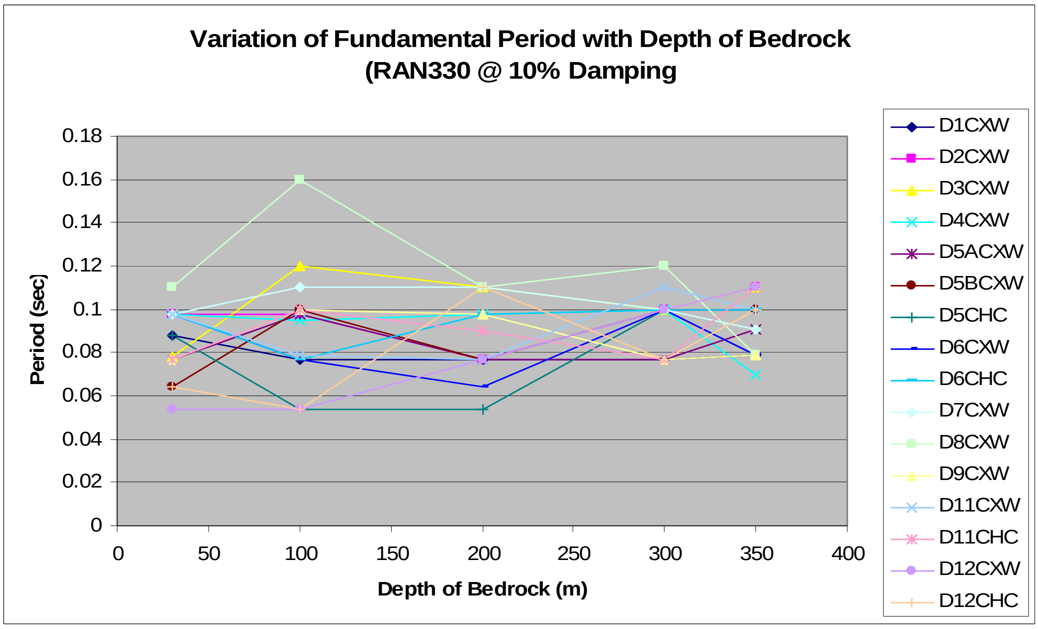


(b)

Figure 12.12: Results of the dynamic site response analysis fundamental periods with increasing bedrock depth using earthquake RAN230



(a)



(b)

Figure 12.13: Results of the dynamic site response analysis fundamental periods with increasing bedrock depth using earthquake RAN330

c). Conclusions of the Analyses of the Effects of Increasing the Bedrock Depth on the Site Fundamental Period

The results of the previous section showed that the site fundamental period values of certain soil profiles at Al-Durrah site were influenced by the increased depth of the bedrock. Different profiles exhibited different fluctuations in the values of the fundamental period depending on the selection of the synthetic earthquake and the damping ratio that were used in the dynamic site response analysis.

The fluctuations in the values of the fundamental periods with the increased depth of the bedrock ranged from insignificant change in some cases, to very significant changes in others. In order to categorize these fluctuations into significant and insignificant fluctuations, a criterion was selected. The average value of the fundamental periods of each profile shown in Tables (11.2) to (11.5) represent the average of all fundamental periods of that profile at the various selected depths. The best statistical tool that characterizes fluctuation for a certain variable is its coefficient of variation (COV), which is defined as [28]:

COV = (the standard deviation ÷ the mean) X 100

COV is commonly expressed as a percentage. Higher COV values indicate higher fluctuations in the values of the data being analyzed. The COV of the fundamental periods in Tables (11.2) to (11.5) were calculated, and the results are reproduced in Table (12.12). A COV limit of 20% was selected to separate profiles with significant fluctuations from those with no significant fluctuations. If the COV of the fundamental period at a certain soil profile is less than 20%, then the fundamental period at this profile is considered *not* to be influenced by increasing the bedrock depth. On the other hand, a COV of more than 20% was considered to indicate significant fluctuation in the value of the fundamental period due to increased bedrock depth. This criterion was applied to all profiles that had a ratio of more than 20% under any analysis of the two synthetic earthquakes. Based on this criterion, Table (12.13) shows that the following profiles had significant fluctuations in the values of the fundamental period as a result of increasing the bedrock depth:

D2CXW, D3CXW, D4CXW, D5BCXW, D6CXW, D7CXW, D8CXW, D12CXW, D5CH, and D12CH.

The next step was to determine the soil characteristics that caused the fundamental period of some profiles to vary with increasing bedrock depth. Table (12.14) presents a summary of Al-Durrah's field tests results for each soil profile and its corresponding site classifications. The last column of Table (12.14) identifies the soil cross-section models that exhibited significant fundamental period fluctuation due the bedrock depth variation.

Coefficient of Variation (COV) of the Fundamental Period (%)					
Test Type	Test Location	Earthquake RAN230		Earthquake RAN330	
		5% Damping	10% Damping	5% Damping	10% Damping
CXW	**D1**	15.59	8.41	10.92	6.00
	D2	18.53	21.12	9.12	12.46
	D3	38.43	20.95	28.07	15.41
	D4	6.00	14.16	46.06	13.60
	D5A	16.79	14.19	6.26	11.79
	D5B	7.57	11.98	78.01	19.05
	D6	11.00	11.98	74.75	18.19
	D7	31.91	19.19	27.26	8.05
	D8	47.23	14.59	24.19	25.15
	D9	17.53	15.90	17.39	13.61
	D11	8.27	1.15	13.61	15.38
	D12	12.23	2.98	17.67	26.96
CH	**D5**	11.06	11.98	16.41	27.42
	D6	15.90	7.66	9.26	10.45
	D11	20.00	13.76	13.61	15.91
	D12	16.47	11.17	63.33	29.19

Table 12.13: Coefficients of variation (COV) of the fundamental periods of Al-Durrah soil cross-section models

Test Location	NEHRP SPT Average No. of blows	NEHRP SPT Site Classification	CXW Average SWV	CXW NEHRP Site Classification	Cross-Hole Average SWV	Cross-hole NEHRP Site Classification	Significant Fundamental Period Fluctuation
D1	83.92	C	420.	C			No
D2	67.57	C	439	C			Yes
D3	70.74	C	410	C			Yes
D4	34.48	D	422	C			Yes
D5A	65.84	C	465	C	316	*D*	No
D5b	65.84	C	523	C	316	*D*	Yes (CXW)
D6	80.84	C	333	*D*	438	C	Yes (CXW)
D7	65.62	C	466	C			Yes
D8	92.85	C	424	C			Yes
D9	74.30	D	476	C			No
D11	25.85	D	371	C	381	C	No
D12	92.01	C	353	*D*	223	*D*	Yes (CXW,CH)

Table 12.14: Summary of Al-Durrah soil cross-section average SPT, NEHRP SWV, and effect of bedrock depth variation

From Table (12.14), the field tests' results and their corresponding NEHRP site classifications do not provide any indications on whether a soil cross-section model's fundamental period will be influenced by the bedrock depth variation. For example, test location D11 with a NEHRP SPT average blow count of 25.85 did not exhibit any significant fluctuation in the fundamental period as a result of bedrock depth variation, while test location D7 with a higher NEHRP SPT average blow count of 92.85 did exhibit significant fluctuation. Similarly, test location D11 with a CXW average SWV of 371 (m/s) did not exhibit any significant fluctuation in the fundamental period with the variation of the bedrock depth, while test location D5b with a higher CXW average SWV of 523 (m/s) did. Similar cases can also be found in the cross-hole test results. No definite conclusions can be made about the relationship between a profile's NHERP site classifications, its NEHRP average SWV, and its fundamental period sensitivity to increased bedrock depth. Therefore, it was necessary to look for other factors that caused some of the soil profiles to exhibit significant fundamental period fluctuation with increasing bedrock depth, while not having the same effect on other *softer* profiles.

Figures (11.10a) to (11.10p) showed the SWV of each of Al-Durrah's soil cross-section model (or profiles), that were used in the dynamic site response analysis. These profiles were generated by

ProShake, based on the input SWV of each profile. The input SWV profiles were based on the results of the CXW and the CH field tests. *All* of the profiles that showed significant fundamental period fluctuations are characterized by the presence of embedded soft layers that are sandwiched by stiffer layers. On the other hand, embedded soft layers were also present in *some* of the profiles that did not show significant fluctuations. These results lead to the following conclusions:

- Variation of the bedrock depth at site could influence the fundamental period of the site.
- The effects of increasing the bedrock depth on the site fundamental period *can not* be predicted based on the site classification, or the site average SWV ($\bar{v}_s$).
- The presence of embedded soft layer(s) within the soil cross-section model *may* be critical to the sensitivity of the site fundamental period to variations of the depth of the bedrock at the site.

In order to determine the factors that cause embedded soft layers to influence the fundamental period of some of the soil profiles, further dynamic site response analysis was performed using two soil cross-section models. The results and conclusions of this analysis are presented in the next section.

12.3d Effects of the Presence of an Embedded Soft Layer Within the Soil Cross-section on the Site Fundamental Period

The effects of the presence of an embedded soft layer within a soil cross-section were analyzed in conjunction with increasing the bedrock depth. The soil cross-section model D1CXW that was shown in Figure (11.10a) was used in this analysis. This soil cross-section model was selected because it did not show significant fluctuation in the values of the fundamental period with increasing the bedrock depth. The original profile had a very thin soft layer at the ground surface, and another one that began at a depth of 3.25 m. However, for the purpose of this analysis, both layers were removed initially and the profile was assumed to have a constant SWV of 500 m/s. The bedrock depth was placed at the NEHRP depth of 30 m, and this soil cross-section model was designated as D1N.

In order to compare the profile D1N with a soil profile that has an actual bedrock depth of 350 m, another soil cross-section model identical to D1N with the exception of the bedrock depth was also established and designated as D1ac. The bedrock depth of profile D1ac was placed at the estimated actual bedrock depth of 350 m. The analysis was performed using ProShake and the synthetic earthquake RAN330 with two soil damping ratios of 5% and 10%.

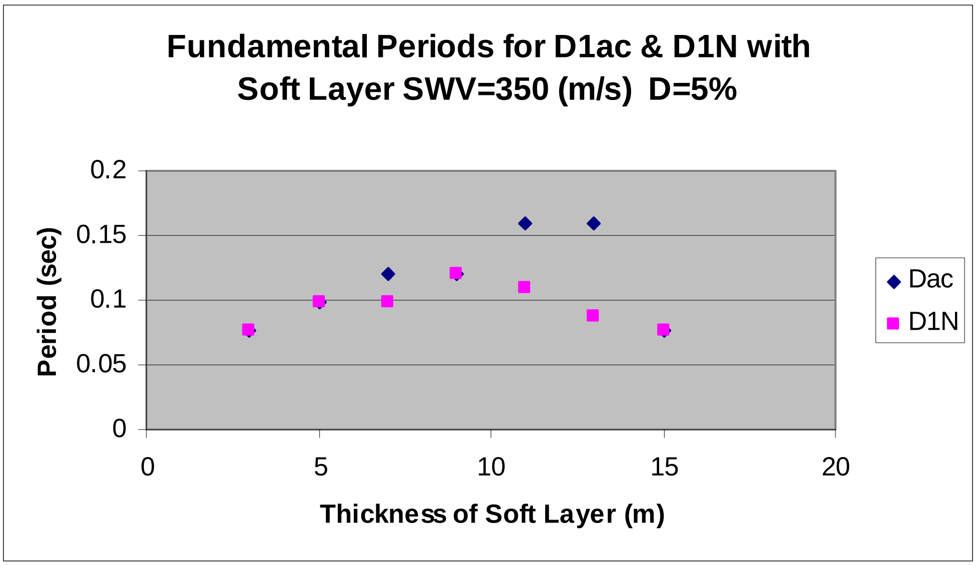
A soft soil layer was embedded into both soil models at a depth of 3.25 m, which was the case in the original profile. The dynamic site response analysis was performed repeatedly for both profiles with varying soft layer thicknesses. In each analysis, the soft layer thickness was increased incrementally from 3 to 15 m. At each damping ratio, the analysis was repeated four times using four values for the SWV of the soft layer including 350, 300, 250, 200 m/s. The results of the analysis are reproduced in Figures (12.14) and (12.15) for convenience.

Figures (12.14a) to (12.142d) show the results of the analysis at 5% soil damping ratio. For a small thickness of soft layer, there was little or no variation in the fundamental period between the two soil cross-section models. For a soft layer thickness of 7 m and higher, the four figures clearly show that the variation in the fundamental period between the two profiles increases with increasing soft layer thickness. The variation of the fundamental period also increased with decreasing the SWV of the soft layer.

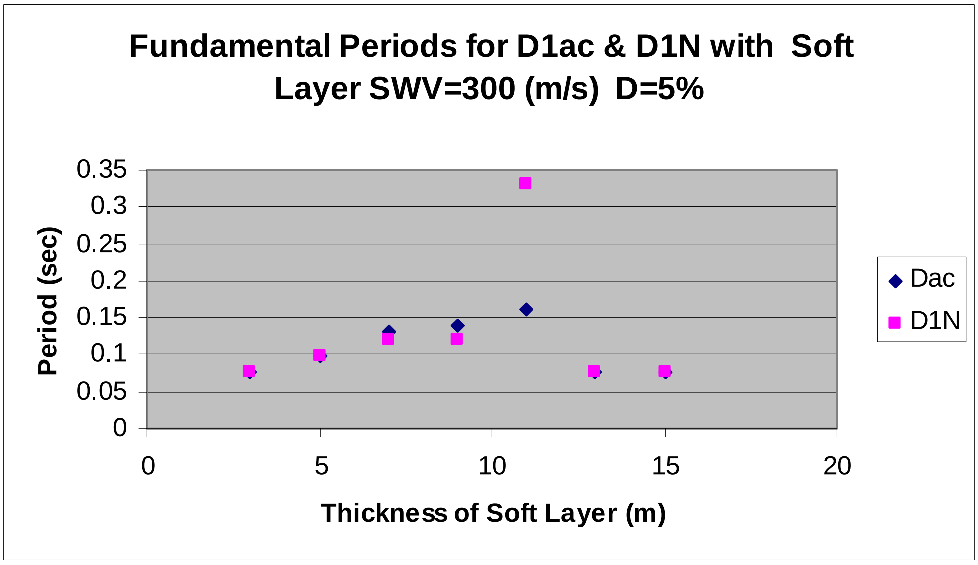
Figures (12.15a) to (12.15d) show the results of the analysis at 10% soil damping ratio. Again, at the lower values of the soft layer thickness, there was little or no variation in the fundamental period. Figures (12.15a, b, and c) show that the variation of the fundamental period starts increasing at the soft layer thickness of 5m, then starts decreasing after reaching the thickness of 9m. Figure (12.15d) which has the soft layer lowest SWV of 200 m/s, shows that the variation of the fundamental period increased with increasing soft layer thickness. All of the four figures indicate that the variation of the fundamental period between the two profiles increased with decreasing the SWV of the soft layer.

The analyses that were presented in Sections 12.3c and 12.3d lead to the following conclusions:

- The presence of embedded soft soil layer(s) within a soil cross-section model *can* influence the sensitivity of the fundamental period to variations in the bedrock depth.
- The effects of the embedded soft soil layer on the site fundamental period depends on the soft layer's thickness, its SWV, its location, and on the damping ratio of the soil.

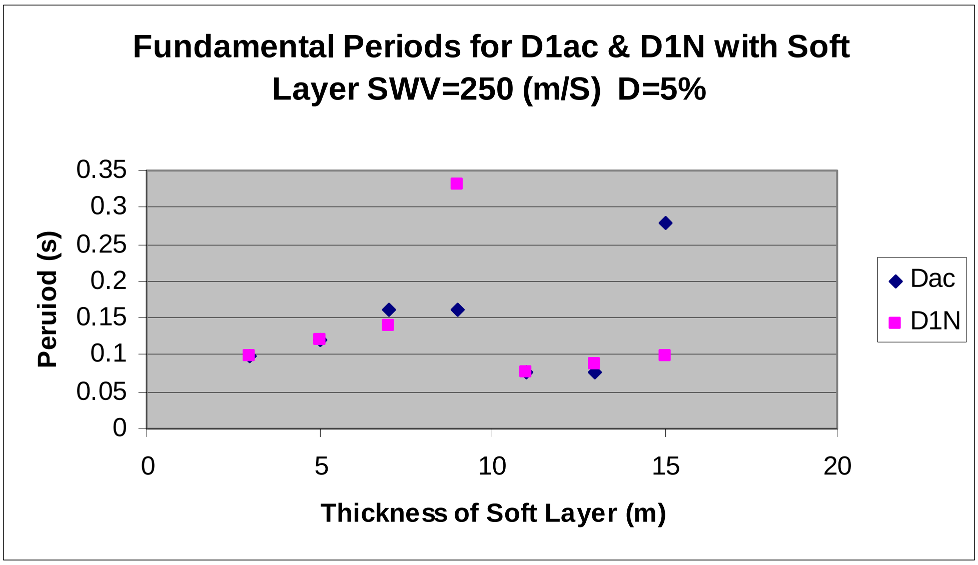


(a)

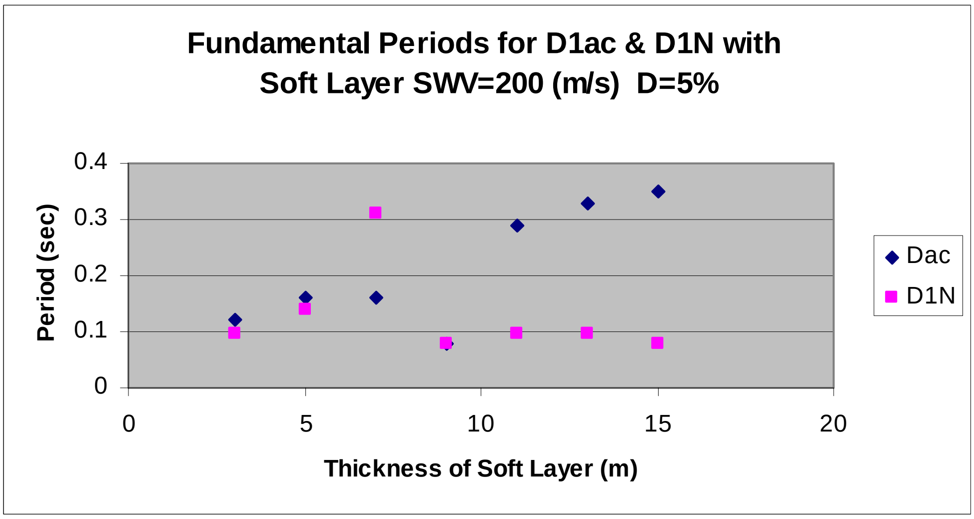


(b)

Figure 12.14: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (5% damping)

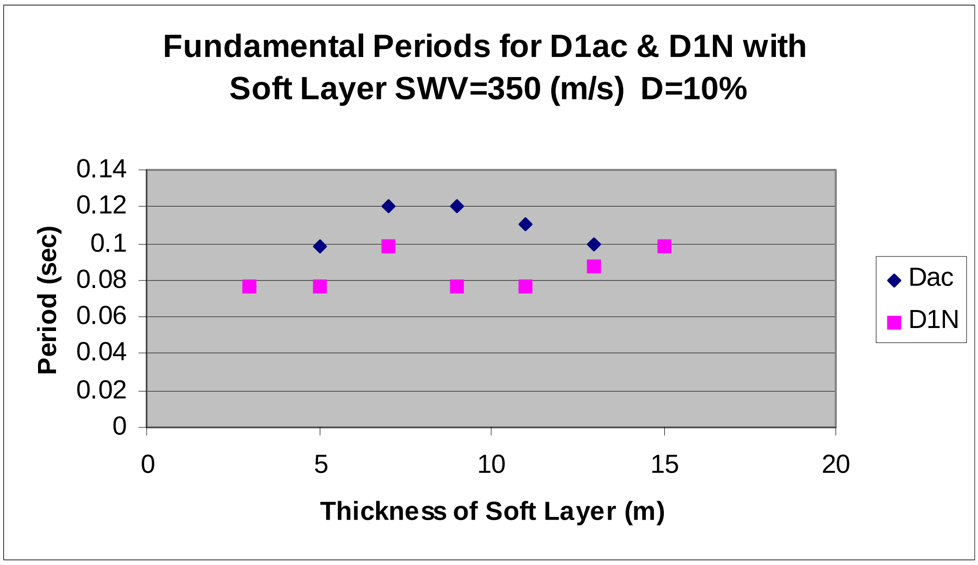


(c)

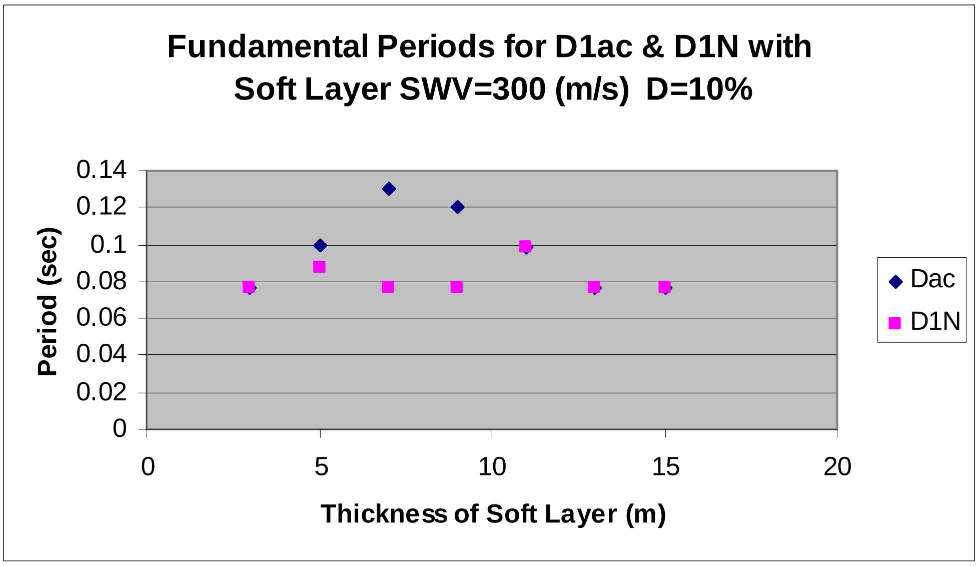


(d)

Figure 12.14-continued: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (5% damping)

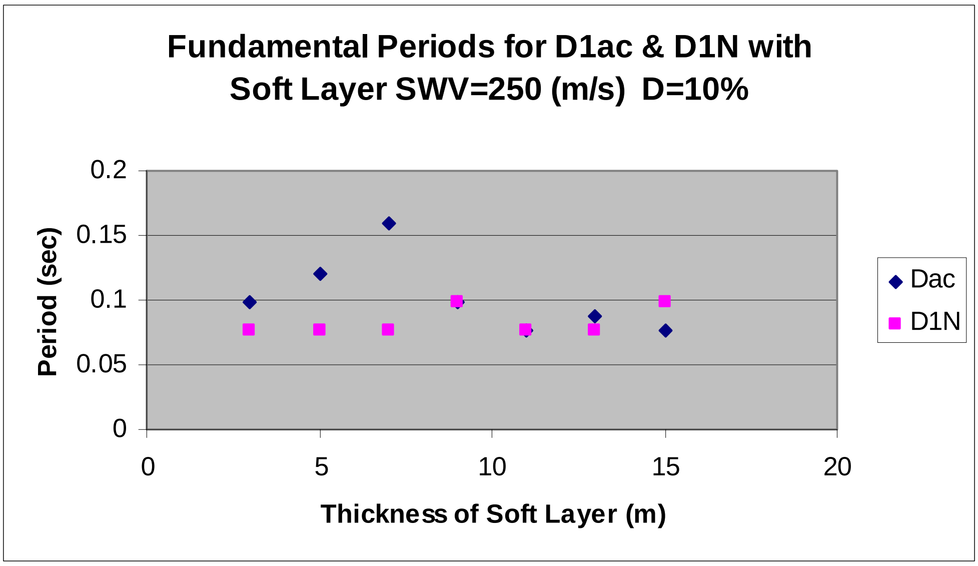


(a)

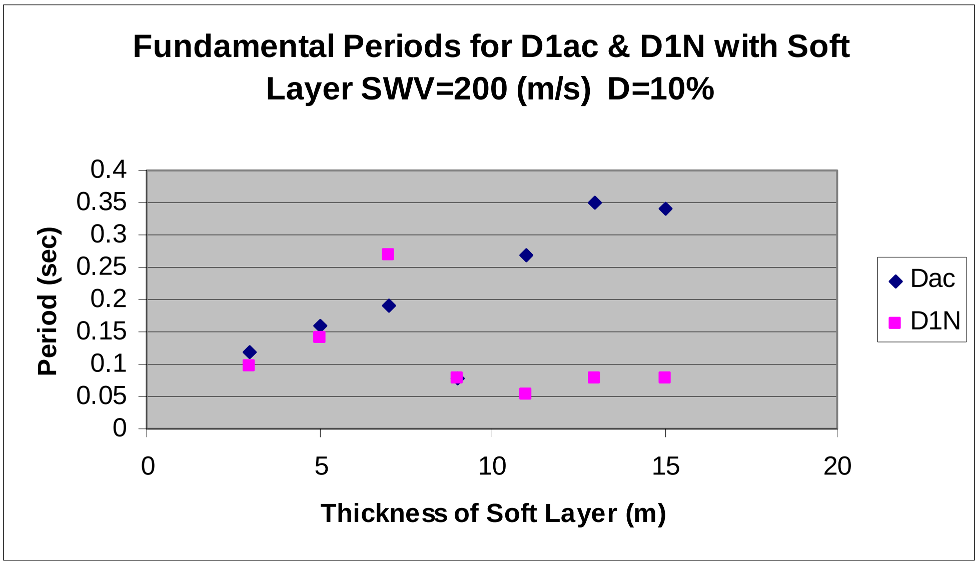


(b)

Figure 12.15: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (10% damping)



(c)



(d)

Figure 12.15-continued: Variations of the fundamental period with variations of bedrock depth and embedded soft layer thickness (10% damping)

12.3e Analysis of the East-West Seismic Array

The East-west seismic array was presented in Chapter 7. The array extended approximately eastward from the Al-Durrah site to the first rock outcrop located at a distance of about 6 miles. The array illustration is reproduced in Figure (12.16) for convenience. Five collinear seismic stations were established along the array. The first seismic station was established on the rock outcrop, and the bedrock depth at the other four seismic stations was estimated by VES tests. Table (12.15) summarizes the bedrock depth at each station. An actual earthquake was recorded simultaneously at all five stations, and the records of the earthquakes were presented in Chapter 7. The magnitude and epicenter information of the earthquake were also presented in Chapter 7. The fundamental periods at the stations were determined by two methods. First, the earthquake record of the rock outcrop was used in a dynamic site response analysis for a soil cross-section model at each of the other four stations. The fundamental period at each station was determined from the results of these analyses. The earthquake record at the rock outcrop was assumed to represent the motion at the bedrock at each station (i.e., the bedrock was assumed to be infinitely rigid) [3]. Second, the earthquake time domain records were converted to frequency domain records, and the fundamental periods were determined at the maximum amplitudes.

Apart from the VES tests that established the bedrock estimated depth at each station, no other information was available for the soil profiles of the stations along the East-west array, with the exception of station DRA2, which was part of the Al-Durrah site tests locations. The closest estimate to the soil properties at the array stations was the soil properties of Al-Durrah soil profiles. Therefore, the average minimum and maximum shear wave velocities were computed for all the soil cross-section models in Al-Durrah and these values were used for soil cross-section models along the array. The top 30 m of each soil cross-section model was divided into six equal layers. The number of layers is not critical to the analysis as long as the SWV distribution is kept consistent. The top soil layer was assigned the average minimum SWV, while the last layer at the NEHRP depth of 30 m was assigned the average maximum SWV. The shear wave velocity for the intermediate layers within the NEHRP depth increased linearly from the ground surface to the NEHRP depth of 30 m. All layers below the NEHRP depth and above the actual bedrock were assigned the same average *maximum* SWV. The analysis was repeated for 5% and 10% soil damping ratios. The results of the analysis are reproduced in Tables (12.16) for the east-west component of the earthquake, and in Table (12.17) for the north-south component.

Location	Bedrock Depth (m)
RD0	35-40
RD2	≈ 170
RD3	≈ 225
DRA2	≈ 350

Table 12.15: Seismic stations of the East-west seismic array and their bedrock depths

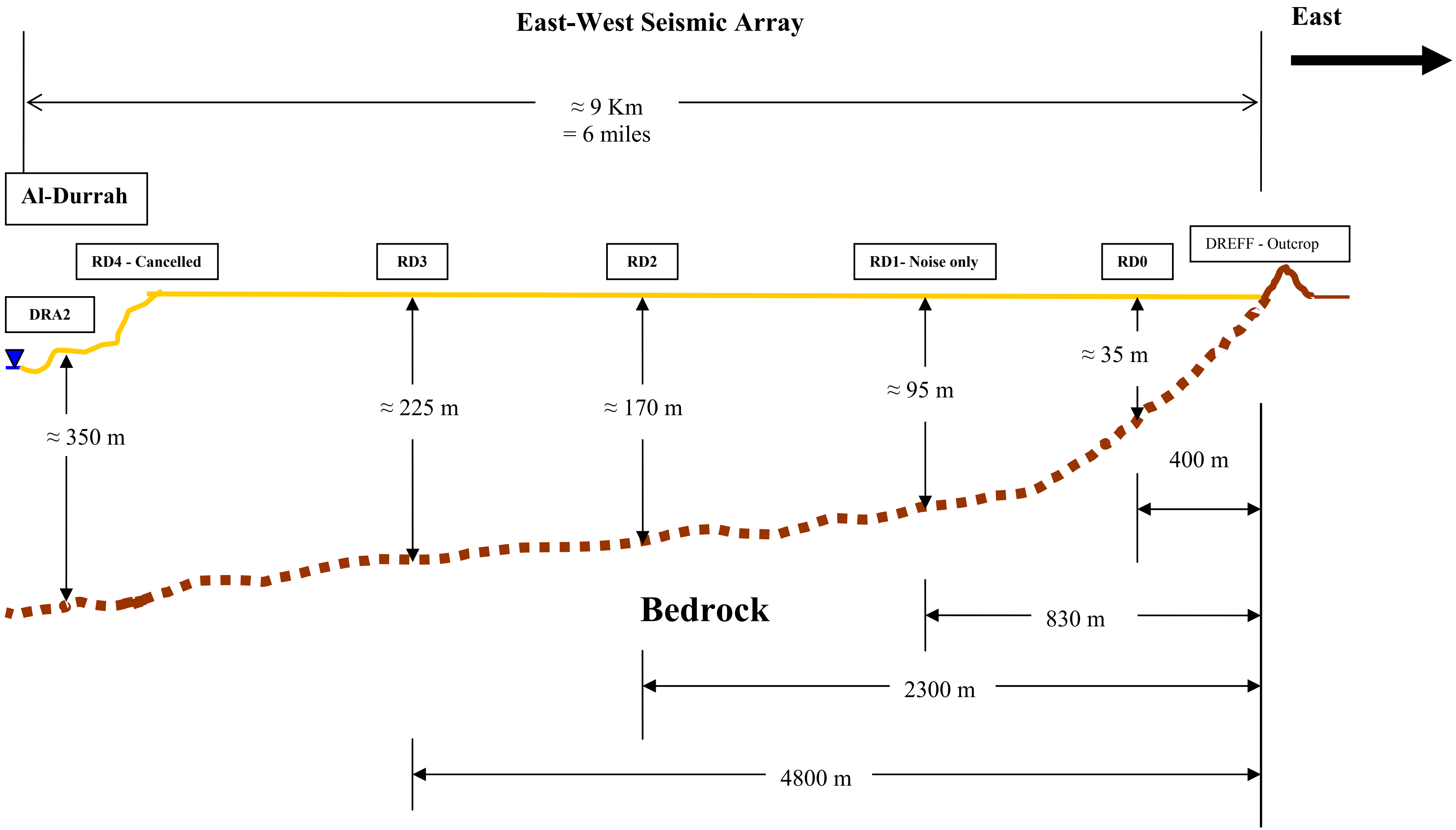


Figure 12.16: East-west seismic array

1- The Dynamic Site Response Analysis Fundamental Periods

A) East- west Components

- 5% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.098	0.098	0.08	0.08

Table 12.16a: Fundamental periods for the east-west component of array earthquake (5% damping)

- 10% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.11	0.11	0.11	0.11

Table 12.16b: Fundamental periods for the east-west Component of Array earthquake (10% damping)

B) North-south Components

- 5% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.077	0.077	0.077	0.077

Table 12.17a: Fundamental periods for the north-south component of array earthquake (5% damping)

- 10% Damping

Station	RD0	RD2	RD3	A2
Fundamental Period (sec.)	0.077	0.077	0.077	0.077

Table 12.17b: Fundamental periods for the north-south Component of array earthquake (10% damping)

Table (12.16) shows that the dynamic site response analysis for the *east-wes*t component of the earthquake at both damping ratios and at all four stations resulted in site fundamental periods of 0.098 and 0.11 second. Table (12.17) shows that the dynamic site response analysis for the *north-south* component of the earthquake at both damping ratios and at all four stations resulted in a site fundamental period of 0.077 second.

The dynamic site response analysis of the East-west seismic array was performed with the assumption that no embedded soft layers were present in any of the stations soil profiles. The results confirm that if no embedded soft layers are present in the profile, the bedrock depth is irrelevant to the site fundamental period.

2- Frequency Domain Spectra Fundamental Periods

A) East-west Components

Station	DREFF	RD0	RD2	RD3	A2
Frequency Hz	9.37	23.24	8.15	12.36	54.48
Fundamental Period (sec.)	0.107	0.043	0.123	0.081	0.018

Table 12.18: Fundamental frequencies (and periods) for the East-west component of array earthquake

B) North-south Components

Station	DREFF	RD0	RD2	RD3	A2
Frequency Hz	11.22	16.84	15.71	22.05	59.78
Fundamental Period (sec.)	0.089	0.059	0.064	0.046	0.017

Table 12.19: Fundamental frequencies (and periods) for the North-south component of array earthquake

Tables (12.18) and (12.19) present the fundamental periods based on the frequency domain records of the earthquake at each station. Contrary to the results of the dynamic site response analysis, the frequency domain fundamental periods show variation with increased bedrock depth. In the dynamic site response analysis, the soil cross-sectional models were assumed to be *"normal"*, meaning that their shear wave velocity increased with depth and there were no embedded soft soil layers. However, the results of the frequency domain fundamental period, which represent the actual fundamental period at each station, suggest that the soil profiles at the stations may not be *"normal"*. Since the only subsurface soil information at the stations' locations is that of the vertical electric sounding, the only certain way to verify the characteristics of the soil profiles is to conduct soil explorations similar to the ones that were performed at the Al-Durrah site. The results of the analysis lead to the following conclusions:

- If no embedded soft layers are present in the profile, then increasing the bedrock depth beyond NEHRP depth of 30 m *does not* affect the site fundamental period.

12.4 Summary of Conclusions

We have different methods for determining the soil cross-sectional modeling profile such as the invasive methods of SPT and CH, and noninvasive methods such as CXW. The use of any of these methods is acceptable for determining the site design response spectra and the site fundamental period as per NEHRP Provisions.

This research project has the unique advantage of using all methods of testing the same site, thus the advantage and limitations of using one method over another could be determined.

It was found that:

- Different methods of field testing the same location can provide different soil profiles and thus different site classification.
- Different site classifications, can lead to significantly different design response spectra, and significantly different fundamental periods for the same location. Different tests at the Al-Durrah site led to two different site classifications that led to two different design spectra with a maximum difference, in terms of the spectral acceleration, of 41%. These two classifications were compared at two sites on NEHRP maps. The first site had seismic characteristics (S_s and S_1) that were similar to the Al-Durrah site representing medium to low earthquakes. The design spectra for the two classifications at the first site also had a maximum difference of 41%. The second site S_s and S_1 values were much higher than at Al-Durrah site, and the spectral acceleration difference in this case was 18%. Although the difference between the design response spectra of the sites tended to decrease with increasing earthquake magnitudes, it is important to note that the vast majority of earthquakes had small to medium magnitudes [29]. This indicated that the difference between the spectra of the two site classes would more likely be significant for most sites. If no further testing is possible or desirable, then the weaker (softer) classification must be selected for the site despite the implications of higher costs.

- Caution should be exercised when using non-invasive soil cross-section modeling methods, such as the CXW, that do not always detect the presence of soft embedded soil strata. If a site's soil cross-section is modeled by such methods, and embedded soft profiles are not accounted for, then the resulting site fundamental period may not be accurate, especially if the bedrock depth at the site is much higher than the NEHRP bedrock depth of 30 m.
- The effects of embedded soft soil strata on the fundamental period will depend on their thickness, stiffness, location, and damping.
- The microtremors results were inconsistent in determining the site fundamental period and the approximate method does not account for the effects of embedded soft soil strata on the fundamental period, which was shown to be significant. On the other hand, the dynamic site response analysis accounted for the effects of strain level, damping, and the presence of embedded soft soil strata, thus it was expected to be the most accurate method. The results of the dynamic site response analyses showed good agreement with the results of the East-west seismic array for an actual earthquake, which confirmed that the dynamic site response analysis is the most accurate method for determining the site fundamental period, as was expected.

12.5 Recommendations

Further study is needed to establish correlations between the various soil cross-section modeling methods in order to determine which one is more appropriate and at which site. This research has shown that these methods affect the design response spectrum and the fundamental period, and thus it should be of concern for the designer. Establishing the actual shear wave velocity profiles for the East-west seismic array through invasive modeling that can detect the presence of soft embedded layers will lead to a better understanding of the effects of increasing the bedrock depth on the site fundamental period. In addition, subsequent earthquakes will be analyzed based on the actual soil cross-sectional model and will lead to more benefit from the use of the array.

Appendix A: ProShake Theoretical Background

A1. Introduction

ProShake dynamic site response analysis is based on the one-dimensional ground response analysis theory, which follows the general approach of Kramer's work [1]. The theory is first presented for a single layer in order to demonstrate the principles behind it in a simplified manner. The theory is then extended to multi-layers situations.

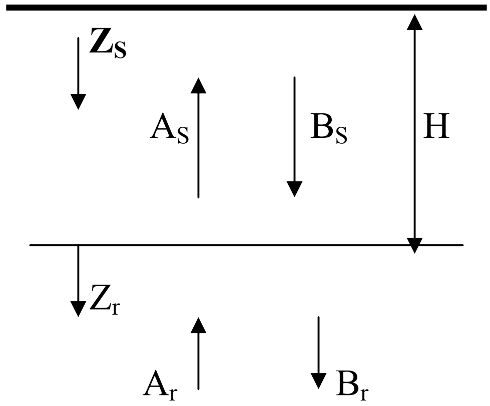
A.2 Theoretical Background

This section was taken directly from ProShake manual, with permission of EduPro Civil Systems. The user manual is also readily available on line at EduPro website.

A.3 ProShake Theory

ProShake uses a frequency domain approach to solve the ground response problem. In simple terms, the input motion is represented as the sum of a series of sine waves of different amplitudes, frequencies, and phase angles. A relatively simple solution for the response of the soil profile to sine waves of different frequencies (in the form of a transfer function) is used to obtain the response of the soil deposit to each of the input sine waves. The overall response is obtained by summing the individual responses to each of the input sine waves. This section describes the basic mathematics of the process for a problem involving a single soil layer, illustrates how that problem can be solved using a widely available mathematical programming language, and extends the approach to the layered systems.

Single Soil Layer



The following paragraphs describe The basis of the analysis used in ProShake and follow the general approach of Kramer (1996).

That reference provided substantial background material and a more detailed description of ground response analyses than is presented in this User's Manual.

To illustrate the basic approach used in ProShake, consider a uniform soil layer lying on an elastic layer of rock that extends to infinite depth, as illustrated to the right. If the subscripts s and r refer to soil and rock, respectively, the horizontal displacements due to vertically propagating harmonic s-waves in each material can be written as

$$U_s(z_s,t) = A_s e^{i(\omega t + k_s^* z_s)} + B_s e^{i(\omega t - k_s^* z_s)} \qquad (1)$$

$$U_s(z_r,t) = A_r e^{i(\omega t + k_r^* z_r)} + B_r e^{i(\omega t - k_r^* z_r)} \qquad (2)$$

Where ω is the circular frequency of the harmonic wave and k^* is the complex wave number. No shear stress can exist at the ground surface ($z_s = 0$), so

$$\tau(0,t) = G_s^* \frac{\partial u_s(0,t)}{\partial z_s} = 0 \tag{3}$$

Where $G_s^* = G(1+2i\xi)$ is the complex shear modulus of the soil.

Substituting Equation (1) into Equation (3) and differentiating gives

$$G_s^* ik_s(A_s e^{ik_s(0)} - B_s e^{-ik_s(0)})e^{i\omega t} = G_s^* ik_s(A_s - B_s)e^{i\omega t} = 0 \tag{4}$$

Which is satisfied when *As* = *Bs*. Compatibility of displacements and continuity of stresses at the soil/rock boundary require

$$U_s(z_s = H) = U_r(z_r = 0) \tag{5}$$

$$\tau_s(z_s = H) = \tau_r(z_r = 0) \tag{6}$$

Substituting Equations (1) and (2) into Equation (5)

$$A_s(e^{ik_s^* H} + e^{-ik_s^* H}) = A_r + B_r \tag{7}$$

From Equation (6) and the definition of shear stress $(\tau = G_s^* \partial U / \partial z)$

$$A_s i G_s^* k_s^* (e^{ik_s^* H} - e^{-ik_s^* H}) = i G_r^* k_r^* (A_r - B_r)$$

Or

$$\frac{G_s^* k_s^*}{G_r^* k_r^*} A_s (e^{ik_s^* H} - e^{-ik_s^* H}) = A_r - B_r \tag{8}$$

The ratio

$$\frac{G_s^* k_s^r}{G_r^* k_r^*} = \alpha_z^*$$

Where α_z^* is known as the complex impedance ratio. Solving Equations (7) and (8) simultaneously gives

$$A_r = \frac{1}{2} A_s \left[(1+\alpha_z^*) e^{ik_s^* H} + (1-\alpha_z^*) e^{-ik_s^* H} \right] \tag{9a}$$

$$B_r = \frac{1}{2} A_s \left[(1-\alpha_z^*) e^{ik_s^* H} + (1+\alpha_z^*) e^{-ik_s^* H} \right] \tag{9b}$$

If a vertically propagating shear wave of amplitude, *A*, traveled upward through the rock and the soil was not present, the free surface effect at the rock outcrop would produce a bedrock outcropping motion of amplitude *2A*. If the soil was present, the free surface motion amplitude would be

$$2A_s = \frac{4A}{(1+\alpha_z^*) e^{ik_s^* H} + (1-\alpha_z^*) e^{-ik_s^* H}}$$

The transfer function, F(w), defined as the ratio of the soil surface amplitude to the rock outcrop amplitude, is given by

$$F(\omega) = \frac{2}{(1+\alpha_z^*)e^{ik_s^* H} + (1-\alpha_z^*)e^{-ik_s^* H}}$$

Obviously, the transfer function is a complex function. It can be rewritten using Euler's Law as

$$F(\omega) = \frac{1}{\cos k_s^* H + i\alpha_z^* \sin k_s^* H} \tag{10}$$

Solution of Single Layer Problem

Because the transfer function is defined as the ratio of the soil surface amplitude to the rock outcrop amplitude, the soil surface amplitude can be obtained as the product of the rock outcrop amplitude and the transfer function. Therefore, the response of the soil layer to a periodic input motion can be obtained by the following steps:

1. Express the input (rock outcrop) motion in the frequency domain as a Fourier series (as the sum of a series of sine waves of different amplitudes, frequencies, and phase angles). For an earthquake motion, this Fourier series will have both real and imaginary parts.
2. Define the transfer function (Equation 10). The transfer function will have both real and imaginary parts.
3. Compute the Fourier series of the output (ground surface) motion as the product of the Fourier series of the input (bedrock) motion and the transfer function. This Fourier series will also have both real and imaginary parts.

4. Express the output motion in the time domain by means of an inverse Fourier transform.

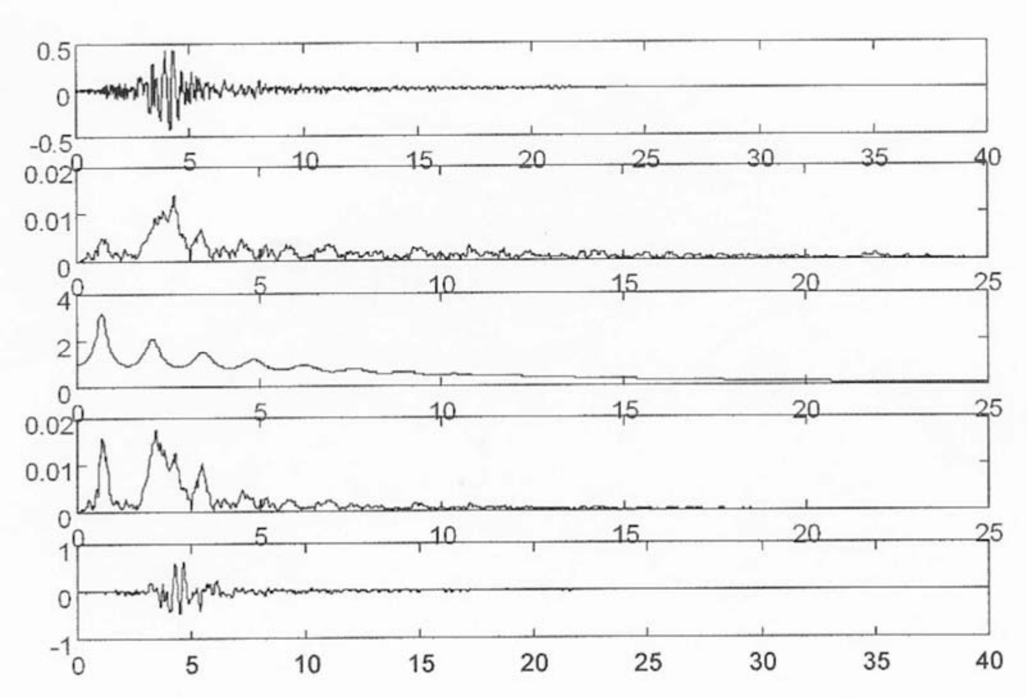
These steps are coded into a program using the mathematical processing program MATLAB in the box located below. The syntax of a MATLAB program is similar to common languages such as FORTRAN and BASIC, but MATLAB contains high-level functions that allow many complicated calculations and graphics commands to be processed in a single line of text. The MATLAB program is well-commented, and should be relatively easy to follow.

The variables defined in the first part of the MATLAB program correspond to Example 7.3 in Kramer (1996). This example considers the response of a 540 ft thick soil layer of soil (v_{ss} = 1500 ft/sec, γ = 125 pcf, and ζ= 5%) overlying bedrock (v_{sr} = 5000 ft/sec, γ = 160 pcf, and ζ = 2%).

```
%     EX73.M  -  A MATLAB script for computing the seismic response of a uniform

%                    damped soil layer on elastic bedrock.  Input data corresponds to
%                    Example 7.3 in Kramer, S. L. (1996), Geotechnical Earthquake
%                   Eingineering, Prentice Hall. 653 pp.
height=540;                              % soil layer thickness
vss=1500;                                % soil shear wave velocity
vsr=5000;                                % rock shear wave velocity
rho_s=125;                               % soil unit weight
rho_r=160;                               % rock unit weight
xs=0.05;                                 % soil damping ratio
xr=0.02;                                 % rock damping ratio
load gle.dat                             % load input motion
n=length(gle);
for j=2: n+1
    a(j) = gle (j-1)/981;                % shift and conver input motion to g's
end
a(1) = 0.0
dt = 0.02;                               % time step
df =1./(n*dt);                           % frequency increment
t = 0.0 : dt : n*dt;                     % set up time vector
f = 0.0 :df : n*df;                      % set up frequency vector
afft = fft (a)/n;
absfft = abs (aft);
for j=1 : n/2+1                          % set up single-sided FAS
    b (j) = 2.*absfft (j);
    ff (j) = f (j);
end
alpha_z = (rho_s*vss (1+i*xs)) / (rho_r*vsr* (1+i*xr));    % complex impedance ratio
h (1) = 1.0;
for j = 2 :n/2+1
    ksH (j) = 2*pi*f (j)*height / (vss+xs*i*vss)             % wave number x thickness
    h (j) = 1. / (cos(ksH (j))+ i*alpha_z*sin(ksH (j)));     % left half of transfer function
    h (n+3-j) = conj (h (j));                                % right half of transfer function
end
for j = 1 : n / 2+1
     habs (j) = abs (h (j));             % modulus of transfer function (for plotting)
end
subplot (5,1,1)
plot (t,a)                               % plot input motion (time domain)
subplot (5,1,2)
plot (ff,b)                              % plot FAS of input motion (frequency domain
subplot (5,1,3)
plot (ff,habs)                           % plot modulus of transfer function ( freq. domain)
for j = 1 : n+1
    acc (j) = aft (j)*h (j);             % compute output motion in frequency domain
end
for j = 1 : n /2+1
     acc1 (j) =2.*abs (acc (j));         % compute FAS of output motion
end
subplot (5,1,4)
plot (ff,acc1)                           % plot FAS of output motion (frequency domain)
atime = n*real (ifft (acc));
subplot (5,1,5)
plot (t,atime)                           % plot output motion (time domain)
```

The MATLAB generates the plots shown below

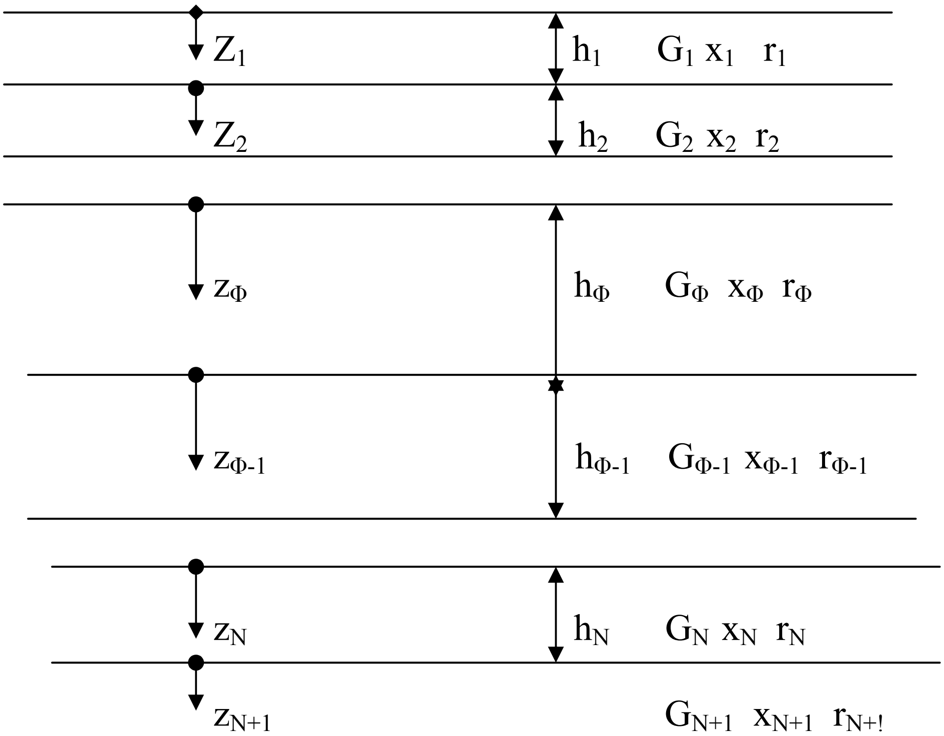


The first of these plots shows a time history of acceleration of the 40-sec input motion in the time domain. Immediately below this is the Fourier amplitude spectrum of the input motion-the Fourier amplitude spectrum shows a variation of amplitude with frequency for each of the frequencies in the Fourier series. The abscissas of the second, third, and fourth plots are frequency Hz. The third plot shows the modulus (the square root of the sum of the squares of the real and imaginary parts) of the transfer function. The transfer function is clearly seen to have a series of local peaks that illustrate the nature of amplification that will take place at the natural frequencies of the soil layer; note that the greatest amplification will take place at the natural frequency (where the transfer function reaches its global maximum).

The fourth plot shows the Fourier amplitude spectrum of the output (ground surface) motion which is numerically equal to the product of the input motion (second plot) and the transfer function (third plot). The origin of this spectrum is clearly seen by comparing the second, third, and fourth plots-the peaks in the fourth plot (the output motion) are related to the peaks in the second plot (the input motion) and the third plot (the transfer function). Finally, the last plot shows the output (ground surface) motion in the time domain as obtained by taking the inverse Fourier transform of the output motion in the frequency domain.

Multiple Soil Layers

The basic approach described in the preceding sections is also used to analyze layered soil deposits in ProShake-the only difference is that the transfer function is different for a layered soil deposit. The transfer function for a layered soil deposit must account for the transmission and reflection of waves at boundaries between adjacent layers, much as those factors were accounted for at the soil/rock boundary in the previous section.



Consider the soil deposit shown to the right. Within a given layer, say layer j, the horizontal displacements will be given by

$$U_j(z_j, t) = (A_j e^{ik_j^* z_j} + B_j e^{-ik_j^* z_j})e^{i\omega t} \tag{11}$$

At the boundary between layer j and layer $j+1$, compatibility of displacements requires that

$$A_{j+1} + B_{j+1} = A_j e^{ik_j^* h_j} + B_j e^{-ik_j^* h_j} \tag{12}$$

Continuity of shear stresses requires that

$$A_{j+1} + B_{j+1} = \frac{G_j^* k_j^*}{G_{j+1}^* k_{j+1}^*}\left(A_j e^{ik_s^* h_j} - B_j e^{-ik_s^* h_j} \right) \tag{13}$$

Note that Equations (12) and (13) are analogous to Equations (7) and (8), respectively. Defining α_j^* as the complex impedance ratio at the boundary between layers *j* and *j+1*, the wave amplitudes for layer *j+1* can be obtained from the amplitudes of layer *j* by solving Equations (12) and (13)

$$A_{j+1} = \frac{1}{2} A_j (1+\alpha_j^*) e^{ik_j^* h_j} + \frac{1}{2} B_j (1-\alpha_j^*) e^{-ik_j^* h_j} \tag{14a}$$

$$B_{j+1} = \frac{1}{2} A_j (1-\alpha_j^*) e^{ik_j^* h_j} + \frac{1}{2} B_j (1+\alpha_j^*) e^{-ik_j^* h_j} \tag{14b}$$

At the ground surface ($z_1 = 0$), the requirement that the shear stress must be zero means that $A_1=B_1$. Applying Equations (14) recursively for j =1, 2, 3, ……, N, the coefficients A_{j+1} and B_{j+1} can be related to A_j and B_j by

$$A_{j+1} = a_{j+1}(\omega) A_1 \tag{15a}$$

$$B_{j+1} = b_{j+1}(\omega) B_1 \tag{15b}$$

Where the functions $a_{j+1}(\omega)$ and $b_{j+1}(\omega)$ represent the effects of the wave interactions that take place at all of the layer interfaces above layer $j+1$. Then, a transfer function relating the motions at the tops of any two layers, say layers i and j, can be expressed as

$$F_{ij}(\omega) = \frac{a_i(\omega) + b_i(\omega)}{a_j(\omega) + b_j(\omega)} \tag{16}$$

This transfer function can become quite complicated, but it is used in exactly the same way as the much simpler transfer function developed for the single layer case. In fact, the MATLAB program that illustrated the single layer case could be used to compute the response for a multi-layered problem by changing only one line – the line where the transfer function is defined (with the comment % left half of transfer function).

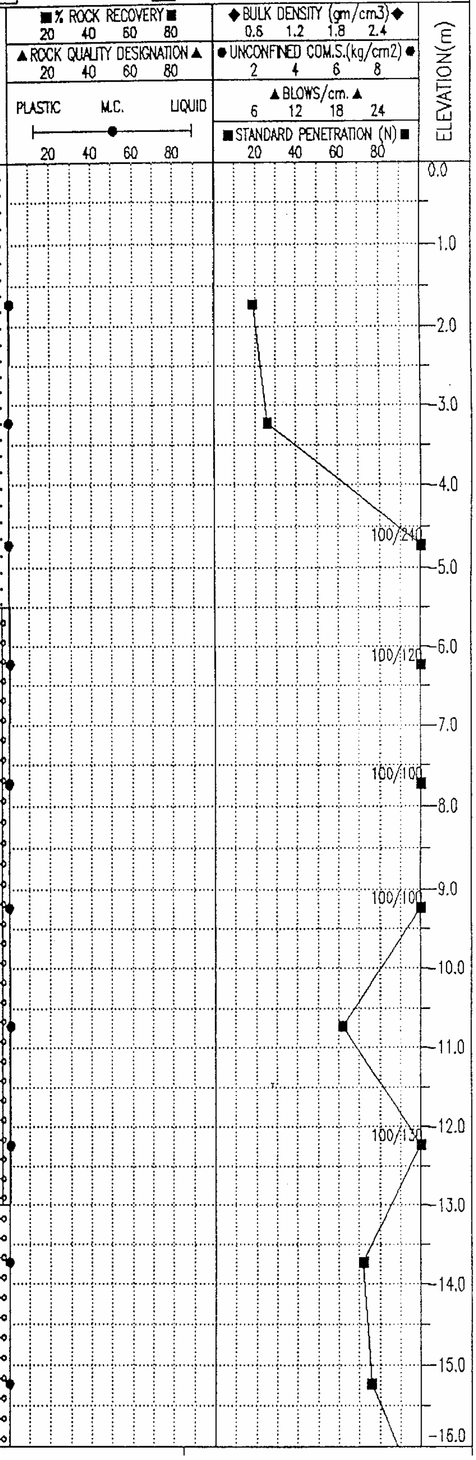
Appendix B: Sample SPT Logs

The Following plots are a sample standard penetration test (SPT) logs for boring D2 Al-Durrah site.

SITE & SEISMIC INVESTIGATION	DRILL RIG: CME-75(HOLLOW STEM AUGERS)	BOREHOLE No: D-2
KING ABDUL AZIZ CITY FOR SCIENCE & TECH.	START DATE: 01/10/01	Project No: RHQ-0139
LOCATION: HAQUEL & AL-DURRAH	PIEZOMETRIC HEAD= - 28.0 m	ELEVATION: 0.0 (m)

SAMPLE TYPE: DISTURBED / SHELBY TUBE / SPT SAMPLE / H. STEM AUGER / ROCK BIT / CORE

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL/ROCK DESCRIPTION	USC
0.0				Medium to coarse sand, little gravel, trace silt Light brown Medium dense to extremely dense	SW-SM
	SPT	1	19		
	SPT	2	26		
	SPT	3	100/240		
				Medium to fine sand, little silt, trace gravel Creamy Extremely dense	SM
	SPT	4	100/120		
	SPT	5	100/100		
	SPT	6	100/100		
	SPT	7	62		
	SPT	8	100/130		
				Medium to fine sand, trace to little silt, trace gravel Brownish creamy Extremely dense	SP-SM
	SPT	9	72		
	SPT	10	76		
16.0					



SPT D2

SITE & SEISMIC INVESTIGATION	DRILL RIG: CME-75(HOLLOW STEM AUGERS)	BOREHOLE No: D-2
KING ABDUL AZIZ CITY FOR SCIENCE & TECH.	START DATE: 01/10/01	Project No: RHQ-0139
LOCATION: HAQUEL & AL-DURRAH	PIEZOMETRIC HEAD= -	ELEVATION: 0.0 (m)

SAMPLE TYPE: DISTURBED / SHELBY TUBE / SPT SAMPLE / H. STEM AUGER / ROCK BIT / CORE

■% ROCK RECOVERY■ 20 40 60 80
▲ROCK QUALITY DESIGNATION▲ 20 40 60 80
PLASTIC M.C. LIQUID 20 40 60 80
◆BULK DENSITY (gm/cm3)◆ 0.6 1.2 1.8 2.4
●UNCONFINED COM.S.(kg/cm2)● 2 4 6 8
▲BLOWS/cm.▲ 6 12 18 24
■STANDARD PENETRATION (N)■ 20 40 60 80

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	SOIL/ROCK DESCRIPTION	USC	ELEVATION(m)
16.0				Medium to fine sand, trace to little silt, trace gravel Brownish creamy Extremely dense	SP-SM	-16.0
	SPT	11	100/100			
17.0						-17.0
18.0	SPT	12	100/100			-18.0
19.0						-19.0
	SPT	13	100/60			
20.0						-20.0
21.0	SPT	14	100/60			-21.0
22.0						-22.0
	SPT	15	100/60			
23.0						-23.0
24.0	SPT	16	100/240			-24.0
25.0				Medium to fine sand, trace to little gravel, trace silt Reddish brown Extremely dense	SP-SM	-25.0
	SPT	17	100/60			
26.0						-26.0
27.0	SPT	18	69			-27.0
28.0						-28.0
	SPT	19	100/100			
29.0						-29.0
30.0	SPT	20	100/240			-30.0
				End of boring-30.5m.		
31.0						-31.0
32.0						-32.0

SPT D2-cont.

Appendix C: Cross-hole and Down-hole Calculations

1. Cross-hole Profiles Calculations

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n}\left(\frac{d_i}{v_{si}}\right)} \qquad i = 1,2,3,.......n$$

Where d_i and v_{si} are the thickness and shear wave velocity for layer (i), respectively.

Boring Location: D5- CH

Depth (m)		Thickness d_i (m)	$(V_{si})_{raw}$ (m/s)	$(V_{si})_{correctr}$ (m/s)	$d_i/(V_{si})_{correctec}$
From	To				
0	2	2	280	276	0.007246
2	4	2	350	348	0.005747
4	6	2	260	259	0.007722
6	7	1	159	249	0.004016
7	8	1	350	348	0.002874
8	9	1	477	475	0.002105
9	10	1	149	222	0.004505
10	11	1	131	179	0.005587
11	12	1	167	273	0.003663
12	13	1	414	413	0.002421
13	14	1	350	348	0.002874
14	15	1	521	519	0.001927
15	16	1	500	498	0.002008
16	17	1	301	300	0.003333
17	18	1	155	239	0.004184
18	19	1	164	266	0.003759
19	20	1	228	565	0.00177
20	21	1	228	565	0.00177
21	22	1	211	457	0.002188
				Σ =	0.069699

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n}\left(\frac{d_i}{v_{si}}\right)} = \text{ 315.6 m/s}$$

Bring LOcation: D6-CH

Depth (m)		Thickness d_i (m)	$(V_{si})_{raw}$ (m/s)	$(V_{si})_{correctr}$ (m/s)	$d_i/(V_{si})_{correctec}$
From	To				
0	2	2	381	381	0.005249
2	4	2	848	848	0.002358
4	6	2	467	467	0.004283
6	7	1	233	233	0.004292
7	8	1	267	267	0.003745
8	9	1	389	389	0.002571
9	10	1	284	284	0.003521
10	11	1	431	431	0.00232
11	12	1	175	350	0.002857
12	13	1	431	431	0.00232
13	15	2	189	374	0.005348
15	16	1	350	448	0.002232
16	17	1	171	341	0.002933
17	18	1	350	599	0.001669
18	19	1	400	599	0.001669
19	25	6	400	550	0.011494
25	30	5	400	550	0.009579
				Σ =	0.068441

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \left(\frac{d_i}{v_{si}} \right)} = \text{438.6 m/s}$$

Boring Location: D11- CH

Depth (m)		Thickness d_i	$(V_{si})_{raw}$	$(V_{si})_{correctr}$	$d_i/(V_{si})_{correctec}$
From	To	(m)	(m/s)	(m/s)	
0	1	1	130	307	0.003257
1	2	1	170	340	0.002941
2	3	1	178	221	0.004525
3	4	1	144	170	0.005882
4	5	1	131	216	0.00463
5	6	1	142	244	0.004098
6	7	1	151	280	0.003571
7	8	1	162	209	0.004785
8	9	1	139	221	0.004525
9	10	1	144	352	0.002841
10	12	2	165	340	0.005882
12	13	1	175	314	0.003185
13	14	1	236	308	0.003247
14	15	1	218	505	0.00198
15	16	1	213	498	0.002008
16	17	1	350	367	0.002725
17	18	1	345	562	0.001779
18	19	1	255	625	0.0016
19	20	1	560	720	0.001389
20	25	5	650	720	0.006944
25	30	5	650	720	0.006944
				Σ =	0.07874

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n}\left(\frac{d_i}{v_{si}}\right)} = \quad 381.2 \text{ m/s}$$

Boring No.: D12- CH

Depth (m)		Thickness d_i (m)	$(V_{si})_{raw}$ (m/s)	$(V_{si})_{correctr}$ (m/s)	$d_i/(V_{si})_{correctec}$
From	To				
0	2	2	116	171	0.011696
2	4	2	123	188	0.010638
4	6	2	80	113	0.017699
6	7	1	158	191	0.005236
7	9	2	183	184	0.01087
9	10	1	258	281	0.003559
10	12	2	249	271	0.00738
12	13	1	320	348	0.002874
13	14	1	335	365	0.00274
14	15	1	261	388	0.002577
15	16	1	160	350	0.002857
16	17	1	160	382	0.002618
17	18	1	373	406	0.002463
18	19	1	440	479	0.002088
19	20	1	356	388	0.002577
20	21	1	147	346	0.00289
21	22	1	350	381	0.002625
22	23	1	303	398	0.002513
23	24	1	415	452	0.002212
24	25	1	408	445	0.002247
25	26	1	273	419	0.002387
26	30	4	**550**	**550**	0.007273
				Σ =	0.110017

$$\bar{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n}\left(\frac{d_i}{v_{si}}\right)} = 223 \text{ m/s}$$

2. Down-hole Profiles and Sample Calculations

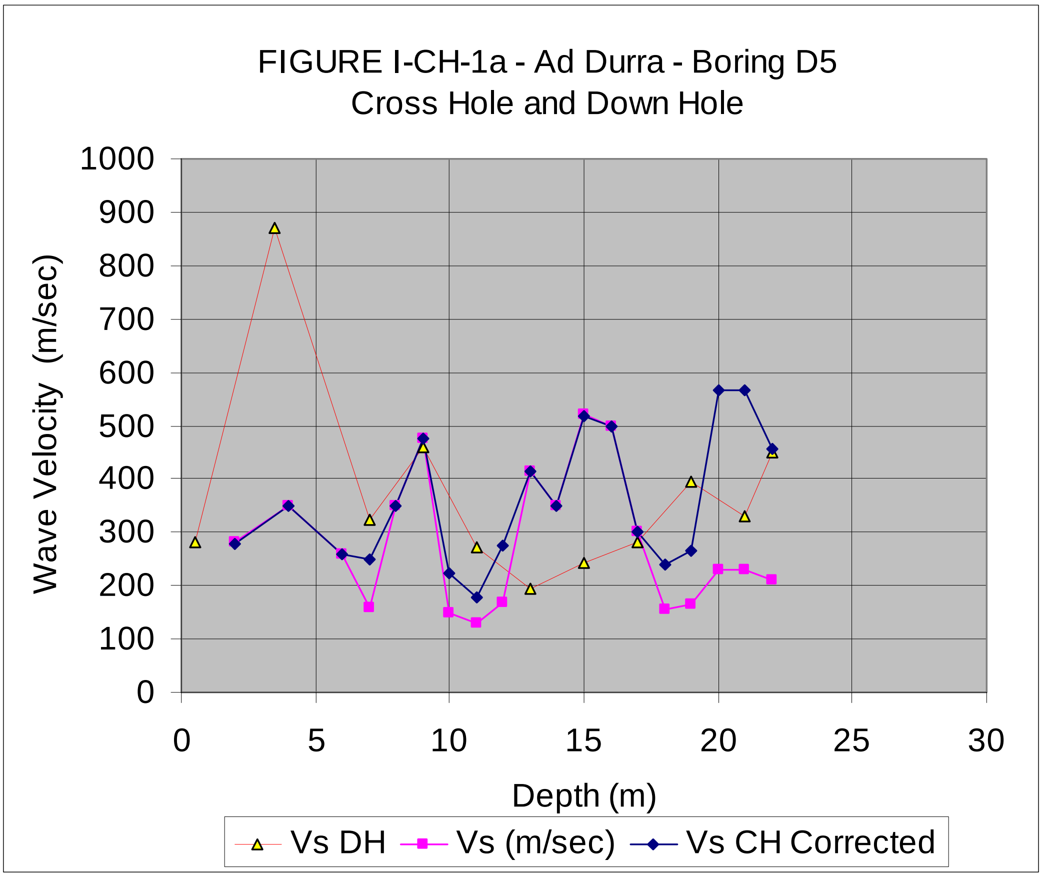


Figure C1: D5 Profiles

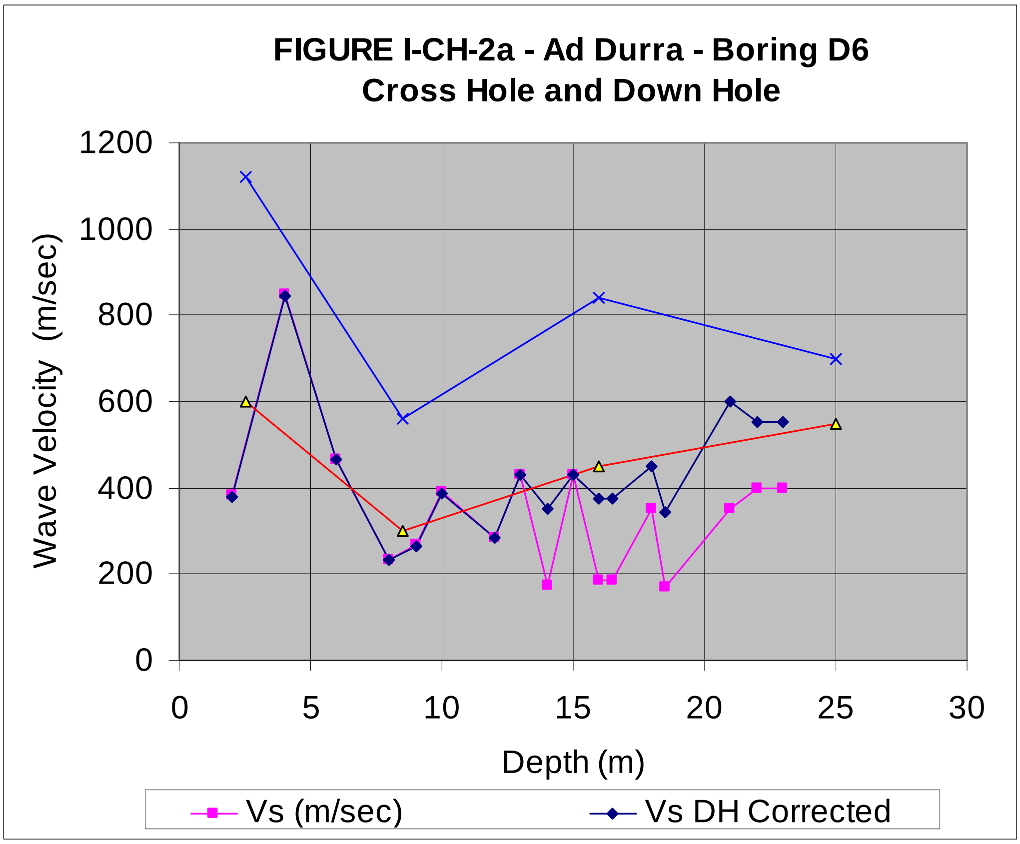


Figure C2: D56Profiles

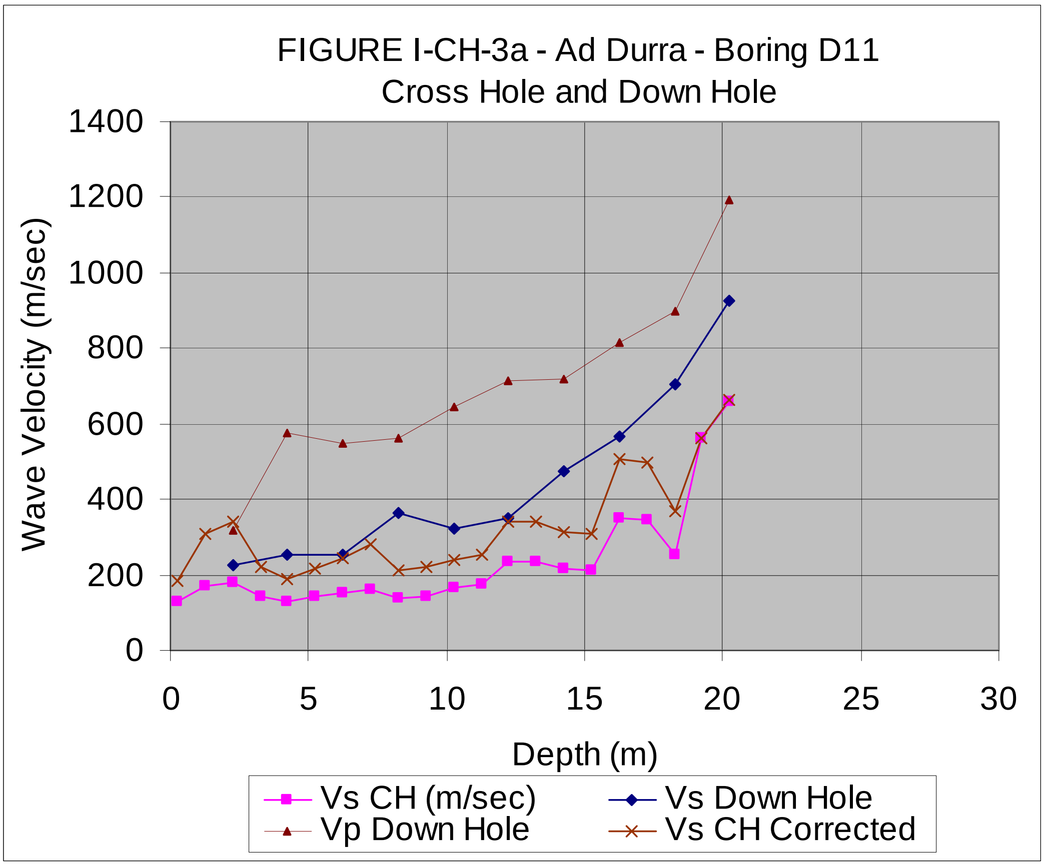


Figure C3: D11 Profiles

3. Sample Calculations Cross-hole Corrections

To illustrate the cross-hole correction method using equation (7.1), which is reproduced below, cross-hole Haq-5 calculations are presented here (note that this cross-hole profile was part of the research project, but was not in Al-Durrah site. In addition, this correction method is an empirical method and should not be used without a through understanding of the nature of the soil profile and the availability of supporting data from other tests):

$$V_{s-corr} = \frac{L_t - L_l}{\dfrac{L_t}{V_{s-avg}} - \dfrac{L_l}{V_{s-loose}}} \qquad (7.1)$$

Step 1. Calculate X_{nu}:

$$X_{nu} = \frac{2 - (\frac{V_p}{V_s})^2}{2(1 - (\frac{V_p}{V_s})^2)}$$

The calculations of X_{nu} are presented in Table (C1)

Table (C1)

Depth (m)	Wave Travel Time (ms)	Distance Of Wave (V_p) Travel m	V_s CH	V_p DH	$(\frac{V_p}{V_s})^2$	X_{mu}
1	1.62	1.12	212.00	690.00	10.59	0.45
3	11.50	4.37	211.00	380.00	3.24	0.28
5	20.50	5.02	120.00	245.00	4.17	0.34
7	18.75	7.01	122.60	374.00	9.31	0.44
9	15.62	9.01	154.70	577.00	13.91	0.46
11	18.62	10.99	140.70	590.00	17.58	0.47
13	19.50	13.01	134.30	667.00	24.67	0.48
15	23.00	15.00	122.10	652.00	28.51	0.48
17	25.00	17.00	129.10	680.00	27.74	0.48
19	24.25	18.99	132.50	783.00	34.92	0.49

Average= 0.45

Step 2. Use X_{nu} to calculate $V_{s\text{-}Loose}$ from $V_{s\text{-}ave}$, which measured from the cross-hole test:

$V_{s\text{-}Loose} = X_{mu} (V_{s\text{-}ave})$

$V_{s\text{-}ave}$ = Distance between source and receiver / time of travel

=2.95 / time of travel

The results are shown in Table (C2)

Table (C2)

Depth m	Time of travel ms	$V_{s\text{-}ave}$ m/s	$V_{s\text{-}Loose}$ m/s	(V_s)corrected m/s
1	17.37	169.83	76.42	212.66
2	21.50	137.21	61.74	171.81
3	17.50	168.57	75.86	211.08
4	26.25	112.38	50.57	140.72
5	30.62	96.34	43.35	120.64
6	28.50	103.51	46.58	129.61
7	30.12	97.94	44.07	122.64
8	29.00	101.72	45.78	127.38
9	23.87	123.59	55.61	154.75
10	22.62	130.42	58.69	163.30
11	26.25	112.38	50.57	140.72
12	30.75	95.93	43.17	120.13
13	27.50	107.27	48.27	134.32
14	29.37	100.44	45.20	125.77
15	30.25	97.52	43.88	122.11
16	34.00	86.76	39.04	108.64
17	28.62	103.07	46.38	129.07
18	28.62	103.07	46.38	129.07
19	27.87	105.85	47.63	132.54
19.5	27.87	105.85	47.63	132.54

Appendix D: CXW Calculations

Note:
In addition to determining the shear wave velocity for the soil profile, the same information was used for each profile's

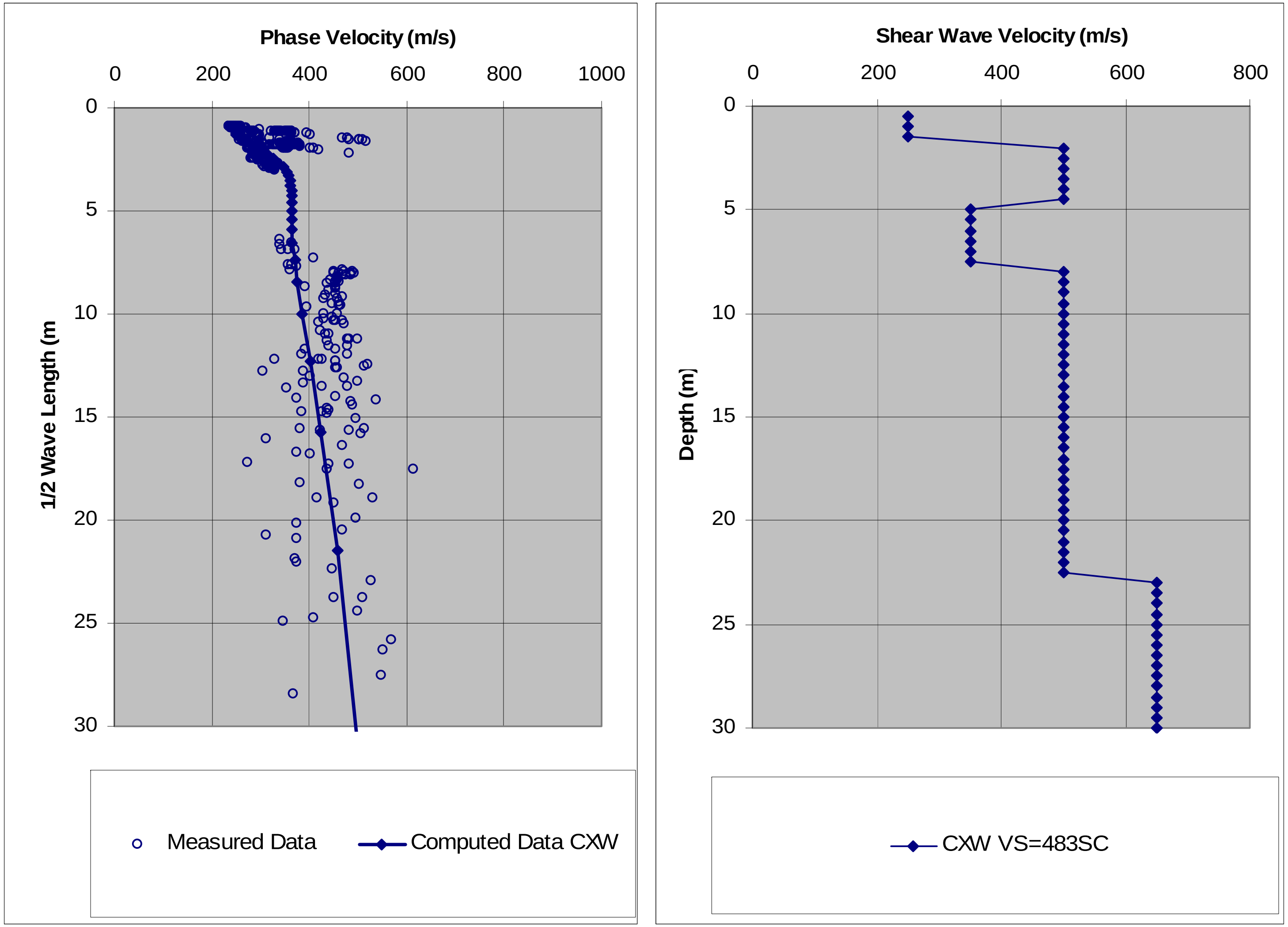
Dynamic site response analysis (ProShake). $\sum di$ =30 m for all CXW profiles

Boring No.: D1- CXW(A10)

Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al- Durah	A10	D1	29	20.393	34	56.95	19	Level 1

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
FRom	To			
0	0	0	0	0
2	2	2	2	2
4	4	4	4	4
7	7	7	7	7
10	10	10	10	10
15	15	15	15	15
20	20	20	20	20
23	23	23	23	23
25	25	25	25	25
			$\sum =$ 0.063674	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 471.15 \qquad m/s$$


Phase Velocity (m/s)
0
200
400
600
800
1000
1/2 Wave Length (m
0
5
10
15
20
25
30
Measured Data
Computed Data CXW
Shear Wave Velocity (m/s)
0
200
400
600
800
Depth (m)
0
5
10
15
20
25
30
CXW VS=483SC

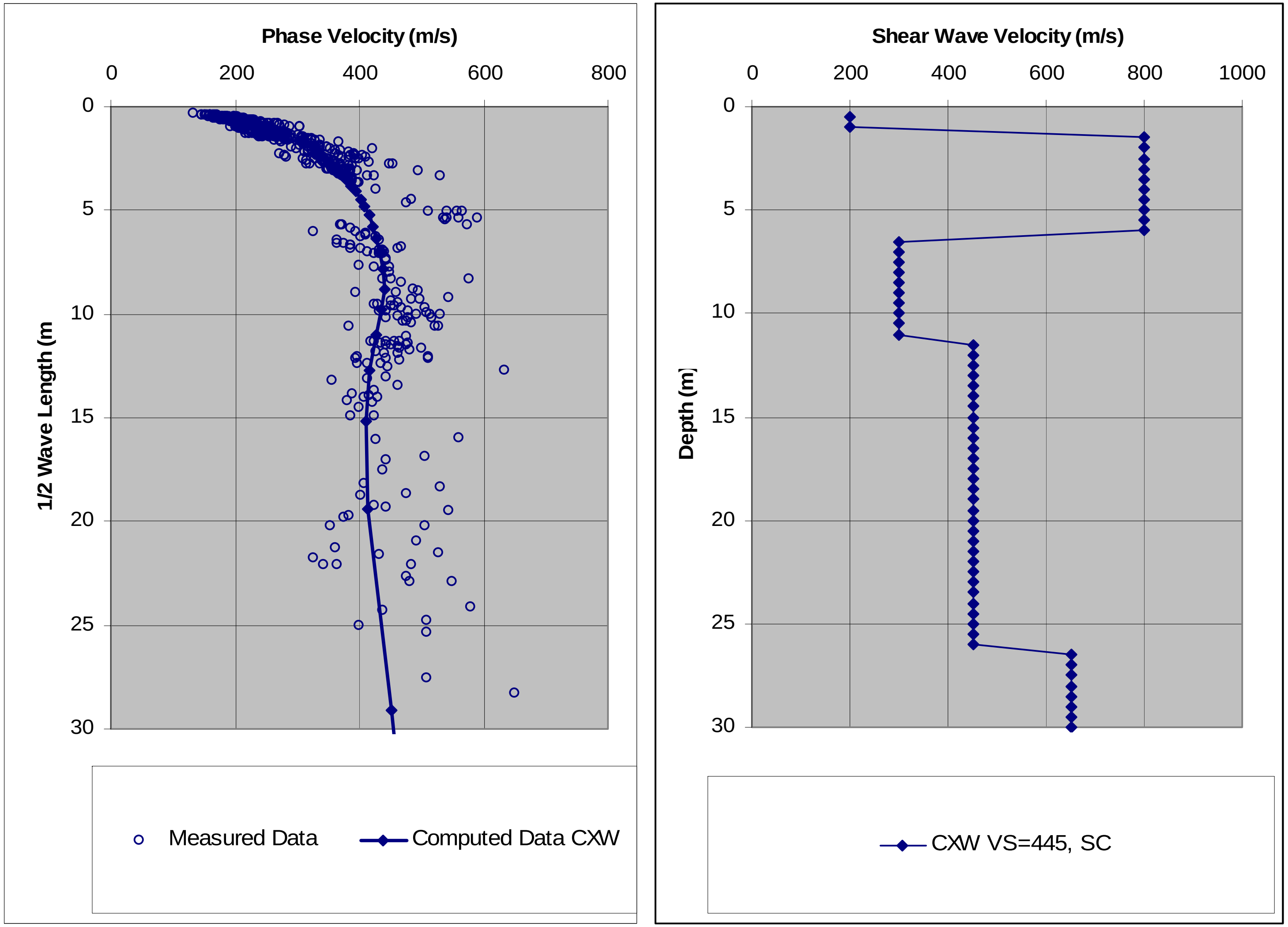
D1CXW

Boring: D2- CXW(A6)

Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al-Durrah	A6	D2	29	20.47	34	57.13		Fill over level 2

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	200	0.005
1	6	5	800	0.00625
6	11.5	5.5	300	0.018333
11.5	15	3.5	450	0.007778
15	20	5	450	0.011111
20	26.5	6.5	450	0.014444
26.5	30	3.5	650	0.005385
			$\sum = 0.06830$	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 439.24 \qquad m/s$$


Phase Velocity (m/s)
0
200
400
600
800
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW
Shear Wave Velocity (m/s)
0
200
400
600
800
1000
0
5
10
15
20
25
30
Depth (m)
CXW VS=445, SC

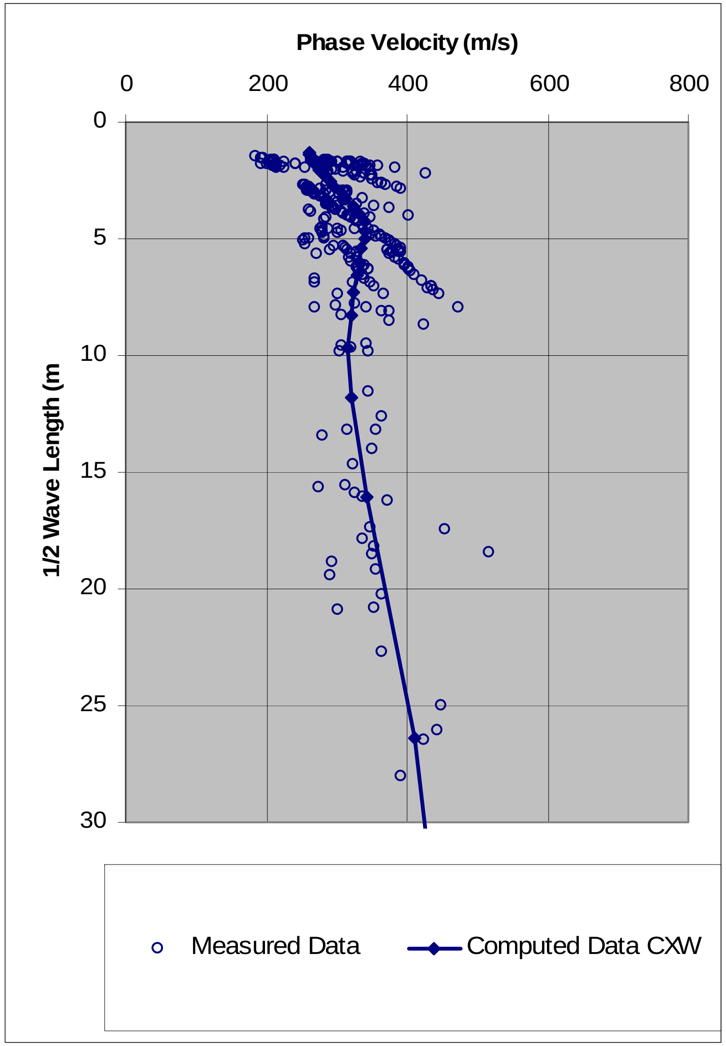
D2CXW

Boring No.: D3- CXW(A14)

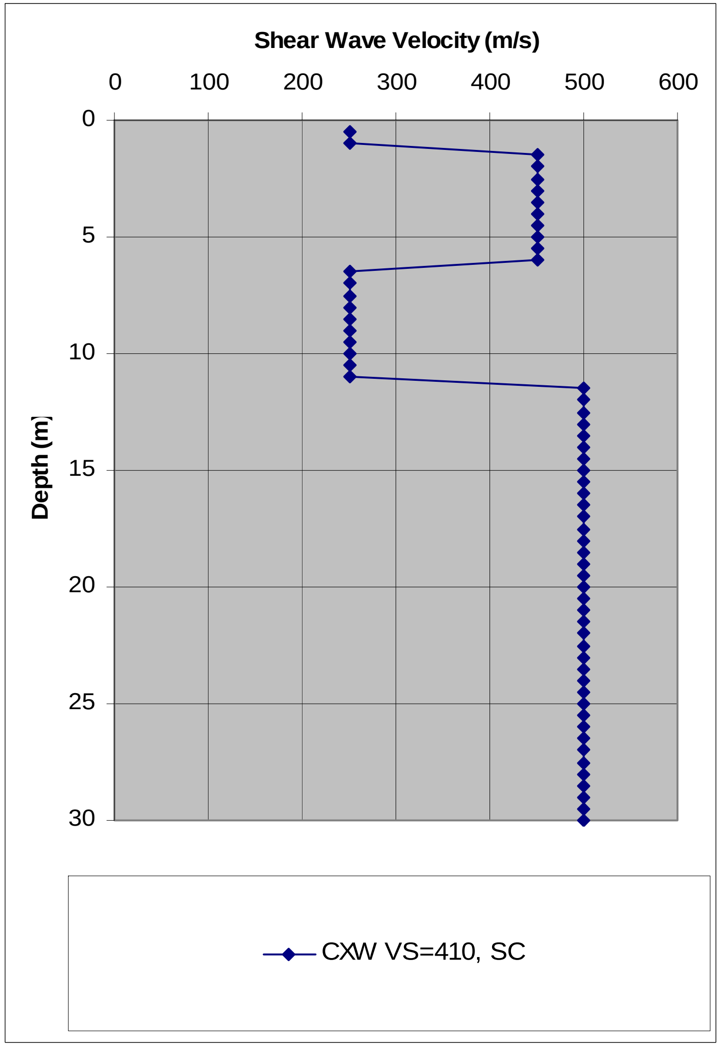
Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al-Durrah	A14	D3	29	20.75	34	57.33		Cut on Level 2

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	250	0.004
1	6	5	450	0.011111
6	11	5	250	0.02
11	15	4	500	0.008
15	20	5	500	0.01
20	25	5	500	0.01
25	30	5	500	0.01
			$\sum = 0.07311$	

$$(\overline{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 410.33 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
1/2 Wave Length (m
0
5
10
15
20
25
30
Measured Data
Computed Data CXW



Shear Wave Velocity (m/s)
0
100
200
300
400
500
600
Depth (m)
0
5
10
15
20
25
30
CXW VS=410, SC

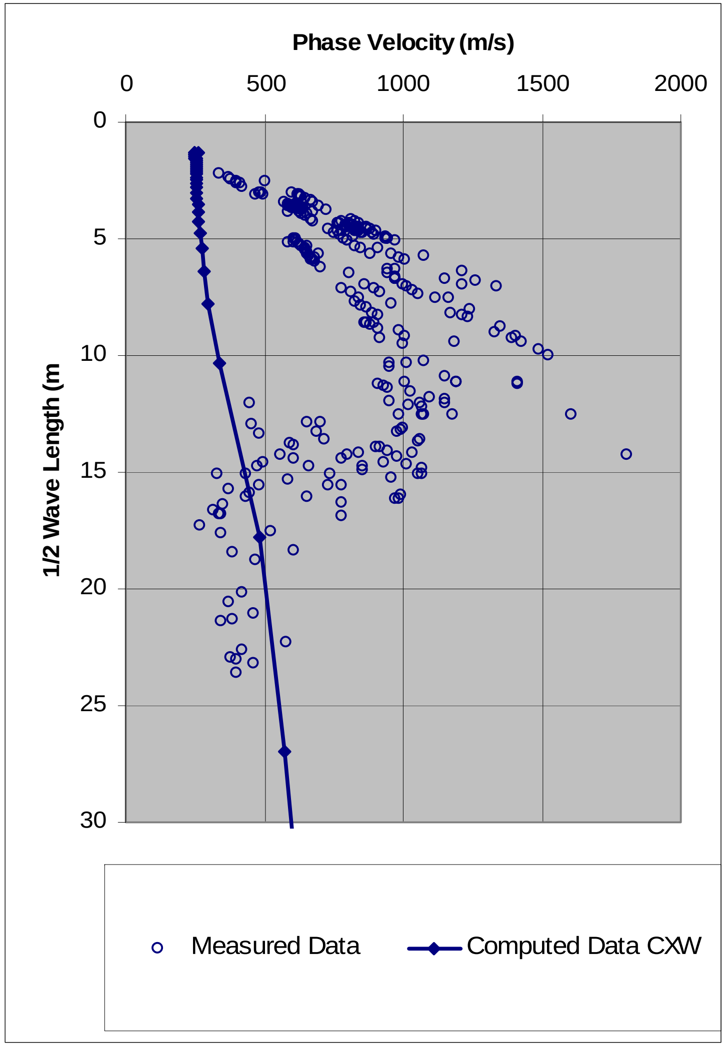
D3CXW

Boring No.: D4- CXW(A11)

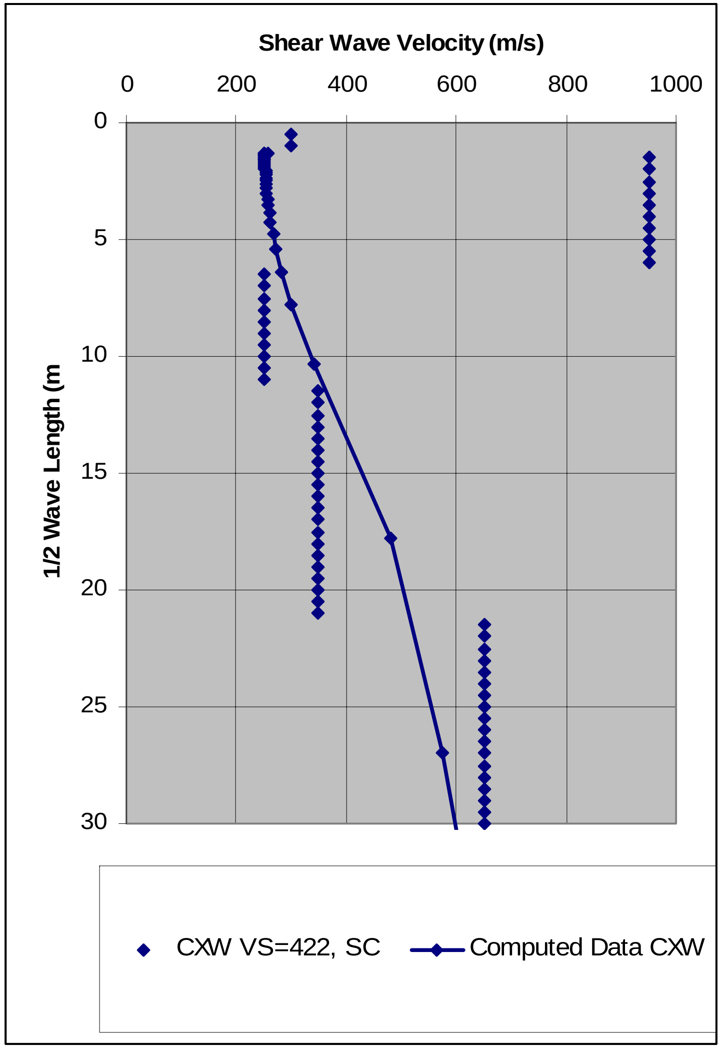
Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al-Durrah	A11	D4	29	21	34	57.4		Level 1

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	300	0.003333
1	6	5	950	0.005263
6	11	5	250	0.02
11	15	4	350	0.011429
15	21	6	350	0.017143
21	25	4	650	0.006154
25	30	5	650	0.007692
			$\sum = 0.071014$	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 422.45 \qquad m/s$$



Phase Velocity (m/s)
0
500
1000
1500
2000
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW



Shear Wave Velocity (m/s)
0
200
400
600
800
1000
0
5
10
15
20
25
30
1/2 Wave Length (m
CXW VS=422, SC
Computed Data CXW

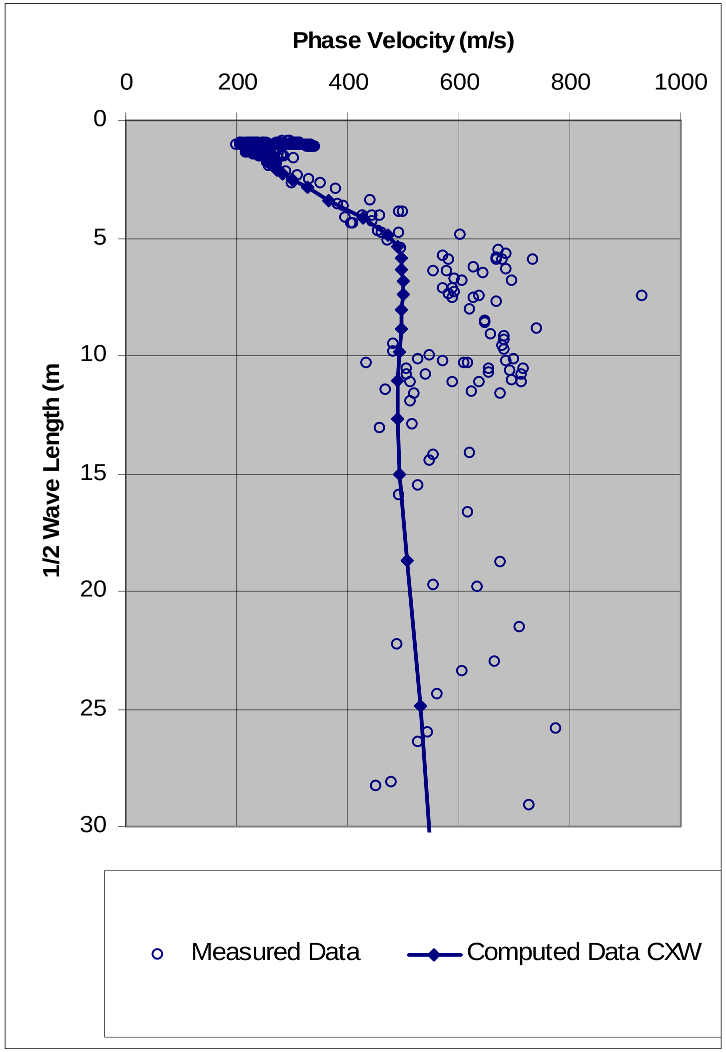
D4CXW

Boring D5A-CXW (A3a)

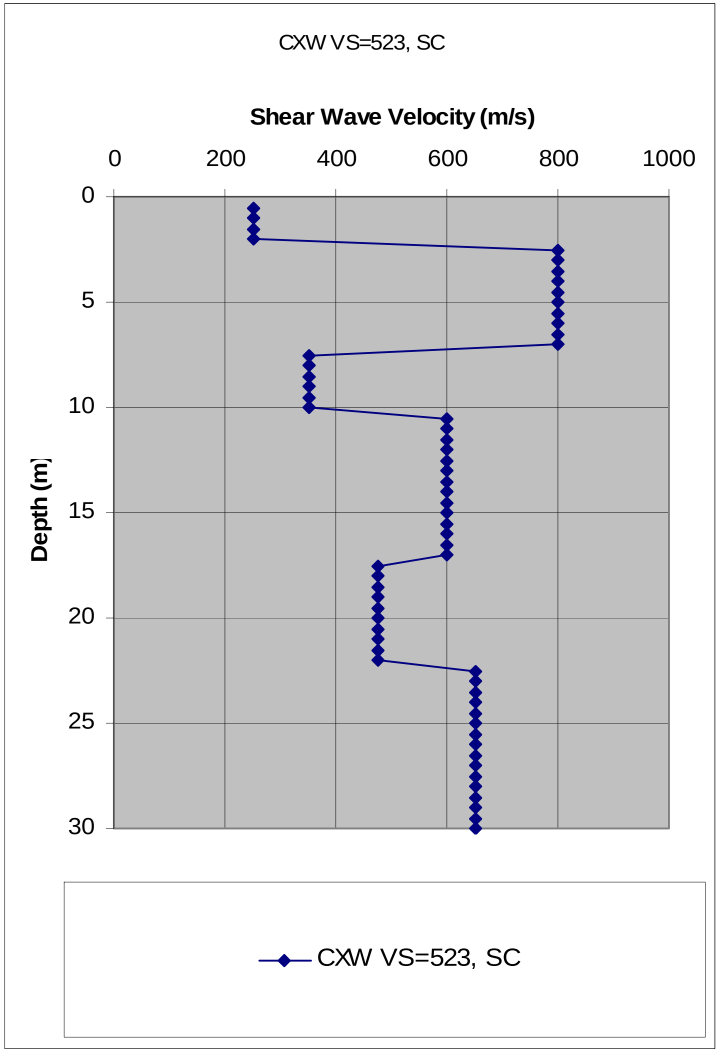
Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al-Durrah	A3a	D5	29	20.567	34	57.0264	16	Level 1

Depth (m) From	Depth (m) To	Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
0	2	2	250	0.008
2	5	3	800	0.00375
5	7	2	800	0.0025
7	10	3	350	0.008571
10	15	5	600	0.008333
15	17	2	600	0.003333
17	20	3	475	0.006316
20	22	2	475	0.004211
22	25	3	650	0.004615
25	30	5	650	0.007692
			$\sum = 0.05732$	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 523.36 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
1000
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW



CXW VS=523, SC
Shear Wave Velocity (m/s)
0
200
400
600
800
1000
0
5
10
15
20
25
30
Depth (m)
CXW VS=523, SC

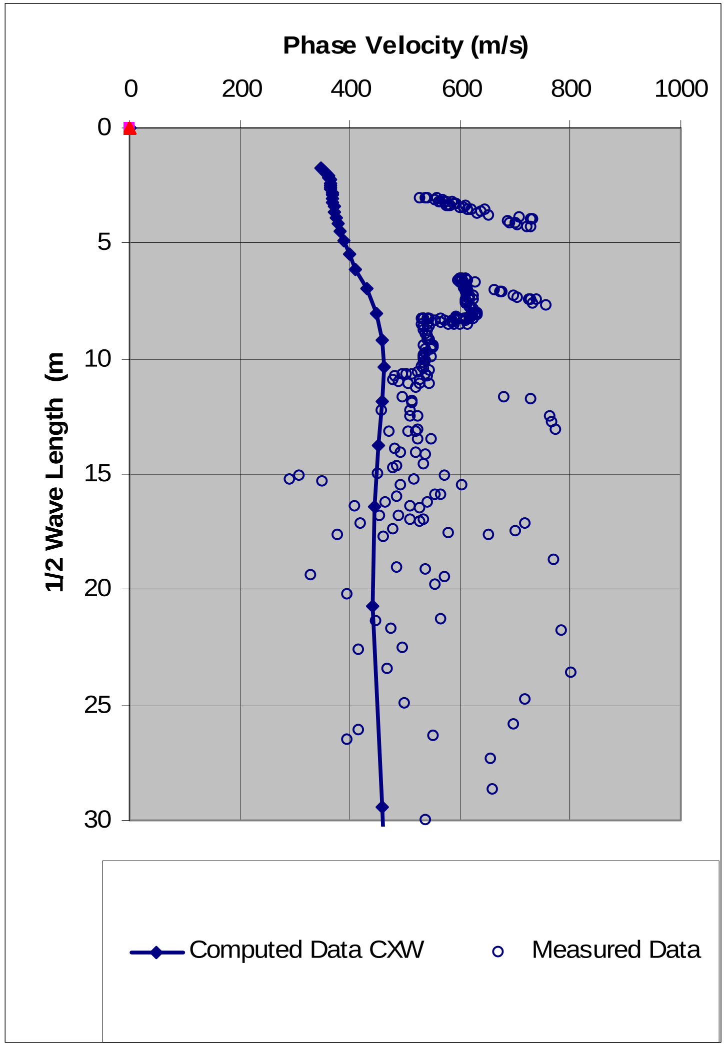
D5ACXW

Boring D5- CXW(A3)

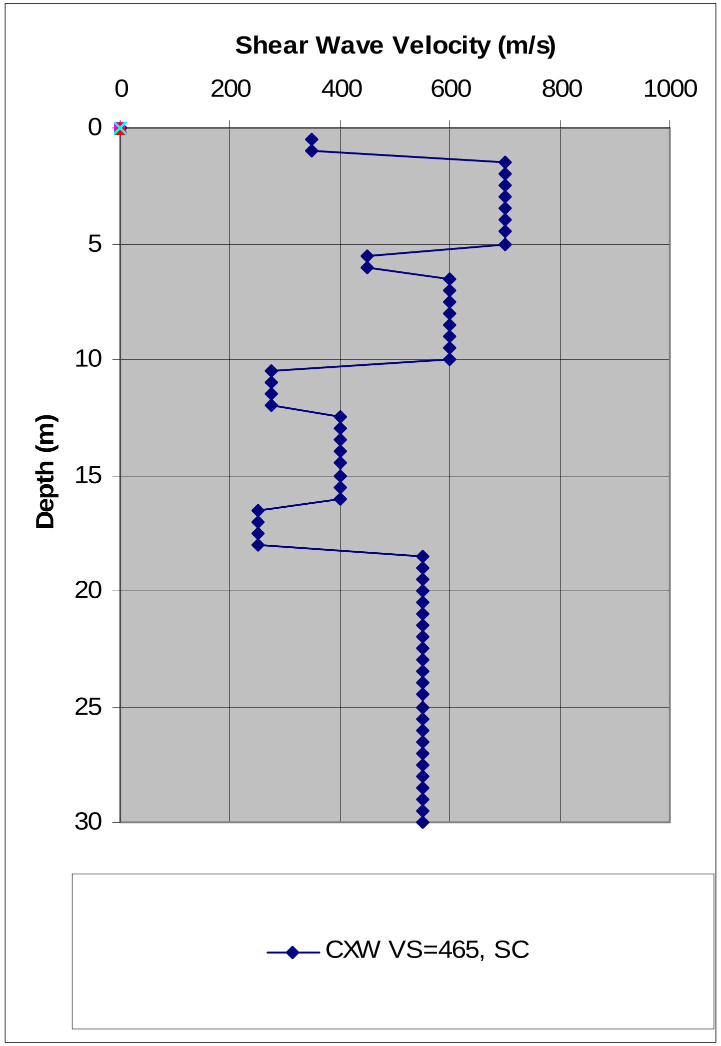
Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al-Durrah	A3b	D5	29	20.567	34	57.0264	16	Level 1

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	350	0.002857
1	5	4	700	0.005714
5	6	1	450	0.002222
6	10	4	600	0.006667
10	12	2	275	0.007273
12	16	4	400	0.01
16	18	2	250	0.008
18	20	2	550	0.003636
20	25	5	550	0.009091
25	30	5	550	0.009091
			$\sum = 0.064551$	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 464.75 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
1000
1/2 Wave Length (m
0
5
10
15
20
25
30
Computed Data CXW
Measured Data



Shear Wave Velocity (m/s)
0
200
400
600
800
1000
Depth (m)
0
5
10
15
20
25
30
CXW VS=465, SC

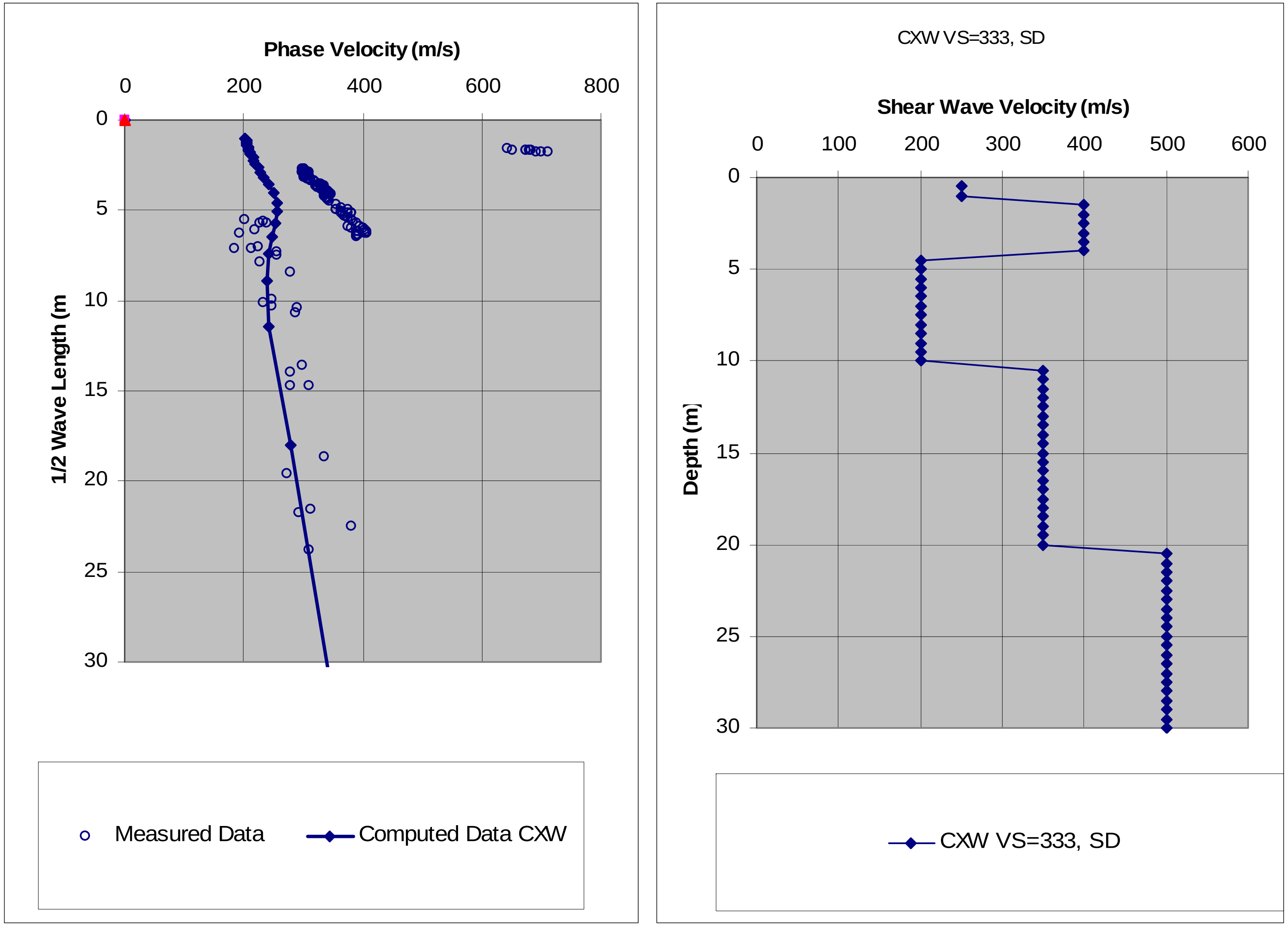
D5CXW

Boring No.: D6-CXW (A5)

Area	CXW Site	Boring	Cross Hole	K2	North		East
Ad Durah	A5	D6	CH	Site 3	29	20.737	34

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	250	0.004
1	4	3	400	0.0075
4	10	6	200	0.03
10	15	5	350	0.014286
15	20	5	350	0.014286
20	25	5	500	0.01
25	30	5	500	0.01
			$\sum = 0.090071$	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 333.07 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW
CXW VS=333, SD
Shear Wave Velocity (m/s)
0
100
200
300
400
500
600
Depth (m)
CXW VS=333, SD

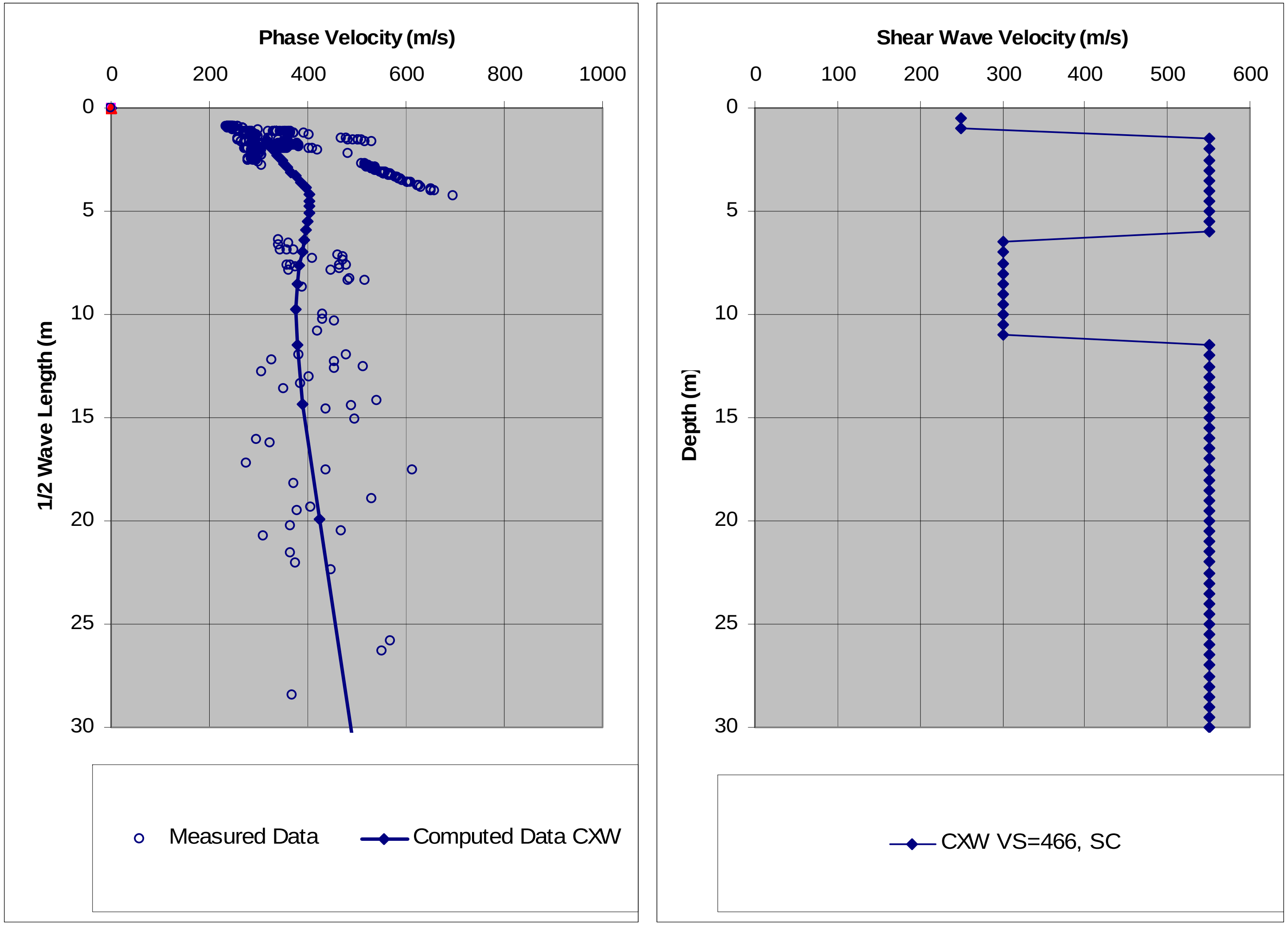
D6CXW

Boring No.: D7- CXW (A13)

Area	CXW Site	Boring	North	East	MORPHOLOGY
Ad-Durrah	A13	D7	20.9	34.57.3	Fill over Level 2

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	250	0.004
1	6	5	550	0.009091
6	11	5	300	0.016667
11	15	4	550	0.007273
15	20	5	550	0.009091
20	25	5	550	0.009091
25	30	5	550	0.009091
				0.064303
			$\sum = 0.064303$	

$$(\overline{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 466.54 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
1000
1/2 Wave Length (m
0
5
10
15
20
25
30
Measured Data
Computed Data CXW
Shear Wave Velocity (m/s)
0
100
200
300
400
500
600
Depth (m)
CXW VS=466, SC

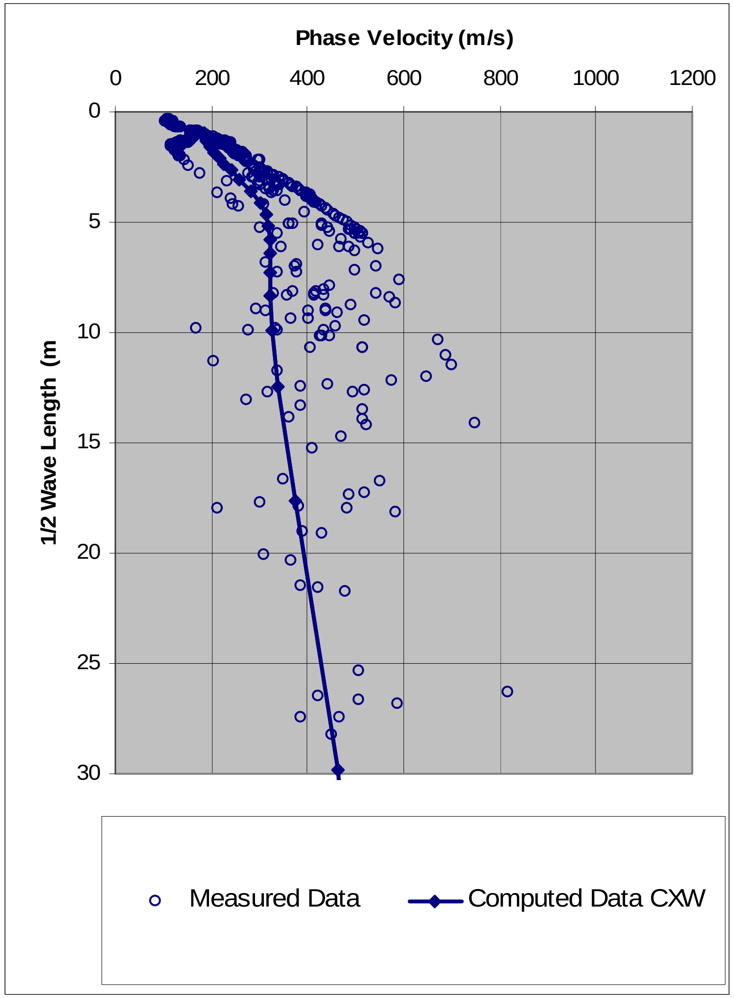
D7CXW

Boring No.: D8- CXW (A12)

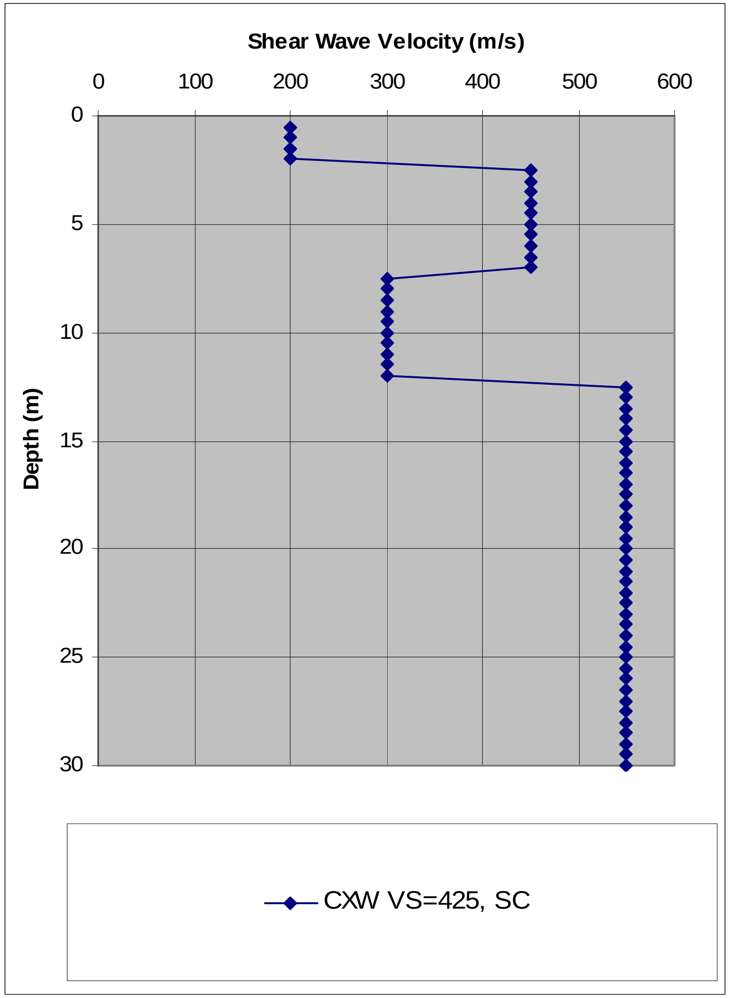
Area	CXW Site	Boring	North		East		MORPHOLOGY
Ad Durah	A12	D8	29	20.79	34	57.25	Fill over Level 2

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	2	2	200	0.01
2	5	3	450	0.006667
5	7.5	2.5	450	0.005556
7.5	10	2.5	300	0.008333
10	12.5	2.5	300	0.008333
12.5	15	2.5	550	0.004545
15	20	5	550	0.009091
20	25	5	550	0.009091
25	30	5	550	0.009091
			$\sum =$ 0.070707	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 424.29 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
1000
1200
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW



Shear Wave Velocity (m/s)
0
100
200
300
400
500
600
0
5
10
15
20
25
30
Depth (m)
CXW VS=425, SC

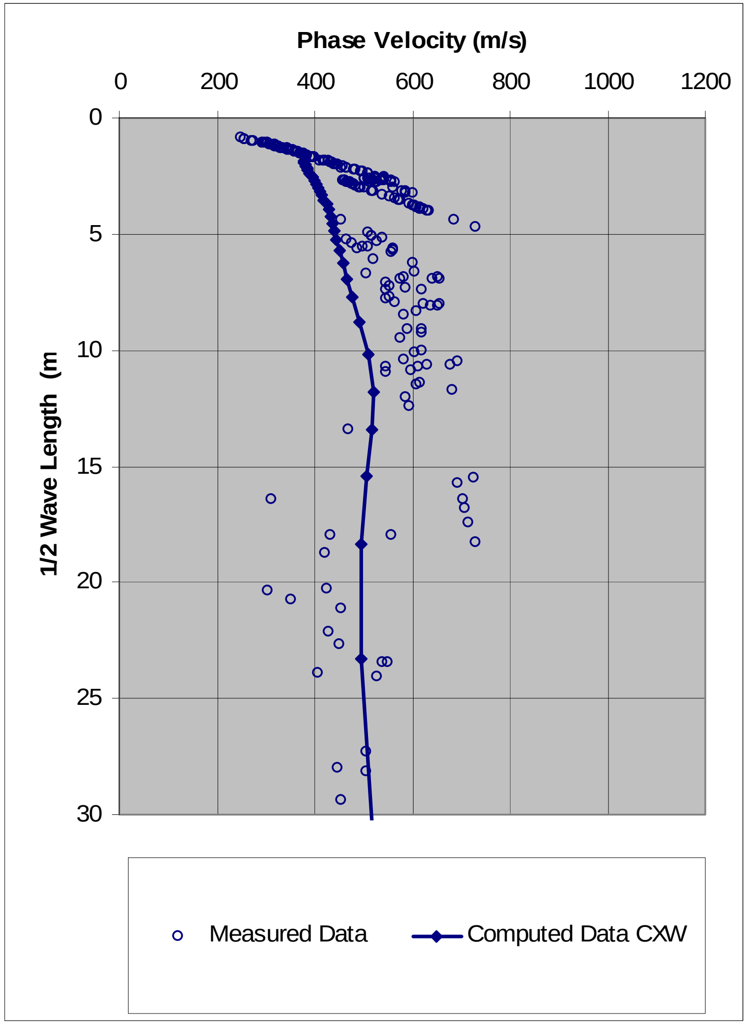
D8CXW

Boring No.: D9- CXW (A4)

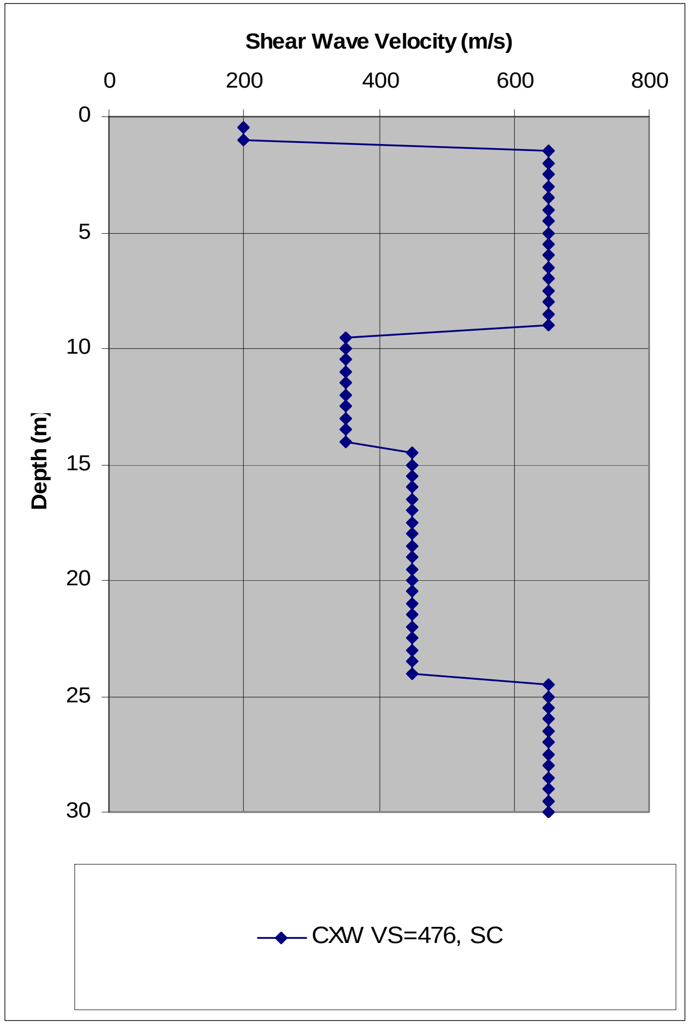
Area	CXW Site	Boring	North		East		MORPHOLOGY
Al-Durrah	A4	D9	29	20.66	34	57.27	Level 2

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	1	1	200	0.005
1	5	4	650	0.006154
5	9	4	650	0.006154
9	14	5	350	0.014286
14	20	6	450	0.013333
20	24	4	450	0.008889
24	30	6	650	0.009231
				0.063046
			$\sum = 0.063046$	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 475.84 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
1000
1200
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW



Shear Wave Velocity (m/s)
0
200
400
600
800
0
5
10
15
20
25
30
Depth (m)
CXW VS=476, SC

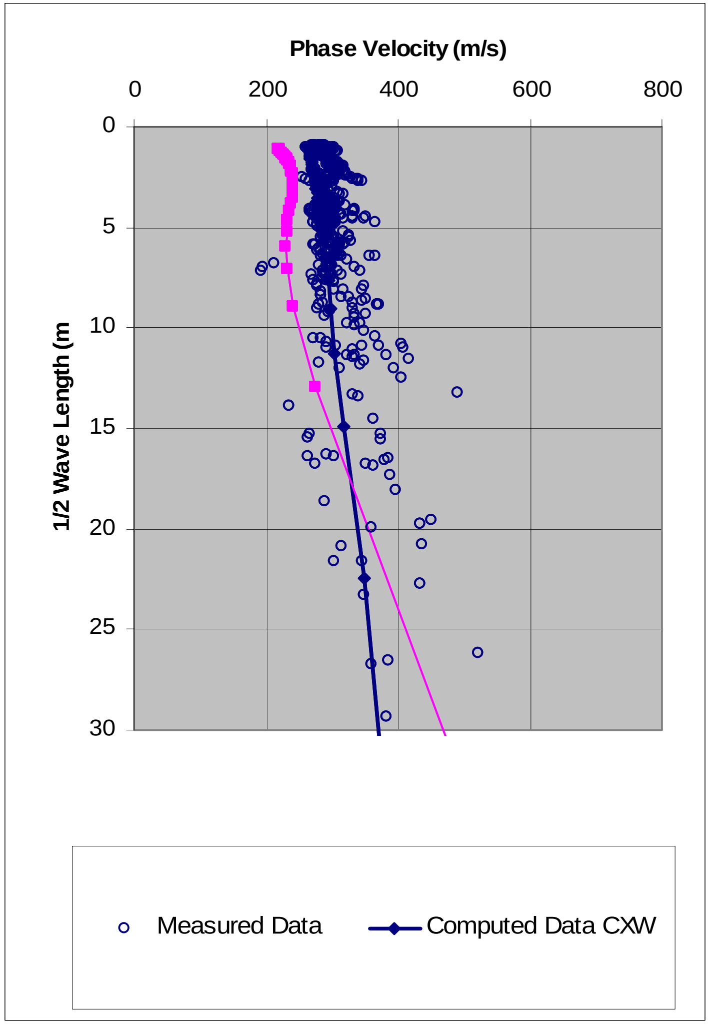
D9CXW

Boring No.: D11- CXW (A1)

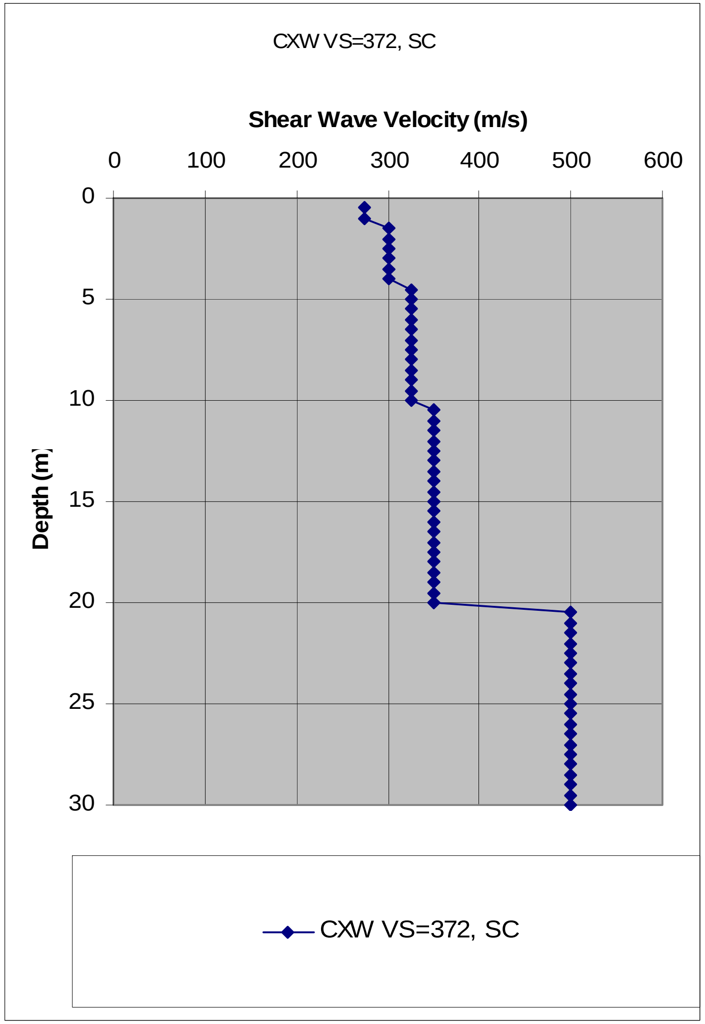
Area	CXW Site	Boring	North		East		Elev.	MORPHOLOGY
Al-Durrah	A1	D11	29	20.52	34	57.061	18	Fill over level 1

Depth (m) From	To	Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
0	1	1	275	0.003636
1	4	3	300	0.01
4	10	6	325	0.018462
10	15	5	350	0.014286
15	20	5	350	0.014286
20	25	5	500	0.01
25	30	5	500	0.01
			$\sum =$ 0.080067	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 371.89 \qquad m/s$$



Phase Velocity (m/s)
0
200
400
600
800
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW



CXW VS=372, SC
Shear Wave Velocity (m/s)
0
100
200
300
400
500
600
0
5
10
15
20
25
30
Depth (m)
CXW VS=372, SC

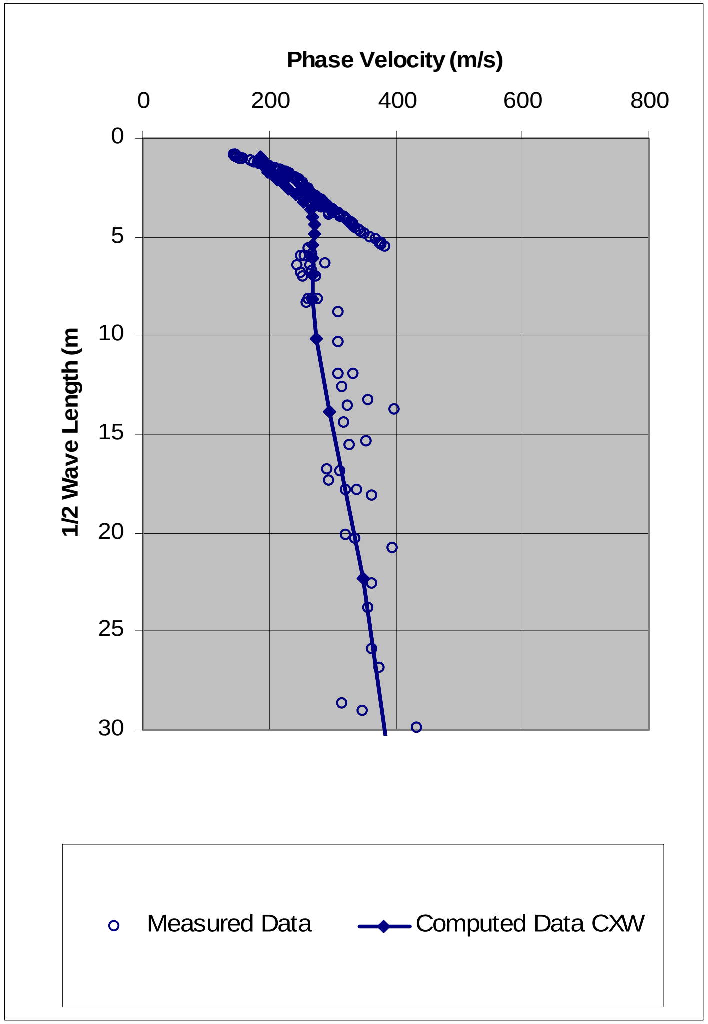
D11CXW

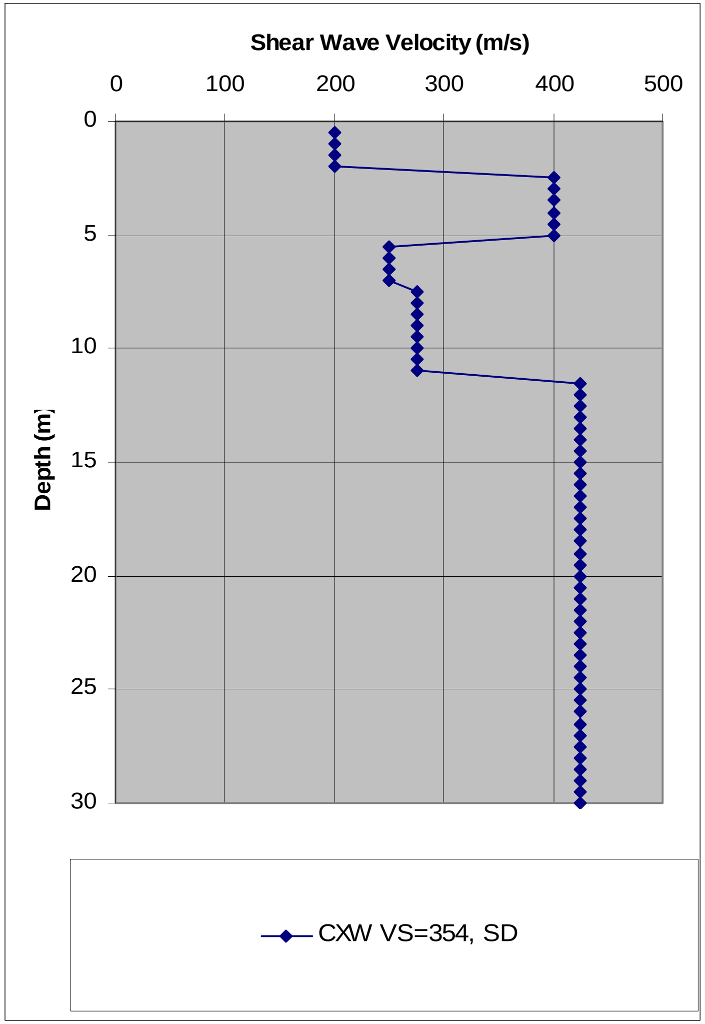
Boring No.: D12- CXW (A7)

Area	CXW Site	Boring	North		East		MORPHOLOGY
Al-Durrah	A7	D12	29	20.55	34	57.27	Cut on Level 2

Depth (m)		Layer Thickness (d_i) (m)	SWV (V_{si}) m/s	$\frac{d_i}{v_{si}}$
From	To			
0	2	2	200	0.01
2	5	3	400	0.0075
5	7	2	250	0.008
7	11	4	275	0.014545
11	15	4	425	0.009412
15	20	5	425	0.011765
20	25	5	425	0.011765
25	30	5	425	0.011765
			$\sum =$ 0.084751	

$$(\bar{v}_s)_{CXW} = \frac{\sum d_i}{\sum \frac{d_i}{v_{si}}} = 354.00 \qquad m/s$$


Phase Velocity (m/s)
0
200
400
600
800
0
5
10
15
20
25
30
1/2 Wave Length (m
Measured Data
Computed Data CXW


Shear Wave Velocity (m/s)
0
100
200
300
400
500
0
5
10
15
20
25
30
Depth (m)
CXW VS=354, SD

D12CXW

Appendix E: Sample Vertical Electric Sounding (VES) Field Data

Appendix E presents sample (VES) depth plots and calculations that were performed at the East-west seismic array. Figure (E1) shows the locations of the stations as was determined by the advanced global positioning system (GPS) that was presented in Chapter 6.

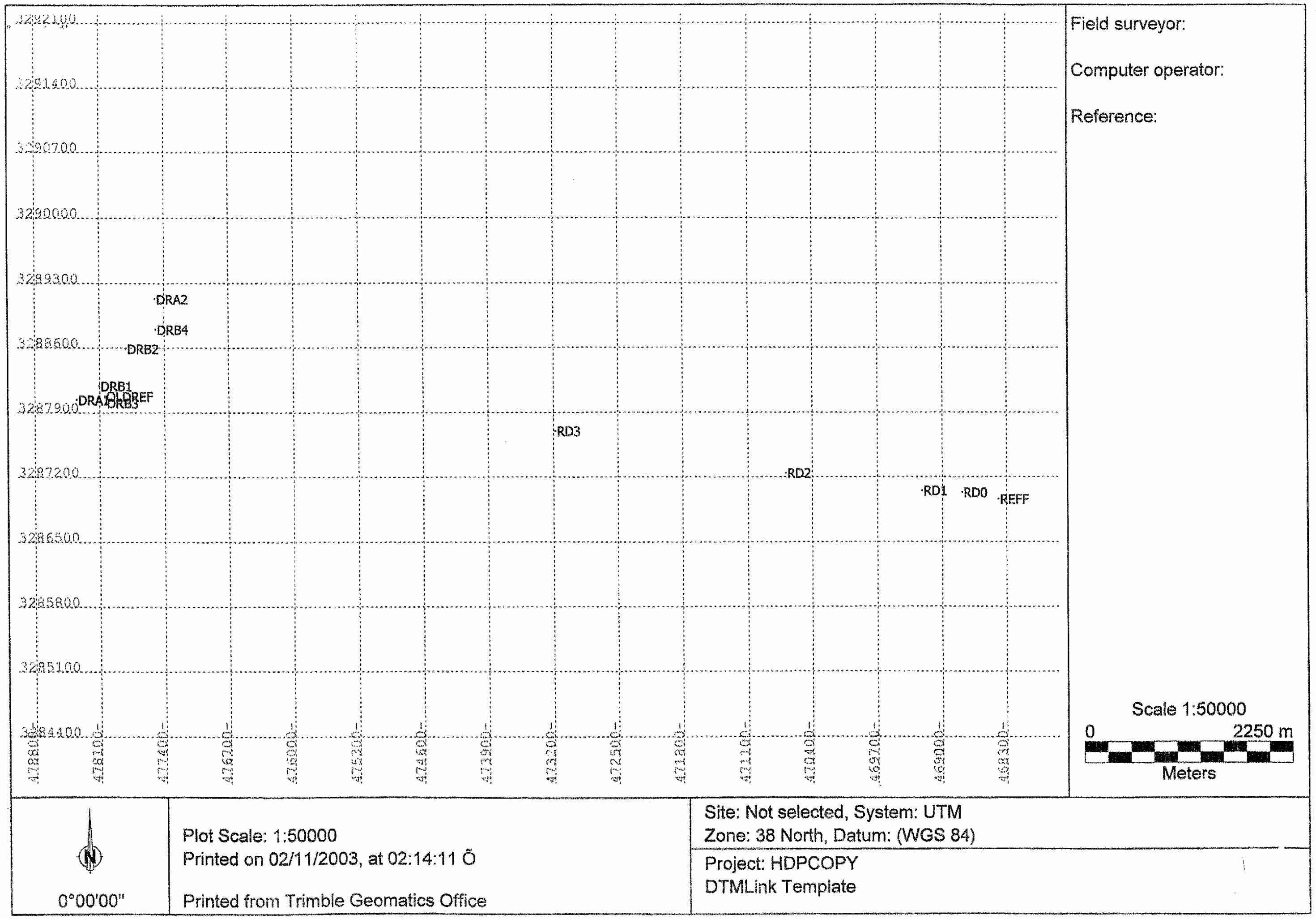


Figure E1: Al-Durrah and the East-west seismic array stations locations

Point listing

Name	Northing	Easting	Elevation	Feature Code	lat	log	dis.from.REF
REFF	3286958.816	468386.520-	530.841		29°20'18.89455"N	35°03'03.96863"E	----
RD0	3287030.486	468782.485-	471.459		29°20'20.09868"N	35°02'49.28194"E	397.943M
RD1	3287052.071	469220.653-	442.132		29°20'19.58339"N	29°20'19.58339"N	830.031M
RD2	3287240.102	470688.999-	347.272		29°20'21.55489"N	29°20'21.55489"N	2293.858M
RD3	3287698.672	473179.801-	188.976		29°20'29.35152"N	35°00'06.58745"E	4796.084M

DATA SET: DURAH1

CLIENT: kacst
LOCATION: Haqul_Durah
COUNTY: Saudi Arabia
PROJECT: IAGR
ELEVATION: 0.00
SOUNDING COORDINATES: X: 0.0000 Y: 0.0000

DATE: 27/10/2003
SOUNDING: 1
AZIMUTH: E-W
EQUIPMENT: Syscal

Schlumberger Configuration

FITTING ERROR: 10.755 PERCENT

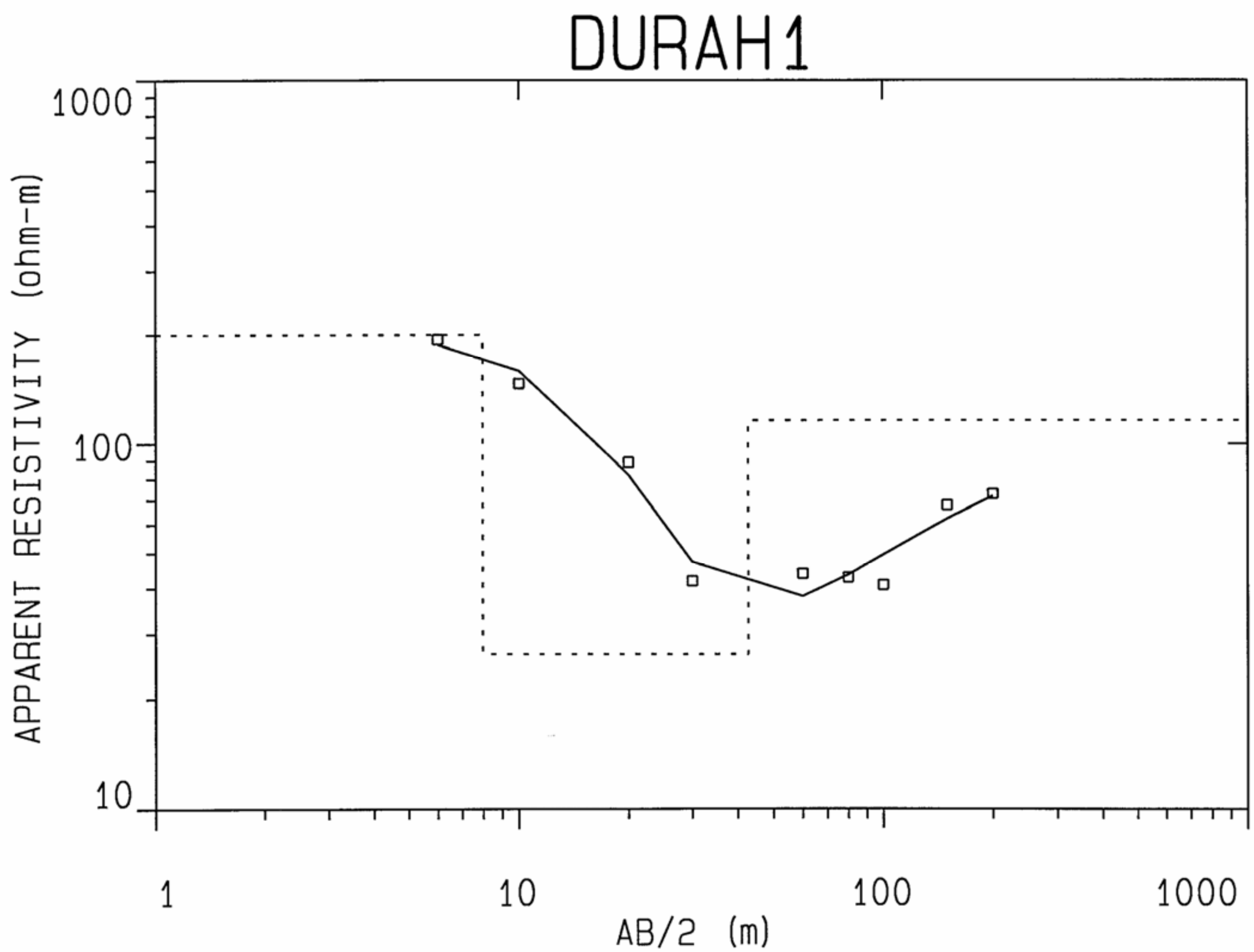
L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES (Ohm-m^2)
			0.0		
1	199.5	7.95	-7.95	0.0398	1587.8
2	26.40	34.78	-42.74	1.31	918.5
3	115.9				

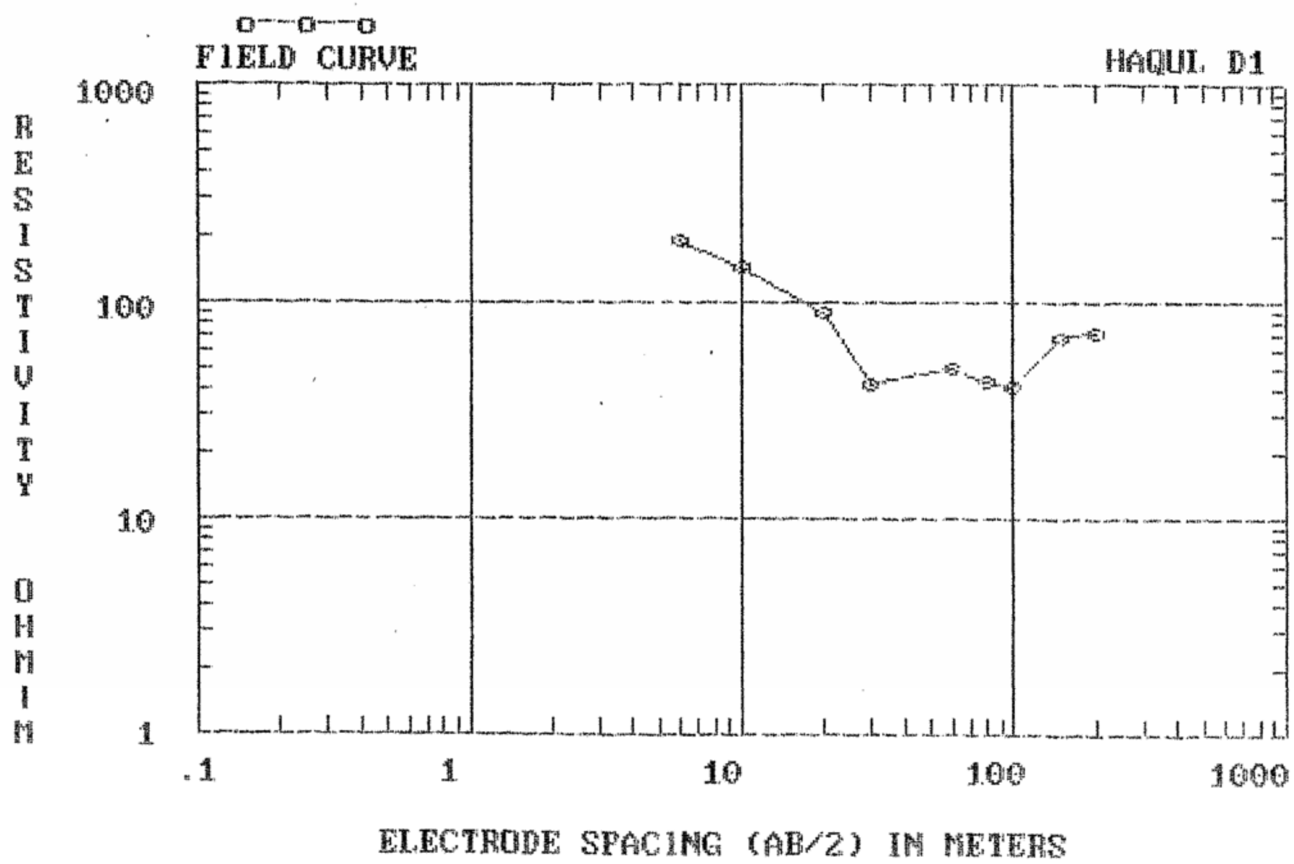
ALL PARAMETERS ARE FREE

No.	SPACING (m)	RHO-A (ohm-m) DATA	SYNTHETIC	DIFFERENCE (percent)
1	6.00	194.0	187.5	3.35
2	10.00	147.0	159.1	-8.29
3	20.00	89.00	82.31	7.51
4	30.00	42.00	47.45	-12.97
5	60.00	44.00	38.11	13.38
6	80.00	43.00	43.72	-1.67
7	100.0	41.00	49.67	-21.15
8	150.0	68.00	62.37	8.27
9	200.0	73.00	71.91	1.48

PARAMETER RESOLUTION MATRIX:
"F" INDICATES FIXED PARAMETER

	P 1	P 2	P 3	T 1	T 2
P 1	1.00				
P 2	0.00	0.97			
P 3	0.00	-0.01	0.98		
T 1	0.00	0.01	0.00	0.99	
T 2	0.00	-0.04	-0.02	0.01	0.95


DURAH1
1000
100
10
APPARENT RESISTIVITY (ohm-m)
1
10
100
1000
AB/2 (m)



HAQUL D1 (FIELD DATA)

AB/2	App. Res.	AB/2	App. Res.
6.00	194.00	60.00	50.00
10.00	147.00	80.00	43.00
20.00	89.00	100.00	41.00
30.00	42.00	150.00	68.00
		200.00	72.00

DATA SET: DURAH2

CLIENT:	kacst	DATE:	27/10/2003
LOCATION:	Haqul_Durah	SOUNDING:	2
COUNTY:	Saudi Arabia	AZIMUTH:	E-W
PROJECT:	IAGR	EQUIPMENT:	Syscal

ELEVATION: 0.00
SOUNDING COORDINATES: X: 0.0000 Y: 0.0000

Schlumberger Configuration

FITTING ERROR: 6.742 PERCENT

L #	RESISTIVITY (ohm-m)	THICKNESS (meters)	ELEVATION (meters)	LONG. COND. (Siemens)	TRANS. RES (Ohm-m^2)
			0.0		
1	578.8	1.64	-1.64	0.00285	954.5
2	106.7	29.28	-30.93	0.274	3125.0
3	32.52	63.84	-94.77	1.96	2076.6
4	130.5				

ALL PARAMETERS ARE FREE

No.	SPACING (m)	RHO-A (ohm-m) DATA	SYNTHETIC	DIFFERENCE (percent)
1	2.00	480.0	479.9	0.0125
2	6.00	172.0	172.2	-0.165
3	10.00	120.0	119.7	0.233
4	10.00	120.0	119.7	0.233
5	30.00	102.0	98.38	3.54
6	60.00	66.00	73.01	-10.63
7	80.00	62.00	61.11	1.42
8	100.0	59.00	54.88	6.97
9	150.0	56.00	53.93	3.68
10	200.0	52.00	60.25	-15.88
11	300.0	82.00	73.84	9.94
12	400.0	84.00	84.35	-0.424

PARAMETER RESOLUTION MATRIX:
"F" INDICATES FIXED PARAMETER

P 1	0.96		
P 2	-0.01	0.98	
P 3	0.00	-0.01	0.66

0.00	0.01	0.01	0.85			
0.02	0.02	0.01	-0.01	0.96		
0.01	0.02	0.16	-0.04	-0.02	0.87	
0.00	-0.01	-0.39	-0.13	0.01	0.15	0.38
P 1	P 2	P 3	P 4	T 1	T 2	T 3

Appendix F: Microtremors Calculations

The step-by step procedure for generating microtremors mean ratio spectra from raw, 3-components microtremors record was presented in Chapter 3, and is reproduced here for convenience [8]:

5. Select portion of the record (for all three components) to be analyzed.
6. Segment signals into non-overlapping time windows (S-segment) of about (20-30) seconds each.
7. Taper each segment by multiplying it by a triangular unit window function and compute its spectra by performing FFT. Tapering the segment is important to minimize frequency leakage when the FFT is performed [13]. Figure (F.1) show an example of triangular unit window that can be used for a 4000 point seismic record

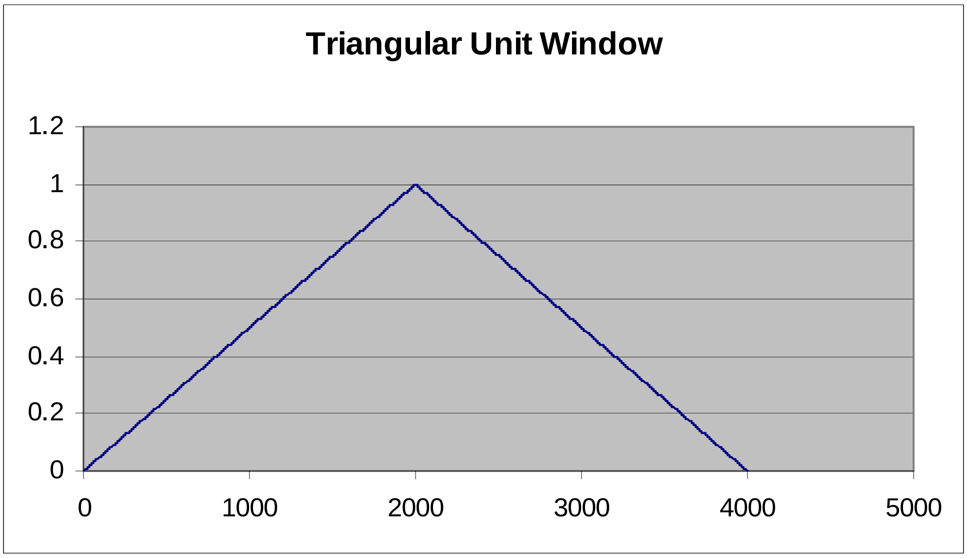


Figure F.1: A triangular unit window for 4000 values segment

4. Smooth the resulting spectra using a Parzen window function.

A Parzen window function is a unity function, and is defined as [14]

$$\text{Parzen}(x) = 0.25 \begin{cases} (2+x)^3 & -2 \le x < -1 \\ 4-6x^2-3x^3 & -1 \le x < 0 \\ 4-6x^2+3x^3 & 0 \le x < 1 \\ (2-x)^3 & 1 \le x < 2 \\ 0 & \text{else} \end{cases}$$

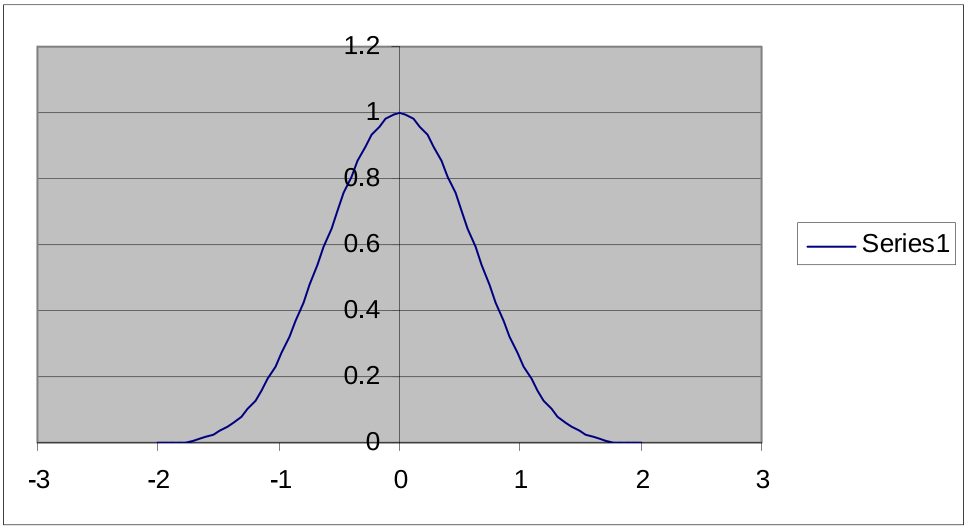


Figure F.2: Parzen Smoothing Window

Figure (F.2) is a plot of a standard Parzen window. Although the range of a Parzen window is from -2 to 2, it can be scaled to fit any required window width. Smoothing with Parzen window minimizes rapid fluctuations, and emphasizes the underlying trends of the spectra [13].

5. Compute the mean ratio spectra by using equation (3.3.2c).
6. Compute the average mean ratio spectra.
7. Plot the resulting graphs simultaneously.
8. Compute the direct ratio spectra by using equation (3.3.2a) and (3.3.2b)
9. Compute the average direct ratio spectra.

10. Plot the resulting graphs simultaneously.
11. Determine the fundamental frequency (or period) from the largest common peak of the graphs.

Microtremors Segment:A1-S1

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
26.79	5.86	-15.33	0.26	6.95	1.52	-3.98	1.31	1.13	1.81		0.23	0.30	0.50	30.03	1.28	2.48
-30.20	-5.13	-4.28	0.26	-7.82	-1.33	-1.11	0.29	0.19	1.31		0.24	0.30	0.50	29.98	1.27	2.45
8.85	-3.10	-13.23	0.26	2.29	-0.80	-3.42	1.08	1.18	0.31		0.24	0.30	0.50	29.93	1.25	2.42
29.77	-3.08	-12.16	0.26	7.68	-0.79	-3.14	0.43	0.73	0.52		0.24	0.30	0.50	29.88	1.24	2.39
-33.22	-5.05	-6.11	0.26	-8.55	-1.30	-1.57	0.63	0.68	1.16		0.25	0.30	0.50	29.83	1.22	2.36
24.81	-4.02	-7.07	0.26	6.37	-1.03	-1.82	0.60	0.37	1.25		0.25	0.30	0.50	29.79	1.21	2.33
-9.22	-1.00	-2.04	0.26	-2.37	-0.26	-0.52	0.76	0.67	0.51		0.25	0.30	0.50	29.74	1.20	2.29
-5.19	-1.98	0.98	0.26	-1.33	-0.51	0.25	0.61	1.52	1.15		0.26	0.30	0.49	29.69	1.18	2.26
8.81	-7.95	-3.01	0.26	2.25	-2.03	-0.77	0.29	1.60	0.85		0.26	0.30	0.49	29.64	1.17	2.23
-19.17	6.07	-7.97	0.26	-4.89	1.55	-2.03	0.29	1.64	0.35		0.26	0.31	0.49	29.59	1.16	2.20
11.85	1.07	2.06	0.25	3.02	0.27	0.52	0.56	0.47	0.83		0.27	0.31	0.49	29.54	1.16	2.17
-16.14	-3.92	5.06	0.25	-4.10	-0.99	1.28	1.40	0.48	1.51		0.27	0.31	0.48	29.49	1.15	2.14
4.89	9.09	-15.91	0.25	1.24	2.30	-4.03	1.36	0.85	1.44		0.27	0.31	0.48	29.44	1.15	2.11
-0.12	-8.90	-0.86	0.25	-0.03	-2.25	-0.22	0.74	0.58	1.12		0.27	0.31	0.48	29.39	1.15	2.09
-3.11	-2.87	22.11	0.25	-0.78	-0.72	5.58	1.42	0.46	0.75		0.28	0.32	0.47	29.35	1.15	2.07
6.89	6.14	8.07	0.25	1.74	1.55	2.03	1.11	0.48	1.05		0.28	0.32	0.47	29.30	1.15	2.05
-28.06	-5.85	10.04	0.25	-7.06	-1.47	2.53	0.72	0.80	0.49		0.28	0.32	0.47	29.25	1.15	2.04
22.95	1.17	5.03	0.25	5.76	0.29	1.26	0.58	0.96	1.27		0.28	0.32	0.47	29.20	1.16	2.03
-8.07	-11.80	-10.95	0.25	-2.02	-2.96	-2.74	0.32	1.28	1.43		0.28	0.33	0.46	29.15	1.16	2.02
-12.03	-1.76	-1.91	0.25	-3.01	-0.44	-0.48	0.79	0.84	2.45		0.28	0.33	0.46	29.10	1.17	2.02
7.98	19.22	6.10	0.25	1.99	4.80	1.52	0.80	0.96	1.48		0.28	0.33	0.46	29.05	1.18	2.01
-36.95	6.18	9.08	0.25	-9.20	1.54	2.26	0.21	1.38	0.82		0.28	0.33	0.46	29.00	1.18	2.01
21.08	2.17	2.07	0.25	5.24	0.54	0.52	0.11	0.94	0.28		0.28	0.34	0.46	28.96	1.19	2.01
-13.93	-11.79	-8.90	0.25	-3.45	-2.92	-2.21	0.81	0.33	0.81		0.28	0.34	0.46	28.91	1.20	2.02
-7.88	8.22	8.12	0.25	-1.95	2.04	2.01	1.25	0.41	1.77		0.28	0.34	0.46	28.86	1.21	2.02
36.07	28.16	14.09	0.25	8.91	6.96	3.48	0.91	1.05	2.18		0.28	0.34	0.45	28.81	1.21	2.02
-35.93	-6.87	1.07	0.25	-8.86	-1.69	0.26	1.80	0.81	2.32		0.28	0.34	0.45	28.76	1.22	2.02
11.13	11.14	4.07	0.25	2.74	2.74	1.00	0.22	0.72	1.60		0.28	0.34	0.45	28.71	1.23	2.03
-0.89	22.08	3.07	0.25	-0.22	5.42	0.75	0.49	1.11	1.12		0.28	0.35	0.45	28.66	1.23	2.03
-8.87	-4.94	4.07	0.25	-2.17	-1.21	1.00	0.30	0.48	1.29		0.28	0.35	0.45	28.61	1.23	2.03
36.08	1.08	12.05	0.24	8.82	0.26	2.95	0.88	0.12	0.66		0.28	0.35	0.45	28.56	1.24	2.03
-28.93	8.07	5.03	0.24	-7.06	1.97	1.23	0.79	0.17	0.15		0.28	0.35	0.45	28.52	1.24	2.02
5.13	5.05	2.03	0.24	1.25	1.23	0.50	0.76	1.02	0.19		0.28	0.35	0.45	28.47	1.24	2.02

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
10.10	-7.93	3.04	0.24	2.45	-1.93	0.74	0.97	1.01	1.45		0.28	0.35	0.45	28.42	1.23	2.02
1.08	8.08	-7.94	0.24	0.26	1.96	-1.93	0.97	1.07	0.50		0.28	0.34	0.45	28.37	1.23	2.01
26.03	22.03	-9.89	0.24	6.30	5.33	-2.39	0.74	1.02	1.40		0.28	0.34	0.44	28.32	1.23	2.00
-11.99	-11.98	-6.84	0.24	-2.90	-2.89	-1.65	0.94	0.85	0.27		0.28	0.34	0.44	28.27	1.22	1.99
16.00	-4.93	-13.79	0.24	3.86	-1.19	-3.32	1.02	1.12	1.18		0.28	0.34	0.44	28.22	1.21	1.99
18.94	19.05	-9.73	0.24	4.55	4.58	-2.34	0.61	0.68	1.21		0.28	0.34	0.44	28.17	1.21	1.98
-2.09	-2.97	0.31	0.24	-0.50	-0.71	0.07	0.32	0.36	0.45		0.28	0.34	0.44	28.13	1.20	1.97
-8.07	-8.94	-4.67	0.24	-1.93	-2.14	-1.12	0.21	0.47	1.23		0.28	0.34	0.44	28.08	1.19	1.96
16.92	8.08	-10.63	0.24	4.04	1.93	-2.54	0.39	0.04	1.73		0.28	0.33	0.44	28.03	1.18	1.95
26.83	-0.93	-8.57	0.24	6.40	-0.22	-2.04	0.19	0.22	0.88		0.28	0.33	0.44	27.98	1.17	1.94
-29.16	-1.91	-7.53	0.24	-6.94	-0.45	-1.79	0.37	0.80	1.22		0.28	0.33	0.44	27.93	1.16	1.93
13.88	17.07	-6.49	0.24	3.30	4.05	-1.54	0.58	0.29	1.31		0.28	0.33	0.44	27.88	1.16	1.92
13.82	8.03	-6.44	0.24	3.28	1.90	-1.53	1.20	0.60	1.54		0.29	0.33	0.44	27.83	1.15	1.91
-12.18	-15.94	-4.41	0.24	-2.88	-3.77	-1.04	1.03	0.51	2.10		0.29	0.33	0.44	27.78	1.14	1.90
4.84	-4.89	-2.38	0.24	1.14	-1.15	-0.56	0.94	0.65	1.59		0.29	0.32	0.44	27.73	1.13	1.90
-23.12	13.11	-7.35	0.24	-5.44	3.09	-1.73	0.36	0.41	1.23		0.29	0.32	0.44	27.69	1.12	1.89
4.92	-6.90	5.67	0.24	1.16	-1.62	1.33	0.29	0.64	0.33		0.29	0.32	0.44	27.64	1.11	1.89
-16.05	-1.87	14.64	0.23	-3.76	-0.44	3.43	0.45	1.56	0.99		0.29	0.32	0.44	27.59	1.10	1.88
-10.99	21.11	7.61	0.23	-2.57	4.94	1.78	1.16	1.65	1.21		0.29	0.31	0.44	27.54	1.10	1.88
17.00	-7.91	-1.38	0.23	3.97	-1.85	-0.32	1.50	2.02	0.66		0.29	0.31	0.44	27.49	1.09	1.88
-24.98	-12.86	-6.35	0.23	-5.82	-3.00	-1.48	2.29	1.56	1.55		0.29	0.31	0.44	27.44	1.08	1.88
18.04	3.17	14.64	0.23	4.19	0.74	3.40	1.64	0.59	0.73		0.29	0.31	0.44	27.39	1.08	1.87
1.00	2.17	13.60	0.23	0.23	0.50	3.16	1.01	0.56	0.76		0.29	0.31	0.44	27.34	1.07	1.87
-17.96	1.18	2.58	0.23	-4.16	0.27	0.60	0.86	1.33	0.41		0.28	0.30	0.44	27.29	1.06	1.87
15.05	-8.80	10.57	0.23	3.48	-2.03	2.44	0.28	1.12	0.15		0.28	0.30	0.44	27.25	1.06	1.87
-5.96	8.22	-0.44	0.23	-1.37	1.89	-0.10	0.73	0.35	1.01		0.28	0.30	0.44	27.20	1.05	1.87
10.03	0.21	6.56	0.23	2.31	0.05	1.51	0.27	0.44	1.75		0.28	0.29	0.44	27.15	1.04	1.87
-13.95	-24.73	8.55	0.23	-3.20	-5.68	1.96	0.30	0.77	1.08		0.28	0.29	0.44	27.10	1.04	1.86
4.07	0.33	-7.44	0.23	0.93	0.08	-1.70	0.17	0.63	0.56		0.28	0.29	0.44	27.05	1.03	1.86
3.06	6.33	-4.40	0.23	0.70	1.45	-1.01	0.78	0.97	0.51		0.28	0.29	0.43	27.00	1.03	1.86
-21.90	-3.67	12.59	0.23	-4.99	-0.84	2.87	1.04	0.71	0.56		0.28	0.29	0.43	26.95	1.02	1.86

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-21.90	-3.67	12.59	0.23	-4.99	-0.84	2.87	1.04	0.71	0.56	0.28	0.29	0.43	26.95	1.02	1.55	1.86
34.08	-4.64	9.56	0.23	7.75	-1.06	2.18	0.74	0.93	1.42	0.28	0.28	0.43	26.90	1.02	1.55	1.85
-15.95	-5.61	-7.43	0.23	-3.62	-1.27	-1.69	0.81	0.78	0.72	0.28	0.28	0.43	26.86	1.02	1.55	1.85
-11.89	-2.58	2.60	0.23	-2.69	-0.58	0.59	1.05	0.31	0.99	0.28	0.28	0.43	26.81	1.01	1.54	1.85
9.12	-3.56	-1.39	0.23	2.06	-0.80	-0.31	0.75	0.36	1.26	0.28	0.28	0.43	26.76	1.01	1.54	1.84
-17.86	6.45	-15.34	0.23	-4.03	1.45	-3.46	0.44	0.73	1.01	0.28	0.28	0.42	26.71	1.01	1.53	1.84
15.15	-5.54	14.67	0.23	3.41	-1.25	3.30	0.42	1.15	1.00	0.28	0.28	0.42	26.66	1.01	1.53	1.83
-3.87	-3.51	1.65	0.22	-0.87	-0.79	0.37	0.25	0.83	1.00	0.28	0.28	0.42	26.61	1.00	1.52	1.82
14.11	14.48	-45.25	0.22	3.16	3.24	-10.14	0.21	1.12	1.19	0.28	0.28	0.42	26.56	1.00	1.51	1.81
-13.88	-14.51	-19.10	0.22	-3.10	-3.24	-4.27	0.67	1.24	0.47	0.28	0.28	0.42	26.51	1.00	1.50	1.81
-6.84	-8.45	4.94	0.22	-1.52	-1.89	1.10	1.24	0.35	0.42	0.28	0.28	0.42	26.46	1.00	1.49	1.80
38.11	11.55	-12.03	0.22	8.48	2.57	-2.68	0.44	0.96	0.56	0.28	0.28	0.41	26.42	1.01	1.48	1.79
-27.91	-2.46	1.00	0.22	-6.20	-0.55	0.22	0.28	1.30	1.10	0.28	0.28	0.41	26.37	1.01	1.47	1.78
-1.85	-2.43	2.01	0.22	-0.41	-0.54	0.45	0.81	0.82	0.77	0.28	0.29	0.41	26.32	1.01	1.45	1.77
10.14	-15.39	-11.95	0.22	2.24	-3.40	-2.64	0.85	1.00	0.43	0.28	0.29	0.41	26.27	1.01	1.44	1.76
3.12	-0.34	8.07	0.22	0.69	-0.08	1.78	0.73	1.22	0.73	0.29	0.29	0.41	26.22	1.01	1.42	1.75
-1.88	9.65	14.04	0.22	-0.41	2.12	3.09	0.41	1.09	1.10	0.29	0.29	0.41	26.17	1.02	1.41	1.74
-17.84	-17.33	-4.97	0.22	-3.92	-3.80	-1.09	0.62	0.26	0.58	0.29	0.30	0.40	26.12	1.02	1.39	1.73
25.15	5.71	-10.92	0.22	5.51	1.25	-2.39	0.44	0.26	0.13	0.29	0.30	0.40	26.07	1.03	1.38	1.72
-21.85	14.68	-10.86	0.22	-4.77	3.21	-2.37	0.10	0.16	0.68	0.29	0.30	0.40	26.03	1.03	1.36	1.71
-11.78	0.66	-1.82	0.22	-2.57	0.14	-0.40	0.48	0.22	0.49	0.29	0.30	0.39	25.98	1.04	1.35	1.70
13.22	8.65	7.18	0.22	2.88	1.88	1.56	0.70	0.39	0.89	0.29	0.31	0.39	25.93	1.05	1.33	1.69
-27.74	0.65	-1.82	0.22	-6.02	0.14	-0.39	0.95	0.44	1.31	0.29	0.31	0.39	25.88	1.05	1.32	1.69
3.31	-3.34	0.20	0.22	0.72	-0.72	0.04	1.44	0.78	2.05	0.29	0.31	0.38	25.83	1.06	1.31	1.68
2.30	4.67	-2.78	0.22	0.50	1.01	-0.60	1.31	0.60	2.51	0.29	0.31	0.38	25.78	1.07	1.30	1.68
-2.69	2.67	-3.75	0.22	-0.58	0.57	-0.81	1.15	0.71	1.56	0.29	0.32	0.38	25.73	1.07	1.29	1.68
-18.64	-1.32	-0.73	0.22	-4.01	-0.28	-0.16	0.82	0.72	0.35	0.29	0.32	0.37	25.68	1.08	1.28	1.67
-7.59	-1.31	-26.66	0.21	-1.63	-0.28	-5.72	0.71	0.38	0.54	0.29	0.32	0.37	25.63	1.09	1.27	1.68
37.36	-0.29	-12.56	0.21	7.99	-0.06	-2.69	1.17	0.84	0.38	0.29	0.32	0.37	25.59	1.10	1.27	1.68
-15.68	-1.28	28.42	0.21	-3.35	-0.27	6.07	1.65	0.71	0.81	0.29	0.32	0.36	25.54	1.11	1.26	1.68
-9.63	-2.26	-10.60	0.21	-2.05	-0.48	-2.26	1.53	0.22	0.81	0.28	0.32	0.36	25.49	1.12	1.26	1.69

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-9.66	1.74	25.49	0.21	-2.05	0.37	5.40	1.42	0.26	0.68	0.28	0.32	0.35	25.39	1.14	1.26	1.70
-9.62	-0.25	8.44	0.21	-2.03	-0.05	1.79	1.10	0.24	1.24	0.28	0.32	0.35	25.34	1.15	1.26	1.70
5.39	9.74	-11.54	0.21	1.14	2.06	-2.43	0.77	0.44	0.78	0.27	0.31	0.34	25.29	1.15	1.26	1.71
19.35	-2.26	10.48	0.21	4.07	-0.48	2.21	0.95	0.10	0.56	0.27	0.31	0.34	25.24	1.16	1.26	1.71
-15.66	-3.24	21.43	0.21	-3.29	-0.68	4.50	1.38	0.13	0.29	0.27	0.31	0.34	25.20	1.16	1.27	1.72
6.37	8.76	19.36	0.21	1.33	1.84	4.06	1.16	0.35	0.63	0.27	0.31	0.34	25.15	1.16	1.27	1.72
33.29	1.75	-12.64	0.21	6.96	0.37	-2.64	1.73	0.18	2.09	0.26	0.31	0.34	25.10	1.16	1.27	1.72
-21.73	8.74	-3.59	0.21	-4.53	1.82	-0.75	3.14	0.98	2.66	0.26	0.30	0.33	25.05	1.16	1.27	1.72
13.29	-2.26	11.41	0.21	2.77	-0.47	2.37	3.72	0.41	2.84	0.26	0.30	0.33	25.00	1.15	1.27	1.72
15.24	-6.23	-5.59	0.21	3.16	-1.29	-1.16	1.72	0.94	2.74	0.26	0.30	0.33	24.95	1.14	1.27	1.71
-0.78	12.77	1.43	0.21	-0.16	2.64	0.30	0.83	1.07	1.85	0.26	0.29	0.33	24.90	1.13	1.27	1.70
23.17	2.75	-15.53	0.21	4.79	0.57	-3.21	0.23	0.11	1.76	0.26	0.29	0.33	24.85	1.11	1.27	1.68
8.12	8.73	-3.47	0.21	1.67	1.80	-0.72	0.69	0.51	1.61	0.26	0.29	0.33	24.80	1.09	1.26	1.66
10.08	11.70	11.53	0.21	2.07	2.41	2.37	0.88	0.35	0.89	0.27	0.28	0.33	24.76	1.06	1.25	1.64
1.06	-8.29	-4.47	0.21	0.22	-1.70	-0.92	0.69	0.86	0.85	0.27	0.28	0.33	24.71	1.03	1.24	1.61
11.04	-8.25	7.53	0.20	2.26	-1.69	1.54	0.32	0.97	0.50	0.27	0.27	0.33	24.66	1.00	1.22	1.58
3.02	-7.21	1.53	0.20	0.62	-1.47	0.31	0.33	0.85	1.06	0.28	0.27	0.34	24.61	0.96	1.21	1.55
5.01	-8.16	4.53	0.20	1.02	-1.66	0.92	0.67	0.63	1.15	0.28	0.26	0.34	24.56	0.93	1.19	1.51
13.97	0.86	-2.46	0.20	2.84	0.17	-0.50	0.69	0.34	0.40	0.29	0.26	0.34	24.51	0.89	1.18	1.48
-9.03	6.86	-16.41	0.20	-1.83	1.39	-3.32	0.95	0.87	0.13	0.30	0.25	0.35	24.46	0.85	1.16	1.44
19.95	-2.14	17.61	0.20	4.03	-0.43	3.56	1.01	1.34	0.78	0.31	0.25	0.35	24.41	0.81	1.14	1.40
-8.07	-2.12	0.58	0.20	-1.63	-0.43	0.12	0.88	1.00	1.25	0.31	0.24	0.35	24.37	0.77	1.13	1.37
11.92	-9.09	-20.36	0.20	2.40	-1.83	-4.09	0.29	1.00	0.56	0.32	0.24	0.36	24.32	0.73	1.11	1.33
24.85	-20.02	10.67	0.20	4.98	-4.01	2.14	0.40	1.08	0.74	0.33	0.23	0.36	24.27	0.70	1.09	1.30
-50.09	14.00	-5.33	0.20	-10.02	2.80	-1.07	0.47	0.83	0.67	0.34	0.23	0.37	24.22	0.66	1.08	1.27
15.98	0.99	-14.27	0.20	3.19	0.20	-2.85	0.12	0.50	0.80	0.35	0.22	0.38	24.17	0.63	1.07	1.24
1.95	-19.97	-8.21	0.20	0.39	-3.97	-1.63	0.49	0.52	1.36	0.36	0.22	0.38	24.12	0.60	1.05	1.21
-32.99	18.05	-19.14	0.20	-6.55	3.58	-3.80	1.05	0.90	1.17	0.37	0.21	0.39	24.07	0.58	1.04	1.19
25.03	2.02	1.91	0.20	4.96	0.40	0.38	0.52	0.42	0.99	0.38	0.21	0.39	24.02	0.55	1.03	1.17
-11.99	-12.95	4.91	0.20	-2.37	-2.56	0.97	0.30	0.32	1.06	0.39	0.21	0.40	23.97	0.53	1.03	1.16
-2.96	7.08	-4.08	0.20	-0.58	1.39	-0.80	0.93	0.35	0.31	0.40	0.21	0.41	23.93	0.51	1.02	1.14

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
12.03	-4.92	3.93	0.20	2.36	-0.97	0.77	1.17	0.92	1.38	0.41	0.20	0.41	23.88	0.50	1.02	1.13
-4.98	-8.88	-0.06	0.20	-0.98	-1.74	-0.01	0.33	0.68	1.41	0.41	0.20	0.42	23.83	0.49	1.02	1.13
-7.95	-7.83	-3.04	0.20	-1.55	-1.53	-0.59	1.25	0.23	1.30	0.42	0.20	0.43	23.78	0.48	1.02	1.12
-11.91	-6.79	-4.01	0.20	-2.32	-1.32	-0.78	0.60	0.41	1.27	0.42	0.20	0.43	23.73	0.47	1.02	1.12
1.12	-1.76	6.00	0.19	0.22	-0.34	1.17	0.36	1.17	0.82	0.43	0.20	0.44	23.68	0.47	1.02	1.12
-14.85	-6.74	7.99	0.19	-2.88	-1.31	1.55	0.89	1.19	0.62	0.43	0.20	0.44	23.63	0.47	1.03	1.13
-1.82	-5.70	3.98	0.19	-0.35	-1.10	0.77	0.52	0.47	0.62	0.43	0.20	0.45	23.58	0.47	1.03	1.13
-16.77	1.32	19.95	0.19	-3.24	0.25	3.85	0.56	0.35	1.44	0.43	0.21	0.45	23.54	0.48	1.04	1.14
1.26	6.32	21.88	0.19	0.24	1.22	4.21	0.54	1.09	1.37	0.43	0.21	0.45	23.49	0.48	1.05	1.15
20.22	7.30	3.84	0.19	3.88	1.40	0.74	0.26	1.76	1.62	0.43	0.21	0.45	23.44	0.49	1.06	1.17
-19.78	-7.69	-9.14	0.19	-3.79	-1.47	-1.75	0.49	1.48	1.68	0.42	0.21	0.45	23.39	0.51	1.07	1.18
29.21	-18.62	8.88	0.19	5.58	-3.56	1.70	0.59	0.58	2.03	0.42	0.22	0.45	23.34	0.52	1.08	1.20
-16.81	-1.57	22.83	0.19	-3.20	-0.30	4.35	0.93	0.88	1.30	0.41	0.22	0.45	23.29	0.54	1.10	1.22
-9.75	6.43	4.79	0.19	-1.85	1.22	0.91	0.90	0.90	0.36	0.41	0.23	0.45	23.24	0.56	1.11	1.24
44.18	-0.57	-9.19	0.19	8.37	-0.11	-1.74	0.80	0.48	1.49	0.40	0.23	0.45	23.19	0.58	1.13	1.27
-33.84	3.44	-3.15	0.19	-6.40	0.65	-0.60	0.88	0.66	0.61	0.39	0.23	0.45	23.14	0.61	1.15	1.30
12.21	9.42	9.85	0.19	2.30	1.78	1.86	0.36	0.29	0.94	0.38	0.24	0.44	23.10	0.63	1.17	1.33
4.18	6.40	-4.15	0.19	0.79	1.20	-0.78	0.20	0.98	0.83	0.37	0.24	0.44	23.05	0.66	1.19	1.36
-22.78	-19.56	0.87	0.19	-4.27	-3.67	0.16	0.10	1.11	0.89	0.36	0.25	0.43	23.00	0.69	1.21	1.39
18.24	2.49	17.85	0.19	3.41	0.46	3.34	0.11	1.66	0.32	0.35	0.25	0.43	22.95	0.72	1.23	1.42
-9.78	28.44	-4.17	0.19	-1.82	5.30	-0.78	0.75	2.28	0.51	0.34	0.26	0.42	22.90	0.75	1.25	1.46
-0.75	-16.58	2.85	0.19	-0.14	-3.08	0.53	0.54	1.81	0.43	0.33	0.26	0.42	22.85	0.79	1.27	1.50
-7.73	-5.52	5.85	0.19	-1.43	-1.02	1.08	0.60	0.63	0.95	0.32	0.26	0.42	22.80	0.82	1.30	1.54
11.27	18.46	-6.14	0.19	2.08	3.42	-1.14	0.67	0.26	1.21	0.31	0.27	0.41	22.75	0.85	1.32	1.58
-3.75	-7.55	17.85	0.18	-0.69	-1.39	3.29	0.79	0.70	0.85	0.30	0.27	0.41	22.71	0.89	1.35	1.62
-17.70	-7.50	6.82	0.18	-3.26	-1.38	1.25	0.02	0.67	0.43	0.29	0.27	0.40	22.66	0.92	1.38	1.66
34.27	-3.47	-16.15	0.18	6.29	-0.64	-2.96	0.15	0.86	1.10	0.29	0.27	0.40	22.61	0.96	1.41	1.70
-8.78	7.53	2.89	0.18	-1.61	1.38	0.53	0.66	0.77	1.23	0.28	0.28	0.40	22.56	0.99	1.43	1.74
-14.72	-4.46	-8.09	0.18	-2.69	-0.81	-1.48	1.38	0.47	0.43	0.27	0.28	0.40	22.51	1.03	1.46	1.78
-1.69	-10.42	-8.04	0.18	-0.31	-1.90	-1.46	1.31	0.56	1.91	0.27	0.28	0.40	22.46	1.06	1.49	1.82
4.31	12.59	21.94	0.18	0.78	2.28	3.98	1.09	0.48	1.97	0.26	0.28	0.39	22.41	1.09	1.51	1.86

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
1.30	-3.42	0.91	0.18	0.24	-0.62	0.17	0.72	1.37	0.42	0.26	0.29	0.39	22.36	1.11	1.54	1.90
-21.65	-2.40	-22.03	0.18	-3.91	-0.43	-3.98	2.17	1.57	0.56	0.25	0.29	0.39	22.31	1.14	1.56	1.93
20.36	4.61	-10.95	0.18	3.66	0.83	-1.97	1.99	0.99	0.27	0.25	0.29	0.39	22.27	1.17	1.58	1.97
-13.65	-15.36	-5.90	0.18	-2.45	-2.76	-1.06	0.73	0.42	1.58	0.25	0.29	0.40	22.22	1.19	1.60	2.00
-3.62	-1.31	-2.87	0.18	-0.65	-0.24	-0.51	0.15	0.56	0.75	0.24	0.30	0.40	22.17	1.22	1.62	2.03
20.35	-1.30	4.14	0.18	3.63	-0.23	0.74	0.63	0.92	0.71	0.24	0.30	0.40	22.12	1.24	1.64	2.06
-14.65	-12.26	1.14	0.18	-2.61	-2.18	0.20	0.63	1.34	0.84	0.24	0.30	0.40	22.07	1.27	1.66	2.09
17.35	-2.22	-4.84	0.18	3.08	-0.39	-0.86	0.67	1.43	0.50	0.24	0.31	0.40	22.02	1.29	1.67	2.11
-3.68	-5.19	-19.77	0.18	-0.65	-0.92	-3.50	1.24	1.26	1.66	0.24	0.31	0.40	21.97	1.31	1.68	2.13
5.32	-8.15	-15.69	0.18	0.94	-1.44	-2.77	0.57	0.74	1.90	0.24	0.31	0.40	21.92	1.33	1.69	2.15
-10.66	-0.12	17.32	0.18	-1.88	-0.02	3.05	0.69	0.36	0.30	0.23	0.32	0.40	21.88	1.35	1.69	2.17
-9.62	2.88	1.30	0.18	-1.69	0.51	0.23	0.18	0.66	0.91	0.23	0.32	0.40	21.83	1.37	1.69	2.18
45.31	6.88	-17.65	0.18	7.93	1.20	-3.09	0.78	0.64	0.59	0.23	0.32	0.40	21.78	1.39	1.69	2.19
-32.71	-1.12	-2.60	0.17	-5.71	-0.20	-0.45	0.79	1.54	0.77	0.23	0.33	0.39	21.73	1.40	1.69	2.19
-5.63	-2.11	-2.57	0.17	-0.98	-0.37	-0.45	0.96	1.76	0.90	0.23	0.33	0.39	21.68	1.41	1.68	2.19
13.36	21.87	-2.55	0.17	2.32	3.79	-0.44	0.65	1.06	1.26	0.24	0.33	0.39	21.63	1.42	1.66	2.19
-22.61	0.83	1.47	0.17	-3.91	0.14	0.25	0.68	0.74	0.85	0.24	0.34	0.39	21.58	1.43	1.64	2.18
22.39	-25.11	10.46	0.17	3.86	-4.33	1.80	0.84	1.16	1.13	0.24	0.34	0.39	21.53	1.43	1.62	2.16
-12.63	6.94	5.44	0.17	-2.17	1.19	0.94	1.12	1.28	0.71	0.24	0.34	0.38	21.48	1.43	1.60	2.15
6.39	-3.06	-6.55	0.17	1.10	-0.52	-1.12	0.83	0.90	1.32	0.24	0.34	0.38	21.44	1.43	1.58	2.13
7.37	-27.98	0.48	0.17	1.26	-4.78	0.08	0.99	1.18	1.99	0.24	0.35	0.38	21.39	1.42	1.55	2.10
-10.62	3.08	8.48	0.17	-1.81	0.53	1.45	0.42	1.29	0.88	0.25	0.35	0.37	21.34	1.41	1.52	2.07
13.38	5.08	10.45	0.17	2.27	0.86	1.78	0.51	0.68	0.64	0.25	0.35	0.37	21.29	1.40	1.49	2.04
-16.61	-28.86	-2.55	0.17	-2.82	-4.89	-0.43	0.93	0.19	0.77	0.25	0.35	0.37	21.24	1.38	1.46	2.01
3.42	-2.79	5.46	0.17	0.58	-0.47	0.92	0.64	0.65	1.09	0.26	0.35	0.37	21.19	1.37	1.43	1.98
2.41	21.19	11.44	0.17	0.41	3.57	1.93	0.69	0.89	0.95	0.26	0.35	0.36	21.14	1.35	1.40	1.94
-3.58	-14.81	-14.54	0.17	-0.60	-2.49	-2.44	0.64	1.26	1.06	0.26	0.35	0.36	21.09	1.33	1.37	1.91
-10.55	-3.76	-4.49	0.17	-1.77	-0.63	-0.75	0.36	0.91	0.51	0.27	0.35	0.36	21.04	1.31	1.34	1.87
0.47	-1.74	4.53	0.17	0.08	-0.29	0.76	0.70	0.16	0.60	0.27	0.35	0.36	21.00	1.29	1.32	1.84
22.43	-13.70	-6.46	0.17	3.73	-2.28	-1.07	0.89	0.58	1.49	0.28	0.35	0.36	20.95	1.27	1.29	1.81
-25.56	23.29	12.55	0.17	-4.24	3.87	2.08	0.61	0.67	2.02	0.28	0.35	0.36	20.90	1.26	1.27	1.79

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
15.46	-7.72	12.51	0.17	2.56	-1.28	2.07	0.46	0.97	0.06	0.29	0.35	0.36	20.85	1.24	1.25	1.76
14.41	-12.67	-1.50	0.17	2.38	-2.09	-0.25	0.86	0.61	1.16	0.29	0.35	0.36	20.80	1.23	1.24	1.74
-18.58	43.28	-1.48	0.16	-3.06	7.12	-0.24	1.02	0.61	0.89	0.29	0.35	0.36	20.75	1.21	1.22	1.72
15.43	-0.79	-10.44	0.16	2.53	-0.13	-1.71	0.66	1.14	0.41	0.30	0.36	0.36	20.70	1.20	1.21	1.71
-7.58	-14.75	2.59	0.16	-1.24	-2.41	0.42	0.80	1.44	0.89	0.30	0.36	0.36	20.65	1.20	1.20	1.70
-14.53	17.26	12.57	0.16	-2.37	2.81	2.05	1.25	1.09	0.81	0.30	0.36	0.36	20.61	1.19	1.20	1.69
-12.47	-0.77	-7.43	0.16	-2.03	-0.12	-1.21	1.59	1.11	0.55	0.30	0.36	0.36	20.56	1.19	1.19	1.68
-0.44	12.22	-8.38	0.16	-0.07	1.98	-1.36	1.55	0.20	0.71	0.30	0.36	0.36	20.51	1.18	1.19	1.68
-6.43	13.18	-3.34	0.16	-1.04	2.13	-0.54	0.93	0.67	0.63	0.30	0.36	0.36	20.46	1.18	1.19	1.68
-19.37	-15.80	-5.31	0.16	-3.12	-2.54	-0.86	0.72	1.02	0.77	0.30	0.36	0.36	20.41	1.18	1.19	1.68
11.65	0.24	-5.28	0.16	1.87	0.04	-0.85	1.48	0.74	1.06	0.30	0.36	0.36	20.36	1.19	1.20	1.69
-2.36	11.23	-8.23	0.16	-0.38	1.80	-1.32	1.74	0.77	0.51	0.30	0.36	0.36	20.31	1.19	1.20	1.69
-4.35	-7.76	1.79	0.16	-0.69	-1.24	0.29	1.28	0.93	0.44	0.30	0.36	0.37	20.26	1.19	1.21	1.70
-3.33	6.25	4.79	0.16	-0.53	0.99	0.76	0.63	0.42	0.91	0.30	0.36	0.37	20.21	1.20	1.21	1.70
13.66	20.21	-8.19	0.16	2.16	3.20	-1.30	0.97	0.83	0.85	0.30	0.36	0.37	20.17	1.20	1.22	1.71
15.60	-17.78	-10.14	0.16	2.47	-2.81	-1.60	0.55	0.45	0.83	0.30	0.36	0.37	20.12	1.20	1.23	1.72
-13.40	-16.70	-4.09	0.16	-2.11	-2.63	-0.64	0.99	1.14	1.02	0.30	0.36	0.37	20.07	1.20	1.23	1.72
33.57	20.30	4.92	0.16	5.27	3.19	0.77	0.60	0.78	0.50	0.30	0.36	0.37	20.02	1.21	1.24	1.73
-8.48	-2.72	11.90	0.16	-1.33	-0.43	1.86	0.05	0.52	0.29	0.30	0.36	0.37	19.97	1.21	1.24	1.73
-16.43	-15.67	2.89	0.16	-2.56	-2.44	0.45	1.11	0.60	0.63	0.30	0.36	0.37	19.92	1.20	1.24	1.73
23.56	11.35	-9.09	0.16	3.66	1.76	-1.41	1.28	1.17	1.08	0.30	0.35	0.37	19.87	1.20	1.25	1.73
-29.42	-10.64	4.93	0.16	-4.56	-1.65	0.76	0.31	0.93	0.43	0.29	0.35	0.37	19.82	1.19	1.24	1.72
13.62	-16.57	18.90	0.15	2.10	-2.56	2.92	0.57	0.74	0.50	0.30	0.35	0.37	19.78	1.19	1.24	1.72
-9.39	8.45	-5.11	0.15	-1.45	1.30	-0.79	0.84	0.53	1.09	0.30	0.35	0.36	19.73	1.18	1.23	1.70
-32.30	-9.53	-11.07	0.15	-4.96	-1.46	-1.70	0.98	1.21	0.12	0.30	0.35	0.36	19.68	1.16	1.22	1.69
29.71	-4.49	11.95	0.15	4.55	-0.69	1.83	1.55	1.17	0.88	0.30	0.34	0.36	19.63	1.15	1.21	1.67
-5.34	3.52	5.92	0.15	-0.81	0.54	0.90	1.65	0.41	0.73	0.30	0.34	0.36	19.58	1.13	1.20	1.65
-0.32	-15.44	0.92	0.15	-0.05	-2.35	0.14	0.82	0.58	0.12	0.30	0.34	0.36	19.53	1.12	1.18	1.62
9.67	-7.38	10.91	0.15	1.46	-1.12	1.65	0.55	0.09	0.75	0.30	0.33	0.35	19.48	1.10	1.16	1.60
6.64	-1.35	5.89	0.15	1.00	-0.20	0.89	1.15	1.21	0.95	0.31	0.33	0.35	19.43	1.08	1.14	1.57
13.60	-9.32	-4.10	0.15	2.05	-1.40	-0.62	1.73	1.10	1.15	0.31	0.33	0.35	19.38	1.06	1.12	1.54

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-11.40	-9.27	8.91	0.15	-1.71	-1.39	1.34	0.58	0.99	0.57	0.31	0.33	0.34	19.34	1.04	1.09	1.51
-4.36	1.76	14.87	0.15	-0.65	0.26	2.22	0.83	0.55	0.80	0.32	0.32	0.34	19.29	1.02	1.07	1.48
14.62	13.74	6.84	0.15	2.18	2.05	1.02	0.23	0.11	0.68	0.32	0.32	0.34	19.24	1.00	1.05	1.45
28.54	10.70	11.82	0.15	4.24	1.59	1.76	0.75	0.25	0.20	0.33	0.32	0.33	19.19	0.98	1.02	1.42
-19.48	1.69	7.79	0.15	-2.88	0.25	1.15	0.12	0.39	0.71	0.33	0.32	0.33	19.14	0.96	1.00	1.39
0.56	-1.30	-9.19	0.15	0.08	-0.19	-1.36	0.57	1.06	0.67	0.33	0.32	0.32	19.09	0.95	0.97	1.36
34.50	-0.29	-3.15	0.15	5.07	-0.04	-0.46	1.04	0.91	1.19	0.34	0.31	0.32	19.04	0.93	0.95	1.33
-43.48	-2.27	3.86	0.15	-6.37	-0.33	0.57	1.32	1.22	1.74	0.34	0.31	0.32	18.99	0.92	0.93	1.30
4.60	18.71	-9.12	0.15	0.67	2.73	-1.33	1.00	1.21	1.02	0.34	0.31	0.31	18.95	0.90	0.91	1.28
9.58	9.67	-10.06	0.15	1.39	1.41	-1.46	1.29	1.13	0.96	0.35	0.31	0.31	18.90	0.89	0.89	1.26
-30.38	-23.29	-2.03	0.15	-4.40	-3.38	-0.29	1.55	1.29	0.78	0.35	0.31	0.30	18.85	0.88	0.87	1.24
9.67	9.74	-9.99	0.14	1.40	1.41	-1.44	1.24	0.78	0.37	0.35	0.31	0.30	18.80	0.87	0.85	1.22
-3.34	-2.26	-17.92	0.14	-0.48	-0.33	-2.58	0.34	0.69	1.27	0.35	0.30	0.30	18.75	0.86	0.84	1.20
2.67	-13.22	-10.85	0.14	0.38	-1.90	-1.56	0.18	0.62	1.07	0.35	0.30	0.29	18.70	0.86	0.82	1.19
-14.31	9.80	-6.80	0.14	-2.05	1.40	-0.97	0.09	0.66	0.40	0.36	0.30	0.29	18.65	0.85	0.81	1.18
-0.27	-28.15	-18.73	0.14	-0.04	-4.01	-2.67	0.42	0.71	0.76	0.36	0.30	0.29	18.60	0.85	0.80	1.17
19.69	-8.06	-13.65	0.14	2.80	-1.14	-1.94	1.07	1.91	0.49	0.36	0.30	0.28	18.55	0.84	0.79	1.16
-14.31	12.94	3.38	0.14	-2.03	1.83	0.48	1.62	2.14	0.84	0.36	0.30	0.28	18.51	0.84	0.79	1.15
-7.27	-3.07	2.38	0.14	-1.02	-0.43	0.34	0.66	0.89	1.19	0.36	0.30	0.28	18.46	0.84	0.78	1.15
-13.22	5.94	-2.60	0.14	-1.86	0.83	-0.37	0.37	1.09	1.31	0.36	0.30	0.28	18.41	0.84	0.78	1.14
18.77	-15.03	-5.57	0.14	2.63	-2.10	-0.78	0.30	1.55	0.42	0.35	0.30	0.27	18.36	0.84	0.77	1.14
0.74	1.01	-0.54	0.14	0.10	0.14	-0.08	0.72	1.28	1.03	0.35	0.30	0.27	18.31	0.84	0.77	1.14
-21.22	9.00	1.47	0.14	-2.95	1.25	0.20	0.62	0.35	0.31	0.35	0.30	0.27	18.26	0.84	0.77	1.14
5.82	-14.97	-5.51	0.14	0.81	-2.07	-0.76	0.72	0.68	1.00	0.35	0.30	0.27	18.21	0.84	0.78	1.15
-15.16	8.05	7.50	0.14	-2.09	1.11	1.04	0.58	0.51	1.30	0.35	0.30	0.27	18.16	0.85	0.78	1.15
1.87	11.03	8.48	0.14	0.26	1.52	1.17	0.50	0.23	0.46	0.35	0.30	0.27	18.12	0.85	0.78	1.16
-0.13	-4.97	-11.50	0.14	-0.02	-0.68	-1.58	1.15	0.58	0.89	0.35	0.30	0.27	18.07	0.86	0.79	1.17
17.84	-8.93	9.52	0.14	2.44	-1.22	1.30	0.37	0.93	0.63	0.35	0.30	0.28	18.02	0.86	0.80	1.18
5.80	-8.88	15.48	0.14	0.79	-1.21	2.11	0.58	0.89	2.28	0.34	0.30	0.28	17.97	0.87	0.81	1.19
-18.17	-3.85	1.46	0.14	-2.46	-0.52	0.20	0.95	1.17	1.66	0.34	0.30	0.28	17.92	0.88	0.81	1.20
28.81	-6.81	20.43	0.14	3.89	-0.92	2.76	1.06	1.22	0.18	0.34	0.30	0.28	17.87	0.89	0.83	1.21

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-15.21	8.20	7.39	0.13	-2.05	1.10	0.99	0.66	0.61	2.49	0.34	0.30	0.28	17.82	0.90	0.84	1.23
7.81	7.18	-15.58	0.13	1.05	0.96	-2.09	0.06	0.91	2.65	0.34	0.31	0.28	17.77	0.91	0.85	1.24
7.78	-12.80	-4.52	0.13	1.04	-1.71	-0.60	0.26	1.42	0.89	0.33	0.31	0.29	17.72	0.92	0.86	1.26
-24.18	-11.74	11.48	0.13	-3.22	-1.56	1.53	0.35	0.73	0.49	0.33	0.31	0.29	17.68	0.94	0.88	1.28
33.80	-4.69	16.43	0.13	4.48	-0.62	2.18	0.27	0.29	0.69	0.33	0.31	0.29	17.63	0.95	0.89	1.30
-28.20	27.28	5.40	0.13	-3.72	3.60	0.71	0.36	0.67	1.09	0.33	0.32	0.30	17.58	0.97	0.91	1.33
-12.12	10.21	14.38	0.13	-1.59	1.34	1.89	0.72	0.74	0.72	0.32	0.32	0.30	17.53	0.99	0.92	1.35
37.83	-42.71	8.35	0.13	4.96	-5.59	1.09	0.99	1.81	1.51	0.32	0.32	0.30	17.48	1.01	0.94	1.38
-16.21	4.38	-14.63	0.13	-2.11	0.57	-1.91	1.07	1.13	1.12	0.32	0.33	0.31	17.43	1.03	0.96	1.41
-11.15	26.33	6.40	0.13	-1.45	3.42	0.83	0.57	0.20	0.43	0.32	0.33	0.31	17.38	1.05	0.98	1.43
0.88	-1.70	6.39	0.13	0.11	-0.22	0.83	0.34	1.03	0.80	0.31	0.33	0.31	17.33	1.07	1.00	1.46
11.86	24.26	-16.58	0.13	1.53	3.13	-2.14	0.81	0.67	0.57	0.31	0.34	0.32	17.29	1.09	1.02	1.49
-12.14	8.21	-2.52	0.13	-1.56	1.05	-0.32	0.84	0.68	0.84	0.31	0.34	0.32	17.24	1.11	1.05	1.53
5.88	-11.77	3.49	0.13	0.75	-1.51	0.45	0.69	0.29	1.00	0.30	0.34	0.32	17.19	1.13	1.07	1.56
20.83	4.26	-4.50	0.13	2.66	0.54	-0.57	0.47	0.72	0.67	0.30	0.35	0.33	17.14	1.16	1.10	1.59
-27.15	-9.72	-2.47	0.13	-3.45	-1.23	-0.31	0.29	1.67	0.66	0.30	0.35	0.33	17.09	1.18	1.12	1.63
14.88	15.28	-10.43	0.13	1.88	1.93	-1.32	0.77	1.94	0.50	0.29	0.35	0.34	17.04	1.20	1.15	1.66
3.84	23.22	-21.35	0.13	0.48	2.93	-2.69	0.38	1.45	0.39	0.29	0.35	0.34	16.99	1.22	1.18	1.70
-8.14	-13.79	-12.27	0.13	-1.02	-1.73	-1.54	0.54	0.97	0.40	0.28	0.35	0.34	16.94	1.25	1.21	1.74
8.86	4.24	3.76	0.13	1.11	0.53	0.47	1.02	0.85	0.09	0.28	0.35	0.35	16.89	1.27	1.24	1.77
-3.15	9.23	-5.22	0.12	-0.39	1.15	-0.65	1.19	0.94	0.61	0.28	0.36	0.35	16.85	1.29	1.27	1.81
16.83	-4.77	0.80	0.12	2.09	-0.59	0.10	0.27	0.90	1.00	0.27	0.36	0.36	16.80	1.30	1.30	1.84
-29.14	10.23	11.79	0.12	-3.60	1.26	1.46	0.88	0.91	0.91	0.27	0.36	0.36	16.75	1.32	1.34	1.88
-3.07	9.20	-15.19	0.12	-0.38	1.13	-1.87	0.60	1.41	3.04	0.27	0.36	0.36	16.70	1.34	1.37	1.91
22.89	-4.79	-15.12	0.12	2.80	-0.59	-1.85	3.27	4.38	6.26	0.26	0.35	0.37	16.65	1.35	1.40	1.95
-34.08	-20.73	-0.07	0.12	-4.16	-2.53	-0.01	0.92	3.59	2.12	0.26	0.35	0.37	16.60	1.36	1.43	1.98
-0.01	-1.67	3.94	0.12	0.00	-0.20	0.48	2.34	2.19	1.75	0.26	0.35	0.37	16.55	1.38	1.46	2.01
1.99	13.31	16.91	0.12	0.24	1.61	2.05	1.49	0.34	0.54	0.25	0.35	0.38	16.50	1.39	1.49	2.03
-15.98	-13.67	0.89	0.12	-1.93	-1.65	0.11	1.86	0.87	0.28	0.25	0.35	0.38	16.46	1.40	1.51	2.06
4.05	9.35	-18.07	0.12	0.49	1.12	-2.17	0.89	1.48	0.44	0.25	0.35	0.38	16.41	1.41	1.54	2.08
2.04	25.29	8.97	0.12	0.24	3.02	1.07	0.59	1.75	0.11	0.25	0.35	0.38	16.36	1.41	1.56	2.10

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-7.94	1.25	24.91	0.12	-0.94	0.15	2.96	0.76	1.26	0.09	0.25	0.35	0.39	16.31	1.42	1.57	2.12
-8.90	-7.73	2.87	0.12	-1.05	-0.92	0.34	0.54	0.62	0.40	0.24	0.35	0.39	16.26	1.43	1.58	2.13
19.08	-22.65	6.86	0.12	2.25	-2.67	0.81	0.59	0.35	0.51	0.24	0.35	0.39	16.21	1.43	1.59	2.14
-9.93	8.39	8.85	0.12	-1.17	0.99	1.04	0.53	0.83	1.08	0.24	0.35	0.39	16.16	1.44	1.60	2.15
-8.89	12.36	-3.15	0.12	-1.04	1.45	-0.37	0.76	0.87	0.27	0.24	0.35	0.39	16.11	1.45	1.59	2.15
23.09	-25.60	14.84	0.12	2.69	-2.98	1.73	0.59	0.97	0.53	0.24	0.35	0.39	16.06	1.45	1.59	2.15
-13.92	-2.53	4.81	0.12	-1.62	-0.29	0.56	0.80	0.31	1.44	0.25	0.36	0.39	16.02	1.45	1.58	2.15
-13.86	0.48	1.81	0.12	-1.60	0.06	0.21	0.51	0.42	1.02	0.25	0.36	0.39	15.97	1.46	1.56	2.14
-4.82	-17.47	10.80	0.12	-0.55	-2.01	1.24	0.29	0.22	0.64	0.25	0.37	0.39	15.92	1.46	1.55	2.13
-4.80	-1.42	-12.18	0.11	-0.55	-0.16	-1.39	0.83	0.99	0.46	0.25	0.37	0.39	15.87	1.46	1.53	2.11
-15.75	7.58	-8.13	0.11	-1.80	0.86	-0.93	0.65	0.89	0.09	0.26	0.38	0.39	15.82	1.46	1.50	2.10
5.27	1.57	0.90	0.11	0.60	0.18	0.10	0.42	0.31	0.52	0.26	0.38	0.39	15.77	1.46	1.48	2.08
12.24	8.56	-7.07	0.11	1.38	0.97	-0.80	0.81	0.61	0.52	0.27	0.39	0.39	15.72	1.46	1.45	2.06
-20.73	7.54	0.95	0.11	-2.33	0.85	0.11	1.48	1.04	0.31	0.27	0.40	0.39	15.67	1.46	1.43	2.04
4.30	-6.45	-1.03	0.11	0.48	-0.72	-0.12	1.15	1.52	1.17	0.28	0.40	0.39	15.63	1.46	1.40	2.02
-4.69	6.57	-6.01	0.11	-0.52	0.73	-0.67	0.58	1.55	0.68	0.28	0.41	0.39	15.58	1.45	1.37	2.00
28.27	24.52	-5.97	0.11	3.14	2.72	-0.66	0.76	1.45	0.75	0.29	0.42	0.39	15.53	1.45	1.35	1.98
-10.76	21.44	-11.92	0.11	-1.19	2.37	-1.32	1.31	1.35	0.63	0.30	0.43	0.39	15.48	1.44	1.32	1.96
-39.66	4.40	-3.87	0.11	-4.36	0.48	-0.43	0.87	0.46	0.93	0.30	0.44	0.39	15.43	1.44	1.29	1.93
55.32	1.40	1.15	0.11	6.06	0.15	0.13	0.60	1.10	0.59	0.31	0.44	0.39	15.38	1.43	1.27	1.91
-25.74	11.38	4.15	0.11	-2.81	1.24	0.45	0.56	2.07	0.58	0.32	0.45	0.39	15.33	1.42	1.24	1.89
3.31	8.35	-2.84	0.11	0.36	0.91	-0.31	0.46	0.90	0.86	0.32	0.45	0.39	15.28	1.41	1.22	1.87
48.21	11.33	-18.78	0.11	5.21	1.22	-2.03	0.74	0.79	1.29	0.33	0.46	0.39	15.23	1.41	1.20	1.85
-33.81	-14.66	5.26	0.11	-3.63	-1.58	0.57	0.56	0.65	1.37	0.33	0.46	0.39	15.19	1.40	1.18	1.83
22.22	-22.57	5.25	0.11	2.38	-2.42	0.56	1.05	0.91	1.08	0.34	0.47	0.39	15.14	1.39	1.17	1.81
-13.79	18.45	-23.70	0.11	-1.47	1.96	-2.52	0.61	0.31	0.95	0.34	0.47	0.39	15.09	1.38	1.15	1.79
-14.73	-3.57	12.34	0.11	-1.56	-0.38	1.31	1.21	0.44	0.66	0.34	0.47	0.39	15.04	1.37	1.13	1.77
35.23	-24.50	9.31	0.11	3.72	-2.58	0.98	1.76	0.84	1.13	0.35	0.47	0.39	14.99	1.35	1.12	1.76
-19.80	5.55	-30.63	0.11	-2.08	0.58	-3.22	0.67	0.82	1.16	0.35	0.47	0.38	14.94	1.34	1.10	1.74
-4.74	20.51	13.41	0.10	-0.50	2.14	1.40	1.85	1.20	0.18	0.35	0.47	0.38	14.89	1.33	1.09	1.72
7.26	15.45	17.37	0.10	0.75	1.61	1.81	0.83	0.89	0.78	0.35	0.46	0.37	14.84	1.32	1.07	1.70

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
7.26	15.45	17.37	0.10	0.75	1.61	1.81	0.83	0.89	0.78	0.35	0.46	0.37	14.84	1.32	1.07	1.70
-5.74	-0.57	-22.61	0.10	-0.59	-0.06	-2.34	0.27	1.08	1.29	0.35	0.46	0.37	14.79	1.31	1.06	1.68
-8.71	-4.55	-1.55	0.10	-0.90	-0.47	-0.16	2.61	0.85	0.47	0.35	0.45	0.36	14.75	1.30	1.04	1.67
8.30	-0.53	-5.52	0.10	0.85	-0.05	-0.57	3.34	0.48	0.64	0.35	0.45	0.36	14.70	1.29	1.03	1.65
-2.71	5.48	-4.48	0.10	-0.28	0.56	-0.46	1.58	0.61	0.52	0.34	0.44	0.35	14.65	1.28	1.02	1.63
-21.65	7.46	26.49	0.10	-2.20	0.76	2.69	1.36	1.42	1.01	0.34	0.43	0.34	14.60	1.27	1.00	1.62
15.36	-5.53	11.42	0.10	1.55	-0.56	1.15	2.31	1.90	1.38	0.34	0.43	0.34	14.55	1.26	0.99	1.60
-6.65	-8.49	-5.57	0.10	-0.67	-0.85	-0.56	2.98	1.73	1.04	0.34	0.42	0.33	14.50	1.25	0.98	1.59
12.35	-0.46	7.44	0.10	1.23	-0.05	0.74	4.02	2.29	0.83	0.33	0.41	0.32	14.45	1.23	0.97	1.57
18.29	9.53	10.41	0.10	1.82	0.95	1.04	2.59	3.01	0.84	0.33	0.41	0.32	14.40	1.22	0.96	1.56
-22.70	5.51	3.40	0.10	-2.25	0.55	0.34	2.28	2.49	0.10	0.33	0.40	0.31	14.36	1.21	0.95	1.54
17.32	-3.48	4.40	0.10	1.71	-0.34	0.43	2.16	2.30	1.19	0.33	0.39	0.31	14.31	1.20	0.94	1.52
7.27	11.51	-0.60	0.10	0.71	1.13	-0.06	2.10	2.00	1.48	0.33	0.39	0.30	14.26	1.19	0.93	1.51
-1.73	7.49	0.42	0.10	-0.17	0.73	0.04	1.72	1.91	0.70	0.33	0.38	0.30	14.21	1.17	0.92	1.49
15.24	3.48	0.43	0.10	1.48	0.34	0.04	1.35	1.74	0.10	0.33	0.38	0.30	14.16	1.16	0.91	1.47
14.19	3.47	-13.53	0.10	1.37	0.34	-1.31	1.30	0.95	0.48	0.33	0.37	0.29	14.11	1.14	0.90	1.45
7.15	-4.51	-3.48	0.10	0.69	-0.43	-0.33	2.77	1.16	0.73	0.33	0.37	0.29	14.06	1.12	0.89	1.43
-14.83	4.50	-5.45	0.10	-1.42	0.43	-0.52	2.42	0.70	1.40	0.33	0.37	0.29	14.01	1.11	0.87	1.41
17.17	2.50	-15.39	0.10	1.63	0.24	-1.46	1.40	0.31	0.87	0.34	0.37	0.29	13.96	1.09	0.86	1.39
8.13	14.47	5.64	0.09	0.77	1.37	0.53	1.32	1.04	0.41	0.35	0.37	0.29	13.92	1.07	0.85	1.36
-6.87	14.43	-1.36	0.09	-0.65	1.36	-0.13	1.10	1.94	0.16	0.35	0.37	0.29	13.87	1.05	0.83	1.33
18.11	-17.56	-27.28	0.09	1.69	-1.64	-2.55	2.27	1.86	1.17	0.36	0.37	0.30	13.82	1.02	0.81	1.31
3.07	8.47	-13.19	0.09	0.29	0.79	-1.23	3.01	1.21	0.95	0.37	0.37	0.30	13.77	1.00	0.80	1.28
5.06	22.42	7.84	0.09	0.47	2.07	0.72	2.57	0.57	0.21	0.39	0.38	0.30	13.72	0.98	0.78	1.25
5.04	-0.61	-2.16	0.09	0.46	-0.06	-0.20	1.86	1.01	0.28	0.40	0.38	0.30	13.67	0.95	0.76	1.22
13.01	13.37	-8.13	0.09	1.19	1.22	-0.74	0.74	1.13	1.03	0.41	0.39	0.30	13.62	0.93	0.73	1.19
-8.99	8.34	2.90	0.09	-0.82	0.76	0.26	1.32	0.34	0.87	0.43	0.39	0.31	13.57	0.91	0.71	1.16
-16.94	0.34	0.90	0.09	-1.53	0.03	0.08	0.12	0.52	0.51	0.45	0.40	0.31	13.53	0.89	0.69	1.13
18.06	8.33	-5.07	0.09	1.63	0.75	-0.46	0.82	0.81	0.39	0.46	0.40	0.31	13.48	0.87	0.67	1.10
-11.94	-2.67	-10.03	0.09	-1.07	-0.24	-0.90	0.44	1.36	0.58	0.48	0.41	0.31	13.43	0.85	0.65	1.07
12.06	13.32	1.00	0.09	1.07	1.19	0.09	0.84	1.37	1.06	0.50	0.42	0.31	13.38	0.84	0.63	1.05

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
14.01	2.30	3.01	0.09	1.24	0.20	0.27	1.35	0.70	1.83	0.52	0.43	0.32	13.33	0.82	0.61	1.02
-15.98	-31.63	-9.96	0.09	-1.41	-2.78	-0.88	1.98	0.97	0.82	0.54	0.44	0.32	13.28	0.81	0.59	1.00
25.01	-5.55	21.03	0.09	2.19	-0.49	1.84	1.19	0.93	1.92	0.56	0.45	0.32	13.23	0.80	0.57	0.98
1.96	-5.52	5.99	0.09	0.17	-0.48	0.52	0.81	0.38	1.27	0.58	0.45	0.32	13.18	0.79	0.55	0.96
-14.02	-4.48	-17.97	0.09	-1.21	-0.39	-1.55	0.51	0.63	0.64	0.60	0.46	0.32	13.13	0.78	0.53	0.94
10.00	14.51	14.05	0.09	0.86	1.25	1.21	0.62	0.68	0.47	0.61	0.47	0.32	13.09	0.77	0.52	0.93
9.96	11.46	14.01	0.09	0.85	0.98	1.20	1.03	1.00	1.59	0.63	0.48	0.32	13.04	0.76	0.50	0.91
-14.03	-3.54	16.96	0.09	-1.19	-0.30	1.44	0.18	0.97	1.89	0.64	0.49	0.31	12.99	0.76	0.49	0.90
-2.99	-32.46	7.92	0.08	-0.25	-2.74	0.67	0.39	1.12	1.40	0.66	0.49	0.31	12.94	0.75	0.48	0.89
17.98	6.61	-6.07	0.08	1.51	0.55	-0.51	0.59	0.84	0.84	0.67	0.50	0.31	12.89	0.75	0.47	0.88
-21.01	27.55	3.95	0.08	-1.75	2.30	0.33	0.62	0.83	0.95	0.68	0.50	0.31	12.84	0.74	0.46	0.87
2.04	-17.46	3.95	0.08	0.17	-1.45	0.33	0.89	1.17	0.51	0.69	0.51	0.31	12.79	0.74	0.45	0.87
0.04	8.57	40.87	0.08	0.00	0.71	3.37	1.28	0.64	0.68	0.69	0.51	0.31	12.74	0.74	0.44	0.86
-14.93	13.53	25.75	0.08	-1.22	1.11	2.11	0.88	0.34	1.52	0.70	0.51	0.31	12.70	0.74	0.44	0.86
-4.89	-15.45	-14.26	0.08	-0.40	-1.26	-1.16	1.80	1.40	0.96	0.70	0.51	0.31	12.65	0.73	0.44	0.85
-16.84	4.58	3.78	0.08	-1.36	0.37	0.31	1.65	2.01	0.26	0.70	0.51	0.30	12.60	0.73	0.44	0.85
16.17	3.57	-16.18	0.08	1.30	0.29	-1.30	1.38	2.39	4.04	0.70	0.51	0.30	12.55	0.73	0.44	0.85
-17.82	-4.41	3.86	0.08	-1.43	-0.35	0.31	0.73	1.82	4.65	0.69	0.51	0.30	12.50	0.73	0.44	0.85
-8.77	-0.39	17.83	0.08	-0.70	-0.03	1.42	1.29	2.27	0.90	0.69	0.50	0.30	12.45	0.73	0.44	0.86
2.25	-3.37	-42.11	0.08	0.18	-0.27	-3.33	0.50	1.58	0.52	0.68	0.50	0.30	12.40	0.73	0.45	0.86
-23.70	-2.35	-9.99	0.08	-1.86	-0.18	-0.78	1.60	1.77	0.88	0.67	0.49	0.30	12.35	0.74	0.46	0.87
23.30	1.66	24.99	0.08	1.82	0.13	1.95	0.85	1.17	1.02	0.66	0.48	0.31	12.30	0.74	0.47	0.87
-15.71	5.66	7.94	0.08	-1.22	0.44	0.62	1.03	1.39	0.41	0.64	0.48	0.31	12.26	0.74	0.48	0.88
2.32	3.65	-1.06	0.08	0.18	0.28	-0.08	1.07	0.67	2.17	0.63	0.47	0.31	12.21	0.74	0.49	0.89
11.30	8.63	-25.00	0.08	0.86	0.66	-1.91	0.80	0.63	2.11	0.61	0.46	0.31	12.16	0.75	0.51	0.91
-24.67	-3.37	11.04	0.08	-1.87	-0.26	0.84	0.22	0.42	1.56	0.60	0.45	0.32	12.11	0.75	0.53	0.92
36.31	-10.33	6.02	0.08	2.74	-0.78	0.45	0.21	0.47	1.03	0.58	0.44	0.32	12.06	0.76	0.55	0.94
-4.75	3.70	-32.91	0.08	-0.36	0.28	-2.47	0.66	0.38	0.86	0.57	0.43	0.33	12.01	0.77	0.58	0.96
-19.69	0.70	9.15	0.07	-1.47	0.05	0.68	1.22	0.84	0.78	0.55	0.43	0.33	11.96	0.78	0.61	0.99
18.32	5.70	-17.82	0.07	1.36	0.42	-1.32	0.78	0.68	0.85	0.53	0.42	0.34	11.91	0.79	0.64	1.01
-1.71	7.68	-22.72	0.07	-0.13	0.56	-1.67	1.52	1.54	1.28	0.52	0.41	0.35	11.87	0.80	0.67	1.05

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
0.29	-1.32	36.27	0.07	0.02	-0.10	2.65	2.12	2.54	1.33	0.50	0.41	0.35	11.82	0.81	0.71	1.08
2.29	6.68	-2.79	0.07	0.17	0.48	-0.20	3.24	2.22	1.82	0.48	0.40	0.36	11.77	0.83	0.75	1.12
13.27	4.67	-11.74	0.07	0.96	0.34	-0.85	3.99	2.28	1.11	0.47	0.40	0.37	11.72	0.85	0.79	1.16
-10.73	7.65	8.28	0.07	-0.77	0.55	0.59	4.33	2.38	1.05	0.46	0.40	0.38	11.67	0.87	0.83	1.20
9.27	12.62	-9.71	0.07	0.66	0.90	-0.69	4.09	2.01	1.23	0.44	0.39	0.39	11.62	0.89	0.87	1.25
16.23	-8.38	12.30	0.07	1.14	-0.59	0.87	3.67	2.86	1.61	0.43	0.39	0.40	11.57	0.91	0.92	1.29
-21.76	-6.34	10.27	0.07	-1.52	-0.44	0.72	4.81	2.51	1.01	0.42	0.39	0.41	11.52	0.93	0.96	1.34
20.25	14.66	-11.71	0.07	1.41	1.02	-0.81	4.21	1.46	2.46	0.41	0.40	0.42	11.47	0.95	1.00	1.39
9.19	7.62	-4.67	0.07	0.63	0.53	-0.32	3.61	1.54	2.02	0.41	0.40	0.43	11.43	0.98	1.04	1.43
-3.81	-16.35	-5.63	0.07	-0.26	-1.12	-0.39	3.02	0.80	1.17	0.40	0.40	0.43	11.38	1.00	1.08	1.47
7.18	-16.27	-3.60	0.07	0.49	-1.11	-0.24	2.62	0.65	1.03	0.40	0.41	0.44	11.33	1.02	1.12	1.51
12.15	1.77	2.42	0.07	0.82	0.12	0.16	3.60	1.35	0.77	0.39	0.41	0.45	11.28	1.04	1.14	1.55
11.11	7.76	8.41	0.07	0.74	0.52	0.56	2.34	1.28	0.67	0.39	0.42	0.46	11.23	1.05	1.17	1.57
-27.86	-1.24	-2.59	0.07	-1.85	-0.08	-0.17	1.97	1.25	0.43	0.39	0.42	0.47	11.18	1.07	1.18	1.59
9.19	-0.23	2.42	0.07	0.61	-0.02	0.16	3.33	1.02	1.64	0.40	0.43	0.47	11.13	1.07	1.19	1.61
-2.82	12.75	9.41	0.07	-0.18	0.84	0.62	5.26	2.09	1.32	0.40	0.43	0.48	11.08	1.08	1.20	1.61
-16.78	0.74	-20.55	0.07	-1.09	0.05	-1.34	4.27	1.96	1.11	0.41	0.44	0.49	11.04	1.08	1.19	1.61
11.24	-4.25	-0.49	0.06	0.72	-0.27	-0.03	2.81	1.20	2.74	0.42	0.45	0.49	10.99	1.07	1.18	1.59
-0.78	5.76	25.47	0.06	-0.05	0.37	1.63	4.84	1.61	2.12	0.43	0.45	0.50	10.94	1.06	1.16	1.57
16.19	-1.24	-4.56	0.06	1.03	-0.08	-0.29	4.14	1.08	1.49	0.44	0.46	0.50	10.89	1.05	1.14	1.54
-23.79	-5.21	-6.52	0.06	-1.50	-0.33	-0.41	4.08	1.93	1.46	0.46	0.47	0.50	10.84	1.03	1.11	1.51
4.25	4.80	5.49	0.06	0.27	0.30	0.34	3.06	2.56	0.98	0.47	0.47	0.51	10.79	1.00	1.07	1.47
19.21	9.78	-6.49	0.06	1.19	0.61	-0.40	3.15	2.08	0.62	0.49	0.48	0.51	10.74	0.98	1.03	1.42
-37.75	0.77	-4.45	0.06	-2.32	0.05	-0.27	2.47	2.17	0.27	0.51	0.49	0.51	10.69	0.95	0.99	1.37
22.29	7.76	3.56	0.06	1.36	0.47	0.22	1.23	1.16	1.11	0.54	0.50	0.51	10.64	0.92	0.95	1.32
-1.75	14.73	-14.40	0.06	-0.11	0.89	-0.87	1.38	0.77	0.35	0.57	0.50	0.51	10.60	0.89	0.90	1.27
-19.70	-7.28	-7.35	0.06	-1.18	-0.44	-0.44	3.54	1.85	1.29	0.59	0.51	0.51	10.55	0.86	0.86	1.22
9.32	5.73	-1.31	0.06	0.55	0.34	-0.08	2.80	1.53	1.58	0.62	0.52	0.51	10.50	0.83	0.82	1.16
-13.66	0.73	-10.28	0.06	-0.81	0.04	-0.61	1.16	0.92	0.42	0.66	0.52	0.51	10.45	0.80	0.78	1.11
9.35	-27.20	11.73	0.06	0.55	-1.59	0.69	1.55	0.98	1.34	0.69	0.53	0.51	10.40	0.77	0.74	1.07
-4.66	11.84	-3.27	0.06	-0.27	0.69	-0.19	1.73	0.75	1.10	0.72	0.54	0.51	10.35	0.74	0.70	1.02

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-1.64	7.81	-9.23	0.06	-0.09	0.45	-0.53	2.61	2.46	2.43	0.76	0.54	0.51	10.30	0.71	0.67	0.98
-0.63	-22.15	17.77	0.06	-0.04	-1.26	1.01	0.72	1.02	1.40	0.80	0.55	0.51	10.25	0.69	0.64	0.94
-7.61	-8.08	-10.23	0.06	-0.43	-0.46	-0.58	1.13	1.74	1.85	0.83	0.55	0.51	10.21	0.67	0.61	0.90
18.37	-1.05	-16.17	0.06	1.03	-0.06	-0.91	2.17	2.85	2.19	0.87	0.56	0.50	10.16	0.64	0.58	0.87
-2.65	9.94	-2.12	0.06	-0.15	0.55	-0.12	2.19	2.13	1.60	0.91	0.57	0.50	10.11	0.63	0.56	0.84
12.33	-10.05	-7.08	0.06	0.68	-0.55	-0.39	1.37	1.48	0.54	0.94	0.57	0.50	10.06	0.61	0.53	0.81
7.30	-11.00	10.92	0.05	0.40	-0.60	0.60	0.57	1.18	0.45	0.97	0.58	0.50	10.01	0.59	0.51	0.78
-4.70	23.99	-3.08	0.05	-0.25	1.30	-0.17	0.84	0.86	0.84	1.01	0.58	0.50	9.96	0.58	0.50	0.76
7.29	-7.04	-0.06	0.05	0.39	-0.38	0.00	1.90	1.17	1.58	1.03	0.58	0.50	9.91	0.56	0.48	0.74
4.28	-17.98	14.93	0.05	0.23	-0.95	0.79	2.63	1.38	1.38	1.06	0.59	0.50	9.86	0.55	0.47	0.72
22.23	15.04	-12.07	0.05	1.17	0.79	-0.63	1.08	0.77	0.72	1.08	0.59	0.50	9.81	0.54	0.46	0.71
-7.80	-0.98	-2.02	0.05	-0.41	-0.05	-0.11	0.50	1.62	0.72	1.11	0.59	0.49	9.77	0.54	0.45	0.70
4.21	-15.93	11.97	0.05	0.22	-0.82	0.62	1.37	2.19	1.60	1.12	0.59	0.49	9.72	0.53	0.44	0.69
4.20	5.10	8.94	0.05	0.21	0.26	0.46	1.20	1.55	1.36	1.14	0.60	0.49	9.67	0.52	0.43	0.68
-17.77	8.08	6.92	0.05	-0.90	0.41	0.35	1.84	1.07	1.49	1.15	0.60	0.49	9.62	0.52	0.43	0.67
20.23	-11.90	-17.04	0.05	1.01	-0.59	-0.85	2.24	1.79	2.65	1.15	0.60	0.49	9.57	0.52	0.42	0.67
-11.78	-5.85	-22.95	0.05	-0.58	-0.29	-1.14	0.32	2.84	3.22	1.16	0.60	0.49	9.52	0.52	0.42	0.67
-0.75	3.16	-3.88	0.05	-0.04	0.15	-0.19	2.44	0.48	1.58	1.16	0.60	0.49	9.47	0.52	0.42	0.67
18.21	-16.80	13.12	0.05	0.88	-0.81	0.64	2.56	2.15	1.29	1.15	0.60	0.49	9.42	0.52	0.42	0.67
-18.78	-9.74	30.04	0.05	-0.90	-0.47	1.44	1.31	1.69	2.25	1.14	0.60	0.48	9.38	0.52	0.42	0.67
11.24	8.28	20.95	0.05	0.53	0.39	1.00	1.73	0.40	0.83	1.13	0.60	0.48	9.33	0.53	0.43	0.68
8.20	-10.71	-18.04	0.05	0.39	-0.50	-0.85	0.88	0.94	0.44	1.12	0.60	0.48	9.28	0.53	0.43	0.69
-11.79	-9.66	-12.96	0.05	-0.55	-0.45	-0.60	0.22	1.48	0.61	1.10	0.60	0.48	9.23	0.54	0.44	0.70
4.23	-1.62	19.04	0.05	0.19	-0.07	0.88	0.68	1.24	1.69	1.08	0.59	0.48	9.18	0.55	0.45	0.71
4.22	-0.61	1.01	0.05	0.19	-0.03	0.05	0.76	1.47	1.12	1.06	0.59	0.48	9.13	0.56	0.46	0.72
-19.74	6.39	-8.96	0.05	-0.89	0.29	-0.40	0.60	1.46	0.89	1.03	0.59	0.48	9.08	0.57	0.47	0.74
11.28	-4.60	6.06	0.04	0.50	-0.20	0.27	1.29	1.77	2.31	1.01	0.59	0.48	9.03	0.59	0.48	0.76
18.22	6.41	7.05	0.04	0.80	0.28	0.31	1.05	1.44	0.69	0.98	0.59	0.48	8.98	0.60	0.49	0.78
-31.75	10.38	5.04	0.04	-1.38	0.45	0.22	1.33	1.20	1.04	0.95	0.59	0.48	8.94	0.62	0.50	0.80
23.27	-4.62	-16.92	0.04	1.00	-0.20	-0.73	1.12	1.26	0.93	0.93	0.59	0.48	8.89	0.63	0.52	0.82
0.23	4.39	3.12	0.04	0.01	0.19	0.13	1.44	1.41	0.15	0.90	0.59	0.48	8.84	0.65	0.54	0.85

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-24.72	11.37	31.06	0.04	-1.04	0.48	1.30	2.15	0.39	1.01	0.87	0.58	0.49	8.79	0.67	0.56	0.87
34.27	17.33	-17.95	0.04	1.42	0.72	-0.74	1.53	1.16	2.11	0.84	0.58	0.49	8.74	0.69	0.58	0.90
-26.74	5.29	-18.86	0.04	-1.10	0.22	-0.77	0.95	0.75	1.77	0.81	0.58	0.49	8.69	0.71	0.60	0.93
-2.68	-0.71	21.15	0.04	-0.11	-0.03	0.86	0.63	1.18	1.31	0.79	0.58	0.49	8.64	0.74	0.62	0.97
12.30	13.28	-2.87	0.04	0.49	0.53	-0.11	1.07	1.13	0.93	0.76	0.58	0.49	8.59	0.76	0.65	1.00
-14.69	-2.73	-14.83	0.04	-0.58	-0.11	-0.59	1.89	0.53	0.95	0.74	0.58	0.50	8.54	0.78	0.67	1.03
26.29	-5.71	9.20	0.04	1.03	-0.22	0.36	1.27	0.48	1.66	0.72	0.58	0.50	8.50	0.81	0.70	1.07
-20.71	3.31	2.19	0.04	-0.80	0.13	0.08	0.38	0.67	2.51	0.69	0.57	0.50	8.45	0.83	0.72	1.10
4.32	11.29	-22.75	0.04	0.16	0.43	-0.86	1.86	1.08	1.30	0.67	0.57	0.50	8.40	0.85	0.75	1.13
22.27	13.25	-11.67	0.04	0.84	0.50	-0.44	2.49	1.90	1.60	0.65	0.57	0.51	8.35	0.87	0.78	1.17
-19.73	-6.75	5.36	0.04	-0.73	-0.25	0.20	0.89	1.21	2.19	0.64	0.57	0.51	8.30	0.89	0.80	1.20
12.29	0.27	-5.63	0.04	0.45	0.01	-0.21	2.04	0.94	0.94	0.62	0.57	0.51	8.25	0.91	0.83	1.23
6.26	4.27	-14.58	0.04	0.23	0.15	-0.52	2.14	2.16	3.13	0.61	0.56	0.51	8.20	0.93	0.85	1.26
-5.74	-6.71	-7.52	0.04	-0.20	-0.24	-0.27	2.64	2.15	1.43	0.59	0.56	0.52	8.15	0.95	0.87	1.29
-3.72	0.31	9.49	0.04	-0.13	0.01	0.33	2.70	2.63	0.91	0.58	0.56	0.52	8.11	0.96	0.89	1.31
13.27	7.31	-2.51	0.03	0.46	0.25	-0.09	2.23	3.40	0.98	0.57	0.55	0.52	8.06	0.98	0.91	1.34
2.24	6.29	-23.44	0.03	0.08	0.21	-0.80	1.78	2.81	0.60	0.56	0.55	0.52	8.01	0.99	0.93	1.36
-7.74	-9.69	8.60	0.03	-0.26	-0.32	0.29	1.39	1.05	1.03	0.55	0.55	0.52	7.96	1.00	0.95	1.38
14.25	-15.63	7.59	0.03	0.47	-0.52	0.25	2.03	1.27	1.41	0.54	0.54	0.52	7.91	1.01	0.96	1.39
-12.75	3.40	-19.38	0.03	-0.41	0.11	-0.63	3.41	1.48	2.28	0.53	0.54	0.52	7.86	1.01	0.98	1.41
6.26	-3.59	-8.31	0.03	0.20	-0.11	-0.27	2.50	0.77	1.47	0.53	0.53	0.52	7.81	1.02	0.99	1.42
7.24	-11.55	-21.23	0.03	0.23	-0.36	-0.67	1.75	0.43	0.75	0.52	0.53	0.52	7.76	1.02	1.00	1.43
-3.76	-1.51	-8.16	0.03	-0.12	-0.05	-0.25	1.81	1.57	0.66	0.52	0.53	0.52	7.71	1.02	1.01	1.43
9.23	-14.47	21.83	0.03	0.28	-0.44	0.67	2.04	3.12	0.73	0.51	0.52	0.52	7.67	1.02	1.01	1.44
-4.77	-3.42	-5.19	0.03	-0.14	-0.10	-0.16	2.29	1.35	1.00	0.51	0.52	0.52	7.62	1.02	1.02	1.44
6.23	2.59	-3.16	0.03	0.18	0.08	-0.09	1.04	1.00	0.67	0.51	0.51	0.52	7.57	1.01	1.02	1.44
-5.77	-30.34	10.84	0.03	-0.17	-0.88	0.31	1.35	0.88	1.72	0.51	0.51	0.52	7.52	1.01	1.02	1.43
20.20	-16.24	-9.15	0.03	0.58	-0.46	-0.26	3.56	1.32	1.97	0.51	0.51	0.51	7.47	1.00	1.02	1.43
20.13	-2.19	-7.10	0.03	0.56	-0.06	-0.20	3.57	2.44	1.09	0.51	0.50	0.51	7.42	0.99	1.01	1.42
-16.88	-14.15	16.89	0.03	-0.46	-0.39	0.46	1.85	2.12	0.31	0.51	0.50	0.51	7.37	0.98	1.01	1.41
14.13	-14.08	20.83	0.03	0.38	-0.38	0.56	1.57	1.46	1.88	0.51	0.50	0.51	7.32	0.97	1.00	1.39

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
5.10	-18.00	-2.19	0.03	0.14	-0.48	-0.06	2.57	1.71	1.18	0.52	0.50	0.51	7.28	0.96	0.99	1.38
-9.89	-0.95	-8.16	0.03	-0.26	-0.02	-0.21	3.26	2.55	0.80	0.52	0.50	0.51	7.23	0.95	0.98	1.37
1.13	-4.93	1.87	0.03	0.03	-0.13	0.05	1.88	3.80	0.75	0.53	0.50	0.51	7.18	0.93	0.97	1.35
3.13	-7.89	-4.11	0.03	0.08	-0.20	-0.10	1.73	5.43	1.01	0.54	0.50	0.52	7.13	0.92	0.96	1.33
-10.86	11.11	0.91	0.02	-0.27	0.27	0.02	1.81	3.96	2.07	0.55	0.50	0.52	7.08	0.91	0.94	1.31
-16.80	-3.89	1.92	0.02	-0.40	-0.09	0.05	2.61	2.55	1.27	0.56	0.50	0.52	7.03	0.90	0.93	1.29
3.23	8.11	9.91	0.02	0.08	0.19	0.23	1.98	3.87	1.07	0.57	0.50	0.52	6.98	0.89	0.91	1.27
-4.76	11.08	23.85	0.02	-0.11	0.25	0.55	2.42	1.88	2.42	0.58	0.51	0.52	6.93	0.88	0.89	1.26
-3.74	-5.92	-3.17	0.02	-0.08	-0.13	-0.07	1.35	4.07	1.59	0.59	0.51	0.52	6.88	0.87	0.88	1.24
-3.72	4.10	-5.14	0.02	-0.08	0.09	-0.11	1.25	4.27	1.41	0.60	0.52	0.52	6.84	0.86	0.86	1.22
6.28	-3.89	9.86	0.02	0.13	-0.08	0.21	2.53	0.67	0.80	0.62	0.53	0.52	6.79	0.86	0.84	1.20
7.26	7.11	-0.14	0.02	0.15	0.15	0.00	3.54	2.39	0.49	0.63	0.54	0.52	6.74	0.85	0.82	1.18
-17.72	6.10	7.86	0.02	-0.36	0.13	0.16	2.67	2.67	1.52	0.64	0.54	0.52	6.69	0.84	0.80	1.17
11.30	3.09	0.85	0.02	0.23	0.06	0.02	0.68	1.71	1.23	0.66	0.55	0.52	6.64	0.84	0.78	1.15
2.27	23.05	-7.12	0.02	0.04	0.45	-0.14	0.99	1.06	1.35	0.67	0.56	0.52	6.59	0.84	0.77	1.14
-16.69	1.01	8.89	0.02	-0.32	0.02	0.17	1.87	2.20	2.41	0.69	0.58	0.51	6.54	0.84	0.75	1.12
-1.65	16.99	-8.10	0.02	-0.03	0.31	-0.15	2.48	1.24	0.61	0.70	0.59	0.51	6.49	0.84	0.73	1.11
-2.64	10.94	-13.04	0.02	-0.05	0.20	-0.23	2.37	0.47	2.34	0.71	0.60	0.51	6.45	0.84	0.71	1.10
-3.63	-21.03	10.98	0.02	-0.06	-0.37	0.19	1.28	1.72	1.78	0.73	0.61	0.51	6.40	0.84	0.70	1.10
-7.60	26.97	-4.02	0.02	-0.13	0.46	-0.07	0.62	3.62	0.58	0.74	0.63	0.50	6.35	0.85	0.68	1.09
17.39	11.90	-18.96	0.02	0.29	0.20	-0.31	0.61	3.42	1.27	0.75	0.64	0.50	6.30	0.86	0.67	1.09
-10.62	-17.07	-15.88	0.02	-0.17	-0.27	-0.25	1.08	2.28	0.15	0.76	0.65	0.50	6.25	0.86	0.66	1.08
-12.57	13.94	-10.81	0.02	-0.19	0.22	-0.17	4.01	2.64	0.92	0.77	0.67	0.49	6.20	0.87	0.64	1.08
32.39	-0.07	0.22	0.02	0.49	0.00	0.00	3.71	1.68	0.48	0.78	0.69	0.49	6.15	0.88	0.63	1.09
-22.63	-8.05	-10.74	0.01	-0.33	-0.12	-0.16	2.45	2.48	2.08	0.78	0.70	0.49	6.10	0.90	0.62	1.09
4.41	-0.02	-5.69	0.01	0.06	0.00	-0.08	3.06	3.42	0.89	0.79	0.72	0.49	6.05	0.91	0.62	1.10
25.36	-0.01	13.31	0.01	0.34	0.00	0.18	4.47	3.64	3.43	0.80	0.74	0.48	6.01	0.92	0.61	1.11
-13.66	9.98	-5.70	0.01	-0.18	0.13	-0.07	2.62	2.84	3.81	0.80	0.75	0.48	5.96	0.94	0.60	1.12
9.35	-11.01	-12.64	0.01	0.12	-0.14	-0.16	2.50	2.72	4.94	0.80	0.77	0.48	5.91	0.96	0.60	1.13
-16.63	-14.94	5.39	0.01	-0.20	-0.18	0.06	2.55	1.52	3.02	0.81	0.78	0.48	5.86	0.97	0.59	1.14
20.37	1.09	-1.61	0.01	0.23	0.01	-0.02	1.66	1.29	4.64	0.81	0.80	0.48	5.81	0.99	0.59	1.15

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
6.32	-12.87	-2.59	0.01	0.07	-0.14	-0.03	1.27	0.96	2.08	0.81	0.82	0.48	5.76	1.01	0.59	1.17
-43.61	-2.83	12.41	0.01	-0.46	-0.03	0.13	2.29	4.70	1.73	0.81	0.83	0.48	5.71	1.02	0.59	1.18
28.43	2.18	-2.60	0.01	0.28	0.02	-0.03	1.76	4.94	5.18	0.81	0.85	0.48	5.66	1.04	0.59	1.20
-20.58	-12.78	-2.57	0.01	-0.20	-0.12	-0.02	3.36	1.46	3.75	0.81	0.86	0.48	5.62	1.06	0.59	1.21
-17.50	-1.74	-1.55	0.01	-0.16	-0.02	-0.01	3.05	1.15	0.41	0.81	0.87	0.48	5.57	1.08	0.60	1.23
35.46	-0.73	-8.51	0.01	0.30	-0.01	-0.07	2.00	0.67	0.65	0.81	0.88	0.49	5.52	1.09	0.60	1.25
-32.54	-11.69	5.51	0.01	-0.26	-0.09	0.04	1.36	1.12	0.99	0.81	0.89	0.49	5.47	1.11	0.61	1.26
0.53	-12.63	-14.46	0.01	0.00	-0.09	-0.11	6.82	3.30	10.95	0.81	0.90	0.49	5.42	1.12	0.61	1.28
17.50	-6.58	-8.40	0.01	0.12	-0.05	-0.06	8.47	3.73	14.16	0.80	0.91	0.50	5.37	1.13	0.62	1.29
-14.50	9.42	13.60	0.01	-0.09	0.06	0.09	2.14	3.51	3.27	0.80	0.92	0.50	5.32	1.14	0.63	1.30
8.51	-2.58	-10.39	0.01	0.05	-0.02	-0.06	2.03	3.25	0.45	0.80	0.92	0.51	5.27	1.15	0.64	1.31
-1.50	-8.55	-14.32	0.01	-0.01	-0.05	-0.08	1.64	2.60	0.77	0.80	0.93	0.52	5.22	1.15	0.65	1.32
-2.49	3.47	-0.28	0.01	-0.01	0.02	0.00	0.79	1.50	0.59	0.80	0.93	0.53	5.18	1.16	0.66	1.33
7.51	-10.50	12.71	0.00	0.03	-0.05	0.06	1.90	0.59	0.82	0.80	0.93	0.54	5.13	1.16	0.67	1.34
-9.48	-3.46	10.68	0.00	-0.04	-0.01	0.04	1.17	0.25	1.06	0.81	0.93	0.55	5.08	1.15	0.69	1.34
8.52	13.53	-2.32	0.00	0.03	0.05	-0.01	1.99	5.46	2.02	0.81	0.93	0.57	5.03	1.15	0.70	1.35
17.47	2.51	13.67	0.00	0.05	0.01	0.04	3.24	9.23	8.54	0.81	0.93	0.58	4.98	1.15	0.72	1.35
-25.51	-10.46	17.62	0.00	-0.06	-0.03	0.04	1.15	5.47	7.23	0.82	0.93	0.60	4.93	1.14	0.74	1.36
1.55	7.55	-9.38	0.00	0.00	0.02	-0.02	1.81	3.29	1.91	0.82	0.93	0.62	4.88	1.13	0.75	1.36
4.54	20.51	-4.34	0.00	0.01	0.03	-0.01	0.04	2.64	1.73	0.83	0.93	0.64	4.83	1.12	0.77	1.36
-27.41	-9.50	19.64	0.00	-0.03	-0.01	0.02	1.44	0.92	0.89	0.84	0.93	0.66	4.79	1.11	0.79	1.36
31.58	-2.47	-4.37	0.00	0.02	0.00	0.00	1.00	1.43	1.23	0.84	0.93	0.69	4.74	1.10	0.81	1.37

Microtremors Segment: A1-S2

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
22.86	-27.79	14.55	0.26	5.93	-7.21	3.77	1.16	1.06	0.84	21.30	20.45	38.11	30.03	0.96	1.79	2.030551
41.74	40.20	-2.46	0.26	10.81	10.41	-0.64	0.71	0.99	0.69	21.83	20.42	37.93	29.98	0.94	1.74	1.972836
-50.24	14.10	8.55	0.26	-12.99	3.65	2.21	0.96	0.96	0.74	22.38	20.41	37.68	29.93	0.91	1.68	1.915137
22.82	-14.88	-4.44	0.26	5.89	-3.84	-1.14	0.47	0.44	1.58	22.92	20.41	37.38	29.88	0.89	1.63	1.858204
11.76	33.09	-6.40	0.26	3.03	8.52	-1.65	0.70	0.94	2.34	23.46	20.43	37.03	29.83	0.87	1.58	1.802744
-39.18	3.03	10.62	0.26	-10.07	0.78	2.73	0.66	0.81	1.33	23.98	20.46	36.62	29.79	0.85	1.53	1.749408
17.87	-22.91	2.61	0.26	4.58	-5.88	0.67	1.01	0.41	0.82	24.47	20.51	36.16	29.74	0.84	1.48	1.698693
-9.14	20.10	-1.37	0.26	-2.34	5.15	-0.35	0.39	0.57	0.94	24.94	20.56	35.67	29.69	0.82	1.43	1.650946
-2.11	8.06	3.64	0.26	-0.54	2.06	0.93	0.56	0.81	1.55	25.36	20.63	35.14	29.64	0.81	1.39	1.606483
12.87	-3.93	7.64	0.26	3.28	-1.00	1.95	0.56	0.25	1.05	25.75	20.71	34.58	29.59	0.80	1.34	1.565584
-24.10	18.05	-6.34	0.25	-6.13	4.59	-1.61	0.71	0.60	0.19	26.08	20.80	34.01	29.54	0.80	1.30	1.528439
16.92	6.01	-3.30	0.25	4.30	1.53	-0.84	1.42	0.82	1.18	26.37	20.90	33.43	29.49	0.79	1.27	1.495196
14.86	11.99	14.70	0.25	3.77	3.04	3.73	0.31	1.81	2.42	26.60	21.01	32.85	29.44	0.79	1.24	1.466009
-19.12	8.96	-7.30	0.25	-4.84	2.27	-1.85	2.01	1.65	2.05	26.77	21.12	32.29	29.39	0.79	1.21	1.441052
21.88	-19.01	-16.23	0.25	5.52	-4.80	-4.10	2.01	0.64	0.96	26.89	21.23	31.75	29.35	0.79	1.18	1.420419
13.81	12.02	-5.17	0.25	3.48	3.03	-1.30	1.24	1.22	0.49	26.94	21.35	31.23	29.30	0.79	1.16	1.404181
-15.18	27.95	-7.12	0.25	-3.82	7.03	-1.79	0.71	1.84	1.48	26.94	21.47	30.75	29.25	0.80	1.14	1.392313
13.83	-13.06	-7.07	0.25	3.47	-3.28	-1.77	0.60	0.82	1.63	26.88	21.59	30.31	29.20	0.80	1.13	1.384714
24.75	-7.01	-8.02	0.25	6.20	-1.76	-2.01	0.21	1.09	0.66	26.76	21.71	29.92	29.15	0.81	1.12	1.38131
-23.24	11.99	-2.98	0.25	-5.81	3.00	-0.74	0.28	0.41	0.25	26.59	21.83	29.57	29.10	0.82	1.11	1.382013
-16.16	-6.01	-13.92	0.25	-4.03	-1.50	-3.47	0.83	0.52	0.96	26.38	21.94	29.27	29.05	0.83	1.11	1.386679
35.81	7.00	-15.84	0.25	8.92	1.74	-3.94	1.61	0.38	1.08	26.12	22.04	29.01	29.00	0.84	1.11	1.395077
-35.19	12.97	-3.78	0.25	-8.74	3.22	-0.94	1.10	0.80	1.37	25.83	22.14	28.81	28.96	0.86	1.12	1.406866
-18.07	-14.01	-16.72	0.25	-4.48	-3.47	-4.15	0.87	0.57	1.27	25.52	22.24	28.66	28.91	0.87	1.12	1.421674
61.84	9.01	-4.65	0.25	15.31	2.23	-1.15	0.94	1.45	0.71	25.18	22.33	28.55	28.86	0.89	1.13	1.439165
-37.20	24.96	-0.62	0.25	-9.19	6.16	-0.15	0.49	0.63	1.43	24.85	22.41	28.49	28.81	0.90	1.15	1.458973
-26.07	-3.08	-14.57	0.25	-6.43	-0.76	-3.59	3.04	0.58	1.82	24.50	22.49	28.47	28.76	0.92	1.16	1.480608
56.88	5.93	4.47	0.25	13.99	1.46	1.10	3.37	0.37	1.35	24.17	22.55	28.50	28.71	0.93	1.18	1.503519
-35.16	7.91	1.48	0.25	-8.63	1.94	0.36	1.33	1.04	0.89	23.85	22.61	28.56	28.66	0.95	1.20	1.527123
-28.03	-9.07	-6.49	0.25	-6.87	-2.22	-1.59	0.12	0.21	0.62	23.56	22.66	28.65	28.61	0.96	1.22	1.550811
57.92	10.94	9.53	0.24	14.16	2.67	2.33	0.64	1.15	1.62	23.29	22.71	28.77	28.56	0.98	1.24	1.573902

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-30.04	-13.06	-16.40	0.24	-7.31	-3.18	-3.99	1.04	0.17	0.67	22.87	22.80	29.08	28.47	1.00	1.27	1.615623
35.96	-10.00	5.64	0.24	8.74	-2.43	1.37	1.31	0.50	0.73	22.72	22.83	29.25	28.42	1.01	1.29	1.633132
-14.08	0.03	8.63	0.24	-3.41	0.01	2.09	0.82	1.00	1.29	22.61	22.86	29.42	28.37	1.01	1.30	1.64785
-3.04	12.02	-0.36	0.24	-0.74	2.91	-0.09	0.74	1.60	0.54	22.55	22.89	29.59	28.32	1.02	1.31	1.659414
14.94	5.00	5.65	0.24	3.61	1.21	1.36	0.56	0.60	0.63	22.52	22.91	29.76	28.27	1.02	1.32	1.667457
-5.07	0.00	-14.31	0.24	-1.22	0.00	-3.45	0.32	0.59	0.92	22.55	22.92	29.92	28.22	1.02	1.33	1.671698
9.92	-2.98	-7.25	0.24	2.39	-0.72	-1.74	0.62	0.27	1.94	22.62	22.93	30.07	28.17	1.01	1.33	1.672005
-11.07	-1.96	17.75	0.24	-2.66	-0.47	4.26	0.46	0.70	2.18	22.73	22.92	30.21	28.13	1.01	1.33	1.668485
3.95	6.04	-9.24	0.24	0.95	1.45	-2.21	0.59	1.11	0.77	22.88	22.91	30.33	28.08	1.00	1.33	1.66145
9.93	-0.95	-9.18	0.24	2.37	-0.23	-2.20	0.94	0.64	0.44	23.06	22.89	30.43	28.03	0.99	1.32	1.651249
-10.07	13.03	12.83	0.24	-2.40	3.11	3.06	1.13	1.05	1.26	23.28	22.87	30.52	27.98	0.98	1.31	1.638196
27.90	4.01	-1.17	0.24	6.64	0.95	-0.28	0.70	0.84	1.31	23.53	22.83	30.60	27.93	0.97	1.30	1.622655
3.85	-17.95	6.84	0.24	0.91	-4.26	1.62	0.16	0.64	2.04	23.80	22.79	30.66	27.88	0.96	1.29	1.605104
-18.12	6.09	11.82	0.24	-4.29	1.44	2.80	0.28	0.38	1.42	24.09	22.74	30.71	27.83	0.94	1.27	1.586147
26.87	5.08	-8.16	0.24	6.35	1.20	-1.93	1.04	0.41	1.09	24.38	22.67	30.74	27.78	0.93	1.26	1.566402
6.81	-10.90	10.85	0.24	1.61	-2.57	2.56	0.81	0.94	0.72	24.68	22.59	30.76	27.73	0.92	1.25	1.546413
-13.18	0.13	19.81	0.24	-3.10	0.03	4.67	0.95	1.43	0.62	24.96	22.48	30.76	27.69	0.90	1.23	1.526715
2.85	0.15	-14.18	0.24	0.67	0.03	-3.33	0.24	0.21	1.00	25.22	22.37	30.75	27.64	0.89	1.22	1.507699
-8.13	7.14	4.86	0.23	-1.91	1.68	1.14	0.37	0.46	0.13	25.46	22.24	30.73	27.59	0.87	1.21	1.489631
3.88	11.12	31.81	0.23	0.91	2.60	7.44	0.55	1.57	0.66	25.68	22.09	30.70	27.54	0.86	1.20	1.472733
-1.12	3.10	-5.22	0.23	-0.26	0.72	-1.22	1.56	1.13	0.77	25.88	21.94	30.67	27.49	0.85	1.19	1.457247
-3.10	14.08	-2.19	0.23	-0.72	3.28	-0.51	1.10	0.38	0.85	26.04	21.77	30.64	27.44	0.84	1.18	1.44345
2.90	17.03	11.81	0.23	0.67	3.96	2.75	0.58	0.73	0.48	26.16	21.60	30.60	27.39	0.83	1.17	1.431642
-22.05	-3.99	-15.16	0.23	-5.12	-0.92	-3.52	1.41	0.43	0.51	26.25	21.43	30.56	27.34	0.82	1.16	1.422102
12.97	-10.94	11.87	0.23	3.00	-2.53	2.75	1.54	0.51	1.15	26.29	21.26	30.52	27.29	0.81	1.16	1.415025
6.93	12.07	22.82	0.23	1.60	2.79	5.27	0.49	0.69	1.20	26.28	21.08	30.49	27.25	0.80	1.16	1.410458
-35.00	3.05	-13.18	0.23	-8.07	0.70	-3.04	0.95	0.23	1.41	26.22	20.91	30.44	27.20	0.80	1.16	1.408388
28.02	-6.93	-0.13	0.23	6.44	-1.59	-0.03	1.28	0.40	0.69	26.12	20.74	30.40	27.15	0.79	1.16	1.408839
11.94	0.09	-1.11	0.23	2.74	0.02	-0.25	0.89	1.51	0.79	25.97	20.57	30.35	27.10	0.79	1.17	1.411879
-40.00	-11.87	-8.07	0.23	-9.16	-2.72	-1.85	0.72	0.41	0.43	25.77	20.41	30.29	27.05	0.79	1.18	1.41757
27.04	10.14	14.94	0.23	6.18	2.32	3.41	0.14	0.38	0.49	25.52	20.25	30.23	27.00	0.79	1.18	1.425797

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
8.97	-3.86	-11.05	0.23	2.04	-0.88	-2.52	0.95	0.81	0.65	25.24	20.11	30.15	26.95	0.80	1.19	1.436229
-34.97	-13.81	-19.96	0.23	-7.96	-3.14	-4.54	0.55	0.47	0.62	24.92	19.98	30.07	26.90	0.80	1.21	1.448474
26.05	18.19	10.08	0.23	5.91	4.13	2.29	1.21	0.34	0.60	24.59	19.86	29.97	26.86	0.81	1.22	1.462114
-3.99	-10.81	-0.92	0.23	-0.90	-2.45	-0.21	1.02	0.74	1.40	24.24	19.76	29.85	26.81	0.82	1.23	1.476726
-22.93	0.22	-1.89	0.23	-5.18	0.05	-0.43	0.47	0.79	2.76	23.88	19.67	29.71	26.76	0.82	1.24	1.49197
22.08	5.22	-1.86	0.23	4.98	1.18	-0.42	0.96	0.68	2.04	23.52	19.59	29.56	26.71	0.83	1.26	1.507505
-11.94	-24.73	-8.82	0.23	-2.69	-5.56	-1.99	0.33	0.55	1.56	23.17	19.53	29.39	26.66	0.84	1.27	1.522897
1.09	2.33	7.20	0.22	0.25	0.52	1.62	0.63	0.34	1.19	22.82	19.47	29.20	26.61	0.85	1.28	1.537659
9.08	-1.66	-4.78	0.22	2.03	-0.37	-1.07	0.52	0.99	1.24	22.49	19.41	28.98	26.56	0.86	1.29	1.551279
-16.90	3.35	1.25	0.22	-3.78	0.75	0.28	0.72	0.33	0.27	22.18	19.36	28.75	26.51	0.87	1.30	1.563217
36.07	26.30	7.25	0.22	8.04	5.87	1.62	0.63	0.74	1.43	21.89	19.32	28.51	26.46	0.88	1.30	1.572987
-4.99	-3.73	-9.72	0.22	-1.11	-0.83	-2.16	0.24	1.31	0.44	21.63	19.27	28.24	26.42	0.89	1.31	1.580268
-30.91	-4.70	0.32	0.22	-6.86	-1.04	0.07	0.58	1.15	0.33	21.41	19.22	27.97	26.37	0.90	1.31	1.584909
34.09	8.30	-10.64	0.22	7.55	1.84	-2.36	0.37	0.38	0.45	21.22	19.16	27.68	26.32	0.90	1.30	1.586803
-43.89	-6.69	-2.59	0.22	-9.70	-1.48	-0.57	0.39	1.16	0.13	21.06	19.11	27.40	26.27	0.91	1.30	1.58586
-14.76	-0.66	15.40	0.22	-3.26	-0.15	3.40	0.43	0.81	1.10	20.94	19.04	27.10	26.22	0.91	1.29	1.582021
62.15	4.34	-10.59	0.22	13.67	0.96	-2.33	0.45	0.96	1.60	20.85	18.98	26.81	26.17	0.91	1.29	1.575394
-50.87	-3.65	-4.54	0.22	-11.17	-0.80	-1.00	0.50	0.79	1.01	20.79	18.91	26.52	26.12	0.91	1.28	1.566426
2.23	-20.59	14.47	0.22	0.49	-4.51	3.17	0.59	0.60	0.83	20.76	18.83	26.24	26.07	0.91	1.26	1.555777
53.13	-15.50	4.45	0.22	11.61	-3.39	0.97	0.90	1.48	1.23	20.75	18.75	25.98	26.03	0.90	1.25	1.544124
-53.86	6.53	9.44	0.22	-11.74	1.42	2.06	0.62	1.61	1.73	20.75	18.66	25.74	25.98	0.90	1.24	1.532148
5.24	-0.47	5.43	0.22	1.14	-0.10	1.18	0.51	0.58	2.36	20.76	18.57	25.53	25.93	0.89	1.23	1.520496
28.18	10.52	-12.53	0.22	6.11	2.28	-2.72	0.60	0.83	1.52	20.78	18.48	25.35	25.88	0.89	1.22	1.509759
-34.80	7.50	-0.48	0.22	-7.53	1.62	-0.10	0.19	0.23	0.69	20.79	18.39	25.21	25.83	0.88	1.21	1.500509
7.26	-6.49	-2.46	0.22	1.57	-1.40	-0.53	0.57	0.66	1.20	20.80	18.30	25.09	25.78	0.88	1.21	1.493313
11.23	1.53	-8.41	0.22	2.42	0.33	-1.81	0.75	0.52	1.31	20.79	18.22	25.02	25.73	0.88	1.20	1.488644
-22.74	-9.45	17.59	0.22	-4.89	-2.03	3.78	1.43	0.20	0.87	20.76	18.14	24.97	25.68	0.87	1.20	1.4869
-2.69	1.58	3.57	0.21	-0.58	0.34	0.77	0.98	1.16	0.59	20.71	18.08	24.96	25.63	0.87	1.21	1.488428
0.32	-0.41	-12.39	0.21	0.07	-0.09	-2.65	0.83	1.23	0.92	20.63	18.04	24.98	25.59	0.87	1.21	1.493458
-12.64	-16.36	2.65	0.21	-2.70	-3.49	0.56	1.20	0.61	0.99	20.53	18.01	25.03	25.54	0.88	1.22	1.502073
-13.59	-0.32	-13.31	0.21	-2.89	-0.07	-2.84	1.67	0.85	1.08	20.40	18.00	25.10	25.49	0.88	1.23	1.514317

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-13.53	0.70	-14.23	0.21	-2.87	0.15	-3.02	1.99	0.74	0.43	20.24	18.01	25.20	25.44	0.89	1.24	1.530236
27.45	-7.28	13.79	0.21	5.82	-1.54	2.92	0.99	0.36	0.62	20.06	18.04	25.31	25.39	0.90	1.26	1.549826
14.38	1.74	6.77	0.21	3.04	0.37	1.43	1.06	0.53	0.83	19.85	18.09	25.46	25.34	0.91	1.28	1.573038
-25.60	6.74	-0.22	0.21	-5.40	1.42	-0.05	0.74	0.36	0.72	19.63	18.16	25.62	25.29	0.92	1.31	1.59965
24.41	-5.25	12.77	0.21	5.14	-1.11	2.69	1.16	0.89	0.59	19.39	18.25	25.80	25.24	0.94	1.33	1.629256
0.37	-1.23	-5.22	0.21	0.08	-0.26	-1.10	1.37	1.01	1.17	19.15	18.36	25.99	25.20	0.96	1.36	1.661334
-37.55	9.77	-4.18	0.21	-7.87	2.05	-0.88	0.63	0.52	0.14	18.91	18.48	26.18	25.15	0.98	1.38	1.69527
17.50	-0.24	12.82	0.21	3.66	-0.05	2.68	1.34	0.92	2.24	18.66	18.63	26.38	25.10	1.00	1.41	1.730272
-0.53	3.77	-8.17	0.21	-0.11	0.79	-1.70	2.26	0.64	1.14	18.43	18.78	26.56	25.05	1.02	1.44	1.765382
-27.47	3.76	11.85	0.21	-5.71	0.78	2.46	1.84	1.20	2.90	18.21	18.95	26.73	25.00	1.04	1.47	1.799551
20.55	-6.22	20.80	0.21	4.26	-1.29	4.32	2.66	1.42	2.17	18.01	19.12	26.89	24.95	1.06	1.49	1.831625
-8.47	5.79	-28.16	0.21	-1.75	1.20	-5.83	1.04	0.33	1.23	17.85	19.29	27.03	24.90	1.08	1.51	1.860404
-20.40	7.78	6.90	0.21	-4.21	1.61	1.43	0.82	1.09	1.57	17.73	19.47	27.16	24.85	1.10	1.53	1.884709
29.59	3.77	28.85	0.21	6.09	0.78	5.94	0.36	1.40	0.99	17.66	19.64	27.28	24.80	1.11	1.54	1.903472
-7.45	-2.22	-25.14	0.21	-1.53	-0.46	-5.17	0.90	0.48	0.84	17.64	19.80	27.38	24.76	1.12	1.55	1.915781
-3.42	-4.20	-1.06	0.21	-0.70	-0.86	-0.22	0.88	0.94	0.72	17.68	19.95	27.48	24.71	1.13	1.55	1.920977
26.54	9.80	9.94	0.20	5.43	2.00	2.03	0.52	0.28	1.01	17.78	20.09	27.56	24.66	1.13	1.55	1.918666
-9.49	3.79	-30.00	0.20	-1.94	0.77	-6.12	0.39	0.42	0.97	17.94	20.22	27.64	24.61	1.13	1.54	1.908713
9.51	-5.20	0.08	0.20	1.94	-1.06	0.02	0.55	0.29	1.18	18.17	20.32	27.71	24.56	1.12	1.53	1.891342
26.45	2.82	16.07	0.20	5.37	0.57	3.26	0.45	1.20	1.33	18.46	20.41	27.77	24.51	1.11	1.50	1.867098
-4.59	-13.15	-13.91	0.20	-0.93	-2.66	-2.82	0.64	1.14	1.05	18.81	20.49	27.82	24.46	1.09	1.48	1.836782
3.42	-19.07	1.13	0.20	0.69	-3.85	0.23	0.40	0.39	0.86	19.21	20.54	27.85	24.41	1.07	1.45	1.80139
14.39	10.96	2.15	0.20	2.90	2.21	0.43	0.49	0.83	0.80	19.67	20.58	27.88	24.37	1.05	1.42	1.762012
0.37	8.93	-21.79	0.20	0.07	1.79	-4.38	0.22	0.41	0.71	20.17	20.59	27.90	24.32	1.02	1.38	1.719756
-9.61	-9.06	2.27	0.20	-1.93	-1.82	0.46	0.77	1.00	0.98	20.71	20.60	27.93	24.27	0.99	1.35	1.675746
-5.57	7.95	4.28	0.20	-1.11	1.59	0.86	1.13	1.36	0.59	21.28	20.59	27.96	24.22	0.97	1.31	1.631117
14.42	2.94	-14.68	0.20	2.88	0.59	-2.93	0.92	0.88	0.90	21.89	20.57	27.99	24.17	0.94	1.28	1.586947
-8.59	-4.04	6.36	0.20	-1.71	-0.80	1.27	0.85	0.35	0.11	22.51	20.54	28.04	24.12	0.91	1.25	1.544188
-19.53	14.95	0.37	0.20	-3.88	2.97	0.07	0.34	0.79	0.82	23.14	20.51	28.10	24.07	0.89	1.21	1.503627
24.47	4.92	0.39	0.20	4.84	0.97	0.08	0.21	1.44	0.98	23.76	20.48	28.17	24.02	0.86	1.19	1.465922
-6.56	-1.07	10.39	0.20	-1.30	-0.21	2.05	1.30	0.51	1.05	24.36	20.44	28.25	23.97	0.84	1.16	1.431557

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-18.51	-3.05	-10.59	0.20	-3.65	-0.60	-2.09	0.94	0.70	0.24	24.93	20.41	28.33	23.93	0.82	1.14	1.400807
39.46	-8.02	4.44	0.20	7.75	-1.58	0.87	0.34	0.48	1.14	25.45	20.38	28.42	23.88	0.80	1.12	1.37383
-9.60	5.00	6.44	0.20	-1.88	0.98	1.26	0.44	0.51	0.83	25.93	20.35	28.50	23.83	0.78	1.10	1.35074
-24.52	-5.99	-6.54	0.20	-4.79	-1.17	-1.28	0.52	1.65	1.24	26.34	20.33	28.58	23.78	0.77	1.09	1.331609
46.44	3.03	19.46	0.20	9.06	0.59	3.79	0.49	0.77	1.76	26.68	20.31	28.66	23.73	0.76	1.07	1.316462
2.35	12.01	10.42	0.19	0.46	2.34	2.03	0.51	0.08	1.41	26.95	20.30	28.74	23.68	0.75	1.07	1.305253
-25.60	-18.96	-5.57	0.19	-4.97	-3.68	-1.08	0.07	0.80	0.53	27.15	20.29	28.81	23.63	0.75	1.06	1.297896
33.39	-2.91	11.44	0.19	6.46	-0.56	2.21	0.56	0.62	0.42	27.27	20.30	28.87	23.58	0.74	1.06	1.294275
-2.66	17.08	-2.56	0.19	-0.51	3.30	-0.49	0.60	0.50	0.83	27.30	20.31	28.92	23.54	0.74	1.06	1.294263
-32.59	2.05	-9.51	0.19	-6.27	0.39	-1.83	0.82	0.68	0.87	27.26	20.32	28.95	23.49	0.75	1.06	1.297736
21.44	2.05	5.52	0.19	4.12	0.39	1.06	0.34	1.50	1.06	27.13	20.34	28.97	23.44	0.75	1.07	1.304575
-2.59	6.05	-1.47	0.19	-0.50	1.16	-0.28	0.03	0.65	1.49	26.93	20.37	28.96	23.39	0.76	1.08	1.314647
-29.52	4.04	11.53	0.19	-5.64	0.77	2.20	0.69	0.57	1.40	26.65	20.40	28.91	23.34	0.77	1.08	1.327825
18.51	-7.94	10.51	0.19	3.53	-1.51	2.00	0.45	0.49	0.53	26.30	20.43	28.84	23.29	0.78	1.10	1.343947
-0.52	-3.90	-19.45	0.19	-0.10	-0.74	-3.70	0.40	0.42	0.23	25.88	20.45	28.73	23.24	0.79	1.11	1.362877
-19.48	15.09	-9.38	0.19	-3.69	2.86	-1.78	0.31	0.95	0.49	25.40	20.47	28.59	23.19	0.81	1.13	1.384447
7.55	-5.92	-5.33	0.19	1.43	-1.12	-1.01	0.75	0.63	0.77	24.87	20.49	28.42	23.14	0.82	1.14	1.408416
6.53	-2.89	-7.28	0.19	1.23	-0.54	-1.37	3.32	1.94	1.02	24.31	20.50	28.22	23.10	0.84	1.16	1.434561
0.52	20.09	11.73	0.19	0.10	3.78	2.21	2.66	2.25	2.04	23.73	20.51	28.00	23.05	0.86	1.18	1.462711
-11.45	-15.91	-1.27	0.19	-2.15	-2.98	-0.24	0.67	1.35	1.31	23.12	20.52	27.76	23.00	0.89	1.20	1.49264
15.55	-6.85	-6.23	0.19	2.91	-1.28	-1.17	0.93	0.86	0.00	22.51	20.52	27.50	22.95	0.91	1.22	1.524037
-3.47	24.13	1.80	0.19	-0.65	4.50	0.34	0.66	0.89	0.44	21.91	20.52	27.23	22.90	0.94	1.24	1.556522
-32.39	-5.90	-13.16	0.19	-6.02	-1.10	-2.45	0.55	1.12	0.90	21.31	20.53	26.95	22.85	0.96	1.26	1.589674
36.61	1.12	-4.10	0.19	6.79	0.21	-0.76	0.61	0.86	0.84	20.73	20.53	26.67	22.80	0.99	1.29	1.62306
-12.44	19.09	7.91	0.19	-2.30	3.53	1.46	0.47	0.37	0.76	20.18	20.52	26.38	22.75	1.02	1.31	1.656244
-28.35	-6.92	-1.08	0.18	-5.23	-1.28	-0.20	0.32	0.42	0.36	19.66	20.52	26.09	22.71	1.04	1.33	1.688775
40.63	-19.85	-3.05	0.18	7.48	-3.65	-0.56	0.98	1.04	0.29	19.17	20.52	25.81	22.66	1.07	1.35	1.720193
-24.39	-5.79	-10.00	0.18	-4.48	-1.06	-1.84	0.43	1.43	1.16	18.72	20.53	25.54	22.61	1.10	1.36	1.750052
-11.32	1.23	-2.96	0.18	-2.07	0.23	-0.54	0.57	0.46	0.80	18.32	20.53	25.28	22.56	1.12	1.38	1.777911
39.63	-9.74	7.06	0.18	7.23	-1.78	1.29	0.37	0.68	1.19	17.97	20.55	25.05	22.51	1.14	1.39	1.80326
-8.42	-2.70	-8.92	0.18	-1.53	-0.49	-1.62	1.62	0.80	1.25	17.66	20.57	24.83	22.46	1.16	1.41	1.825564

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-10.38	-11.66	-15.85	0.18	-1.88	-2.12	-2.88	1.46	0.13	1.44	17.41	20.60	24.64	22.41	1.18	1.41	1.84
15.62	-19.59	-0.79	0.18	2.83	-3.55	-0.14	1.02	0.44	1.37	17.22	20.65	24.47	22.36	1.20	1.42	1.86
12.57	-0.54	1.23	0.18	2.27	-0.10	0.22	0.94	0.93	1.57	17.09	20.71	24.32	22.31	1.21	1.42	1.87
-16.42	-8.51	-6.74	0.18	-2.96	-1.53	-1.21	1.56	1.02	1.81	17.01	20.78	24.20	22.27	1.22	1.42	1.88
7.60	0.52	10.28	0.18	1.36	0.09	1.84	0.62	0.05	1.45	16.98	20.87	24.09	22.22	1.23	1.42	1.88
31.53	-5.46	7.26	0.18	5.64	-0.98	1.30	0.47	0.42	1.07	17.01	20.98	24.00	22.17	1.23	1.41	1.87
-28.47	-18.40	-2.72	0.18	-5.08	-3.28	-0.49	0.08	0.85	0.82	17.09	21.09	23.93	22.12	1.23	1.40	1.87
-4.40	7.64	8.29	0.18	-0.78	1.36	1.47	1.54	0.44	1.32	17.21	21.22	23.86	22.07	1.23	1.39	1.86
30.56	-10.34	-9.69	0.18	5.42	-1.84	-1.72	3.23	1.02	1.40	17.37	21.36	23.81	22.02	1.23	1.37	1.84
-20.46	-8.29	12.33	0.18	-3.62	-1.47	2.18	2.43	1.51	1.24	17.57	21.50	23.77	21.97	1.22	1.35	1.82
7.57	10.71	28.27	0.18	1.34	1.89	4.99	0.85	0.59	0.91	17.79	21.64	23.74	21.92	1.22	1.33	1.81
30.50	-13.27	-4.76	0.18	5.37	-2.34	-0.84	0.43	0.55	1.44	18.05	21.79	23.72	21.88	1.21	1.31	1.78
-11.53	-8.21	31.21	0.18	-2.02	-1.44	5.48	0.30	0.57	1.70	18.33	21.93	23.72	21.83	1.20	1.29	1.76
4.49	4.81	26.11	0.18	0.79	0.84	4.57	0.35	0.25	1.02	18.64	22.07	23.72	21.78	1.18	1.27	1.74
28.43	0.81	-15.89	0.17	4.96	0.14	-2.77	0.51	0.23	0.20	18.97	22.20	23.74	21.73	1.17	1.25	1.71
7.36	8.80	22.12	0.17	1.28	1.53	3.85	1.26	1.15	0.97	19.31	22.32	23.77	21.68	1.16	1.23	1.69
-13.62	8.78	11.08	0.17	-2.36	1.52	1.92	0.96	0.37	1.58	19.67	22.43	23.81	21.63	1.14	1.21	1.66
7.40	-4.22	-11.90	0.17	1.28	-0.73	-2.06	0.26	1.20	1.64	20.03	22.51	23.87	21.58	1.12	1.19	1.64
10.37	-6.18	12.12	0.17	1.79	-1.07	2.09	0.50	1.12	0.85	20.41	22.58	23.95	21.53	1.11	1.17	1.61
-8.63	12.81	3.11	0.17	-1.48	2.20	0.53	0.21	1.22	0.63	20.78	22.61	24.06	21.48	1.09	1.16	1.59
22.35	2.80	6.11	0.17	3.83	0.48	1.05	0.27	1.63	0.78	21.15	22.62	24.19	21.44	1.07	1.14	1.57
10.29	-4.19	3.11	0.17	1.76	-0.72	0.53	0.68	0.43	0.63	21.50	22.60	24.34	21.39	1.05	1.13	1.54
-21.68	12.81	-10.85	0.17	-3.70	2.18	-1.85	0.44	0.30	0.62	21.84	22.54	24.51	21.34	1.03	1.12	1.52
13.34	-3.20	19.15	0.17	2.27	-0.54	3.26	0.37	1.08	0.38	22.17	22.45	24.71	21.29	1.01	1.11	1.51
6.30	2.81	4.13	0.17	1.07	0.48	0.70	0.32	0.35	0.89	22.47	22.34	24.93	21.24	0.99	1.11	1.49
-13.68	20.78	-27.81	0.17	-2.31	3.51	-4.70	0.60	0.96	1.14	22.77	22.20	25.17	21.19	0.97	1.11	1.47
21.31	8.73	6.26	0.17	3.59	1.47	1.05	0.96	0.17	0.54	23.05	22.04	25.44	21.14	0.96	1.10	1.46
1.27	16.69	5.26	0.17	0.21	2.80	0.88	0.94	0.31	0.62	23.31	21.85	25.72	21.09	0.94	1.10	1.45
-20.68	12.65	-17.70	0.17	-3.46	2.12	-2.96	0.35	0.27	0.57	23.56	21.66	26.02	21.04	0.92	1.10	1.44
16.33	1.63	-3.64	0.17	2.73	0.27	-0.61	0.16	0.09	1.07	23.77	21.45	26.33	21.00	0.90	1.11	1.43
0.30	3.63	-8.59	0.17	0.05	0.60	-1.43	0.25	0.65	0.34	23.96	21.23	26.65	20.95	0.89	1.11	1.42
-15.66	4.63	-1.55	0.17	-2.60	0.77	-0.26	0.57	0.56	0.64	24.12	21.00	26.96	20.90	0.87	1.12	1.42

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
24.33	19.59	-0.52	0.17	4.03	3.24	-0.09	0.63	1.14	0.64	24.24	20.77	27.26	20.85	0.86	1.12	1.41
10.26	-2.43	-19.46	0.17	1.69	-0.40	-3.21	0.62	0.42	0.40	24.32	20.54	27.55	20.80	0.84	1.13	1.41
-19.71	-10.40	-1.40	0.16	-3.24	-1.71	-0.23	0.71	0.94	0.60	24.36	20.32	27.81	20.75	0.83	1.14	1.41
14.30	11.61	-0.38	0.16	2.35	1.90	-0.06	0.61	0.39	1.16	24.36	20.11	28.04	20.70	0.83	1.15	1.42
3.27	-4.39	-12.33	0.16	0.54	-0.72	-2.02	0.90	1.18	1.35	24.31	19.91	28.24	20.65	0.82	1.16	1.42
-13.70	6.62	1.71	0.16	-2.23	1.08	0.28	0.96	1.01	1.42	24.22	19.73	28.39	20.61	0.81	1.17	1.43
9.31	16.58	-2.26	0.16	1.51	2.69	-0.37	0.23	0.14	1.39	24.08	19.57	28.50	20.56	0.81	1.18	1.44
-17.67	-8.42	-15.21	0.16	-2.86	-1.36	-2.46	0.65	0.84	2.01	23.91	19.42	28.55	20.51	0.81	1.19	1.44
-23.58	-3.39	-16.12	0.16	-3.81	-0.55	-2.60	0.78	0.39	2.20	23.69	19.30	28.56	20.46	0.81	1.21	1.45
3.47	-4.36	-1.07	0.16	0.56	-0.70	-0.17	1.05	0.54	1.66	23.44	19.19	28.52	20.41	0.82	1.22	1.47
10.45	-7.33	9.93	0.16	1.68	-1.18	1.59	1.07	0.34	0.94	23.14	19.09	28.43	20.36	0.82	1.23	1.48
-5.56	0.70	3.93	0.16	-0.89	0.11	0.63	0.36	0.87	1.47	22.81	19.00	28.29	20.31	0.83	1.24	1.49
-8.53	-9.27	3.93	0.16	-1.36	-1.48	0.63	0.29	0.47	0.52	22.43	18.92	28.10	20.26	0.84	1.25	1.51
18.46	-11.22	0.95	0.16	2.94	-1.78	0.15	0.74	0.60	1.61	22.02	18.84	27.88	20.21	0.86	1.27	1.53
-8.55	-9.17	4.95	0.16	-1.36	-1.45	0.79	0.75	0.30	0.86	21.58	18.77	27.62	20.17	0.87	1.28	1.55
3.46	-16.10	8.95	0.16	0.55	-2.54	1.41	1.22	0.24	1.05	21.13	18.70	27.32	20.12	0.89	1.29	1.57
33.39	-9.04	7.93	0.16	5.26	-1.42	1.25	1.44	0.58	0.85	20.66	18.64	27.01	20.07	0.90	1.31	1.59
-19.63	0.99	19.90	0.16	-3.08	0.16	3.12	1.48	0.82	0.15	20.19	18.57	26.67	20.02	0.92	1.32	1.61
-3.58	-19.96	9.86	0.16	-0.56	-3.12	1.54	0.87	0.66	0.85	19.72	18.50	26.34	19.97	0.94	1.34	1.63
31.37	-19.87	-1.14	0.16	4.89	-3.10	-0.18	0.49	0.80	0.78	19.26	18.43	26.00	19.92	0.96	1.35	1.65
-24.64	15.15	14.86	0.16	-3.83	2.36	2.31	0.49	0.15	0.73	18.82	18.35	25.68	19.87	0.97	1.36	1.68
-22.54	-3.86	19.81	0.16	-3.49	-0.60	3.07	0.30	1.11	0.62	18.40	18.25	25.38	19.82	0.99	1.38	1.70
28.46	-19.80	15.76	0.15	4.40	-3.06	2.43	0.81	0.64	0.62	18.02	18.15	25.11	19.78	1.01	1.39	1.72
-11.57	11.23	12.72	0.15	-1.78	1.73	1.96	1.07	1.03	0.48	17.67	18.04	24.87	19.73	1.02	1.41	1.74
-16.51	-7.76	-0.28	0.15	-2.53	-1.19	-0.04	1.03	0.34	1.14	17.36	17.92	24.68	19.68	1.03	1.42	1.76
33.46	-9.72	16.70	0.15	5.12	-1.49	2.56	0.92	1.15	1.19	17.09	17.78	24.54	19.63	1.04	1.44	1.77
-12.58	4.31	24.64	0.15	-1.92	0.66	3.76	0.70	1.17	0.28	16.86	17.65	24.45	19.58	1.05	1.45	1.79
-23.50	-16.65	-6.38	0.15	-3.57	-2.53	-0.97	0.75	1.09	0.64	16.69	17.50	24.40	19.53	1.05	1.46	1.80
33.49	12.37	-6.33	0.15	5.07	1.87	-0.96	1.04	0.97	1.38	16.56	17.36	24.39	19.48	1.05	1.47	1.81
-2.57	14.33	11.68	0.15	-0.39	2.16	1.76	0.82	0.52	1.20	16.48	17.22	24.44	19.43	1.04	1.48	1.81
-36.49	-9.67	6.66	0.15	-5.49	-1.46	1.00	0.55	0.57	0.58	16.46	17.09	24.52	19.38	1.04	1.49	1.82

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
23.54	13.33	-4.32	0.15	3.53	2.00	-0.65	0.97	1.24	0.64	16.48	16.96	24.64	19.34	1.03	1.49	23.54
8.49	5.31	-3.29	0.15	1.27	0.79	-0.49	1.36	0.69	0.32	16.55	16.84	24.78	19.29	1.02	1.50	8.49
-35.46	-2.68	6.73	0.15	-5.28	-0.40	1.00	0.94	0.14	0.83	16.67	16.73	24.96	19.24	1.00	1.50	-35.46
14.59	5.32	4.72	0.15	2.17	0.79	0.70	0.39	0.85	1.63	16.82	16.63	25.15	19.19	0.99	1.50	14.59
9.55	5.31	-13.24	0.15	1.41	0.79	-1.96	0.76	0.36	1.68	17.01	16.54	25.34	19.14	0.97	1.49	9.55
-21.42	12.29	-9.18	0.15	-3.16	1.81	-1.35	0.77	1.26	2.16	17.22	16.46	25.54	19.09	0.96	1.48	-21.42
5.62	0.28	6.85	0.15	0.83	0.04	1.01	0.35	0.99	0.85	17.46	16.40	25.74	19.04	0.94	1.47	5.62
13.58	-6.70	-3.14	0.15	1.99	-0.98	-0.46	0.29	0.32	2.20	17.72	16.36	25.92	18.99	0.92	1.46	13.58
0.56	11.31	-8.10	0.15	0.08	1.65	-1.18	0.59	0.63	1.43	17.99	16.34	26.08	18.95	0.91	1.45	0.56
-1.43	16.26	-6.05	0.15	-0.21	2.37	-0.88	1.27	0.41	1.06	18.27	16.34	26.21	18.90	0.89	1.43	-1.43
19.54	-2.75	-9.00	0.15	2.83	-0.40	-1.30	0.97	0.54	1.29	18.55	16.36	26.31	18.85	0.88	1.42	19.54
8.48	3.26	-0.96	0.14	1.23	0.47	-0.14	0.42	0.53	0.38	18.83	16.40	26.37	18.80	0.87	1.40	8.48
-11.50	27.21	-10.91	0.14	-1.66	3.92	-1.57	0.35	0.44	0.14	19.11	16.46	26.40	18.75	0.86	1.38	-11.50
5.51	-5.82	-14.84	0.14	0.79	-0.84	-2.13	0.30	0.75	0.30	19.38	16.54	26.39	18.70	0.85	1.36	5.51
8.49	-7.78	16.18	0.14	1.21	-1.11	2.31	0.26	0.59	0.58	19.64	16.64	26.35	18.65	0.85	1.34	8.49
-1.52	26.19	11.14	0.14	-0.22	3.73	1.59	0.90	0.25	0.98	19.88	16.75	26.28	18.60	0.84	1.32	-1.52
1.49	-6.83	-19.82	0.14	0.21	-0.97	-2.81	1.15	1.76	1.41	20.11	16.88	26.18	18.55	0.84	1.30	1.49
3.48	-3.80	-9.74	0.14	0.49	-0.54	-1.38	1.60	2.21	0.93	20.32	17.01	26.07	18.51	0.84	1.28	3.48
-12.50	10.20	-7.69	0.14	-1.76	1.44	-1.08	1.33	0.71	1.50	20.51	17.16	25.93	18.46	0.84	1.26	-12.50
-5.45	-9.79	-12.62	0.14	-0.77	-1.38	-1.77	1.31	0.56	1.88	20.67	17.31	25.79	18.41	0.84	1.25	-5.45
0.56	8.23	-0.58	0.14	0.08	1.15	-0.08	1.03	2.01	0.92	20.81	17.47	25.65	18.36	0.84	1.23	0.56
-12.41	-0.78	5.43	0.14	-1.73	-0.11	0.76	0.61	1.61	0.75	20.92	17.63	25.51	18.31	0.84	1.22	-12.41
27.56	-3.76	15.41	0.14	3.83	-0.52	2.14	0.58	1.06	0.70	21.01	17.80	25.39	18.26	0.85	1.21	27.56
5.50	12.24	3.40	0.14	0.76	1.69	0.47	0.70	1.19	1.01	21.07	17.97	25.28	18.21	0.85	1.20	5.50
-33.44	-12.75	-1.59	0.14	-4.61	-1.76	-0.22	0.43	1.39	0.61	21.11	18.13	25.20	18.16	0.86	1.19	-33.44
36.56	6.28	11.41	0.14	5.03	0.86	1.57	0.62	0.89	1.35	21.14	18.30	25.14	18.12	0.87	1.19	36.56
-3.50	9.26	-3.58	0.14	-0.48	1.27	-0.49	0.30	0.73	0.84	21.14	18.46	25.11	18.07	0.87	1.19	-3.50
-31.42	-10.73	6.43	0.14	-4.29	-1.46	0.88	0.59	0.28	1.08	21.13	18.61	25.11	18.02	0.88	1.19	-31.42
70.50	15.27	24.39	0.14	9.59	2.08	3.32	0.55	0.64	1.68	21.10	18.76	25.14	17.97	0.89	1.19	70.50
-7.62	-8.73	10.34	0.14	-1.03	-1.18	1.40	0.15	0.46	1.46	21.05	18.91	25.20	17.92	0.90	1.20	-7.62
-36.52	-24.65	-0.66	0.14	-4.93	-3.33	-0.09	0.18	0.91	0.54	21.00	19.05	25.28	17.87	0.91	1.20	-36.52

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
66.42	5.40	3.36	0.13	8.93	0.73	0.45	0.52	0.56	0.76	20.93	19.19	25.38	17.82	0.92	1.21	1.52
-29.65	-10.58	16.34	0.13	-3.97	-1.42	2.19	0.38	0.74	0.58	20.85	19.33	25.51	17.77	0.93	1.22	1.53
-30.52	-19.50	5.31	0.13	-4.07	-2.60	0.71	0.79	0.88	0.45	20.77	19.47	25.65	17.72	0.94	1.24	1.55
57.43	0.55	-4.67	0.13	7.64	0.07	-0.62	0.83	0.90	1.24	20.68	19.62	25.81	17.68	0.95	1.25	1.57
-31.62	-2.44	-1.64	0.13	-4.19	-0.32	-0.22	0.06	1.18	1.28	20.59	19.77	25.98	17.63	0.96	1.26	1.59
-17.52	-6.41	-14.58	0.13	-2.31	-0.85	-1.93	0.14	0.58	0.12	20.50	19.94	26.15	17.58	0.97	1.28	1.60
41.44	3.61	-1.53	0.13	5.45	0.47	-0.20	0.58	0.86	0.74	20.41	20.11	26.32	17.53	0.99	1.29	1.62
-20.60	1.61	6.48	0.13	-2.70	0.21	0.85	0.85	1.12	1.51	20.33	20.30	26.48	17.48	1.00	1.30	1.64
-15.52	-10.36	0.48	0.13	-2.03	-1.35	0.06	0.36	1.06	0.84	20.24	20.50	26.63	17.43	1.01	1.32	1.66
15.49	-10.30	9.48	0.13	2.01	-1.34	1.23	1.27	0.85	0.91	20.15	20.71	26.76	17.38	1.03	1.33	1.68
-1.54	4.72	-7.50	0.13	-0.20	0.61	-0.97	0.54	0.75	0.70	20.06	20.93	26.86	17.33	1.04	1.34	1.70
-13.50	-0.28	-13.44	0.13	-1.74	-0.04	-1.73	0.42	0.74	0.72	19.97	21.16	26.95	17.29	1.06	1.35	1.72
-1.47	-17.23	-2.39	0.13	-0.19	-2.21	-0.31	0.76	0.19	1.07	19.87	21.39	27.00	17.24	1.08	1.36	1.73
12.52	11.79	-3.35	0.13	1.60	1.51	-0.43	0.72	0.57	1.56	19.76	21.63	27.04	17.19	1.09	1.37	1.75
-19.47	19.74	2.67	0.13	-2.48	2.52	0.34	1.04	1.04	2.19	19.65	21.88	27.05	17.14	1.11	1.38	1.77
-11.40	-12.26	-7.30	0.13	-1.45	-1.56	-0.93	0.49	0.70	1.78	19.53	22.12	27.05	17.09	1.13	1.39	1.79
22.58	1.77	-10.25	0.13	2.86	0.22	-1.30	0.46	1.05	0.58	19.39	22.36	27.03	17.04	1.15	1.39	1.81
-37.38	9.76	7.78	0.13	-4.71	1.23	0.98	1.04	1.22	0.42	19.25	22.59	27.00	16.99	1.17	1.40	1.83
-9.28	-1.24	0.78	0.13	-1.16	-0.16	0.10	0.51	0.10	0.51	19.10	22.81	26.95	16.94	1.19	1.41	1.85
45.65	6.76	1.80	0.13	5.71	0.84	0.22	0.30	0.70	0.50	18.94	23.02	26.89	16.89	1.22	1.42	1.87
-39.36	4.75	5.80	0.12	-4.90	0.59	0.72	0.84	1.06	0.82	18.76	23.20	26.81	16.85	1.24	1.43	1.89
8.71	-4.24	-13.17	0.12	1.08	-0.53	-1.63	1.27	0.38	0.73	18.57	23.36	26.72	16.80	1.26	1.44	1.91
42.61	-8.20	-1.12	0.12	5.26	-1.01	-0.14	0.68	1.65	0.25	18.36	23.50	26.62	16.75	1.28	1.45	1.93
-46.38	-15.15	2.90	0.12	-5.70	-1.86	0.36	1.80	3.00	2.02	18.14	23.60	26.51	16.70	1.30	1.46	1.96
34.65	-10.08	-2.08	0.12	4.24	-1.24	-0.25	5.65	8.17	5.34	17.92	23.67	26.39	16.65	1.32	1.47	1.98
26.53	7.93	22.90	0.12	3.24	0.97	2.79	3.49	3.26	2.97	17.69	23.72	26.28	16.60	1.34	1.49	2.00
-48.42	6.92	6.86	0.12	-5.88	0.84	0.83	1.35	0.72	1.03	17.47	23.73	26.18	16.55	1.36	1.50	2.02
27.63	5.90	-7.12	0.12	3.34	0.71	-0.86	0.60	0.35	0.91	17.25	23.73	26.08	16.50	1.38	1.51	2.04
-2.42	4.89	1.91	0.12	-0.29	0.59	0.23	0.03	0.29	0.50	17.06	23.71	26.00	16.46	1.39	1.52	2.06
-25.36	-14.07	4.91	0.12	-3.04	-1.69	0.59	0.50	0.50	0.35	16.88	23.68	25.94	16.41	1.40	1.54	2.08
25.65	5.95	14.89	0.12	3.07	0.71	1.78	0.98	0.34	0.21	16.74	23.65	25.90	16.36	1.41	1.55	2.10

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-13.37	23.91	-8.10	0.12	-1.59	2.84	-0.96	0.05	0.64	0.86	16.63	23.62	25.87	16.31	1.42	1.56	2.11
-32.27	-14.10	-7.05	0.12	-3.82	-1.67	-0.84	0.63	0.63	0.95	16.56	23.60	25.87	16.26	1.43	1.56	2.11
11.77	-14.03	8.97	0.12	1.39	-1.66	1.06	0.54	0.46	1.13	16.53	23.60	25.88	16.21	1.43	1.57	2.12
20.71	6.99	-3.02	0.12	2.43	0.82	-0.36	0.82	0.22	1.32	16.56	23.61	25.91	16.16	1.43	1.56	2.12
-26.27	-16.97	5.99	0.12	-3.07	-1.99	0.70	1.01	1.07	0.91	16.63	23.65	25.96	16.11	1.42	1.56	2.11
-5.20	-3.92	7.98	0.12	-0.61	-0.46	0.93	0.88	0.80	0.78	16.76	23.73	26.03	16.06	1.42	1.55	2.10
36.74	23.05	10.96	0.12	4.26	2.67	1.27	0.51	0.39	0.59	16.95	23.85	26.13	16.02	1.41	1.54	2.09
-17.29	-2.97	2.95	0.12	-2.00	-0.34	0.34	0.59	0.09	0.39	17.21	24.01	26.25	15.97	1.40	1.53	2.07
-10.23	-8.94	-8.02	0.12	-1.18	-1.03	-0.92	0.30	0.33	0.30	17.53	24.22	26.40	15.92	1.38	1.51	2.04
28.73	-0.91	11.00	0.11	3.29	-0.10	1.26	0.86	0.50	0.70	17.91	24.49	26.59	15.87	1.37	1.48	2.02
-20.28	5.10	-1.00	0.11	-2.31	0.58	-0.11	1.15	0.49	0.63	18.37	24.82	26.80	15.82	1.35	1.46	1.99
-8.22	35.03	-7.96	0.11	-0.93	3.98	-0.90	0.74	0.68	0.44	18.88	25.20	27.03	15.77	1.33	1.43	1.96
18.77	14.94	-0.93	0.11	2.12	1.69	-0.10	0.94	1.11	0.55	19.44	25.63	27.29	15.72	1.32	1.40	1.93
-41.18	-15.05	2.09	0.11	-4.63	-1.69	0.24	1.07	0.21	0.55	20.04	26.09	27.55	15.67	1.30	1.37	1.89
-9.08	14.97	12.08	0.11	-1.02	1.68	1.35	1.13	0.05	0.64	20.67	26.57	27.82	15.63	1.29	1.35	1.86
41.86	13.92	-2.92	0.11	4.67	1.55	-0.33	0.71	0.83	0.32	21.31	27.07	28.08	15.58	1.27	1.32	1.83
-27.16	-22.05	6.10	0.11	-3.01	-2.45	0.68	1.07	0.36	0.53	21.96	27.57	28.33	15.53	1.26	1.29	1.80
-9.08	15.97	20.06	0.11	-1.00	1.77	2.22	0.39	0.38	1.02	22.60	28.05	28.56	15.48	1.24	1.26	1.77
43.85	31.89	-1.95	0.11	4.82	3.51	-0.21	0.14	0.61	0.83	23.23	28.51	28.77	15.43	1.23	1.24	1.74
-42.14	-16.13	0.07	0.11	-4.61	-1.77	0.01	0.27	0.87	0.76	23.84	28.94	28.95	15.38	1.21	1.21	1.72
-23.01	-2.08	2.08	0.11	-2.51	-0.23	0.23	1.11	0.58	1.27	24.41	29.32	29.09	15.33	1.20	1.19	1.69
67.91	-2.06	0.10	0.11	7.37	-0.22	0.01	1.00	0.97	1.46	24.95	29.64	29.20	15.28	1.19	1.17	1.67
-35.15	-7.03	3.11	0.11	-3.80	-0.76	0.34	0.76	0.82	1.62	25.44	29.90	29.27	15.23	1.18	1.15	1.65
-39.00	10.97	-14.84	0.11	-4.19	1.18	-1.60	0.85	0.65	0.90	25.86	30.08	29.30	15.19	1.16	1.13	1.62
58.97	-1.04	-3.79	0.11	6.31	-0.11	-0.41	0.35	0.78	1.00	26.23	30.18	29.27	15.14	1.15	1.12	1.60
-53.04	15.95	14.21	0.11	-5.65	1.70	1.51	0.32	0.75	1.07	26.52	30.18	29.19	15.09	1.14	1.10	1.58
-20.89	14.90	-3.79	0.11	-2.21	1.58	-0.40	1.01	1.07	0.75	26.73	30.07	29.05	15.04	1.12	1.09	1.56
68.02	-15.09	-2.76	0.11	7.18	-1.59	-0.29	2.25	1.28	1.40	26.86	29.85	28.85	14.99	1.11	1.07	1.55
-56.99	-12.03	10.25	0.11	-5.98	-1.26	1.08	1.48	0.60	1.07	26.89	29.52	28.57	14.94	1.10	1.06	1.53
-7.86	3.00	-5.74	0.10	-0.82	0.31	-0.60	0.40	0.60	1.38	26.85	29.09	28.24	14.89	1.08	1.05	1.51
55.05	8.99	-11.69	0.10	5.73	0.94	-1.22	1.14	0.55	1.30	26.73	28.56	27.86	14.84	1.07	1.04	1.49

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-37.97	-3.01	3.35	0.10	-3.93	-0.31	0.35	0.44	0.37	0.27	26.54	27.95	27.44	14.79	1.05	1.03	1.48
15.08	-7.98	-1.64	0.10	1.55	-0.82	-0.17	2.36	0.81	1.04	26.31	27.28	26.98	14.75	1.04	1.03	1.46
34.98	12.03	-4.60	0.10	3.59	1.23	-0.47	1.72	1.47	0.94	26.02	26.55	26.51	14.70	1.02	1.02	1.44
-37.01	10.00	3.42	0.10	-3.77	1.02	0.35	0.70	0.49	0.35	25.70	25.79	26.02	14.65	1.00	1.01	1.43
12.05	-11.99	-6.56	0.10	1.22	-1.22	-0.67	1.21	1.35	0.45	25.35	25.00	25.54	14.60	0.99	1.01	1.41
22.98	16.01	-0.52	0.10	2.32	1.62	-0.05	1.24	1.22	1.10	24.98	24.19	25.06	14.55	0.97	1.00	1.39
-30.00	26.94	-1.50	0.10	-3.01	2.71	-0.15	1.03	1.04	1.49	24.60	23.38	24.59	14.50	0.95	1.00	1.38
6.05	-32.04	-12.45	0.10	0.61	-3.20	-1.25	0.46	0.48	1.36	24.22	22.59	24.14	14.45	0.93	1.00	1.37
20.01	-18.93	7.58	0.10	1.99	-1.88	0.75	0.05	1.00	0.36	23.84	21.82	23.73	14.40	0.92	1.00	1.35
-19.99	6.11	9.56	0.10	-1.98	0.61	0.95	0.71	0.59	0.62	23.48	21.09	23.34	14.36	0.90	0.99	1.34
-1.94	-13.86	4.55	0.10	-0.19	-1.37	0.45	0.74	0.57	0.69	23.14	20.41	23.00	14.31	0.88	0.99	1.33
18.04	7.16	19.53	0.10	1.77	0.70	1.91	0.62	0.37	0.70	22.83	19.78	22.70	14.26	0.87	0.99	1.32
-10.97	-13.81	2.50	0.10	-1.07	-1.35	0.24	0.62	1.02	1.05	22.56	19.23	22.46	14.21	0.85	1.00	1.31
-2.94	-7.75	-13.46	0.10	-0.29	-0.75	-1.31	0.15	0.35	0.91	22.33	18.75	22.28	14.16	0.84	1.00	1.30
27.02	10.25	4.58	0.10	2.61	0.99	0.44	0.35	0.60	0.49	22.16	18.36	22.15	14.11	0.83	1.00	1.30
-11.01	-30.70	4.58	0.10	-1.06	-2.95	0.44	0.49	1.11	1.14	22.04	18.05	22.09	14.06	0.82	1.00	1.29
-13.95	19.34	-2.41	0.10	-1.33	1.85	-0.23	0.96	0.93	0.35	21.97	17.83	22.09	14.01	0.81	1.01	1.29
25.03	24.26	23.57	0.10	2.38	2.31	2.24	0.12	0.75	0.71	21.94	17.68	22.14	13.96	0.81	1.01	1.29
-30.95	-33.71	18.51	0.09	-2.93	-3.19	1.75	2.26	1.01	0.72	21.96	17.60	22.23	13.92	0.80	1.01	1.29
-29.83	11.35	-12.49	0.09	-2.80	1.07	-1.17	5.31	1.13	0.48	22.01	17.59	22.36	13.87	0.80	1.02	1.29
34.17	3.33	-8.43	0.09	3.19	0.31	-0.79	1.85	0.87	0.41	22.10	17.63	22.51	13.82	0.80	1.02	1.29
-31.83	-14.63	-0.39	0.09	-2.96	-1.36	-0.04	0.98	0.50	0.16	22.22	17.72	22.69	13.77	0.80	1.02	1.30
-31.70	21.37	8.61	0.09	-2.93	1.98	0.80	1.30	1.01	1.06	22.37	17.86	22.87	13.72	0.80	1.02	1.30
49.28	-3.66	17.58	0.09	4.53	-0.34	1.62	1.09	0.68	1.41	22.54	18.04	23.06	13.67	0.80	1.02	1.30
-23.77	5.35	-8.42	0.09	-2.17	0.49	-0.77	0.38	0.18	1.55	22.72	18.24	23.25	13.62	0.80	1.02	1.30
-30.66	19.31	-3.38	0.09	-2.79	1.76	-0.31	0.21	0.48	1.60	22.92	18.47	23.43	13.57	0.81	1.02	1.30
50.31	-1.71	18.61	0.09	4.55	-0.15	1.68	2.13	1.02	0.32	23.12	18.70	23.59	13.53	0.81	1.02	1.30
-31.72	21.26	-5.39	0.09	-2.85	1.91	-0.49	2.93	0.95	1.18	23.33	18.95	23.74	13.48	0.81	1.02	1.30
-26.60	11.21	-4.36	0.09	-2.38	1.00	-0.39	0.98	0.74	1.09	23.54	19.20	23.86	13.43	0.82	1.01	1.30
59.34	-7.79	17.64	0.09	5.28	-0.69	1.57	0.28	0.84	1.22	23.75	19.43	23.95	13.38	0.82	1.01	1.30
-28.71	9.22	10.60	0.09	-2.54	0.82	0.94	1.69	0.40	1.01	23.95	19.66	24.01	13.33	0.82	1.00	1.30

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-7.63	2.21	-4.40	0.09	-0.67	0.19	-0.39	1.20	1.07	0.35	24.15	19.87	24.03	13.28	0.82	1.00	1.29
61.26	-8.76	-2.36	0.09	5.36	-0.77	-0.21	0.76	0.43	0.29	24.34	20.06	24.02	13.23	0.82	0.99	1.29
-29.79	4.26	11.64	0.09	-2.59	0.37	1.01	1.01	1.74	0.22	24.52	20.23	23.98	13.18	0.83	0.98	1.28
6.26	12.23	-0.37	0.09	0.54	1.06	-0.03	1.87	1.16	1.03	24.70	20.39	23.90	13.13	0.83	0.97	1.27
48.16	-10.76	-6.33	0.09	4.14	-0.93	-0.54	1.38	1.71	1.52	24.89	20.52	23.80	13.09	0.82	0.96	1.26
-17.90	-0.72	17.66	0.09	-1.53	-0.06	1.51	0.90	0.63	0.47	25.09	20.63	23.67	13.04	0.82	0.94	1.25
26.09	24.24	17.61	0.09	2.22	2.06	1.50	0.91	0.59	1.35	25.30	20.73	23.53	12.99	0.82	0.93	1.24
23.00	-1.79	-7.39	0.08	1.94	-0.15	-0.62	1.52	0.56	0.77	25.52	20.80	23.37	12.94	0.82	0.92	1.23
-20.01	5.21	-10.34	0.08	-1.68	0.44	-0.87	0.16	0.30	0.64	25.76	20.86	23.20	12.89	0.81	0.90	1.21
22.99	26.16	0.70	0.08	1.92	2.18	0.06	0.96	0.21	0.74	26.00	20.89	23.03	12.84	0.80	0.89	1.20
14.92	-2.88	2.71	0.08	1.24	-0.24	0.23	0.53	0.85	0.80	26.27	20.92	22.85	12.79	0.80	0.87	1.18
-18.07	3.13	3.72	0.08	-1.49	0.26	0.31	0.89	0.19	1.22	26.55	20.93	22.69	12.74	0.79	0.85	1.16
16.94	15.11	-0.27	0.08	1.39	1.24	-0.02	1.26	0.86	0.52	26.85	20.93	22.53	12.70	0.78	0.84	1.15
23.86	-8.89	0.75	0.08	1.94	-0.72	0.06	0.81	0.57	0.31	27.17	20.92	22.39	12.65	0.77	0.82	1.13
-30.12	5.13	3.76	0.08	-2.44	0.42	0.30	1.64	1.17	1.07	27.51	20.91	22.27	12.60	0.76	0.81	1.11
8.93	15.10	-5.22	0.08	0.72	1.22	-0.42	1.87	4.29	3.55	27.87	20.90	22.16	12.55	0.75	0.80	1.09
31.85	-12.90	-5.18	0.08	2.55	-1.03	-0.41	0.08	3.68	3.06	28.24	20.89	22.07	12.50	0.74	0.78	1.08
-36.13	-3.85	-0.15	0.08	-2.87	-0.31	-0.01	1.68	2.24	0.95	28.62	20.88	22.00	12.45	0.73	0.77	1.06
13.91	11.14	-5.12	0.08	1.10	0.88	-0.40	1.03	1.18	0.67	29.00	20.88	21.95	12.40	0.72	0.76	1.04
17.86	-11.84	-16.06	0.08	1.40	-0.93	-1.26	0.92	1.03	0.64	29.39	20.89	21.92	12.35	0.71	0.75	1.03
-39.10	-15.78	-5.00	0.08	-3.05	-1.23	-0.39	2.48	1.04	0.86	29.76	20.90	21.92	12.30	0.70	0.74	1.02
18.95	-16.70	1.02	0.08	1.47	-1.29	0.08	3.34	1.12	0.84	30.12	20.94	21.94	12.26	0.70	0.73	1.01
12.89	-10.64	-23.91	0.08	0.99	-0.82	-1.84	1.42	0.50	0.53	30.46	20.98	21.98	12.21	0.69	0.72	1.00
-46.04	9.38	-3.84	0.08	-3.52	0.72	-0.29	0.66	0.93	0.37	30.76	21.05	22.05	12.16	0.68	0.72	0.99
10.04	-2.62	7.18	0.08	0.76	-0.20	0.55	1.67	1.27	1.05	31.02	21.13	22.14	12.11	0.68	0.71	0.99
31.96	2.39	-13.79	0.08	2.41	0.18	-1.04	2.07	1.56	1.25	31.25	21.24	22.25	12.06	0.68	0.71	0.98
-47.01	-1.60	2.25	0.08	-3.53	-0.12	0.17	1.91	1.75	0.42	31.45	21.37	22.38	12.01	0.68	0.71	0.98
-4.90	-20.55	4.26	0.07	-0.36	-1.53	0.32	0.73	0.78	1.28	31.61	21.53	22.52	11.96	0.68	0.71	0.99
33.05	-3.49	7.25	0.07	2.45	-0.26	0.54	0.62	0.39	1.10	31.74	21.71	22.67	11.91	0.68	0.71	0.99
-48.91	-6.46	6.24	0.07	-3.60	-0.47	0.46	1.01	0.94	0.89	31.84	21.94	22.83	11.87	0.69	0.72	0.99
14.16	-11.41	-10.73	0.07	1.03	-0.83	-0.78	0.47	0.91	1.86	31.90	22.19	23.01	11.82	0.70	0.72	1.00

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
42.05	5.61	4.30	0.07	3.05	0.41	0.31	1.02	1.35	0.69	31.93	22.48	23.20	11.77	0.70	0.73	1.01
-54.91	9.59	4.31	0.07	-3.95	0.69	0.31	1.53	0.95	0.74	31.94	22.81	23.40	11.72	0.71	0.73	1.02
8.18	4.58	-1.68	0.07	0.59	0.33	-0.12	2.22	0.44	0.94	31.93	23.18	23.61	11.67	0.73	0.74	1.04
21.13	5.57	1.34	0.07	1.50	0.40	0.10	1.62	0.87	2.15	31.89	23.59	23.83	11.62	0.74	0.75	1.05
-42.82	5.56	-5.63	0.07	-3.02	0.39	-0.40	0.78	1.90	3.71	31.85	24.03	24.07	11.57	0.75	0.76	1.07
33.20	-3.44	-2.60	0.07	2.32	-0.24	-0.18	1.55	1.95	2.91	31.81	24.50	24.31	11.52	0.77	0.76	1.09
13.12	1.58	0.43	0.07	0.91	0.11	0.03	1.21	1.52	0.97	31.77	24.99	24.56	11.47	0.79	0.77	1.10
-36.83	-4.40	1.44	0.07	-2.54	-0.30	0.10	0.79	1.55	1.07	31.74	25.50	24.82	11.43	0.80	0.78	1.12
36.18	-1.38	-3.54	0.07	2.48	-0.09	-0.24	1.94	0.62	1.67	31.73	26.02	25.07	11.38	0.82	0.79	1.14
0.11	17.60	0.49	0.07	0.01	1.20	0.03	2.41	1.21	2.36	31.75	26.55	25.33	11.33	0.84	0.80	1.16
-35.82	-4.42	7.49	0.07	-2.42	-0.30	0.51	1.40	1.90	1.89	31.80	27.08	25.58	11.28	0.85	0.80	1.17
42.18	8.59	-9.49	0.07	2.83	0.58	-0.64	0.26	1.49	0.88	31.88	27.62	25.84	11.23	0.87	0.81	1.19
12.07	22.53	-13.42	0.07	0.80	1.50	-0.89	0.87	1.20	1.18	31.99	28.16	26.11	11.18	0.88	0.82	1.20
-38.87	-21.46	-1.37	0.07	-2.57	-1.42	-0.09	1.56	0.87	1.71	32.12	28.69	26.38	11.13	0.89	0.82	1.21
30.15	1.59	2.65	0.07	1.98	0.10	0.17	1.76	1.34	0.79	32.28	29.20	26.67	11.08	0.90	0.83	1.22
13.07	30.54	-13.31	0.07	0.85	1.99	-0.87	0.53	2.10	1.73	32.46	29.69	26.96	11.04	0.91	0.83	1.24
-41.87	-0.51	-15.24	0.06	-2.70	-0.03	-0.98	0.88	2.16	2.04	32.66	30.15	27.26	10.99	0.92	0.83	1.24
35.15	8.49	12.79	0.06	2.25	0.54	0.82	0.98	1.86	1.01	32.88	30.57	27.57	10.94	0.93	0.84	1.25
1.09	4.47	0.78	0.06	0.07	0.28	0.05	1.25	0.33	1.39	33.11	30.95	27.89	10.89	0.93	0.84	1.26
-36.84	-21.48	-15.17	0.06	-2.32	-1.35	-0.96	1.66	0.70	0.63	33.34	31.29	28.22	10.84	0.94	0.85	1.26
52.14	-4.42	-0.12	0.06	3.26	-0.28	-0.01	0.59	0.51	1.92	33.58	31.57	28.56	10.79	0.94	0.85	1.27
-26.91	-15.37	0.89	0.06	-1.67	-0.95	0.06	0.95	0.37	1.24	33.82	31.81	28.91	10.74	0.94	0.85	1.27
-27.79	-3.32	-2.08	0.06	-1.71	-0.20	-0.13	0.85	1.23	0.86	34.05	32.00	29.28	10.69	0.94	0.86	1.27
71.12	35.63	-8.04	0.06	4.34	2.17	-0.49	1.01	0.88	1.30	34.27	32.17	29.68	10.64	0.94	0.87	1.28
-42.93	-13.41	0.99	0.06	-2.60	-0.81	0.06	0.97	0.80	0.92	34.46	32.30	30.09	10.60	0.94	0.87	1.28
-18.80	-14.34	-1.99	0.06	-1.13	-0.86	-0.12	2.55	0.67	2.41	34.63	32.40	30.52	10.55	0.94	0.88	1.29
80.08	28.64	-18.93	0.06	4.76	1.70	-1.13	2.26	2.65	3.54	34.77	32.47	30.98	10.50	0.93	0.89	1.29
-41.99	-15.38	-12.84	0.06	-2.48	-0.91	-0.76	1.43	1.23	1.51	34.88	32.53	31.46	10.45	0.93	0.90	1.30
-18.86	-15.30	-1.80	0.06	-1.10	-0.90	-0.11	2.22	1.18	2.32	34.96	32.56	31.95	10.40	0.93	0.91	1.30
65.05	10.72	10.21	0.06	3.77	0.62	0.59	1.81	2.03	1.42	35.00	32.57	32.46	10.35	0.93	0.93	1.31
-40.99	-17.26	-1.79	0.06	-2.36	-0.99	-0.10	2.59	3.77	1.93	35.01	32.56	32.98	10.30	0.93	0.94	1.32

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-4.90	-8.20	-3.76	0.06	-0.28	-0.47	-0.21	1.38	2.46	1.39	35.00	32.55	33.50	10.25	0.93	0.96	1.33
47.02	2.83	4.26	0.06	2.66	0.16	0.24	0.58	1.87	1.71	34.96	32.53	34.02	10.21	0.93	0.97	1.35
-41.98	16.80	-8.71	0.06	-2.35	0.94	-0.49	0.69	2.24	2.37	34.90	32.52	34.55	10.16	0.93	0.99	1.36
5.10	28.72	2.32	0.06	0.28	1.59	0.13	0.82	1.27	3.04	34.83	32.51	35.06	10.11	0.93	1.01	1.37
33.02	-8.31	7.32	0.06	1.82	-0.46	0.40	1.18	0.90	3.16	34.74	32.51	35.58	10.06	0.94	1.02	1.39
-16.00	4.71	7.31	0.05	-0.87	0.26	0.40	1.05	0.65	2.11	34.63	32.53	36.08	10.01	0.94	1.04	1.40
3.03	20.67	29.26	0.05	0.16	1.12	1.58	1.07	0.68	0.77	34.52	32.57	36.57	9.96	0.94	1.06	1.42
0.02	-11.34	1.22	0.05	0.00	-0.61	0.07	2.65	0.92	0.88	34.40	32.62	37.05	9.91	0.95	1.08	1.44
1.03	-8.29	-16.73	0.05	0.05	-0.44	-0.89	3.03	2.28	0.31	34.28	32.69	37.50	9.86	0.95	1.09	1.45
-1.97	18.70	-0.68	0.05	-0.10	0.98	-0.04	1.71	1.93	1.34	34.16	32.77	37.93	9.81	0.96	1.11	1.47
-0.96	16.64	-17.62	0.05	-0.05	0.87	-0.92	0.76	1.36	1.32	34.05	32.86	38.33	9.77	0.96	1.13	1.48
12.03	-7.37	1.43	0.05	0.62	-0.38	0.07	0.93	0.67	1.76	33.97	32.96	38.72	9.72	0.97	1.14	1.50
-8.98	1.65	17.41	0.05	-0.46	0.08	0.89	1.51	0.18	0.46	33.90	33.08	39.08	9.67	0.98	1.15	1.51
14.02	-9.32	-15.57	0.05	0.71	-0.47	-0.79	1.09	1.78	0.71	33.86	33.22	39.43	9.62	0.98	1.16	1.52
-8.99	-23.25	-7.51	0.05	-0.45	-1.16	-0.38	0.35	0.77	1.06	33.85	33.37	39.76	9.57	0.99	1.17	1.53
-17.93	23.76	9.51	0.05	-0.89	1.18	0.47	0.87	0.83	0.82	33.86	33.53	40.07	9.52	0.99	1.18	1.54
37.04	12.70	-14.46	0.05	1.81	0.62	-0.71	1.90	0.73	1.91	33.91	33.72	40.37	9.47	0.99	1.19	1.55
-31.97	-14.29	-26.36	0.05	-1.55	-0.69	-1.28	1.12	0.35	1.29	33.98	33.93	40.66	9.42	1.00	1.20	1.56
-11.88	7.74	1.71	0.05	-0.57	0.37	0.08	0.82	0.82	0.81	34.08	34.14	40.93	9.38	1.00	1.20	1.56
43.07	-18.23	-0.28	0.05	2.05	-0.87	-0.01	1.14	1.30	1.23	34.19	34.37	41.20	9.33	1.01	1.20	1.57
-48.92	-10.16	-26.20	0.05	-2.30	-0.48	-1.23	1.44	0.67	1.07	34.33	34.60	41.45	9.28	1.01	1.21	1.57
15.16	35.80	-11.11	0.05	0.70	1.66	-0.52	0.15	0.55	1.82	34.48	34.82	41.70	9.23	1.01	1.21	1.58
33.06	-15.23	-11.04	0.05	1.52	-0.70	-0.51	0.31	0.14	1.05	34.65	35.05	41.93	9.18	1.01	1.21	1.58
-58.88	-36.12	-19.96	0.05	-2.68	-1.64	-0.91	0.89	1.52	1.44	34.83	35.26	42.15	9.13	1.01	1.21	1.58
41.16	19.92	0.10	0.05	1.85	0.90	0.00	0.65	1.47	1.42	35.02	35.47	42.35	9.08	1.01	1.21	1.58
10.06	-8.09	-8.86	0.04	0.45	-0.36	-0.39	0.50	0.15	1.67	35.22	35.67	42.53	9.03	1.01	1.21	1.58
-52.85	-43.97	-18.79	0.04	-2.33	-1.93	-0.83	0.69	0.56	0.89	35.43	35.85	42.68	8.98	1.01	1.20	1.57
53.16	-18.84	-6.71	0.04	2.31	-0.82	-0.29	2.07	1.56	1.96	35.62	36.01	42.80	8.94	1.01	1.20	1.57
1.05	-12.76	-6.67	0.04	0.05	-0.55	-0.29	2.36	0.99	1.28	35.80	36.14	42.89	8.89	1.01	1.20	1.57
-28.89	0.27	-0.63	0.04	-1.23	0.01	-0.03	0.88	1.33	1.28	35.95	36.24	42.93	8.84	1.01	1.19	1.56
40.09	-1.71	2.39	0.04	1.68	-0.07	0.10	1.66	0.75	2.92	36.07	36.30	42.92	8.79	1.01	1.19	1.56

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-3.97	-13.67	3.40	0.04	-0.16	-0.57	0.14	2.25	0.86	3.53	36.15	36.30	42.87	8.74	1.00	1.19	1.55
-31.90	8.35	-4.58	0.04	-1.31	0.34	-0.19	0.89	1.48	3.84	36.19	36.25	42.76	8.69	1.00	1.18	1.55
14.14	-4.64	-7.54	0.04	0.57	-0.19	-0.31	0.87	0.62	3.01	36.19	36.14	42.61	8.64	1.00	1.18	1.54
6.11	-11.60	11.48	0.04	0.24	-0.46	0.46	0.70	1.61	0.88	36.15	35.96	42.40	8.59	0.99	1.17	1.54
-32.83	7.42	-1.52	0.04	-1.30	0.29	-0.06	0.63	2.25	0.70	36.06	35.72	42.16	8.54	0.99	1.17	1.53
10.22	-17.55	-3.49	0.04	0.40	-0.68	-0.14	1.73	1.62	1.40	35.94	35.41	41.87	8.50	0.99	1.17	1.53
3.19	-5.49	18.50	0.04	0.12	-0.21	0.71	1.24	1.18	0.33	35.77	35.06	41.54	8.45	0.98	1.16	1.52
-23.76	19.50	20.44	0.04	-0.90	0.74	0.78	1.86	2.69	1.63	35.57	34.65	41.19	8.40	0.97	1.16	1.51
28.23	-17.50	11.40	0.04	1.06	-0.66	0.43	2.69	4.70	2.58	35.32	34.19	40.81	8.35	0.97	1.16	1.51
-14.79	-2.44	-3.60	0.04	-0.55	-0.09	-0.13	1.45	2.50	1.12	35.05	33.70	40.41	8.30	0.96	1.15	1.50
-22.71	20.53	13.40	0.04	-0.83	0.75	0.49	0.86	1.85	1.30	34.73	33.18	40.02	8.25	0.96	1.15	1.50
40.26	-17.46	19.36	0.04	1.45	-0.63	0.70	0.96	1.19	3.09	34.39	32.63	39.64	8.20	0.95	1.15	1.49
-34.74	2.58	-13.63	0.04	-1.23	0.09	-0.48	0.48	1.24	1.12	34.02	32.08	39.28	8.15	0.94	1.15	1.49
-11.65	22.54	9.39	0.04	-0.41	0.79	0.33	0.72	1.38	0.81	33.64	31.52	38.95	8.11	0.94	1.16	1.49
52.28	-8.48	22.35	0.03	1.80	-0.29	0.77	0.94	1.68	1.77	33.25	30.97	38.66	8.06	0.93	1.16	1.49
-58.71	-2.44	-15.64	0.03	-2.00	-0.08	-0.53	0.29	1.66	1.21	32.87	30.44	38.42	8.01	0.93	1.17	1.49
8.40	2.57	-0.59	0.03	0.28	0.09	-0.02	0.31	0.30	1.14	32.51	29.96	38.25	7.96	0.92	1.18	1.49
60.27	2.57	7.42	0.03	1.99	0.08	0.24	1.01	1.41	2.64	32.16	29.52	38.15	7.91	0.92	1.19	1.50
-73.70	20.53	-7.56	0.03	-2.40	0.67	-0.25	2.19	2.65	3.12	31.84	29.15	38.13	7.86	0.92	1.20	1.51
18.42	-0.49	12.45	0.03	0.59	-0.02	0.40	1.12	1.60	1.45	31.54	28.85	38.17	7.81	0.91	1.21	1.52
56.27	-7.47	1.44	0.03	1.77	-0.24	0.05	1.27	0.25	0.45	31.28	28.64	38.29	7.76	0.92	1.22	1.53
-65.71	12.53	-7.53	0.03	-2.04	0.39	-0.23	1.79	1.32	1.46	31.05	28.52	38.47	7.71	0.92	1.24	1.54
26.38	-9.46	0.51	0.03	0.80	-0.29	0.02	1.61	1.26	1.87	30.85	28.51	38.71	7.67	0.92	1.25	1.56
38.25	0.57	-7.46	0.03	1.15	0.02	-0.22	1.16	0.74	1.98	30.69	28.59	39.00	7.62	0.93	1.27	1.58
-63.69	34.51	2.57	0.03	-1.88	1.02	0.08	1.44	1.85	1.15	30.56	28.77	39.35	7.57	0.94	1.29	1.59
35.37	-1.54	-9.40	0.03	1.03	-0.04	-0.27	1.08	1.29	1.15	30.48	29.06	39.74	7.52	0.95	1.30	1.62
23.26	-7.52	-12.33	0.03	0.66	-0.21	-0.35	0.41	0.99	1.03	30.43	29.44	40.16	7.47	0.97	1.32	1.64
-59.67	26.46	-0.29	0.03	-1.67	0.74	-0.01	0.93	0.91	0.57	30.41	29.91	40.61	7.42	0.98	1.34	1.66
45.37	-1.58	-12.24	0.03	1.25	-0.04	-0.34	2.56	1.21	1.05	30.43	30.45	41.07	7.37	1.00	1.35	1.68
9.26	-1.56	3.80	0.03	0.25	-0.04	0.10	1.54	1.03	0.42	30.48	31.07	41.53	7.32	1.02	1.36	1.70
-51.65	19.41	3.80	0.03	-1.37	0.51	0.10	0.50	1.46	0.91	30.54	31.74	41.98	7.28	1.04	1.37	1.72

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
48.36	-5.61	-12.16	0.03	1.26	-0.15	-0.32	1.39	1.04	1.27	30.62	32.45	42.41	7.23	1.06	1.38	1.74
-5.72	-6.57	4.87	0.03	-0.15	-0.17	0.12	1.48	0.40	1.07	30.70	33.20	42.80	7.18	1.08	1.39	1.76
-35.63	4.45	1.88	0.03	-0.89	0.11	0.05	2.49	0.90	1.30	30.79	33.96	43.15	7.13	1.10	1.40	1.78
58.33	2.44	-6.09	0.02	1.43	0.06	-0.15	3.03	0.98	0.86	30.87	34.72	43.45	7.08	1.12	1.41	1.80
-13.75	2.44	-3.05	0.02	-0.33	0.06	-0.07	1.79	0.55	1.50	30.95	35.48	43.69	7.03	1.15	1.41	1.82
-17.69	1.45	4.96	0.02	-0.42	0.03	0.12	1.02	2.34	0.18	31.03	36.20	43.86	6.98	1.17	1.41	1.83
50.25	1.45	10.95	0.02	1.16	0.03	0.25	0.41	2.08	2.12	31.10	36.88	43.96	6.93	1.19	1.41	1.84
-42.76	-8.52	-10.03	0.02	-0.96	-0.19	-0.23	1.31	1.06	1.67	31.18	37.51	44.00	6.88	1.20	1.41	1.85
-7.65	0.50	2.01	0.02	-0.17	0.01	0.04	0.40	2.49	2.69	31.26	38.07	43.98	6.84	1.22	1.41	1.86
56.25	9.50	17.99	0.02	1.21	0.20	0.39	1.61	3.80	2.96	31.33	38.55	43.90	6.79	1.23	1.40	1.86
-36.78	-7.50	-15.00	0.02	-0.77	-0.16	-0.31	1.57	4.20	3.15	31.40	38.94	43.75	6.74	1.24	1.39	1.87
-10.68	-4.46	-0.95	0.02	-0.22	-0.09	-0.02	1.13	2.14	2.58	31.46	39.25	43.55	6.69	1.25	1.38	1.86
40.26	-1.44	25.03	0.02	0.81	-0.03	0.50	1.06	1.67	1.59	31.52	39.46	43.29	6.64	1.25	1.37	1.86
-35.74	-11.40	-4.00	0.02	-0.70	-0.22	-0.08	0.76	0.91	1.87	31.58	39.58	42.99	6.59	1.25	1.36	1.85
-22.62	-7.35	-0.97	0.02	-0.43	-0.14	-0.02	2.26	1.41	2.38	31.64	39.62	42.63	6.54	1.25	1.35	1.84
48.33	2.67	13.03	0.02	0.89	0.05	0.24	1.63	1.18	1.21	31.71	39.58	42.24	6.49	1.25	1.33	1.83
-17.72	16.64	-1.97	0.02	-0.32	0.30	-0.04	1.20	0.47	3.10	31.79	39.47	41.82	6.45	1.24	1.32	1.81
-40.60	-0.38	-6.93	0.02	-0.71	-0.01	-0.12	1.40	0.43	1.59	31.90	39.30	41.38	6.40	1.23	1.30	1.79
30.42	-20.33	6.09	0.02	0.52	-0.35	0.10	1.60	1.69	0.92	32.02	39.09	40.93	6.35	1.22	1.28	1.77
-30.57	11.70	10.07	0.02	-0.50	0.19	0.17	1.23	1.80	2.27	32.17	38.83	40.48	6.30	1.21	1.26	1.74
-26.45	7.67	-1.92	0.02	-0.42	0.12	-0.03	2.05	2.38	2.70	32.35	38.55	40.04	6.25	1.19	1.24	1.72
49.51	-21.29	-5.89	0.02	0.77	-0.33	-0.09	6.21	4.79	3.05	32.55	38.25	39.63	6.20	1.18	1.22	1.69
-42.50	-4.23	0.15	0.02	-0.64	-0.06	0.00	7.13	3.32	2.42	32.77	37.95	39.24	6.15	1.16	1.20	1.67
-27.36	-0.21	-4.82	0.01	-0.40	0.00	-0.07	6.22	0.32	2.73	33.00	37.67	38.90	6.10	1.14	1.18	1.64
31.64	-13.17	-6.78	0.01	0.44	-0.18	-0.09	1.91	0.87	1.08	33.25	37.41	38.60	6.05	1.13	1.16	1.62
-43.33	-10.11	9.23	0.01	-0.58	-0.14	0.12	1.69	1.02	2.10	33.52	37.20	38.37	6.01	1.11	1.14	1.59
15.73	-14.05	-3.76	0.01	0.20	-0.18	-0.05	2.75	2.85	3.81	33.81	37.05	38.20	5.96	1.10	1.13	1.57
38.63	-3.01	-22.68	0.01	0.48	-0.04	-0.28	2.64	2.54	2.98	34.13	36.96	38.11	5.91	1.08	1.12	1.56
-52.34	-0.99	8.37	0.01	-0.63	-0.01	0.10	1.15	2.46	1.84	34.48	36.94	38.09	5.86	1.07	1.10	1.54
21.72	-17.94	9.35	0.01	0.25	-0.21	0.11	1.04	2.24	3.99	34.87	37.00	38.16	5.81	1.06	1.09	1.52
24.64	0.11	-5.64	0.01	0.27	0.00	-0.06	0.40	2.38	4.73	35.29	37.13	38.32	5.76	1.05	1.09	1.51

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-50.31	3.12	11.37	0.01	-0.53	0.03	0.12	2.69	1.27	1.95	35.75	37.34	38.58	5.71	1.04	1.08	1.50
40.72	-24.83	-2.63	0.01	0.41	-0.25	-0.03	3.40	2.03	2.64	36.25	37.62	38.93	5.66	1.04	1.07	1.49
14.61	-16.73	-6.59	0.01	0.14	-0.16	-0.06	2.15	1.37	1.98	36.79	37.96	39.38	5.62	1.03	1.07	1.49
-46.32	6.30	5.43	0.01	-0.42	0.06	0.05	1.45	1.05	1.14	37.37	38.37	39.92	5.57	1.03	1.07	1.48
46.69	-8.68	6.43	0.01	0.40	-0.07	0.05	1.40	0.72	1.52	38.00	38.84	40.56	5.52	1.02	1.07	1.48
-10.38	-10.63	7.42	0.01	-0.08	-0.09	0.06	0.21	1.00	1.25	38.68	39.36	41.28	5.47	1.02	1.07	1.47
-36.28	15.37	-10.55	0.01	-0.27	0.12	-0.08	4.30	8.36	9.86	39.41	39.93	42.08	5.42	1.01	1.07	1.47
66.66	2.35	4.48	0.01	0.47	0.02	0.03	6.42	8.17	14.50	40.20	40.54	42.96	5.37	1.01	1.07	1.47
-21.43	-4.64	16.46	0.01	-0.14	-0.03	0.11	0.80	3.57	7.67	41.06	41.20	43.91	5.32	1.00	1.07	1.47
-36.30	3.38	-7.54	0.01	-0.22	0.02	-0.05	0.39	2.09	2.61	41.99	41.88	44.94	5.27	1.00	1.07	1.46
59.65	-6.60	2.49	0.01	0.33	-0.04	0.01	2.25	2.16	2.39	42.99	42.57	46.03	5.22	0.99	1.07	1.46
-29.40	18.38	5.50	0.01	-0.15	0.09	0.03	2.81	1.24	2.61	44.06	43.28	47.19	5.18	0.98	1.07	1.45
-14.31	8.34	-4.49	0.00	-0.06	0.04	-0.02	0.42	1.45	2.97	45.18	43.98	48.40	5.13	0.97	1.07	1.45
44.63	-23.62	8.53	0.00	0.18	-0.09	0.03	1.54	0.37	2.32	46.34	44.69	49.66	5.08	0.96	1.07	1.44
-49.35	20.40	4.52	0.00	-0.17	0.07	0.02	1.93	6.54	4.11	47.53	45.38	50.98	5.03	0.95	1.07	1.44
7.74	13.35	0.53	0.00	0.02	0.04	0.00	1.91	6.76	9.79	48.74	46.08	52.35	4.98	0.95	1.07	1.43
47.63	-19.63	1.55	0.00	0.12	-0.05	0.00	0.90	1.43	8.47	49.96	46.77	53.76	4.93	0.94	1.08	1.43
-34.39	6.41	-1.44	0.00	-0.07	0.01	0.00	1.15	2.14	1.06	51.17	47.47	55.23	4.88	0.93	1.08	1.42
17.65	-2.59	11.56	0.00	0.03	0.00	0.02	1.40	0.61	1.05	52.36	48.17	56.75	4.83	0.92	1.08	1.42
10.60	-3.56	5.55	0.00	0.01	0.00	0.01	1.36	1.84	1.28	53.53	48.89	58.32	4.79	0.91	1.09	1.42
-36.35	11.43	-0.44	0.00	-0.02	0.01	0.00	1.67	3.98	1.63	54.65	49.62	59.95	4.74	0.91	1.10	1.42

Microtremors Segment: A1-S3

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-5.52	-5.24	-6.40	0.26	-1.43	-1.36	-1.66	2.05	0.95	0.93	0.28	0.43	0.45	30.03	1.55	1.63	2.25
-8.49	-7.20	1.63	0.26	-2.20	-1.86	0.42	0.95	0.38	0.50	0.28	0.43	0.45	29.98	1.54	1.62	2.24
-20.43	-9.15	11.63	0.26	-5.28	-2.37	3.01	0.76	0.79	1.39	0.28	0.43	0.45	29.93	1.52	1.61	2.22
1.61	0.88	11.60	0.26	0.42	0.23	2.99	2.45	1.39	1.23	0.28	0.42	0.45	29.88	1.51	1.60	2.20
-7.38	-14.08	4.59	0.26	-1.90	-3.63	1.18	4.82	0.93	1.52	0.28	0.42	0.45	29.83	1.49	1.59	2.18
-11.34	-14.01	0.60	0.26	-2.91	-3.60	0.15	2.90	1.08	0.91	0.29	0.42	0.45	29.79	1.48	1.58	2.16
2.68	-2.96	10.60	0.26	0.69	-0.76	2.72	1.14	0.67	1.02	0.29	0.42	0.45	29.74	1.46	1.56	2.14
-18.29	-16.91	3.59	0.26	-4.68	-4.33	0.92	0.45	1.14	0.75	0.29	0.42	0.45	29.69	1.44	1.54	2.11
-3.24	7.13	-11.38	0.26	-0.83	1.82	-2.91	0.87	1.49	1.21	0.29	0.42	0.45	29.64	1.42	1.53	2.09
-7.22	8.11	9.65	0.26	-1.84	2.07	2.46	0.37	1.03	2.33	0.30	0.42	0.45	29.59	1.40	1.51	2.06
-13.18	-17.85	10.63	0.25	-3.35	-4.54	2.70	0.88	1.38	2.13	0.30	0.42	0.45	29.54	1.38	1.48	2.03
20.81	10.18	-23.33	0.25	5.28	2.59	-5.92	1.20	0.66	1.28	0.30	0.42	0.45	29.49	1.36	1.46	2.00
-14.21	7.16	-9.24	0.25	-3.60	1.81	-2.34	0.42	1.27	1.22	0.31	0.42	0.44	29.44	1.35	1.44	1.97
-11.15	-0.84	9.78	0.25	-2.82	-0.21	2.47	0.27	1.06	2.39	0.31	0.42	0.44	29.39	1.33	1.41	1.94
29.81	11.16	-18.18	0.25	7.53	2.82	-4.59	0.84	0.57	1.55	0.32	0.42	0.44	29.35	1.31	1.38	1.90
-14.22	0.15	-12.10	0.25	-3.58	0.04	-3.05	1.13	0.80	1.22	0.32	0.42	0.44	29.30	1.29	1.36	1.87
-15.16	5.15	5.93	0.25	-3.81	1.30	1.49	0.69	0.39	1.24	0.33	0.42	0.44	29.25	1.27	1.33	1.84
20.83	1.15	0.94	0.25	5.23	0.29	0.24	0.54	0.73	0.68	0.33	0.42	0.43	29.20	1.25	1.31	1.81
-15.18	3.16	0.95	0.25	-3.80	0.79	0.24	1.14	0.32	0.92	0.34	0.42	0.43	29.15	1.23	1.28	1.77
-15.12	7.15	-18.99	0.25	-3.78	1.79	-4.75	0.37	1.03	1.50	0.34	0.42	0.43	29.10	1.21	1.25	1.74
16.88	-16.81	-11.91	0.25	4.21	-4.19	-2.97	0.31	0.72	2.99	0.35	0.42	0.43	29.05	1.19	1.23	1.71
-7.14	9.22	16.10	0.25	-1.78	2.30	4.01	0.32	1.43	1.56	0.36	0.42	0.43	29.00	1.17	1.20	1.68
-11.10	25.16	-1.90	0.25	-2.76	6.25	-0.47	0.79	2.02	0.66	0.36	0.41	0.43	28.96	1.14	1.18	1.64
11.90	-11.85	-5.87	0.25	2.95	-2.94	-1.46	0.48	0.94	0.16	0.37	0.41	0.43	28.91	1.12	1.16	1.61
3.87	-4.80	-0.83	0.25	0.96	-1.19	-0.21	1.27	0.94	0.98	0.38	0.41	0.43	28.86	1.10	1.14	1.58
-4.13	12.20	0.19	0.25	-1.02	3.01	0.05	0.36	1.02	1.16	0.38	0.41	0.43	28.81	1.08	1.12	1.55
3.87	-3.80	9.19	0.25	0.95	-0.94	2.27	2.10	0.63	2.07	0.39	0.41	0.43	28.76	1.06	1.10	1.53
1.86	-4.77	-13.78	0.25	0.46	-1.17	-3.39	1.78	0.18	1.05	0.39	0.41	0.43	28.71	1.04	1.09	1.51
-1.14	5.24	-14.70	0.25	-0.28	1.29	-3.61	1.11	0.58	0.07	0.40	0.41	0.43	28.66	1.02	1.08	1.49
-1.13	-4.74	14.32	0.25	-0.28	-1.16	3.51	0.71	1.04	1.13	0.40	0.40	0.43	28.61	1.00	1.07	1.47
-2.12	-19.68	7.30	0.24	-0.52	-4.81	1.78	0.67	2.13	2.37	0.41	0.40	0.44	28.56	0.98	1.07	1.45

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
4.85	3.40	-8.63	0.24	1.18	0.83	-2.10	0.83	1.01	1.25	0.42	0.40	0.44	28.47	0.95	1.07	1.43
-3.15	-13.57	12.38	0.24	-0.77	-3.30	3.01	0.70	1.43	1.18	0.42	0.39	0.45	28.42	0.94	1.07	1.42
-13.12	-4.52	20.34	0.24	-3.18	-1.10	4.93	0.64	1.48	0.83	0.42	0.39	0.45	28.37	0.93	1.07	1.42
-9.07	-7.48	1.32	0.24	-2.20	-1.81	0.32	0.72	1.31	0.41	0.42	0.39	0.46	28.32	0.92	1.08	1.42
14.92	-8.43	2.33	0.24	3.60	-2.04	0.56	0.42	0.30	1.08	0.42	0.39	0.46	28.27	0.91	1.09	1.42
7.88	8.58	10.32	0.24	1.90	2.07	2.49	0.80	0.28	1.72	0.42	0.38	0.46	28.22	0.91	1.10	1.43
-21.10	-1.42	13.30	0.24	-5.07	-0.34	3.20	1.22	0.10	0.99	0.42	0.38	0.47	28.17	0.91	1.12	1.44
-8.04	2.60	8.27	0.24	-1.93	0.62	1.99	2.38	0.54	1.96	0.42	0.38	0.47	28.13	0.91	1.13	1.45
0.98	4.60	-2.72	0.24	0.23	1.10	-0.65	2.64	0.33	1.47	0.42	0.38	0.48	28.08	0.91	1.15	1.47
-15.99	-11.37	4.30	0.24	-3.82	-2.72	1.03	2.77	0.84	1.04	0.41	0.38	0.48	28.03	0.91	1.17	1.49
0.04	11.64	12.29	0.24	0.01	2.78	2.93	2.06	1.38	1.10	0.41	0.37	0.49	27.98	0.92	1.19	1.51
0.05	-0.37	1.28	0.24	0.01	-0.09	0.30	1.57	0.38	0.61	0.40	0.37	0.49	27.93	0.93	1.22	1.53
-11.93	-27.30	-14.67	0.24	-2.83	-6.48	-3.48	1.72	0.95	0.91	0.40	0.37	0.49	27.88	0.94	1.24	1.55
-6.89	8.75	3.37	0.24	-1.63	2.07	0.80	0.96	0.92	1.64	0.39	0.37	0.49	27.83	0.95	1.26	1.58
2.12	5.74	16.35	0.24	0.50	1.36	3.87	1.38	0.58	1.51	0.39	0.37	0.50	27.78	0.96	1.29	1.60
-4.87	-9.24	-12.64	0.24	-1.15	-2.18	-2.98	1.33	1.19	0.66	0.38	0.37	0.50	27.73	0.97	1.31	1.62
-13.83	-1.20	-5.58	0.24	-3.26	-0.28	-1.31	0.75	0.37	1.15	0.38	0.37	0.50	27.69	0.98	1.33	1.65
4.19	-14.15	18.41	0.24	0.98	-3.33	4.33	1.44	0.22	2.18	0.37	0.37	0.50	27.64	0.99	1.34	1.67
-1.81	-1.11	6.38	0.23	-0.42	-0.26	1.50	0.98	1.13	0.80	0.37	0.37	0.50	27.59	1.00	1.36	1.69
-14.78	3.90	-2.60	0.23	-3.46	0.91	-0.61	0.81	1.43	0.45	0.36	0.37	0.50	27.54	1.01	1.37	1.70
-2.74	-15.06	-7.56	0.23	-0.64	-3.52	-1.77	0.27	1.10	0.94	0.36	0.37	0.50	27.49	1.02	1.38	1.71
5.26	-7.00	-7.51	0.23	1.23	-1.63	-1.75	0.96	2.09	1.39	0.36	0.37	0.50	27.44	1.02	1.38	1.72
5.24	4.02	-2.47	0.23	1.22	0.93	-0.57	0.21	2.29	1.58	0.36	0.37	0.49	27.39	1.03	1.38	1.72
-12.74	-4.96	-0.45	0.23	-2.96	-1.15	-0.10	0.44	1.20	2.38	0.36	0.37	0.49	27.34	1.03	1.37	1.72
-7.70	-10.92	4.56	0.23	-1.78	-2.53	1.06	0.77	0.71	1.47	0.36	0.37	0.49	27.29	1.02	1.36	1.71
-0.68	9.10	1.57	0.23	-0.16	2.10	0.36	1.00	0.73	1.04	0.36	0.37	0.49	27.25	1.02	1.35	1.69
-3.67	9.08	-7.40	0.23	-0.85	2.09	-1.70	0.49	1.83	0.94	0.36	0.37	0.48	27.20	1.01	1.33	1.67
15.31	-6.91	-14.33	0.23	3.52	-1.59	-3.30	0.57	2.16	1.13	0.37	0.37	0.48	27.15	0.99	1.31	1.64
7.27	16.09	-1.28	0.23	1.67	3.69	-0.29	0.97	1.12	1.02	0.37	0.36	0.48	27.10	0.98	1.28	1.61
-7.73	22.03	11.72	0.23	-1.77	5.04	2.68	0.35	0.92	1.26	0.38	0.36	0.48	27.05	0.96	1.26	1.58
8.27	-2.00	-10.26	0.23	1.89	-0.46	-2.35	0.48	0.43	0.14	0.38	0.36	0.47	27.00	0.94	1.23	1.55

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
13.23	2.02	-16.19	0.23	3.02	0.46	-3.69	0.86	1.19	0.60	0.39	0.36	0.47	26.95	0.93	1.21	1.52
-1.79	10.01	-0.14	0.23	-0.41	2.28	-0.03	0.66	1.20	1.52	0.40	0.36	0.47	26.90	0.91	1.18	1.49
6.20	2.00	8.86	0.23	1.41	0.45	2.01	0.28	1.08	1.34	0.40	0.36	0.47	26.86	0.89	1.16	1.46
17.16	-6.97	14.84	0.23	3.89	-1.58	3.36	0.90	1.85	1.57	0.41	0.36	0.47	26.81	0.87	1.13	1.43
-12.85	-2.94	-0.17	0.23	-2.90	-0.66	-0.04	0.19	1.12	0.94	0.42	0.36	0.46	26.76	0.86	1.11	1.40
-12.80	2.08	-0.15	0.23	-2.89	0.47	-0.03	0.99	0.66	0.38	0.42	0.36	0.46	26.71	0.84	1.09	1.38
3.23	0.09	15.84	0.23	0.73	0.02	3.56	1.01	0.13	0.76	0.43	0.36	0.46	26.66	0.83	1.08	1.36
-12.75	3.10	3.82	0.22	-2.86	0.70	0.86	0.71	0.56	0.93	0.43	0.36	0.46	26.61	0.82	1.06	1.34
-2.72	2.10	6.82	0.22	-0.61	0.47	1.53	0.46	0.32	1.46	0.44	0.36	0.46	26.56	0.81	1.05	1.33
8.27	-6.87	15.79	0.22	1.85	-1.54	3.53	0.50	1.14	0.87	0.44	0.36	0.46	26.51	0.81	1.04	1.32
-2.74	-9.82	3.77	0.22	-0.61	-2.19	0.84	0.08	1.73	0.78	0.44	0.36	0.46	26.46	0.80	1.04	1.31
-3.72	0.21	7.77	0.22	-0.83	0.05	1.73	1.17	0.87	0.38	0.44	0.36	0.46	26.42	0.81	1.03	1.31
-8.70	2.22	10.75	0.22	-1.93	0.49	2.39	1.07	0.89	0.91	0.44	0.36	0.46	26.37	0.81	1.03	1.31
1.32	-1.77	6.74	0.22	0.29	-0.39	1.49	0.59	0.53	0.79	0.44	0.36	0.46	26.32	0.82	1.04	1.32
10.30	-5.74	5.73	0.22	2.28	-1.27	1.27	0.72	1.01	0.57	0.44	0.36	0.46	26.27	0.83	1.04	1.33
-21.67	-6.70	-3.26	0.22	-4.78	-1.48	-0.72	1.05	1.29	0.72	0.43	0.37	0.46	26.22	0.85	1.05	1.35
-12.60	-0.67	-8.21	0.22	-2.77	-0.15	-1.81	0.35	0.80	0.38	0.43	0.37	0.46	26.17	0.87	1.06	1.37
28.37	2.35	-13.15	0.22	6.23	0.52	-2.89	0.60	1.56	1.19	0.42	0.37	0.45	26.12	0.89	1.08	1.40
-2.68	-1.64	-7.09	0.22	-0.59	-0.36	-1.55	0.66	2.49	1.46	0.41	0.38	0.45	26.07	0.91	1.09	1.42
-10.65	-14.59	6.93	0.22	-2.33	-3.19	1.51	0.97	2.74	1.67	0.41	0.38	0.45	26.03	0.94	1.11	1.46
22.33	-0.55	-4.06	0.22	4.87	-0.12	-0.88	1.01	2.19	1.06	0.40	0.39	0.45	25.98	0.97	1.13	1.49
-14.69	16.44	-10.01	0.22	-3.19	3.58	-2.18	1.28	1.23	0.54	0.39	0.39	0.45	25.93	1.01	1.16	1.53
-15.62	-14.55	-0.97	0.22	-3.39	-3.16	-0.21	1.58	0.45	0.71	0.38	0.39	0.45	25.88	1.04	1.18	1.58
23.36	-13.48	-2.94	0.22	5.06	-2.92	-0.64	1.49	0.80	0.23	0.37	0.40	0.44	25.83	1.08	1.21	1.62
-7.67	14.53	-11.89	0.22	-1.66	3.14	-2.57	2.45	1.08	0.68	0.36	0.40	0.44	25.78	1.13	1.24	1.67
-6.63	-7.46	-3.84	0.22	-1.43	-1.61	-0.83	3.93	1.99	0.77	0.35	0.41	0.44	25.73	1.17	1.26	1.72
13.35	-13.41	10.17	0.22	2.87	-2.88	2.19	1.75	1.00	0.31	0.34	0.41	0.44	25.68	1.21	1.29	1.77
-8.65	2.63	1.17	0.21	-1.86	0.56	0.25	0.21	0.94	0.31	0.33	0.41	0.43	25.63	1.25	1.32	1.82
4.36	-8.34	-1.81	0.21	0.93	-1.79	-0.39	0.17	0.77	0.72	0.32	0.41	0.43	25.59	1.30	1.34	1.86
16.32	-4.30	0.21	0.21	3.48	-0.92	0.04	0.30	0.90	0.47	0.31	0.42	0.42	25.54	1.34	1.36	1.91
-5.70	-2.27	-10.75	0.21	-1.21	-0.48	-2.29	0.42	0.59	0.87	0.30	0.42	0.42	25.49	1.37	1.38	1.95

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-0.68	-0.25	-1.70	0.21	-0.15	-0.05	-0.36	0.57	0.50	0.87	0.30	0.42	0.41	25.44	1.41	1.39	1.98
12.29	4.75	-0.68	0.21	2.61	1.01	-0.14	0.87	1.10	1.19	0.29	0.42	0.41	25.39	1.44	1.40	2.00
-4.72	-10.22	-11.64	0.21	-1.00	-2.16	-2.46	0.38	1.90	0.92	0.29	0.42	0.40	25.34	1.46	1.40	2.02
1.29	9.80	12.38	0.21	0.27	2.07	2.61	0.40	2.20	0.57	0.29	0.42	0.40	25.29	1.48	1.40	2.04
9.27	7.78	12.35	0.21	1.95	1.64	2.60	0.92	2.09	0.78	0.28	0.42	0.39	25.24	1.49	1.39	2.04
-0.74	-22.18	-4.64	0.21	-0.16	-4.66	-0.97	0.96	2.01	0.89	0.28	0.42	0.39	25.20	1.50	1.38	2.04
-8.72	4.87	4.38	0.21	-1.83	1.02	0.92	0.62	1.77	0.38	0.28	0.42	0.38	25.15	1.50	1.36	2.02
-18.66	9.86	0.39	0.21	-3.90	2.06	0.08	1.66	0.68	1.78	0.28	0.42	0.38	25.10	1.50	1.33	2.01
-0.62	-5.13	7.39	0.21	-0.13	-1.07	1.54	2.72	0.79	1.61	0.29	0.43	0.37	25.05	1.49	1.30	1.98
0.38	7.88	7.38	0.21	0.08	1.64	1.54	3.90	1.42	3.95	0.29	0.43	0.37	25.00	1.48	1.27	1.95
-20.58	-1.12	-6.60	0.21	-4.27	-0.23	-1.37	3.52	1.43	3.19	0.29	0.43	0.36	24.95	1.46	1.24	1.92
-0.53	-8.09	18.40	0.21	-0.11	-1.67	3.81	2.23	2.31	0.73	0.30	0.43	0.36	24.90	1.45	1.20	1.88
1.47	4.93	14.35	0.21	0.30	1.02	2.96	1.79	2.62	1.48	0.30	0.43	0.35	24.85	1.43	1.16	1.84
-19.49	5.93	-4.65	0.21	-4.02	1.22	-0.96	1.39	2.10	0.44	0.31	0.43	0.35	24.80	1.41	1.12	1.80
-0.45	3.92	12.35	0.21	-0.09	0.81	2.54	1.50	0.46	1.04	0.32	0.44	0.34	24.76	1.38	1.08	1.76
12.53	2.93	6.34	0.21	2.57	0.60	1.30	0.31	0.85	0.67	0.32	0.44	0.34	24.71	1.36	1.05	1.72
-17.46	-2.06	7.33	0.20	-3.57	-0.42	1.50	0.14	0.54	0.98	0.33	0.44	0.33	24.66	1.34	1.01	1.68
-15.39	5.95	7.32	0.20	-3.14	1.21	1.49	0.42	0.24	1.36	0.34	0.45	0.33	24.61	1.32	0.98	1.64
4.63	3.94	-13.65	0.20	0.94	0.80	-2.78	1.31	1.36	0.50	0.35	0.45	0.33	24.56	1.30	0.95	1.61
-14.34	-8.03	4.39	0.20	-2.91	-1.63	0.89	1.50	1.21	0.29	0.35	0.45	0.33	24.51	1.28	0.92	1.58
-16.28	1.99	14.37	0.20	-3.30	0.40	2.91	1.15	1.29	0.73	0.36	0.46	0.32	24.46	1.26	0.90	1.55
8.74	6.99	-15.61	0.20	1.77	1.41	-3.15	1.23	1.42	0.78	0.37	0.46	0.32	24.41	1.25	0.87	1.52
-1.27	5.98	-16.52	0.20	-0.26	1.21	-3.33	0.74	1.17	0.97	0.38	0.47	0.32	24.37	1.23	0.85	1.50
-17.23	9.96	2.52	0.20	-3.46	2.00	0.51	0.49	0.55	0.94	0.39	0.47	0.32	24.32	1.21	0.84	1.47
1.80	-0.04	12.51	0.20	0.36	-0.01	2.51	0.45	1.00	1.96	0.40	0.47	0.32	24.27	1.20	0.82	1.45
11.78	2.97	13.48	0.20	2.36	0.59	2.70	0.51	0.57	1.20	0.40	0.48	0.33	24.22	1.18	0.81	1.43
-8.23	12.95	0.47	0.20	-1.64	2.58	0.09	1.06	1.17	0.84	0.41	0.48	0.33	24.17	1.17	0.80	1.42
-7.19	-3.05	-0.51	0.20	-1.43	-0.61	-0.10	0.37	0.18	1.53	0.42	0.48	0.33	24.12	1.15	0.79	1.40
2.82	-0.03	4.50	0.20	0.56	-0.01	0.89	0.55	0.69	0.59	0.43	0.49	0.34	24.07	1.14	0.79	1.39
-10.16	7.97	-7.47	0.20	-2.01	1.58	-1.48	1.29	0.87	1.12	0.43	0.49	0.34	24.02	1.13	0.78	1.37
2.86	-12.01	-3.43	0.20	0.56	-2.37	-0.68	1.75	1.20	0.65	0.44	0.49	0.35	23.97	1.12	0.78	1.36

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
25.80	-5.96	9.57	0.20	5.08	-1.17	1.89	0.58	1.76	0.51	0.45	0.49	0.35	23.93	1.11	0.78	1.36
0.75	12.05	-2.42	0.20	0.15	2.37	-0.48	1.31	0.76	0.64	0.45	0.50	0.36	23.88	1.10	0.79	1.35
-2.24	-3.95	-7.38	0.20	-0.44	-0.77	-1.45	0.10	0.32	0.26	0.46	0.50	0.36	23.83	1.09	0.79	1.34
19.73	-12.90	-7.33	0.20	3.86	-2.52	-1.43	0.46	0.54	1.28	0.47	0.50	0.37	23.78	1.08	0.79	1.34
7.67	2.13	-16.27	0.20	1.50	0.42	-3.17	0.44	0.22	0.97	0.47	0.50	0.38	23.73	1.07	0.80	1.33
0.66	6.13	11.76	0.19	0.13	1.19	2.29	0.10	1.10	0.97	0.47	0.50	0.38	23.68	1.06	0.80	1.33
1.66	-5.85	9.74	0.19	0.32	-1.14	1.89	0.28	2.61	1.70	0.48	0.50	0.39	23.63	1.05	0.81	1.32
11.63	0.17	-30.20	0.19	2.25	0.03	-5.84	1.17	1.84	0.95	0.48	0.50	0.39	23.58	1.04	0.82	1.32
14.58	16.16	-11.10	0.19	2.81	3.12	-2.14	1.64	0.84	0.21	0.48	0.50	0.40	23.54	1.03	0.82	1.32
-12.42	-6.85	-2.05	0.19	-2.39	-1.32	-0.40	0.65	1.63	0.48	0.49	0.50	0.40	23.49	1.02	0.83	1.32
-4.38	-13.79	-12.01	0.19	-0.84	-2.65	-2.31	1.39	1.91	0.48	0.49	0.50	0.41	23.44	1.02	0.84	1.32
3.62	8.24	3.03	0.19	0.69	1.58	0.58	1.98	2.17	0.13	0.49	0.49	0.41	23.39	1.01	0.85	1.32
2.61	-11.74	1.04	0.19	0.50	-2.24	0.20	2.15	1.68	0.65	0.49	0.49	0.42	23.34	1.01	0.86	1.32
5.60	-16.67	4.05	0.19	1.07	-3.18	0.77	1.95	1.28	1.20	0.48	0.48	0.42	23.29	1.00	0.87	1.33
-19.37	-0.62	5.05	0.19	-3.68	-0.12	0.96	1.74	0.81	0.75	0.48	0.48	0.42	23.24	1.00	0.87	1.33
4.66	-8.58	-5.93	0.19	0.88	-1.63	-1.12	1.27	1.24	0.63	0.47	0.48	0.42	23.19	1.00	0.88	1.34
27.60	-7.54	11.08	0.19	5.22	-1.42	2.09	1.92	0.66	0.27	0.47	0.47	0.42	23.14	1.00	0.89	1.34
-8.43	-14.48	9.06	0.19	-1.59	-2.73	1.71	1.72	0.58	0.79	0.46	0.46	0.42	23.10	1.00	0.90	1.35
-1.41	-6.42	-5.92	0.19	-0.27	-1.21	-1.11	1.97	1.09	1.52	0.46	0.46	0.42	23.05	1.00	0.91	1.35
24.54	0.61	9.09	0.19	4.60	0.11	1.70	0.74	0.67	0.10	0.45	0.45	0.41	23.00	1.01	0.92	1.36
0.50	-20.34	9.07	0.19	0.09	-3.80	1.70	0.53	1.07	1.22	0.44	0.45	0.41	22.95	1.01	0.93	1.37
-10.48	1.72	3.07	0.19	-1.95	0.32	0.57	0.40	0.89	0.79	0.43	0.44	0.41	22.90	1.02	0.93	1.38
2.54	16.70	0.08	0.19	0.47	3.11	0.01	0.79	1.30	0.48	0.43	0.44	0.40	22.85	1.02	0.94	1.39
4.53	-12.30	-8.88	0.19	0.84	-2.28	-1.65	0.58	1.17	1.14	0.42	0.43	0.40	22.80	1.03	0.95	1.40
4.51	-6.24	2.15	0.19	0.83	-1.15	0.40	0.83	1.12	1.68	0.41	0.43	0.39	22.75	1.04	0.95	1.41
-7.48	11.76	10.14	0.18	-1.38	2.17	1.87	1.12	0.79	1.60	0.40	0.42	0.39	22.71	1.05	0.96	1.42
-12.44	-5.23	8.13	0.18	-2.29	-0.96	1.50	0.88	0.97	1.26	0.40	0.42	0.38	22.66	1.06	0.96	1.43
-1.41	-10.19	-9.85	0.18	-0.26	-1.87	-1.81	0.34	0.93	0.27	0.39	0.42	0.37	22.61	1.07	0.96	1.44
3.59	9.83	-10.79	0.18	0.66	1.80	-1.97	0.76	0.15	0.91	0.38	0.41	0.37	22.56	1.08	0.96	1.44
-5.40	5.81	10.23	0.18	-0.99	1.06	1.87	1.08	0.41	1.44	0.38	0.41	0.36	22.51	1.08	0.96	1.45
-11.37	-2.18	3.22	0.18	-2.07	-0.40	0.59	1.19	1.42	0.91	0.38	0.41	0.36	22.46	1.09	0.95	1.45

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-3.33	9.82	6.22	0.18	-0.61	1.78	1.13	1.01	1.64	1.91	0.37	0.41	0.35	22.41	1.10	0.94	1.45
1.67	11.80	19.19	0.18	0.30	2.14	3.47	1.02	0.52	1.68	0.37	0.41	0.35	22.36	1.10	0.93	1.44
13.64	11.76	-0.83	0.18	2.46	2.12	-0.15	1.35	1.46	0.91	0.37	0.41	0.34	22.31	1.10	0.92	1.44
1.62	9.74	-8.79	0.18	0.29	1.75	-1.58	0.87	0.92	1.25	0.37	0.41	0.34	22.27	1.11	0.90	1.43
-14.35	7.72	5.24	0.18	-2.58	1.39	0.94	0.14	0.89	0.60	0.38	0.41	0.33	22.22	1.11	0.89	1.42
10.66	6.70	1.24	0.18	1.91	1.20	0.22	1.19	1.03	1.30	0.38	0.42	0.33	22.17	1.10	0.87	1.41
-2.36	-7.28	-5.73	0.18	-0.42	-1.30	-1.02	0.92	0.20	2.05	0.38	0.42	0.33	22.12	1.10	0.86	1.39
-12.33	-9.23	-1.69	0.18	-2.19	-1.64	-0.30	0.82	0.76	0.34	0.38	0.42	0.32	22.07	1.09	0.84	1.38
6.69	-4.19	-4.66	0.18	1.19	-0.74	-0.83	0.23	1.44	1.48	0.39	0.42	0.32	22.02	1.09	0.83	1.37
2.67	-2.16	-4.62	0.18	0.47	-0.38	-0.82	0.43	0.78	0.62	0.39	0.43	0.32	21.97	1.08	0.81	1.35
15.64	2.86	-14.57	0.18	2.76	0.50	-2.57	0.59	0.75	0.54	0.40	0.43	0.32	21.92	1.07	0.80	1.34
-8.37	-9.12	-6.51	0.18	-1.47	-1.60	-1.14	0.36	1.00	0.86	0.40	0.43	0.32	21.88	1.06	0.79	1.32
-24.30	-8.07	10.51	0.18	-4.27	-1.42	1.84	0.57	1.55	0.53	0.41	0.43	0.32	21.83	1.06	0.78	1.31
20.71	4.96	-17.46	0.18	3.62	0.87	-3.06	0.27	1.71	0.32	0.41	0.43	0.32	21.78	1.05	0.77	1.30
2.66	-12.01	-12.38	0.17	0.46	-2.10	-2.16	0.38	1.49	0.69	0.41	0.43	0.32	21.73	1.04	0.77	1.29
-17.31	-20.93	11.64	0.17	-3.01	-3.64	2.03	0.69	0.86	0.33	0.42	0.43	0.32	21.68	1.03	0.77	1.28
-4.26	-3.87	1.63	0.17	-0.74	-0.67	0.28	0.72	0.29	0.51	0.42	0.43	0.32	21.63	1.02	0.77	1.28
0.75	6.15	7.63	0.17	0.13	1.06	1.32	0.15	1.41	1.00	0.42	0.42	0.33	21.58	1.01	0.78	1.28
-6.24	-4.84	-5.35	0.17	-1.08	-0.84	-0.92	0.64	0.96	0.77	0.42	0.42	0.33	21.53	1.01	0.78	1.28
-12.20	-7.80	-19.28	0.17	-2.10	-1.34	-3.32	0.80	1.07	0.81	0.42	0.42	0.33	21.48	1.00	0.80	1.28
9.81	7.22	14.74	0.17	1.68	1.24	2.53	0.91	0.95	1.73	0.42	0.42	0.34	21.44	1.00	0.81	1.29
-16.17	0.22	17.70	0.17	-2.77	0.04	3.03	0.96	1.01	1.35	0.41	0.41	0.34	21.39	1.00	0.82	1.30
-9.12	2.23	1.68	0.17	-1.55	0.38	0.29	0.81	0.89	0.23	0.41	0.41	0.35	21.34	1.00	0.84	1.31
2.90	8.23	-0.30	0.17	0.49	1.40	-0.05	0.53	0.50	0.95	0.41	0.41	0.35	21.29	1.00	0.86	1.32
-22.06	-1.77	-16.25	0.17	-3.74	-0.30	-2.75	0.49	0.23	1.18	0.40	0.40	0.35	21.24	1.00	0.89	1.34
11.96	13.22	-15.17	0.17	2.02	2.23	-2.56	0.39	0.53	0.75	0.39	0.40	0.36	21.19	1.01	0.91	1.36
-6.05	7.20	4.87	0.17	-1.02	1.21	0.82	1.02	0.67	0.50	0.39	0.39	0.36	21.14	1.02	0.94	1.38
-9.01	-0.80	18.84	0.17	-1.51	-0.13	3.17	0.50	0.61	1.15	0.38	0.39	0.37	21.09	1.03	0.97	1.41
24.96	8.20	15.79	0.17	4.18	1.37	2.65	1.66	0.83	0.80	0.37	0.39	0.37	21.04	1.04	0.99	1.44
-22.04	3.19	3.77	0.17	-3.68	0.53	0.63	0.45	0.92	0.45	0.37	0.38	0.37	21.00	1.05	1.02	1.47
-6.98	16.17	7.77	0.17	-1.16	2.69	1.29	1.45	0.91	0.56	0.36	0.38	0.38	20.95	1.07	1.05	1.50

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
23.99	9.14	2.77	0.17	3.98	1.52	0.46	1.08	1.16	0.71	0.35	0.38	0.38	20.90	1.08	1.09	1.53
-29.00	0.13	4.77	0.17	-4.80	0.02	0.79	1.11	0.69	0.84	0.34	0.38	0.38	20.85	1.10	1.12	1.57
-11.91	12.12	13.75	0.17	-1.97	2.00	2.27	0.24	0.58	0.24	0.33	0.37	0.38	20.80	1.12	1.14	1.60
13.09	-1.88	2.74	0.16	2.15	-0.31	0.45	0.88	0.64	1.07	0.33	0.37	0.38	20.75	1.15	1.17	1.64
-19.89	9.12	2.74	0.16	-3.26	1.50	0.45	0.52	0.50	0.13	0.32	0.37	0.38	20.70	1.17	1.20	1.67
13.12	6.11	-5.23	0.16	2.15	1.00	-0.86	0.59	0.36	0.73	0.31	0.37	0.38	20.65	1.19	1.22	1.71
20.06	-16.86	-0.20	0.16	3.27	-2.75	-0.03	0.42	0.17	0.76	0.30	0.37	0.38	20.61	1.22	1.24	1.74
-8.96	9.17	14.79	0.16	-1.46	1.49	2.40	0.45	0.48	2.09	0.30	0.37	0.38	20.56	1.24	1.26	1.77
11.04	3.16	-23.18	0.16	1.79	0.51	-3.75	0.22	0.88	1.65	0.29	0.37	0.37	20.51	1.27	1.28	1.80
-1.97	-10.80	-21.07	0.16	-0.32	-1.74	-3.40	0.60	0.53	0.90	0.29	0.37	0.37	20.46	1.29	1.29	1.82
0.03	0.23	12.97	0.16	0.01	0.04	2.09	0.23	1.65	0.50	0.28	0.37	0.37	20.41	1.31	1.30	1.84
30.98	-5.74	-2.04	0.16	4.97	-0.92	-0.33	0.83	1.26	0.91	0.28	0.37	0.36	20.36	1.32	1.31	1.86
-8.07	0.29	-9.00	0.16	-1.29	0.05	-1.44	0.64	1.29	0.63	0.27	0.36	0.36	20.31	1.34	1.31	1.87
-19.01	-12.67	-4.95	0.16	-3.03	-2.02	-0.79	1.25	1.16	0.43	0.27	0.36	0.35	20.26	1.35	1.31	1.88
18.99	-7.62	-4.91	0.16	3.02	-1.21	-0.78	1.39	0.55	0.96	0.27	0.36	0.35	20.21	1.36	1.31	1.89
-2.04	11.39	6.11	0.16	-0.32	1.81	0.97	0.86	1.19	1.66	0.26	0.36	0.34	20.17	1.36	1.31	1.89
-2.02	-8.60	0.11	0.16	-0.32	-1.36	0.02	1.22	1.13	1.67	0.26	0.36	0.34	20.12	1.36	1.30	1.88
23.93	3.43	-5.86	0.16	3.77	0.54	-0.92	1.98	1.30	0.67	0.26	0.35	0.34	20.07	1.36	1.29	1.87
-10.09	9.42	5.16	0.16	-1.58	1.48	0.81	0.44	1.40	0.95	0.26	0.35	0.33	20.02	1.35	1.28	1.86
6.92	-7.57	4.16	0.16	1.08	-1.18	0.65	1.11	0.98	0.13	0.26	0.35	0.33	19.97	1.34	1.27	1.84
20.87	-7.53	-8.81	0.16	3.26	-1.17	-1.37	0.38	1.14	1.02	0.26	0.35	0.33	19.92	1.33	1.25	1.83
-31.11	-15.46	-0.77	0.16	-4.84	-2.40	-0.12	0.12	1.20	0.43	0.26	0.34	0.32	19.87	1.31	1.24	1.80
7.94	-4.41	20.21	0.16	1.23	-0.68	3.13	0.33	0.44	0.87	0.26	0.34	0.32	19.82	1.29	1.23	1.78
23.88	-0.38	-5.80	0.15	3.69	-0.06	-0.90	0.55	0.42	1.27	0.26	0.33	0.32	19.78	1.27	1.22	1.76
-28.11	-15.33	-18.73	0.15	-4.33	-2.36	-2.88	1.46	0.34	0.88	0.26	0.33	0.32	19.73	1.25	1.20	1.74
-1.05	0.71	1.32	0.15	-0.16	0.11	0.20	1.52	0.48	0.74	0.27	0.33	0.32	19.68	1.23	1.19	1.71
3.95	7.71	-10.64	0.15	0.60	1.18	-1.63	0.68	0.50	1.93	0.27	0.32	0.32	19.63	1.21	1.18	1.69
-12.03	-1.29	2.40	0.15	-1.83	-0.20	0.37	1.17	0.65	1.23	0.27	0.32	0.31	19.58	1.19	1.17	1.67
5.99	-4.26	19.37	0.15	0.91	-0.65	2.94	1.17	1.19	0.78	0.27	0.32	0.31	19.53	1.17	1.16	1.65
-13.99	-0.23	-0.65	0.15	-2.12	-0.04	-0.10	0.93	1.83	1.07	0.27	0.31	0.31	19.48	1.15	1.16	1.63
-6.95	17.75	2.37	0.15	-1.05	2.68	0.36	0.12	1.13	1.74	0.27	0.31	0.31	19.43	1.14	1.15	1.62

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-1.93	-2.27	1.38	0.15	-0.29	-0.34	0.21	0.41	0.77	1.18	0.28	0.31	0.32	19.38	1.13	1.15	1.61
-17.88	-23.20	-17.57	0.15	-2.68	-3.48	-2.64	0.45	1.27	1.12	0.28	0.31	0.32	19.34	1.11	1.14	1.59
14.13	3.85	-17.48	0.15	2.11	0.58	-2.61	1.18	1.13	0.51	0.28	0.31	0.32	19.29	1.10	1.14	1.59
-6.88	-0.14	-1.42	0.15	-1.03	-0.02	-0.21	0.54	1.41	0.68	0.28	0.31	0.32	19.24	1.10	1.14	1.58
-15.83	-17.09	2.60	0.15	-2.35	-2.54	0.39	0.82	1.69	1.29	0.28	0.31	0.32	19.19	1.09	1.14	1.57
26.15	1.96	-15.36	0.15	3.87	0.29	-2.27	0.97	0.73	1.01	0.28	0.31	0.32	19.14	1.09	1.14	1.57
-10.88	16.94	-26.26	0.15	-1.60	2.50	-3.87	0.51	0.45	1.10	0.29	0.31	0.32	19.09	1.08	1.14	1.57
-12.83	4.91	-5.17	0.15	-1.89	0.72	-0.76	1.23	1.09	0.81	0.29	0.31	0.33	19.04	1.08	1.14	1.57
24.15	-2.08	4.85	0.15	3.54	-0.30	0.71	1.46	0.65	0.33	0.29	0.31	0.33	18.99	1.09	1.14	1.57
0.11	14.91	-16.11	0.15	0.02	2.18	-2.35	0.50	0.90	0.71	0.29	0.32	0.33	18.95	1.09	1.14	1.58
-5.88	12.87	-7.05	0.15	-0.85	1.87	-1.03	0.39	0.37	1.29	0.29	0.32	0.33	18.90	1.09	1.14	1.58
-0.86	6.85	4.98	0.15	-0.12	0.99	0.72	0.73	1.37	0.94	0.29	0.32	0.34	18.85	1.09	1.15	1.59
-6.84	18.81	-6.00	0.14	-0.99	2.72	-0.87	0.90	1.94	0.50	0.30	0.32	0.34	18.80	1.10	1.15	1.59
-2.82	9.77	12.01	0.14	-0.41	1.41	1.73	1.03	0.52	1.01	0.30	0.33	0.34	18.75	1.10	1.15	1.59
-2.80	2.76	5.99	0.14	-0.40	0.40	0.86	1.87	0.62	0.73	0.30	0.33	0.35	18.70	1.11	1.15	1.60
-3.78	1.77	-9.98	0.14	-0.54	0.25	-1.43	1.27	0.51	0.47	0.30	0.33	0.35	18.65	1.11	1.16	1.60
-4.76	3.77	12.03	0.14	-0.68	0.54	1.71	0.71	1.70	1.28	0.30	0.34	0.35	18.60	1.11	1.16	1.61
1.25	16.75	10.01	0.14	0.18	2.38	1.42	0.16	1.18	1.46	0.30	0.34	0.35	18.55	1.12	1.16	1.61
9.23	-1.27	-0.99	0.14	1.31	-0.18	-0.14	0.20	0.51	1.27	0.31	0.34	0.36	18.51	1.12	1.16	1.62
-14.75	-1.25	9.01	0.14	-2.08	-0.18	1.27	1.19	1.30	0.87	0.31	0.35	0.36	18.46	1.13	1.17	1.62
-3.71	20.73	2.01	0.14	-0.52	2.91	0.28	1.09	1.98	0.48	0.31	0.35	0.36	18.41	1.13	1.17	1.63
18.26	7.69	-8.96	0.14	2.56	1.08	-1.25	0.84	1.34	0.45	0.31	0.35	0.36	18.36	1.13	1.17	1.63
-23.72	4.68	-8.90	0.14	-3.31	0.65	-1.24	0.86	1.93	0.06	0.31	0.35	0.37	18.31	1.14	1.17	1.63
-11.65	9.66	-6.85	0.14	-1.62	1.34	-0.95	0.99	1.57	0.32	0.31	0.36	0.37	18.26	1.14	1.18	1.64
18.34	3.65	3.18	0.14	2.54	0.51	0.44	1.08	0.76	0.64	0.31	0.36	0.37	18.21	1.14	1.18	1.64
-10.67	-2.34	7.18	0.14	-1.47	-0.32	0.99	0.98	0.37	0.62	0.31	0.36	0.37	18.16	1.14	1.18	1.64
-4.64	0.68	-0.82	0.14	-0.64	0.09	-0.11	0.32	1.56	1.27	0.31	0.36	0.37	18.12	1.15	1.18	1.64
0.38	10.67	3.20	0.14	0.05	1.46	0.44	0.94	0.82	0.83	0.32	0.36	0.37	18.07	1.15	1.18	1.65
-6.61	-0.33	9.19	0.14	-0.90	-0.05	1.25	0.96	1.16	0.52	0.32	0.36	0.37	18.02	1.15	1.18	1.65
-5.58	-4.31	0.19	0.14	-0.76	-0.59	0.03	0.14	1.92	0.16	0.32	0.37	0.37	17.97	1.16	1.18	1.65
-14.53	-1.28	4.20	0.14	-1.97	-0.17	0.57	0.14	1.36	0.55	0.32	0.37	0.37	17.92	1.16	1.18	1.65

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
4.49	-6.25	1.21	0.14	0.61	-0.84	0.16	0.52	0.24	0.45	0.32	0.37	0.37	17.87	1.16	1.17	1.65
-4.50	7.76	-9.75	0.13	-0.61	1.04	-1.31	0.33	0.76	0.48	0.32	0.37	0.37	17.82	1.17	1.17	1.65
-7.48	4.75	7.27	0.13	-1.00	0.64	0.97	0.85	0.64	0.23	0.32	0.37	0.37	17.77	1.17	1.16	1.65
19.50	-5.23	4.27	0.13	2.60	-0.70	0.57	0.13	1.80	0.79	0.32	0.37	0.37	17.72	1.18	1.16	1.65
1.47	12.77	-12.69	0.13	0.20	1.70	-1.69	0.83	1.76	1.55	0.32	0.38	0.37	17.68	1.18	1.15	1.65
-0.53	-4.24	-4.64	0.13	-0.07	-0.56	-0.61	0.36	0.18	0.80	0.32	0.38	0.36	17.63	1.19	1.14	1.65
2.47	-3.21	-2.61	0.13	0.33	-0.42	-0.34	0.31	0.87	0.37	0.32	0.38	0.36	17.58	1.19	1.13	1.65
-9.51	23.77	-5.57	0.13	-1.25	3.13	-0.73	0.52	0.93	0.81	0.32	0.38	0.36	17.53	1.20	1.12	1.64
-1.49	-1.26	5.45	0.13	-0.19	-0.17	0.71	1.18	1.13	0.46	0.32	0.39	0.36	17.48	1.21	1.11	1.64
-8.46	-10.22	8.44	0.13	-1.10	-1.33	1.10	0.98	1.56	0.77	0.32	0.39	0.35	17.43	1.21	1.10	1.64
12.54	-8.17	-5.55	0.13	1.63	-1.06	-0.72	0.72	1.69	1.03	0.32	0.39	0.35	17.38	1.22	1.09	1.64
10.49	-10.12	-8.50	0.13	1.36	-1.31	-1.10	0.30	1.77	0.28	0.32	0.39	0.34	17.33	1.23	1.08	1.64
-22.48	15.88	0.54	0.13	-2.90	2.05	0.07	0.62	0.86	1.04	0.32	0.40	0.34	17.29	1.24	1.06	1.64
3.56	-1.13	-1.44	0.13	0.46	-0.15	-0.19	0.70	1.34	0.56	0.32	0.40	0.33	17.24	1.25	1.05	1.64
4.55	-7.10	-1.42	0.13	0.58	-0.91	-0.18	0.80	0.79	0.11	0.32	0.40	0.33	17.19	1.27	1.04	1.64
-9.43	15.90	8.59	0.13	-1.20	2.03	1.10	0.49	0.57	0.46	0.32	0.41	0.32	17.14	1.28	1.03	1.64
-1.41	-13.09	7.58	0.13	-0.18	-1.66	0.96	1.02	0.78	1.18	0.32	0.41	0.32	17.09	1.29	1.02	1.65
-7.39	-2.05	1.58	0.13	-0.93	-0.26	0.20	1.54	1.40	1.09	0.31	0.41	0.31	17.04	1.31	1.00	1.65
0.63	17.93	5.58	0.13	0.08	2.26	0.70	0.44	1.35	0.15	0.31	0.41	0.31	16.99	1.33	1.00	1.66
-6.35	-10.07	5.58	0.13	-0.80	-1.26	0.70	0.66	0.38	0.27	0.31	0.42	0.31	16.94	1.34	0.99	1.67
1.66	0.97	3.58	0.13	0.21	0.12	0.45	0.25	0.26	0.08	0.31	0.42	0.30	16.89	1.36	0.98	1.68
7.65	1.98	1.59	0.12	0.95	0.25	0.20	0.80	0.36	1.20	0.30	0.42	0.30	16.85	1.38	0.97	1.69
-14.33	-4.01	-8.38	0.12	-1.78	-0.50	-1.04	1.55	0.95	0.61	0.30	0.42	0.29	16.80	1.41	0.97	1.71
11.68	6.01	-2.34	0.12	1.44	0.74	-0.29	1.02	0.68	0.55	0.30	0.42	0.29	16.75	1.43	0.96	1.72
-3.34	-10.97	9.67	0.12	-0.41	-1.35	1.19	0.49	0.98	0.51	0.29	0.43	0.28	16.70	1.45	0.96	1.74
-25.27	0.07	6.65	0.12	-3.10	0.01	0.82	3.48	5.08	3.64	0.29	0.43	0.28	16.65	1.47	0.96	1.76
14.75	11.06	9.64	0.12	1.80	1.35	1.18	3.98	6.75	4.95	0.29	0.43	0.27	16.60	1.50	0.96	1.78
-5.26	-3.94	1.64	0.12	-0.64	-0.48	0.20	2.26	2.29	3.19	0.28	0.43	0.27	16.55	1.52	0.96	1.79
-17.21	4.08	0.65	0.12	-2.08	0.49	0.08	0.34	0.76	1.60	0.28	0.43	0.27	16.50	1.54	0.96	1.81
16.79	-0.92	13.64	0.12	2.02	-0.11	1.64	0.12	0.14	0.58	0.28	0.43	0.26	16.46	1.56	0.96	1.83
-7.22	-12.87	-1.36	0.12	-0.87	-1.54	-0.16	0.57	0.57	0.46	0.27	0.43	0.26	16.41	1.58	0.96	1.85

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-18.17	-7.82	13.63	0.12	-2.17	-0.93	1.63	0.48	0.69	1.01	0.27	0.43	0.26	16.36	1.60	0.97	1.87
5.86	-11.76	8.60	0.12	0.70	-1.40	1.02	0.12	0.39	0.35	0.27	0.43	0.26	16.31	1.61	0.97	1.88
-9.12	-0.72	-35.32	0.12	-1.08	-0.09	-4.19	0.95	0.36	0.56	0.27	0.43	0.26	16.26	1.62	0.97	1.89
-16.07	1.29	2.76	0.12	-1.90	0.15	0.33	1.11	0.69	0.53	0.26	0.43	0.26	16.21	1.63	0.98	1.90
0.97	-9.68	29.71	0.12	0.11	-1.14	3.49	1.17	0.99	0.23	0.26	0.43	0.26	16.16	1.63	0.98	1.91
6.96	10.34	-2.32	0.12	0.81	1.21	-0.27	0.93	0.77	0.65	0.26	0.43	0.26	16.11	1.64	0.98	1.91
-9.03	9.31	3.69	0.12	-1.05	1.09	0.43	0.73	1.00	0.26	0.27	0.43	0.26	16.06	1.63	0.98	1.91
-7.00	-7.67	10.68	0.12	-0.81	-0.89	1.24	0.98	1.29	0.91	0.27	0.43	0.26	16.02	1.62	0.99	1.90
9.00	9.34	-9.30	0.12	1.04	1.08	-1.07	0.13	1.35	0.23	0.27	0.43	0.27	15.97	1.61	0.99	1.89
4.98	4.32	-6.25	0.12	0.57	0.50	-0.72	0.25	2.02	0.26	0.27	0.44	0.27	15.92	1.60	0.99	1.88
-11.00	-10.65	22.74	0.11	-1.26	-1.22	2.60	1.36	1.55	0.58	0.28	0.44	0.27	15.87	1.58	0.99	1.87
-11.95	-3.60	18.67	0.11	-1.36	-0.41	2.13	0.96	1.21	1.20	0.28	0.44	0.28	15.82	1.56	0.99	1.85
22.03	-1.58	-7.33	0.11	2.50	-0.18	-0.83	1.27	1.42	1.60	0.29	0.44	0.29	15.77	1.54	0.99	1.83
8.98	10.42	-10.28	0.11	1.01	1.18	-1.16	1.45	1.37	0.49	0.29	0.45	0.29	15.72	1.52	0.99	1.81
-19.00	-0.59	8.74	0.11	-2.14	-0.07	0.98	0.97	1.23	0.72	0.30	0.45	0.30	15.67	1.50	0.99	1.80
2.04	-8.55	18.71	0.11	0.23	-0.96	2.10	0.51	0.75	0.69	0.31	0.45	0.31	15.63	1.47	0.99	1.78
3.04	23.43	-1.31	0.11	0.34	2.61	-0.15	0.69	0.37	0.86	0.31	0.46	0.31	15.58	1.45	1.00	1.76
4.03	-4.59	-1.29	0.11	0.45	-0.51	-0.14	0.35	0.45	0.32	0.32	0.46	0.32	15.53	1.43	1.00	1.74
8.01	-22.52	4.72	0.11	0.88	-2.49	0.52	0.16	0.90	0.42	0.33	0.46	0.33	15.48	1.41	1.00	1.73
5.99	17.50	-7.25	0.11	0.66	1.93	-0.80	1.58	0.52	0.41	0.34	0.47	0.34	15.43	1.39	1.00	1.71
1.97	2.48	11.76	0.11	0.22	0.27	1.29	2.11	0.99	0.16	0.34	0.47	0.34	15.38	1.37	1.00	1.70
-1.02	9.47	10.73	0.11	-0.11	1.03	1.17	1.04	0.91	1.43	0.35	0.48	0.35	15.33	1.35	1.00	1.68
4.98	34.40	-13.25	0.11	0.54	3.73	-1.44	0.31	0.48	1.83	0.36	0.48	0.36	15.28	1.34	1.00	1.67
-9.01	-2.65	-2.20	0.11	-0.97	-0.29	-0.24	0.98	1.50	1.01	0.36	0.48	0.36	15.23	1.33	1.00	1.66
6.00	8.35	-6.16	0.11	0.64	0.90	-0.66	1.78	0.74	0.73	0.37	0.49	0.37	15.19	1.31	1.00	1.65
14.96	18.31	-8.11	0.11	1.60	1.96	-0.87	1.74	0.48	0.67	0.37	0.49	0.38	15.14	1.30	1.00	1.65
-23.02	-10.69	7.90	0.11	-2.45	-1.14	0.84	1.70	0.32	1.32	0.38	0.49	0.38	15.09	1.30	1.00	1.64
-2.96	18.31	-10.07	0.11	-0.31	1.94	-1.07	0.59	0.73	1.02	0.38	0.49	0.38	15.04	1.29	1.00	1.63
15.02	13.26	-15.00	0.11	1.58	1.40	-1.58	4.01	0.63	0.11	0.38	0.49	0.38	14.99	1.28	1.00	1.63
-6.99	-6.74	0.04	0.11	-0.73	-0.71	0.00	3.40	0.18	1.46	0.39	0.49	0.38	14.94	1.28	1.00	1.62
2.03	19.25	-7.92	0.10	0.21	2.01	-0.83	2.42	1.58	1.20	0.39	0.49	0.38	14.89	1.27	0.99	1.61

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
7.01	-2.77	-5.88	0.10	0.73	-0.29	-0.61	2.18	1.33	1.25	0.39	0.49	0.38	14.84	1.26	0.99	1.61
6.99	-12.72	0.15	0.10	0.72	-1.32	0.02	1.62	0.96	1.02	0.39	0.49	0.38	14.79	1.26	0.98	1.60
9.96	4.31	-8.81	0.10	1.03	0.44	-0.91	0.19	1.36	0.48	0.39	0.48	0.38	14.75	1.25	0.98	1.59
-8.04	-2.68	-7.76	0.10	-0.82	-0.27	-0.80	0.23	1.35	0.76	0.38	0.48	0.37	14.70	1.24	0.97	1.58
0.98	11.32	7.26	0.10	0.10	1.15	0.74	0.14	1.39	0.41	0.38	0.47	0.37	14.65	1.23	0.96	1.56
18.95	17.28	19.23	0.10	1.92	1.75	1.95	1.17	2.05	0.89	0.38	0.47	0.36	14.60	1.22	0.95	1.55
-8.07	-11.72	11.19	0.10	-0.82	-1.18	1.13	2.13	1.34	0.57	0.38	0.46	0.36	14.55	1.21	0.93	1.53
-2.05	-20.64	-5.81	0.10	-0.21	-2.07	-0.58	1.41	0.52	0.80	0.38	0.46	0.35	14.50	1.20	0.92	1.51
-3.03	-10.57	5.21	0.10	-0.30	-1.06	0.52	1.23	0.60	0.52	0.38	0.45	0.34	14.45	1.18	0.91	1.49
-17.98	4.46	-1.78	0.10	-1.79	0.44	-0.18	0.93	1.93	1.33	0.38	0.44	0.34	14.40	1.16	0.89	1.46
25.01	16.43	-17.72	0.10	2.48	1.63	-1.75	1.36	1.22	0.95	0.38	0.44	0.33	14.36	1.14	0.87	1.44
-5.03	-4.58	6.32	0.10	-0.50	-0.45	0.62	1.99	0.49	1.07	0.38	0.43	0.33	14.31	1.12	0.86	1.41
-31.95	-7.54	12.30	0.10	-3.13	-0.74	1.21	2.65	1.85	0.94	0.39	0.42	0.32	14.26	1.09	0.84	1.38
19.08	4.48	12.27	0.10	1.86	0.44	1.20	2.43	2.41	0.80	0.39	0.41	0.32	14.21	1.07	0.82	1.34
10.03	-7.50	6.26	0.10	0.97	-0.73	0.61	2.28	1.11	1.13	0.39	0.41	0.31	14.16	1.04	0.80	1.31
-6.97	3.53	-5.73	0.10	-0.67	0.34	-0.55	2.37	1.71	1.48	0.40	0.40	0.31	14.11	1.01	0.78	1.27
-4.94	4.52	23.26	0.10	-0.47	0.43	2.23	1.32	0.95	0.57	0.40	0.39	0.31	14.06	0.97	0.76	1.24
-3.92	-13.44	6.21	0.10	-0.37	-1.28	0.59	1.38	1.52	0.76	0.41	0.39	0.31	14.01	0.94	0.75	1.20
15.06	-0.40	-18.74	0.10	1.43	-0.04	-1.78	2.29	0.54	1.32	0.42	0.38	0.31	13.96	0.91	0.73	1.17
-6.95	12.59	8.30	0.09	-0.66	1.19	0.78	1.71	0.23	0.75	0.43	0.38	0.31	13.92	0.89	0.71	1.14
-7.91	5.57	4.29	0.09	-0.74	0.52	0.40	1.52	0.75	0.56	0.44	0.38	0.31	13.87	0.86	0.70	1.11
19.07	7.56	-1.70	0.09	1.78	0.71	-0.16	2.88	0.64	0.95	0.45	0.37	0.31	13.82	0.83	0.69	1.08
-8.95	1.55	12.30	0.09	-0.83	0.14	1.14	2.01	1.09	0.54	0.46	0.37	0.31	13.77	0.81	0.67	1.05
-9.90	3.56	14.26	0.09	-0.92	0.33	1.32	3.33	3.27	0.23	0.47	0.37	0.31	13.72	0.79	0.66	1.03
-0.88	22.52	-2.74	0.09	-0.08	2.07	-0.25	3.52	0.94	0.46	0.48	0.37	0.31	13.67	0.77	0.65	1.01
-7.85	-3.51	-8.70	0.09	-0.72	-0.32	-0.80	3.84	1.56	0.95	0.49	0.37	0.31	13.62	0.75	0.64	0.99
16.14	-12.46	2.33	0.09	1.47	-1.13	0.21	2.39	1.42	1.28	0.50	0.37	0.32	13.57	0.74	0.63	0.97
-4.88	19.54	4.34	0.09	-0.44	1.77	0.39	2.54	0.72	1.45	0.51	0.37	0.32	13.53	0.73	0.62	0.96
-12.84	5.50	14.32	0.09	-1.16	0.50	1.29	1.68	0.87	1.10	0.52	0.37	0.32	13.48	0.72	0.61	0.94
14.16	-3.49	-0.69	0.09	1.27	-0.31	-0.06	0.75	0.99	1.19	0.53	0.38	0.32	13.43	0.71	0.61	0.93
-10.84	11.51	-10.65	0.09	-0.96	1.02	-0.95	1.80	0.88	0.55	0.54	0.38	0.32	13.38	0.70	0.60	0.92

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-10.79	10.48	8.37	0.09	-0.96	0.93	0.74	2.35	1.38	0.23	0.55	0.38	0.33	13.33	0.69	0.59	0.91
-0.76	2.47	-1.63	0.09	-0.07	0.22	-0.14	1.76	0.76	1.10	0.56	0.39	0.33	13.28	0.69	0.58	0.90
-13.73	-2.52	10.37	0.09	-1.20	-0.22	0.91	1.38	0.37	0.64	0.57	0.39	0.33	13.23	0.69	0.58	0.90
1.30	3.49	10.35	0.09	0.11	0.30	0.90	1.83	0.21	0.52	0.58	0.40	0.33	13.18	0.69	0.57	0.89
-17.66	1.50	-22.61	0.09	-1.53	0.13	-1.96	0.90	0.85	0.69	0.59	0.40	0.33	13.13	0.68	0.56	0.89
-15.59	3.50	2.45	0.09	-1.34	0.30	0.21	1.70	1.05	1.15	0.60	0.41	0.33	13.09	0.68	0.55	0.88
17.42	4.50	17.43	0.09	1.49	0.38	1.49	1.11	1.86	0.29	0.61	0.42	0.33	13.04	0.68	0.55	0.87
-16.58	2.50	-10.57	0.09	-1.41	0.21	-0.90	0.81	0.83	0.62	0.62	0.42	0.33	12.99	0.68	0.54	0.87
-3.53	13.48	-15.50	0.08	-0.30	1.14	-1.31	1.44	1.40	0.47	0.63	0.43	0.33	12.94	0.68	0.53	0.86
19.44	2.46	-8.43	0.08	1.63	0.21	-0.71	2.45	1.61	0.72	0.64	0.43	0.33	12.89	0.67	0.52	0.85
-19.55	-8.51	-4.39	0.08	-1.63	-0.71	-0.37	0.47	1.22	0.78	0.65	0.43	0.33	12.84	0.67	0.52	0.85
16.46	-6.47	-3.35	0.08	1.37	-0.54	-0.28	0.41	0.55	1.37	0.66	0.44	0.33	12.79	0.67	0.51	0.84
29.37	-10.42	-11.31	0.08	2.42	-0.86	-0.93	0.32	1.46	1.43	0.67	0.44	0.33	12.74	0.66	0.50	0.83
-28.63	0.61	-3.26	0.08	-2.35	0.05	-0.27	1.66	1.60	1.76	0.68	0.44	0.33	12.70	0.66	0.49	0.82
-2.56	-9.36	10.74	0.08	-0.21	-0.76	0.88	1.66	1.21	1.20	0.69	0.45	0.33	12.65	0.65	0.48	0.81
22.41	-11.30	-7.24	0.08	1.82	-0.92	-0.59	2.08	1.79	1.56	0.70	0.45	0.33	12.60	0.64	0.48	0.80
-2.63	8.72	-4.20	0.08	-0.21	0.70	-0.34	1.20	1.50	3.94	0.71	0.45	0.33	12.55	0.64	0.47	0.79
-3.61	-11.26	15.79	0.08	-0.29	-0.90	1.26	3.31	0.97	3.32	0.72	0.45	0.33	12.50	0.63	0.46	0.78
2.40	-17.19	-3.22	0.08	0.19	-1.37	-0.26	2.62	0.27	0.85	0.72	0.45	0.33	12.45	0.62	0.46	0.77
20.36	0.85	-3.19	0.08	1.61	0.07	-0.25	2.45	1.19	1.55	0.73	0.45	0.33	12.40	0.62	0.45	0.76
-7.66	7.85	0.84	0.08	-0.60	0.62	0.07	3.97	0.73	2.06	0.74	0.45	0.33	12.35	0.61	0.45	0.76
-30.58	1.85	-5.14	0.08	-2.38	0.14	-0.40	3.96	0.91	1.55	0.74	0.45	0.33	12.30	0.60	0.44	0.75
21.45	-12.12	15.86	0.08	1.66	-0.94	1.23	3.75	1.42	0.60	0.75	0.45	0.33	12.26	0.60	0.44	0.74
12.39	-6.07	11.82	0.08	0.95	-0.47	0.91	3.12	1.15	0.79	0.75	0.44	0.33	12.21	0.59	0.44	0.74
-4.63	-7.03	0.82	0.08	-0.35	-0.54	0.06	2.18	1.01	1.23	0.75	0.44	0.33	12.16	0.59	0.44	0.73
11.37	-1.00	3.82	0.08	0.86	-0.08	0.29	3.80	1.97	1.71	0.75	0.44	0.33	12.11	0.58	0.44	0.73
-19.61	3.01	-4.16	0.08	-1.48	0.23	-0.31	3.07	1.47	1.84	0.75	0.44	0.33	12.06	0.58	0.44	0.73
0.43	-14.95	7.85	0.08	0.03	-1.12	0.59	2.84	1.29	0.63	0.75	0.43	0.33	12.01	0.58	0.44	0.73
23.39	10.07	4.85	0.07	1.74	0.75	0.36	2.40	1.04	1.75	0.75	0.43	0.33	11.96	0.58	0.44	0.73
-24.60	19.03	-10.13	0.07	-1.82	1.41	-0.75	1.58	1.71	1.15	0.74	0.43	0.33	11.91	0.58	0.45	0.73
-19.51	-11.97	1.91	0.07	-1.43	-0.88	0.14	0.95	0.48	0.30	0.74	0.43	0.34	11.87	0.58	0.46	0.74

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
28.48	-13.90	-7.06	0.07	2.08	-1.02	-0.52	2.08	0.84	0.21	0.73	0.43	0.34	11.82	0.58	0.46	0.74
5.42	6.13	-8.02	0.07	0.39	0.44	-0.58	2.88	1.40	1.04	0.73	0.43	0.35	11.77	0.58	0.47	0.75
-18.55	16.10	7.00	0.07	-1.34	1.16	0.50	1.17	1.01	1.04	0.72	0.42	0.35	11.72	0.59	0.48	0.76
9.47	-9.90	-2.99	0.07	0.68	-0.71	-0.21	2.13	1.27	0.77	0.72	0.42	0.36	11.67	0.59	0.50	0.77
5.45	-5.86	0.04	0.07	0.39	-0.42	0.00	2.43	1.87	0.91	0.71	0.42	0.36	11.62	0.59	0.51	0.78
-7.54	17.13	12.03	0.07	-0.53	1.21	0.85	1.17	1.72	0.52	0.71	0.42	0.37	11.57	0.59	0.52	0.79
-15.49	-4.88	-1.97	0.07	-1.08	-0.34	-0.14	1.15	1.05	1.48	0.71	0.42	0.38	11.52	0.60	0.54	0.80
-18.41	3.14	-12.92	0.07	-1.28	0.22	-0.90	2.06	1.21	0.89	0.71	0.42	0.39	11.47	0.60	0.55	0.81
16.60	11.13	8.10	0.07	1.15	0.77	0.56	2.39	1.86	1.02	0.71	0.42	0.40	11.43	0.60	0.56	0.82
0.57	-6.87	12.08	0.07	0.04	-0.47	0.83	3.26	0.89	0.90	0.71	0.43	0.41	11.38	0.60	0.57	0.83
-10.41	13.13	-12.90	0.07	-0.71	0.89	-0.88	4.29	2.55	0.79	0.71	0.43	0.42	11.33	0.60	0.59	0.84
8.60	15.09	-12.83	0.07	0.58	1.02	-0.87	1.62	0.62	0.89	0.72	0.43	0.43	11.28	0.60	0.60	0.84
-10.39	5.06	6.20	0.07	-0.70	0.34	0.42	1.62	1.62	1.20	0.72	0.43	0.44	11.23	0.59	0.60	0.85
27.58	3.06	7.19	0.07	1.83	0.20	0.48	1.19	2.17	0.26	0.73	0.43	0.45	11.18	0.59	0.61	0.85
8.52	-5.92	12.17	0.07	0.56	-0.39	0.80	2.17	1.01	1.36	0.74	0.43	0.45	11.13	0.59	0.61	0.85
-42.41	5.10	7.15	0.07	-2.78	0.33	0.47	2.13	0.54	1.19	0.75	0.44	0.46	11.08	0.58	0.62	0.85
14.65	2.10	-23.80	0.07	0.95	0.14	-1.55	1.57	1.51	1.13	0.76	0.44	0.47	11.04	0.58	0.62	0.84
13.60	-4.88	-1.73	0.06	0.88	-0.32	-0.11	1.43	2.45	2.20	0.77	0.44	0.48	10.99	0.57	0.62	0.84
-21.38	5.13	19.25	0.06	-1.37	0.33	1.23	2.59	2.15	2.13	0.78	0.44	0.48	10.94	0.56	0.61	0.83
-5.32	1.13	-4.76	0.06	-0.34	0.07	-0.30	3.75	0.93	1.57	0.80	0.45	0.49	10.89	0.56	0.61	0.83
11.67	1.14	-3.72	0.06	0.74	0.07	-0.23	2.62	0.66	0.65	0.81	0.45	0.49	10.84	0.55	0.60	0.82
7.64	-4.84	-15.67	0.06	0.48	-0.30	-0.98	2.21	2.09	0.26	0.82	0.45	0.49	10.79	0.55	0.60	0.81
-27.31	-15.78	-10.60	0.06	-1.69	-0.98	-0.66	3.08	1.64	0.56	0.83	0.45	0.49	10.74	0.54	0.59	0.80
-14.22	-2.73	20.40	0.06	-0.87	-0.17	1.25	3.14	0.36	1.34	0.84	0.46	0.49	10.69	0.54	0.58	0.79
9.79	10.27	-9.60	0.06	0.60	0.63	-0.59	1.73	1.16	1.63	0.85	0.46	0.49	10.64	0.54	0.57	0.79
-5.21	-2.74	-21.52	0.06	-0.32	-0.17	-1.30	1.59	1.16	0.95	0.86	0.46	0.49	10.60	0.53	0.56	0.78
10.78	-9.70	-1.46	0.06	0.65	-0.58	-0.09	0.46	0.08	0.45	0.87	0.46	0.48	10.55	0.53	0.56	0.77
3.76	10.32	-10.42	0.06	0.22	0.61	-0.62	2.48	1.08	0.98	0.88	0.47	0.48	10.50	0.53	0.55	0.76
-18.20	1.31	0.62	0.06	-1.07	0.08	0.04	3.38	1.38	2.57	0.88	0.47	0.47	10.45	0.54	0.54	0.76
2.83	-13.66	1.63	0.06	0.17	-0.80	0.10	1.71	1.62	1.59	0.88	0.47	0.47	10.40	0.54	0.53	0.75
7.82	-0.61	-7.34	0.06	0.45	-0.04	-0.43	0.49	2.27	1.16	0.88	0.48	0.46	10.35	0.54	0.52	0.75

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-7.18	2.40	10.68	0.06	-0.41	0.14	0.61	2.58	3.43	2.02	0.89	0.48	0.45	10.30	0.54	0.51	0.75
-0.16	5.40	0.67	0.06	-0.01	0.31	0.04	2.37	1.06	1.01	0.88	0.48	0.45	10.25	0.55	0.51	0.75
10.83	6.39	-19.27	0.06	0.61	0.36	-1.09	2.72	2.11	1.08	0.88	0.49	0.44	10.21	0.55	0.50	0.75
7.80	0.39	-1.21	0.06	0.44	0.02	-0.07	0.73	0.51	1.11	0.88	0.49	0.44	10.16	0.56	0.49	0.75
6.77	8.38	17.77	0.06	0.38	0.47	0.99	1.63	0.31	0.80	0.88	0.49	0.43	10.11	0.56	0.49	0.75
14.74	0.38	4.74	0.06	0.81	0.02	0.26	2.30	0.66	1.88	0.87	0.50	0.42	10.06	0.57	0.49	0.75
15.68	8.37	-0.25	0.05	0.85	0.46	-0.01	2.52	1.62	1.53	0.87	0.50	0.42	10.01	0.58	0.48	0.75
-0.34	27.32	2.77	0.05	-0.02	1.48	0.15	2.89	2.08	0.57	0.87	0.51	0.42	9.96	0.58	0.48	0.76
-1.33	9.26	2.77	0.05	-0.07	0.50	0.15	1.27	3.04	0.78	0.86	0.51	0.41	9.91	0.59	0.48	0.76
3.67	0.25	14.75	0.05	0.19	0.01	0.78	1.18	2.55	1.53	0.86	0.51	0.41	9.86	0.60	0.48	0.77
-11.31	-3.73	1.74	0.05	-0.59	-0.20	0.09	0.25	1.04	1.11	0.85	0.51	0.41	9.81	0.60	0.48	0.77
0.72	0.29	-10.23	0.05	0.04	0.02	-0.53	1.97	1.43	0.65	0.85	0.52	0.41	9.77	0.61	0.48	0.78
31.66	13.28	3.81	0.05	1.63	0.68	0.20	2.25	1.42	0.24	0.85	0.52	0.41	9.72	0.61	0.48	0.78
25.55	-2.73	5.80	0.05	1.30	-0.14	0.30	2.42	1.79	0.85	0.84	0.52	0.41	9.67	0.62	0.49	0.79
-1.50	4.28	6.80	0.05	-0.08	0.22	0.34	0.52	0.46	0.97	0.84	0.52	0.41	9.62	0.62	0.49	0.79
0.51	7.27	-4.19	0.05	0.03	0.36	-0.21	1.80	0.27	0.35	0.84	0.52	0.41	9.57	0.62	0.49	0.80
-1.48	-9.71	-17.13	0.05	-0.07	-0.48	-0.85	0.77	0.31	1.20	0.83	0.52	0.42	9.52	0.63	0.50	0.80
-25.42	14.29	-4.07	0.05	-1.25	0.70	-0.20	2.10	1.17	0.14	0.83	0.53	0.42	9.47	0.63	0.50	0.81
6.62	14.25	-4.04	0.05	0.32	0.69	-0.20	1.83	0.63	1.77	0.83	0.53	0.42	9.42	0.64	0.51	0.81
25.56	-3.76	-13.98	0.05	1.23	-0.18	-0.67	1.01	0.62	1.88	0.83	0.53	0.43	9.38	0.64	0.51	0.82
-3.48	3.25	-0.93	0.05	-0.17	0.15	-0.04	1.18	1.00	1.62	0.83	0.53	0.43	9.33	0.64	0.52	0.83
16.50	-3.73	2.08	0.05	0.78	-0.18	0.10	0.83	1.26	1.27	0.82	0.53	0.43	9.28	0.64	0.53	0.83
17.44	-2.71	-20.86	0.05	0.81	-0.13	-0.97	1.32	1.48	0.26	0.82	0.53	0.44	9.23	0.65	0.53	0.84
-16.55	5.30	-27.75	0.05	-0.76	0.24	-1.28	2.84	1.93	1.13	0.82	0.53	0.44	9.18	0.65	0.54	0.84
-14.49	5.29	2.32	0.05	-0.66	0.24	0.11	3.56	2.70	2.33	0.81	0.53	0.44	9.13	0.65	0.54	0.85
-0.45	-2.70	12.31	0.05	-0.02	-0.12	0.55	2.69	2.11	2.29	0.81	0.53	0.44	9.08	0.66	0.55	0.86
13.53	-14.65	-13.67	0.04	0.60	-0.65	-0.61	1.23	0.35	0.84	0.80	0.53	0.44	9.03	0.66	0.55	0.86
2.50	4.38	-10.60	0.04	0.11	0.19	-0.47	2.04	0.52	2.19	0.80	0.53	0.45	8.98	0.67	0.56	0.87
-3.49	7.37	-1.56	0.04	-0.15	0.32	-0.07	2.54	1.72	2.37	0.79	0.53	0.45	8.94	0.67	0.56	0.88
12.50	-9.61	-10.51	0.04	0.54	-0.41	-0.45	1.12	2.12	2.45	0.79	0.53	0.45	8.89	0.68	0.57	0.89
3.47	-9.56	-8.46	0.04	0.15	-0.41	-0.36	0.98	0.48	1.26	0.78	0.53	0.45	8.84	0.69	0.58	0.90

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
0.47	-9.51	-19.38	0.04	0.02	-0.40	-0.81	0.90	0.46	2.41	0.77	0.53	0.45	8.79	0.69	0.58	0.90
-2.52	-1.47	-19.29	0.04	-0.10	-0.06	-0.80	1.07	1.85	2.35	0.77	0.53	0.45	8.74	0.70	0.59	0.91
-5.50	-10.43	7.75	0.04	-0.23	-0.43	0.32	0.79	1.83	1.64	0.76	0.53	0.45	8.69	0.71	0.59	0.92
9.49	-24.35	-4.23	0.04	0.38	-0.99	-0.17	1.11	0.79	0.86	0.75	0.53	0.45	8.64	0.71	0.59	0.93
1.48	-5.28	-5.20	0.04	0.06	-0.21	-0.21	2.25	1.50	0.67	0.74	0.53	0.44	8.59	0.72	0.60	0.94
-10.50	2.74	18.80	0.04	-0.41	0.11	0.74	0.18	1.62	0.88	0.73	0.53	0.44	8.54	0.73	0.60	0.94
2.52	-15.22	-1.22	0.04	0.10	-0.59	-0.05	1.84	1.15	1.79	0.73	0.53	0.44	8.50	0.73	0.61	0.95
4.51	-3.17	-6.19	0.04	0.17	-0.12	-0.24	0.93	0.62	0.97	0.72	0.53	0.44	8.45	0.74	0.62	0.96
-6.48	9.83	5.83	0.04	-0.25	0.37	0.22	0.97	2.78	0.34	0.71	0.53	0.44	8.40	0.74	0.62	0.97
-4.45	-11.15	4.83	0.04	-0.17	-0.42	0.18	1.56	2.94	2.46	0.70	0.52	0.44	8.35	0.75	0.63	0.98
-5.42	-4.11	15.81	0.04	-0.20	-0.15	0.58	1.71	1.07	1.57	0.69	0.52	0.44	8.30	0.75	0.64	0.98
-2.40	6.90	2.79	0.04	-0.09	0.25	0.10	0.04	0.18	2.11	0.69	0.52	0.44	8.25	0.76	0.64	0.99
-16.36	-5.09	-8.18	0.04	-0.59	-0.18	-0.29	1.84	1.04	1.99	0.68	0.52	0.44	8.20	0.76	0.65	1.00
-1.32	-1.06	12.83	0.04	-0.05	-0.04	0.46	1.78	1.43	0.54	0.67	0.51	0.45	8.15	0.76	0.66	1.01
5.68	1.95	11.80	0.04	0.20	0.07	0.41	1.44	0.88	0.72	0.67	0.51	0.45	8.11	0.77	0.67	1.02
-28.27	3.95	7.78	0.03	-0.98	0.14	0.27	0.79	0.77	0.35	0.66	0.51	0.45	8.06	0.77	0.68	1.03
11.77	-2.04	5.77	0.03	0.40	-0.07	0.20	0.08	1.41	1.16	0.66	0.51	0.46	8.01	0.77	0.69	1.04
-0.25	-10.00	-10.21	0.03	-0.01	-0.34	-0.34	1.26	1.23	0.34	0.65	0.50	0.46	7.96	0.77	0.71	1.05
-32.18	1.03	12.81	0.03	-1.06	0.03	0.42	2.04	0.83	2.00	0.65	0.50	0.47	7.91	0.77	0.72	1.06
18.85	-0.96	11.78	0.03	0.61	-0.03	0.38	0.64	1.03	2.76	0.64	0.50	0.47	7.86	0.78	0.73	1.07
5.81	2.06	-17.19	0.03	0.19	0.07	-0.55	0.91	0.30	2.82	0.64	0.50	0.48	7.81	0.78	0.75	1.08
-22.15	1.06	9.84	0.03	-0.70	0.03	0.31	0.93	1.55	1.59	0.63	0.50	0.49	7.76	0.78	0.77	1.10
-19.06	-13.90	6.82	0.03	-0.59	-0.43	0.21	1.23	1.38	1.00	0.63	0.49	0.49	7.71	0.79	0.79	1.11
7.97	1.14	-20.13	0.03	0.24	0.03	-0.61	1.74	1.14	1.02	0.62	0.49	0.50	7.67	0.79	0.80	1.13
10.93	7.14	-0.07	0.03	0.33	0.21	0.00	1.11	1.85	0.95	0.62	0.49	0.51	7.62	0.80	0.82	1.14
-22.04	-7.85	-10.03	0.03	-0.65	-0.23	-0.30	1.07	2.29	0.34	0.61	0.49	0.52	7.57	0.80	0.84	1.16
3.01	-2.81	-8.98	0.03	0.09	-0.08	-0.26	3.19	1.34	1.60	0.61	0.49	0.52	7.52	0.81	0.86	1.18
13.98	8.19	8.04	0.03	0.40	0.23	0.23	3.91	0.20	1.99	0.60	0.49	0.53	7.47	0.82	0.88	1.20
-5.03	10.17	-10.93	0.03	-0.14	0.28	-0.31	1.97	0.45	1.40	0.60	0.49	0.54	7.42	0.83	0.90	1.22
-17.98	-3.83	-5.88	0.03	-0.49	-0.11	-0.16	1.93	0.80	1.04	0.59	0.49	0.54	7.37	0.84	0.92	1.24
3.06	1.19	-5.84	0.03	0.08	0.03	-0.16	1.01	0.13	0.42	0.58	0.49	0.55	7.32	0.85	0.94	1.26

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
27.00	23.16	-9.79	0.03	0.72	0.61	-0.26	1.04	0.69	0.86	0.58	0.49	0.55	7.28	0.86	0.95	27.00
-6.03	5.11	4.24	0.03	-0.16	0.13	0.11	1.22	0.11	1.21	0.57	0.50	0.55	7.23	0.87	0.97	-6.03
6.97	-2.88	-17.71	0.03	0.18	-0.07	-0.45	1.91	1.06	2.02	0.56	0.50	0.56	7.18	0.88	0.99	6.97
23.92	17.11	-9.64	0.03	0.60	0.43	-0.24	2.59	1.69	4.20	0.56	0.50	0.56	7.13	0.89	1.00	23.92
5.86	7.07	15.37	0.02	0.14	0.17	0.38	1.15	3.21	3.64	0.55	0.50	0.56	7.08	0.90	1.02	5.86
14.83	-7.91	-5.63	0.02	0.36	-0.19	-0.14	1.75	2.11	1.46	0.54	0.50	0.56	7.03	0.91	1.03	14.83
7.79	10.10	1.40	0.02	0.18	0.24	0.03	1.40	3.44	1.61	0.54	0.49	0.56	6.98	0.92	1.04	7.79
-0.22	5.08	3.40	0.02	-0.01	0.12	0.08	1.20	2.84	3.12	0.53	0.49	0.56	6.93	0.93	1.05	-0.22
13.76	-23.87	-3.58	0.02	0.31	-0.54	-0.08	1.36	0.33	1.00	0.52	0.49	0.56	6.88	0.94	1.06	13.76
16.70	4.18	2.45	0.02	0.37	0.09	0.05	2.24	2.46	1.88	0.52	0.49	0.55	6.84	0.94	1.07	16.70
3.66	8.17	-19.50	0.02	0.08	0.18	-0.42	5.19	5.42	3.43	0.52	0.49	0.55	6.79	0.95	1.07	3.66
9.64	-18.79	0.56	0.02	0.20	-0.39	0.01	2.62	2.33	1.19	0.51	0.49	0.55	6.74	0.95	1.07	9.64
7.61	4.25	21.53	0.02	0.16	0.09	0.44	0.79	1.56	0.57	0.51	0.48	0.55	6.69	0.95	1.08	7.61
-5.39	-8.73	-8.48	0.02	-0.11	-0.17	-0.17	2.53	3.13	3.70	0.51	0.48	0.55	6.64	0.95	1.07	-5.39
-5.36	-19.66	-2.44	0.02	-0.10	-0.38	-0.05	2.44	2.93	3.87	0.51	0.48	0.54	6.59	0.94	1.07	-5.36
-10.32	3.39	2.58	0.02	-0.20	0.06	0.05	3.33	1.74	1.82	0.51	0.48	0.54	6.54	0.94	1.07	-10.32
13.68	-13.58	-0.40	0.02	0.25	-0.25	-0.01	3.52	0.66	2.05	0.51	0.47	0.54	6.49	0.93	1.06	13.68
0.65	-12.51	11.59	0.02	0.01	-0.23	0.21	1.18	0.36	0.99	0.51	0.47	0.54	6.45	0.92	1.05	0.65
-12.32	-1.47	-2.41	0.02	-0.22	-0.03	-0.04	1.07	0.62	0.98	0.52	0.47	0.54	6.40	0.91	1.05	-12.32
8.70	-21.41	6.60	0.02	0.15	-0.36	0.11	0.57	1.07	0.95	0.52	0.47	0.54	6.35	0.90	1.04	8.70
-18.28	-11.33	9.59	0.02	-0.30	-0.19	0.16	1.22	1.57	2.36	0.53	0.47	0.55	6.30	0.89	1.03	-18.28
-0.24	2.70	-11.39	0.02	0.00	0.04	-0.18	0.86	0.94	0.74	0.54	0.47	0.55	6.25	0.88	1.02	-0.24
5.76	-8.27	1.65	0.02	0.09	-0.13	0.03	1.20	2.42	1.11	0.54	0.47	0.55	6.20	0.87	1.01	5.76
-27.19	-2.24	5.65	0.02	-0.41	-0.03	0.08	2.23	1.98	1.27	0.55	0.48	0.56	6.15	0.86	1.01	-27.19
-5.12	3.77	14.63	0.01	-0.07	0.05	0.21	3.28	0.30	2.67	0.56	0.48	0.56	6.10	0.85	1.00	-5.12
13.86	5.77	7.61	0.01	0.19	0.08	0.11	1.83	1.54	1.63	0.57	0.48	0.57	6.05	0.85	0.99	13.86
-5.15	3.76	-18.35	0.01	-0.07	0.05	-0.25	1.26	1.52	2.41	0.58	0.49	0.58	6.01	0.84	0.99	-5.15
-6.12	-12.20	-1.30	0.01	-0.08	-0.16	-0.02	4.45	3.53	5.34	0.59	0.50	0.58	5.96	0.84	0.98	-6.12
17.86	4.82	0.72	0.01	0.22	0.06	0.01	3.24	1.69	4.19	0.60	0.51	0.59	5.91	0.84	0.98	17.86
1.83	10.81	-7.25	0.01	0.02	0.13	-0.09	2.42	1.25	1.35	0.61	0.52	0.60	5.86	0.84	0.98	1.83
-8.15	-22.16	-11.19	0.01	-0.09	-0.25	-0.13	2.28	3.67	2.23	0.63	0.53	0.61	5.81	0.84	0.97	-8.15

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-1.13	4.89	-19.11	0.01	-0.01	0.05	-0.21	1.85	5.79	5.99	0.64	0.54	0.62	5.76	0.84	0.97	1.29
10.86	12.87	-4.04	0.01	0.11	0.14	-0.04	1.83	2.71	7.33	0.65	0.55	0.63	5.71	0.85	0.97	1.29
14.81	-19.10	-7.00	0.01	0.15	-0.19	-0.07	0.65	3.57	4.93	0.66	0.56	0.64	5.66	0.85	0.97	1.29
-13.19	10.93	-6.96	0.01	-0.13	0.10	-0.07	0.99	1.62	2.64	0.67	0.57	0.65	5.62	0.86	0.97	1.30
-2.15	17.89	1.07	0.01	-0.02	0.16	0.01	0.19	1.03	1.04	0.68	0.59	0.66	5.57	0.86	0.97	1.30
1.86	2.86	-12.88	0.01	0.02	0.02	-0.11	0.86	0.75	1.95	0.69	0.60	0.67	5.52	0.87	0.97	1.31
-1.14	1.86	-6.82	0.01	-0.01	0.01	-0.05	0.77	2.97	2.57	0.70	0.61	0.68	5.47	0.88	0.98	1.31
20.83	-9.11	-1.79	0.01	0.16	-0.07	-0.01	4.02	5.21	9.70	0.71	0.62	0.69	5.42	0.88	0.98	1.32
2.79	15.89	-3.76	0.01	0.02	0.11	-0.03	5.67	4.76	11.29	0.72	0.64	0.70	5.37	0.89	0.98	1.33
-10.19	14.84	7.25	0.01	-0.07	0.10	0.05	2.16	1.82	2.48	0.72	0.65	0.71	5.32	0.90	0.99	1.33
21.79	-13.14	-1.74	0.01	0.13	-0.08	-0.01	0.95	5.66	1.38	0.73	0.66	0.72	5.27	0.90	0.99	1.34
9.73	10.87	-4.71	0.01	0.05	0.06	-0.03	0.67	3.90	0.29	0.74	0.67	0.73	5.22	0.91	1.00	1.35
-26.23	18.83	4.31	0.01	-0.13	0.09	0.02	0.34	1.76	2.22	0.74	0.68	0.74	5.18	0.91	1.01	1.36
6.81	-6.18	8.31	0.00	0.03	-0.03	0.04	1.50	2.16	2.39	0.75	0.69	0.76	5.13	0.92	1.01	1.37
6.79	-2.15	3.30	0.00	0.03	-0.01	0.01	1.96	3.07	0.80	0.75	0.69	0.77	5.08	0.93	1.03	1.38
-12.19	6.85	-6.67	0.00	-0.04	0.02	-0.02	1.21	4.34	2.73	0.75	0.70	0.78	5.03	0.93	1.04	1.40
3.83	2.85	6.35	0.00	0.01	0.01	0.02	1.71	3.02	10.73	0.76	0.71	0.80	4.98	0.94	1.05	1.41
-8.15	5.84	7.34	0.00	-0.02	0.01	0.02	2.04	4.68	6.27	0.76	0.72	0.81	4.93	0.95	1.07	1.43
-2.13	-3.15	-2.65	0.00	0.00	-0.01	-0.01	3.05	1.97	2.87	0.76	0.73	0.83	4.88	0.95	1.09	1.45
2.88	2.87	3.37	0.00	0.00	0.00	0.01	1.02	1.34	2.19	0.76	0.73	0.85	4.83	0.96	1.11	1.47
-10.10	13.85	7.37	0.00	-0.01	0.01	0.01	1.32	0.09	1.70	0.76	0.74	0.86	4.79	0.97	1.13	1.50
-3.07	-3.16	16.34	0.00	0.00	0.00	0.01	1.58	3.32	1.63	0.76	0.75	0.88	4.74	0.99	1.16	1.52

Microtremors Segment: B2-S1

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
0.68	-21.00	3.79	0.26	0.18	-5.45	0.98	3.03	1.92	1.50	2.83	1.11	0.93	30.03	0.39	0.33	0.51
-17.24	-30.89	17.80	0.26	-4.46	-8.00	4.61	3.61	1.96	1.20	2.79	1.09	0.91	29.98	0.39	0.32	0.51
-0.15	-23.78	10.80	0.26	-0.04	-6.15	2.79	5.00	2.11	1.51	2.75	1.07	0.88	29.93	0.39	0.32	0.50
-6.09	-15.70	7.81	0.26	-1.57	-4.05	2.02	3.41	0.84	1.50	2.70	1.04	0.85	29.88	0.38	0.32	0.50
-13.00	-20.63	28.79	0.26	-3.35	-5.31	7.41	3.19	1.15	1.42	2.65	1.01	0.83	29.83	0.38	0.31	0.49
9.06	-24.54	36.72	0.26	2.33	-6.31	9.44	2.57	2.42	0.55	2.60	0.98	0.80	29.79	0.38	0.31	0.49
-11.89	-12.46	25.65	0.26	-3.05	-3.20	6.58	3.43	2.45	2.05	2.55	0.95	0.77	29.74	0.37	0.30	0.48
-54.70	-9.42	24.60	0.26	-14.00	-2.41	6.30	2.32	2.29	0.97	2.50	0.93	0.74	29.69	0.37	0.30	0.47
-56.43	-9.38	30.54	0.26	-14.42	-2.40	7.80	4.45	2.21	0.18	2.44	0.90	0.71	29.64	0.37	0.29	0.47
-18.23	14.61	31.47	0.26	-4.65	3.73	8.03	3.16	1.19	0.71	2.39	0.87	0.68	29.59	0.37	0.29	0.46
13.83	26.53	32.40	0.25	3.52	6.75	8.25	1.38	0.53	1.90	2.34	0.85	0.65	29.54	0.36	0.28	0.46
0.85	9.46	36.31	0.25	0.22	2.40	9.22	1.48	0.44	2.52	2.29	0.82	0.63	29.49	0.36	0.28	0.45
-13.07	-6.54	38.22	0.25	-3.31	-1.66	9.69	2.68	0.38	1.02	2.24	0.80	0.61	29.44	0.36	0.27	0.45
2.00	2.46	32.13	0.25	0.51	0.62	8.13	5.64	0.41	1.83	2.20	0.78	0.59	29.39	0.35	0.27	0.44
-8.93	10.44	25.07	0.25	-2.26	2.64	6.33	5.58	2.43	2.52	2.16	0.76	0.57	29.35	0.35	0.26	0.44
-21.82	-19.54	20.03	0.25	-5.50	-4.92	5.05	2.85	2.33	1.86	2.13	0.74	0.55	29.30	0.35	0.26	0.44
-1.72	-33.43	10.02	0.25	-0.43	-8.41	2.52	2.55	2.14	1.21	2.09	0.73	0.54	29.25	0.35	0.26	0.43
-9.65	-0.36	-6.93	0.25	-2.42	-0.09	-1.74	3.33	2.02	1.13	2.06	0.72	0.53	29.20	0.35	0.26	0.43
-5.56	14.61	-19.83	0.25	-1.39	3.66	-4.97	3.35	1.98	1.26	2.03	0.70	0.52	29.15	0.35	0.26	0.43
23.45	5.57	-22.69	0.25	5.86	1.39	-5.67	1.63	1.41	1.40	2.00	0.69	0.52	29.10	0.35	0.26	0.43
-10.52	9.54	-37.52	0.25	-2.63	2.38	-9.36	3.53	2.02	3.08	1.97	0.68	0.51	29.05	0.35	0.26	0.43
-34.38	9.50	-43.30	0.25	-8.56	2.37	-10.78	3.90	0.63	0.67	1.95	0.68	0.51	29.00	0.35	0.26	0.43
23.69	8.47	-25.11	0.25	5.89	2.10	-6.24	2.67	0.64	0.74	1.92	0.67	0.51	28.96	0.35	0.26	0.44
39.62	13.43	-31.95	0.25	9.82	3.33	-7.92	1.87	1.48	1.18	1.89	0.66	0.50	28.91	0.35	0.27	0.44
-2.41	13.37	-52.72	0.25	-0.60	3.31	-13.05	0.83	0.50	1.69	1.87	0.66	0.51	28.86	0.35	0.27	0.45
-0.35	7.33	-36.49	0.25	-0.09	1.81	-9.01	5.90	0.91	1.98	1.84	0.66	0.51	28.81	0.36	0.27	0.45
7.69	-10.66	-13.34	0.25	1.89	-2.63	-3.29	2.29	2.24	0.74	1.82	0.65	0.51	28.76	0.36	0.28	0.46
-13.25	-21.59	-19.22	0.25	-3.26	-5.31	-4.73	8.57	3.41	1.84	1.79	0.65	0.51	28.71	0.36	0.28	0.46
13.80	-7.54	-30.06	0.25	3.39	-1.85	-7.38	10.20	3.87	2.34	1.77	0.65	0.51	28.66	0.37	0.29	0.47
35.75	4.47	-26.89	0.25	8.76	1.10	-6.59	7.85	1.49	1.97	1.74	0.64	0.52	28.61	0.37	0.30	0.47
-0.27	-3.53	-32.72	0.24	-0.07	-0.86	-8.00	7.63	3.18	0.79	1.72	0.64	0.52	28.56	0.37	0.30	0.48
-5.21	-1.52	-25.55	0.24	-1.27	-0.37	-6.23	5.63	0.61	0.97	1.69	0.64	0.52	28.52	0.38	0.31	0.49
0.68	-21.00	3.79	0.26	0.18	-5.45	0.98	3.03	1.92	1.50	2.83	1.11	0.93	30.03	0.39	0.33	0.51

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
9.84	11.46	9.54	0.24	2.40	2.79	2.32	5.53	1.17	0.14	1.66	0.64	0.52	28.47	0.38	0.32	0.50
11.84	13.41	17.54	0.24	2.88	3.26	4.26	4.87	2.74	1.30	1.64	0.64	0.53	28.42	0.39	0.32	0.50
-9.11	22.34	8.54	0.24	-2.21	5.42	2.07	3.46	2.66	1.25	1.61	0.63	0.53	28.37	0.39	0.33	0.51
-34.97	20.26	28.52	0.24	-8.46	4.90	6.90	1.26	0.94	1.30	1.59	0.63	0.53	28.32	0.40	0.34	0.52
7.14	-2.78	42.44	0.24	1.72	-0.67	10.25	0.44	1.21	0.42	1.56	0.63	0.54	28.27	0.40	0.34	0.53
12.15	-12.74	19.37	0.24	2.93	-3.07	4.67	2.87	2.04	0.42	1.54	0.63	0.54	28.22	0.41	0.35	0.54
-33.76	-25.67	12.36	0.24	-8.12	-6.17	2.97	1.79	1.92	1.40	1.52	0.63	0.54	28.17	0.41	0.36	0.54
-24.59	-47.52	30.33	0.24	-5.90	-11.40	7.28	0.52	2.28	0.26	1.50	0.62	0.54	28.13	0.42	0.36	0.55
-20.45	-51.32	32.25	0.24	-4.90	-12.29	7.73	1.97	1.45	0.86	1.48	0.62	0.54	28.08	0.42	0.37	0.56
-24.30	-33.15	27.19	0.24	-5.81	-7.92	6.50	2.11	2.23	0.52	1.47	0.62	0.55	28.03	0.42	0.37	0.56
-24.15	-18.04	20.15	0.24	-5.76	-4.30	4.81	2.56	2.26	0.90	1.45	0.62	0.55	27.98	0.43	0.38	0.57
-29.00	-14.98	16.13	0.24	-6.90	-3.56	3.84	1.12	0.83	2.42	1.44	0.62	0.55	27.93	0.43	0.38	0.57
-3.88	-1.94	20.11	0.24	-0.92	-0.46	4.78	1.53	2.14	2.48	1.43	0.62	0.55	27.88	0.43	0.38	0.58
-0.82	7.05	15.09	0.24	-0.19	1.67	3.58	1.58	2.60	2.05	1.43	0.62	0.55	27.83	0.43	0.39	0.58
5.23	3.03	12.09	0.24	1.24	0.72	2.86	3.84	1.55	1.43	1.42	0.62	0.55	27.78	0.43	0.39	0.58
24.22	10.01	13.09	0.24	5.72	2.36	3.09	1.08	1.06	0.64	1.42	0.62	0.55	27.73	0.43	0.39	0.58
-4.76	21.95	1.12	0.24	-1.12	5.17	0.26	1.93	2.08	0.50	1.42	0.62	0.55	27.69	0.43	0.39	0.58
-10.68	8.89	-0.83	0.24	-2.51	2.09	-0.20	0.23	0.96	0.45	1.42	0.62	0.55	27.64	0.44	0.39	0.58
2.39	-10.11	1.22	0.23	0.56	-2.37	0.29	1.84	0.35	0.41	1.43	0.62	0.55	27.59	0.44	0.38	0.58
-17.53	-0.09	-18.69	0.23	-4.10	-0.02	-4.37	1.43	0.88	0.48	1.43	0.62	0.55	27.54	0.44	0.38	0.58
-14.41	9.90	-17.57	0.23	-3.37	2.31	-4.10	1.34	2.28	1.85	1.44	0.63	0.54	27.49	0.44	0.38	0.58
8.65	-3.12	-0.48	0.23	2.02	-0.73	-0.11	2.06	1.18	2.10	1.44	0.63	0.54	27.44	0.44	0.37	0.58
31.62	-5.10	-16.39	0.23	7.35	-1.19	-3.81	1.61	0.39	0.19	1.45	0.64	0.54	27.39	0.44	0.37	0.57
32.55	6.90	-36.23	0.23	7.55	1.60	-8.41	1.67	0.77	0.40	1.46	0.64	0.53	27.34	0.44	0.37	0.57
-3.46	-3.10	-34.04	0.23	-0.80	-0.72	-7.88	0.41	2.77	0.90	1.46	0.64	0.53	27.29	0.44	0.36	0.57
-9.38	-11.07	-28.86	0.23	-2.17	-2.56	-6.67	1.60	3.67	0.97	1.46	0.65	0.52	27.25	0.44	0.36	0.57
12.66	10.93	-25.69	0.23	2.92	2.52	-5.92	1.36	2.11	0.68	1.46	0.65	0.52	27.20	0.45	0.35	0.57
23.64	19.87	-12.56	0.23	5.44	4.57	-2.89	2.33	1.05	0.68	1.46	0.66	0.51	27.15	0.45	0.35	0.57
30.59	-2.17	3.51	0.23	7.02	-0.50	0.81	1.29	1.43	0.56	1.45	0.66	0.51	27.10	0.46	0.35	0.57
25.53	-4.15	3.55	0.23	5.85	-0.95	0.81	2.14	1.67	0.97	1.44	0.67	0.50	27.05	0.46	0.35	0.58
9.51	0.86	-6.39	0.23	2.17	0.20	-1.46	1.65	1.05	1.77	1.43	0.67	0.49	27.00	0.47	0.34	0.58
9.84	11.46	9.54	0.24	2.40	2.79	2.32	5.53	1.17	0.14	1.66	0.64	0.52	28.47	0.38	0.32	0.50
11.84	13.41	17.54	0.24	2.88	3.26	4.26	4.87	2.74	1.30	1.64	0.64	0.53	28.42	0.39	0.32	0.50

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
9.52	-22.10	6.66	0.23	2.17	-5.04	1.52	0.52	0.73	1.16	1.42	0.67	0.49	26.95	0.48	0.34	0.59
-1.44	-31.99	19.66	0.23	-0.33	-7.28	4.47	0.22	1.68	0.37	1.40	0.68	0.48	26.90	0.48	0.34	0.59
-29.33	-24.87	2.67	0.23	-6.66	-5.65	0.61	0.94	3.14	0.64	1.37	0.68	0.47	26.86	0.49	0.35	0.60
-5.21	-19.78	6.71	0.23	-1.18	-4.48	1.52	1.70	1.41	0.21	1.34	0.68	0.47	26.81	0.51	0.35	0.61
17.82	-14.71	20.71	0.23	4.03	-3.32	4.68	2.25	0.76	0.30	1.31	0.68	0.46	26.76	0.52	0.35	0.63
-31.11	-9.66	9.70	0.23	-7.01	-2.18	2.19	1.44	0.18	0.63	1.28	0.68	0.45	26.71	0.53	0.36	0.64
-63.86	7.35	1.73	0.23	-14.37	1.65	0.39	2.14	1.22	1.94	1.24	0.68	0.45	26.66	0.55	0.36	0.65
-20.64	1.33	18.74	0.22	-4.63	0.30	4.21	2.89	3.46	2.31	1.20	0.68	0.44	26.61	0.56	0.37	0.67
29.39	-13.64	32.69	0.22	6.58	-3.05	7.32	2.70	5.11	3.86	1.16	0.67	0.44	26.56	0.58	0.38	0.69
6.37	9.37	21.64	0.22	1.42	2.09	4.84	2.63	2.55	1.32	1.12	0.67	0.43	26.51	0.60	0.38	0.71
-14.56	15.33	36.57	0.22	-3.25	3.42	8.16	1.41	1.76	0.94	1.08	0.67	0.43	26.46	0.62	0.39	0.73
10.50	5.29	42.47	0.22	2.34	1.18	9.45	1.09	2.07	2.91	1.04	0.66	0.42	26.42	0.64	0.41	0.76
-36.39	-1.72	6.42	0.22	-8.08	-0.38	1.43	1.21	2.02	1.95	1.00	0.66	0.42	26.37	0.66	0.42	0.78
-76.11	3.28	13.43	0.22	-16.86	0.73	2.98	0.59	1.02	0.81	0.96	0.66	0.41	26.32	0.68	0.43	0.81
-1.90	12.25	33.39	0.22	-0.42	2.71	7.38	2.72	0.97	3.11	0.92	0.65	0.41	26.27	0.71	0.45	0.84
8.14	-4.76	13.35	0.22	1.79	-1.05	2.94	2.50	1.36	4.15	0.88	0.65	0.41	26.22	0.73	0.46	0.87
-33.76	-11.72	1.37	0.22	-7.43	-2.58	0.30	1.33	1.88	1.56	0.84	0.64	0.40	26.17	0.76	0.48	0.90
5.35	-0.70	7.41	0.22	1.17	-0.15	1.63	1.72	1.63	1.13	0.81	0.64	0.40	26.12	0.79	0.49	0.93
15.36	-2.69	-0.56	0.22	3.36	-0.59	-0.12	2.49	3.13	0.74	0.78	0.64	0.40	26.07	0.81	0.51	0.96
-22.57	9.30	-14.47	0.22	-4.93	2.03	-3.16	5.25	3.05	1.64	0.75	0.63	0.39	26.03	0.84	0.52	0.99
-7.46	10.26	-4.38	0.22	-1.63	2.24	-0.96	5.30	3.47	0.93	0.73	0.63	0.39	25.98	0.87	0.54	1.02
33.55	-9.73	4.67	0.22	7.30	-2.12	1.02	3.98	2.59	0.79	0.70	0.63	0.39	25.93	0.89	0.56	1.05
33.46	-0.71	-6.28	0.22	7.26	-0.15	-1.36	1.52	0.84	0.98	0.69	0.63	0.39	25.88	0.91	0.57	1.08
1.45	11.27	-17.18	0.22	0.31	2.44	-3.72	2.45	0.52	1.80	0.67	0.62	0.39	25.83	0.93	0.59	1.10
-0.50	1.25	-14.06	0.22	-0.11	0.27	-3.04	1.31	0.58	1.55	0.65	0.62	0.39	25.78	0.95	0.60	1.13
41.47	-24.70	-10.96	0.22	8.94	-5.32	-2.36	1.08	0.40	1.62	0.64	0.63	0.39	25.73	0.97	0.61	1.15
52.33	-36.58	-22.84	0.22	11.25	-7.86	-4.91	3.67	2.19	1.56	0.64	0.63	0.40	25.68	0.99	0.63	1.17
17.25	-7.49	-20.70	0.21	3.70	-1.61	-4.44	4.53	2.59	1.04	0.63	0.63	0.40	25.63	1.00	0.64	1.19
0.26	-0.47	-6.59	0.21	0.06	-0.10	-1.41	2.14	2.24	1.08	0.62	0.63	0.41	25.59	1.01	0.65	1.20
-0.68	1.53	-17.49	0.21	-0.15	0.33	-3.73	1.00	1.91	0.56	0.62	0.64	0.41	25.54	1.02	0.66	1.22
-11.61	31.47	-26.35	0.21	-2.47	6.70	-5.61	2.01	0.67	0.67	0.62	0.64	0.42	25.49	1.03	0.67	1.23
9.52	-22.10	6.66	0.23	2.17	-5.04	1.52	0.52	0.73	1.16	1.42	0.67	0.49	26.95	0.48	0.34	0.59
-1.44	-31.99	19.66	0.23	-0.33	-7.28	4.47	0.22	1.68	0.37	1.40	0.68	0.48	26.90	0.48	0.34	0.59

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
5.46	20.37	-9.23	0.21	1.16	4.33	-1.96	2.20	1.47	0.31	0.63	0.65	0.43	25.44	1.03	0.68	1.24
38.42	3.32	-4.15	0.21	8.15	0.70	-0.88	2.22	2.26	1.31	0.63	0.65	0.43	25.39	1.04	0.69	1.25
13.37	14.29	-10.07	0.21	2.83	3.02	-2.13	5.67	1.82	3.87	0.63	0.66	0.44	25.34	1.04	0.70	1.25
-7.59	4.26	2.00	0.21	-1.60	0.90	0.42	7.98	4.94	4.09	0.64	0.66	0.45	25.29	1.03	0.71	1.25
8.46	-14.72	14.02	0.21	1.78	-3.10	2.95	2.01	4.36	0.75	0.65	0.67	0.47	25.24	1.03	0.72	1.25
-11.48	-19.65	-2.94	0.21	-2.41	-4.13	-0.62	6.06	2.29	2.02	0.66	0.67	0.48	25.20	1.02	0.72	1.25
-33.34	-11.59	0.11	0.21	-6.98	-2.43	0.02	3.08	0.66	0.61	0.67	0.68	0.49	25.15	1.01	0.73	1.25
-23.17	-19.52	32.10	0.21	-4.84	-4.08	6.71	1.76	1.23	0.31	0.68	0.69	0.50	25.10	1.00	0.73	1.24
-24.03	-35.41	23.04	0.21	-5.01	-7.38	4.80	2.84	0.37	2.70	0.70	0.69	0.51	25.05	0.99	0.73	1.23
-14.90	-19.29	11.03	0.21	-3.10	-4.01	2.29	1.06	2.45	0.84	0.71	0.70	0.52	25.00	0.98	0.73	1.22
14.16	-2.25	38.98	0.21	2.94	-0.47	8.09	4.89	2.66	3.02	0.73	0.70	0.53	24.95	0.97	0.73	1.21
8.16	-6.23	34.88	0.21	1.69	-1.29	7.22	10.22	2.92	3.79	0.74	0.71	0.54	24.90	0.95	0.73	1.20
-22.75	-10.19	9.85	0.21	-4.70	-2.10	2.03	10.19	2.23	4.36	0.76	0.71	0.55	24.85	0.94	0.72	1.18
-19.62	-2.16	7.86	0.21	-4.04	-0.45	1.62	3.05	3.00	1.09	0.78	0.72	0.56	24.80	0.92	0.72	1.17
-1.52	2.84	15.87	0.21	-0.31	0.58	3.26	1.43	2.41	0.18	0.80	0.72	0.56	24.76	0.90	0.71	1.15
-19.43	9.82	14.86	0.21	-3.98	2.01	3.05	0.88	2.69	0.57	0.82	0.72	0.57	24.71	0.88	0.70	1.13
-38.26	21.76	0.88	0.20	-7.82	4.45	0.18	2.44	2.40	1.19	0.84	0.72	0.58	24.66	0.87	0.69	1.11
-17.09	-1.28	3.92	0.20	-3.49	-0.26	0.80	3.70	2.02	1.21	0.86	0.73	0.58	24.61	0.85	0.68	1.09
-4.99	-29.22	15.93	0.20	-1.02	-5.95	3.24	3.85	2.67	1.97	0.88	0.73	0.58	24.56	0.83	0.67	1.06
-22.89	-18.12	-0.05	0.20	-4.65	-3.68	-0.01	3.24	3.32	0.54	0.90	0.73	0.59	24.51	0.81	0.65	1.04
-36.71	-6.07	-2.99	0.20	-7.43	-1.23	-0.61	2.84	2.08	0.83	0.92	0.73	0.59	24.46	0.79	0.64	1.02
-19.54	-32.99	17.03	0.20	-3.95	-6.66	3.44	2.36	2.40	1.54	0.94	0.73	0.59	24.41	0.78	0.63	1.00
-1.45	-50.81	-0.95	0.20	-0.29	-10.24	-0.19	2.29	1.90	1.23	0.97	0.74	0.59	24.37	0.76	0.61	0.98
-11.37	-13.68	-17.86	0.20	-2.29	-2.75	-3.59	4.83	2.99	1.27	0.99	0.74	0.59	24.32	0.74	0.60	0.95
5.70	16.32	-9.75	0.20	1.14	3.27	-1.96	6.51	4.76	4.05	1.01	0.74	0.59	24.27	0.73	0.58	0.93
24.69	11.27	-23.64	0.20	4.94	2.25	-4.73	6.32	2.32	4.23	1.04	0.74	0.59	24.22	0.72	0.57	0.92
5.68	10.23	-33.47	0.20	1.13	2.04	-6.68	2.88	1.73	2.16	1.06	0.74	0.59	24.17	0.70	0.56	0.90
28.67	12.19	-32.29	0.20	5.71	2.43	-6.42	5.60	2.41	2.56	1.08	0.75	0.59	24.12	0.69	0.55	0.88
60.54	12.14	-18.13	0.20	12.02	2.41	-3.60	19.67	7.84	9.34	1.11	0.75	0.59	24.07	0.68	0.54	0.86
23.43	22.08	-4.04	0.20	4.64	4.37	-0.80	37.11	14.20	15.66	1.13	0.76	0.59	24.02	0.67	0.52	0.85
-14.54	33.97	-16.94	0.20	-2.87	6.71	-3.35	13.80	4.07	5.44	1.16	0.76	0.60	23.97	0.66	0.51	0.84
5.46	20.37	-9.23	0.21	1.16	4.33	-1.96	2.20	1.47	0.31	0.63	0.65	0.43	25.44	1.03	0.68	1.24
38.42	3.32	-4.15	0.21	8.15	0.70	-0.88	2.22	2.26	1.31	0.63	0.65	0.43	25.39	1.04	0.69	1.25

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-11.43	29.84	-3.85	0.20	-2.25	5.88	-0.76	3.20	2.02	1.28	1.18	0.77	0.60	23.93	0.65	0.51	0.82
-12.33	13.76	11.19	0.20	-2.42	2.70	2.20	2.86	0.50	0.91	1.21	0.77	0.60	23.88	0.64	0.50	0.81
-11.23	13.71	-2.77	0.20	-2.20	2.69	-0.54	3.45	1.87	1.61	1.23	0.78	0.60	23.83	0.63	0.49	0.80
11.82	10.66	11.26	0.20	2.31	2.08	2.20	2.76	2.59	3.28	1.26	0.79	0.61	23.78	0.63	0.48	0.79
41.77	-8.34	20.25	0.20	8.14	-1.63	3.95	3.38	3.42	4.10	1.29	0.80	0.62	23.73	0.62	0.48	0.78
29.68	-7.31	2.26	0.19	5.77	-1.42	0.44	2.39	1.05	2.81	1.32	0.81	0.62	23.68	0.62	0.47	0.78
-15.30	7.70	1.30	0.19	-2.97	1.49	0.25	4.29	3.24	2.69	1.34	0.82	0.63	23.63	0.61	0.47	0.77
-14.19	-0.31	26.30	0.19	-2.74	-0.06	5.09	4.35	6.06	6.26	1.37	0.83	0.64	23.58	0.61	0.47	0.76
-10.08	-9.29	35.23	0.19	-1.95	-1.79	6.80	1.41	2.05	3.09	1.40	0.85	0.65	23.54	0.60	0.46	0.76
-26.96	0.73	23.16	0.19	-5.19	0.14	4.46	3.15	0.33	0.55	1.44	0.86	0.66	23.49	0.60	0.46	0.76
-7.83	4.72	31.11	0.19	-1.50	0.91	5.97	2.78	0.86	0.55	1.47	0.87	0.67	23.44	0.59	0.46	0.75
5.23	-4.28	39.02	0.19	1.00	-0.82	7.47	0.71	1.05	0.29	1.51	0.89	0.69	23.39	0.59	0.46	0.75
-12.71	1.73	21.94	0.19	-2.43	0.33	4.19	0.65	0.68	0.90	1.54	0.91	0.71	23.34	0.59	0.46	0.74
-11.60	4.72	17.91	0.19	-2.21	0.90	3.41	1.94	1.18	0.98	1.59	0.93	0.72	23.29	0.58	0.46	0.74
-13.50	-26.23	20.89	0.19	-2.56	-4.98	3.97	2.69	0.59	1.07	1.63	0.94	0.74	23.24	0.58	0.46	0.74
-44.33	-29.12	22.85	0.19	-8.40	-5.52	4.33	2.82	0.61	1.14	1.67	0.96	0.77	23.19	0.58	0.46	0.74
-56.07	0.94	25.80	0.19	-10.60	0.18	4.88	1.93	1.36	0.38	1.72	0.98	0.79	23.14	0.57	0.46	0.73
-16.87	-3.05	9.78	0.19	-3.18	-0.58	1.84	0.39	1.05	0.92	1.77	1.00	0.81	23.10	0.57	0.46	0.73
4.21	-14.02	-2.18	0.19	0.79	-2.63	-0.41	1.10	0.42	1.50	1.81	1.02	0.84	23.05	0.56	0.46	0.73
-14.72	4.01	-0.13	0.19	-2.76	0.75	-0.02	2.44	0.13	0.91	1.86	1.04	0.87	23.00	0.56	0.47	0.73
0.37	19.96	-1.08	0.19	0.07	3.73	-0.20	3.23	0.94	1.31	1.91	1.06	0.89	22.95	0.55	0.47	0.73
19.38	2.92	-7.01	0.19	3.61	0.54	-1.31	1.13	1.45	1.05	1.96	1.08	0.92	22.90	0.55	0.47	0.72
-15.57	-1.08	-21.90	0.19	-2.90	-0.20	-4.07	1.28	1.76	0.85	2.00	1.09	0.95	22.85	0.55	0.47	0.72
-30.42	11.90	-27.75	0.19	-5.64	2.21	-5.15	1.56	1.17	1.76	2.04	1.11	0.98	22.80	0.54	0.48	0.72
9.67	-7.10	-7.63	0.19	1.79	-1.31	-1.41	2.27	3.54	0.98	2.08	1.12	1.00	22.75	0.54	0.48	0.72
3.70	-12.06	2.43	0.18	0.68	-2.23	0.45	3.59	1.50	1.41	2.11	1.13	1.03	22.71	0.54	0.49	0.72
-36.18	18.93	-10.50	0.18	-6.66	3.48	-1.93	5.49	0.89	5.27	2.14	1.14	1.05	22.66	0.53	0.49	0.72
-1.05	28.83	-4.42	0.18	-0.19	5.29	-0.81	7.55	0.79	6.08	2.17	1.15	1.07	22.61	0.53	0.49	0.72
60.89	-0.22	0.63	0.18	11.14	-0.04	0.12	2.34	0.76	0.70	2.18	1.15	1.09	22.56	0.53	0.50	0.73
54.71	-2.21	-6.30	0.18	9.98	-0.40	-1.15	0.91	0.54	1.07	2.19	1.15	1.10	22.51	0.52	0.50	0.73
22.61	30.73	-4.23	0.18	4.11	5.59	-0.77	1.86	0.72	0.71	2.19	1.14	1.11	22.46	0.52	0.51	0.73
-11.43	29.84	-3.85	0.20	-2.25	5.88	-0.76	3.20	2.02	1.28	1.18	0.77	0.60	23.93	0.65	0.51	0.82
-12.33	13.76	11.19	0.20	-2.42	2.70	2.20	2.86	0.50	0.91	1.21	0.77	0.60	23.88	0.64	0.50	0.81

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
29.56	0.67	-5.16	0.18	5.36	0.12	-0.94	3.69	2.19	0.88	2.18	1.14	1.12	22.41	0.52	0.51	0.73
27.50	-29.27	-6.09	0.18	4.98	-5.30	-1.10	2.49	0.55	1.02	2.17	1.12	1.12	22.36	0.52	0.52	0.73
-7.49	13.77	-15.99	0.18	-1.35	2.48	-2.89	2.52	1.26	1.02	2.14	1.11	1.12	22.31	0.52	0.52	0.74
1.58	30.68	-18.87	0.18	0.28	5.52	-3.40	0.39	0.39	0.15	2.11	1.09	1.12	22.27	0.52	0.53	0.74
44.54	7.61	-9.77	0.18	7.99	1.37	-1.75	1.92	0.53	1.08	2.06	1.07	1.10	22.22	0.52	0.54	0.75
41.42	-2.40	-26.64	0.18	7.41	-0.43	-4.77	1.30	0.87	0.45	2.01	1.04	1.09	22.17	0.52	0.54	0.75
3.38	0.60	-29.48	0.18	0.60	0.11	-5.26	2.70	0.13	1.16	1.96	1.02	1.07	22.12	0.52	0.55	0.75
-7.56	-8.38	-12.34	0.18	-1.34	-1.49	-2.20	3.76	0.78	1.31	1.90	0.99	1.05	22.07	0.52	0.55	0.76
3.51	-22.31	-12.24	0.18	0.62	-3.96	-2.17	5.14	0.85	1.30	1.84	0.96	1.03	22.02	0.52	0.56	0.76
-25.40	-11.24	-15.14	0.18	-4.50	-1.99	-2.68	3.11	1.68	1.43	1.77	0.92	1.00	21.97	0.52	0.57	0.77
-46.20	-7.20	-0.05	0.18	-8.15	-1.27	-0.01	0.95	2.15	0.98	1.70	0.89	0.97	21.92	0.52	0.57	0.77
-20.01	-6.17	13.97	0.18	-3.52	-1.09	2.46	2.06	0.57	0.11	1.63	0.85	0.94	21.88	0.52	0.58	0.78
-16.89	9.82	2.99	0.18	-2.96	1.72	0.52	1.50	1.19	0.99	1.56	0.82	0.91	21.83	0.52	0.58	0.78
-43.71	5.79	18.00	0.18	-7.65	1.01	3.15	4.21	1.38	1.31	1.49	0.78	0.88	21.78	0.53	0.59	0.79
-10.55	-14.19	45.92	0.17	-1.84	-2.48	8.01	4.22	0.72	1.45	1.43	0.75	0.85	21.73	0.53	0.59	0.79
25.48	-27.10	22.83	0.17	4.43	-4.72	3.97	1.75	0.66	1.33	1.36	0.72	0.82	21.68	0.53	0.60	0.80
-5.51	-13.02	21.80	0.17	-0.96	-2.26	3.78	1.31	2.83	1.53	1.30	0.68	0.79	21.63	0.52	0.60	0.80
4.55	-11.96	50.70	0.17	0.79	-2.07	8.77	4.49	2.25	0.58	1.25	0.65	0.76	21.58	0.52	0.61	0.80
13.57	-30.87	35.58	0.17	2.34	-5.33	6.14	5.64	3.14	1.89	1.20	0.62	0.73	21.53	0.52	0.61	0.80
-34.34	-7.79	13.53	0.17	-5.91	-1.34	2.33	5.82	4.17	1.00	1.15	0.60	0.71	21.48	0.52	0.61	0.80
-39.14	11.20	20.51	0.17	-6.71	1.92	3.52	2.23	2.48	3.08	1.12	0.57	0.68	21.44	0.51	0.61	0.80
-18.96	-4.81	27.46	0.17	-3.24	-0.82	4.70	1.53	0.59	1.98	1.08	0.55	0.66	21.39	0.51	0.61	0.80
-16.84	-3.79	18.42	0.17	-2.87	-0.65	3.14	1.96	0.40	2.06	1.05	0.53	0.64	21.34	0.50	0.61	0.79
-15.72	3.22	-6.55	0.17	-2.67	0.55	-1.11	3.67	1.29	0.34	1.03	0.51	0.63	21.29	0.50	0.61	0.78
-26.58	1.21	-6.48	0.17	-4.50	0.21	-1.10	3.34	1.13	0.66	1.01	0.50	0.61	21.24	0.49	0.60	0.78
-18.43	11.19	12.56	0.17	-3.11	1.89	2.12	2.23	2.39	1.35	1.00	0.48	0.60	21.19	0.48	0.60	0.77
-1.34	26.12	-13.39	0.17	-0.23	4.40	-2.26	3.76	2.68	1.94	0.99	0.47	0.59	21.14	0.47	0.59	0.76
-9.26	11.05	-12.29	0.17	-1.56	1.86	-2.06	1.78	1.26	2.29	0.99	0.46	0.58	21.09	0.47	0.58	0.75
-2.18	-0.97	35.71	0.17	-0.37	-0.16	5.98	4.82	1.63	0.86	0.98	0.45	0.57	21.04	0.46	0.58	0.74
28.82	25.99	14.66	0.17	4.81	4.34	2.45	3.05	1.43	0.49	0.98	0.44	0.56	21.00	0.45	0.57	0.73
51.72	31.87	-22.27	0.17	8.61	5.31	-3.71	1.42	1.03	0.93	0.98	0.44	0.55	20.95	0.45	0.56	0.72
29.56	0.67	-5.16	0.18	5.36	0.12	-0.94	3.69	2.19	0.88	2.18	1.14	1.12	22.41	0.52	0.51	0.73
27.50	-29.27	-6.09	0.18	4.98	-5.30	-1.10	2.49	0.55	1.02	2.17	1.12	1.12	22.36	0.52	0.52	0.73

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
40.59	14.78	-12.15	0.17	6.74	2.45	-2.02	1.78	0.87	0.52	0.99	0.44	0.54	20.90	0.44	0.55	0.71
12.53	2.75	-21.04	0.17	2.07	0.46	-3.48	3.05	0.32	0.74	0.99	0.44	0.54	20.85	0.44	0.54	0.70
-0.43	-8.24	-30.88	0.17	-0.07	-1.36	-5.10	4.48	1.09	0.45	1.00	0.44	0.53	20.80	0.44	0.53	0.69
11.60	-1.21	-19.73	0.16	1.91	-0.20	-3.25	4.21	1.93	0.78	1.01	0.44	0.52	20.75	0.44	0.52	0.68
17.59	2.78	-16.61	0.16	2.89	0.46	-2.72	3.09	0.65	0.75	1.01	0.44	0.52	20.70	0.44	0.51	0.67
-2.38	18.74	-27.47	0.16	-0.39	3.06	-4.49	2.91	1.30	1.06	1.02	0.44	0.51	20.65	0.44	0.50	0.67
12.65	37.63	-30.31	0.16	2.06	6.13	-4.94	2.19	2.22	0.61	1.03	0.45	0.51	20.61	0.44	0.49	0.66
29.62	9.54	-4.19	0.16	4.81	1.55	-0.68	2.00	1.93	1.13	1.04	0.46	0.50	20.56	0.44	0.49	0.66
9.60	2.52	2.87	0.16	1.55	0.41	0.46	2.56	1.64	0.51	1.04	0.46	0.50	20.51	0.44	0.48	0.65
6.62	30.45	-15.06	0.16	1.07	4.92	-2.43	2.17	1.22	0.62	1.05	0.47	0.50	20.46	0.45	0.47	0.65
26.61	10.37	2.02	0.16	4.28	1.67	0.33	1.87	1.21	1.29	1.06	0.48	0.49	20.41	0.45	0.47	0.65
14.58	-13.62	15.04	0.16	2.34	-2.19	2.41	1.42	1.42	1.17	1.07	0.49	0.49	20.36	0.46	0.46	0.65
-47.30	-3.58	1.05	0.16	-7.57	-0.57	0.17	1.42	2.69	0.85	1.08	0.50	0.49	20.31	0.46	0.45	0.65
-55.04	-7.56	13.08	0.16	-8.78	-1.21	2.09	2.92	4.83	2.64	1.08	0.50	0.48	20.26	0.47	0.45	0.65
-20.84	-15.51	32.04	0.16	-3.31	-2.47	5.09	3.45	2.14	1.12	1.09	0.51	0.48	20.21	0.47	0.44	0.65
-23.69	-11.45	27.97	0.16	-3.76	-1.82	4.43	0.59	1.10	2.09	1.10	0.52	0.48	20.17	0.48	0.44	0.65
-11.57	-15.40	13.93	0.16	-1.83	-2.43	2.20	1.12	1.96	3.29	1.10	0.53	0.48	20.12	0.48	0.43	0.65
27.46	-37.29	14.92	0.16	4.32	-5.87	2.35	2.10	2.38	2.75	1.11	0.54	0.48	20.07	0.49	0.43	0.65
11.43	-40.13	16.91	0.16	1.79	-6.30	2.65	3.89	6.32	6.24	1.11	0.55	0.47	20.02	0.49	0.43	0.65
-40.45	-17.01	-9.06	0.16	-6.33	-2.66	-1.42	0.67	3.24	1.37	1.12	0.56	0.47	19.97	0.50	0.42	0.65
-22.27	-21.93	-13.96	0.16	-3.47	-3.42	-2.18	0.90	1.24	0.70	1.12	0.56	0.47	19.92	0.50	0.42	0.66
12.80	-26.83	11.09	0.16	1.99	-4.17	1.73	0.98	1.46	4.01	1.12	0.57	0.47	19.87	0.51	0.42	0.66
-21.13	-8.75	4.11	0.16	-3.27	-1.36	0.64	2.06	2.68	3.32	1.13	0.58	0.47	19.82	0.51	0.42	0.66
-38.95	-12.71	-13.82	0.15	-6.02	-1.96	-2.13	2.28	1.76	1.71	1.13	0.58	0.47	19.78	0.52	0.41	0.66
-5.81	-25.63	6.25	0.15	-0.89	-3.95	0.96	0.46	1.72	2.11	1.13	0.59	0.47	19.73	0.52	0.41	0.67
-12.71	-22.53	14.26	0.15	-1.95	-3.46	2.19	1.22	1.18	1.63	1.12	0.59	0.46	19.68	0.53	0.41	0.67
-55.52	-6.47	-12.70	0.15	-8.49	-0.99	-1.94	1.84	2.01	2.70	1.12	0.60	0.46	19.63	0.53	0.41	0.67
-39.27	-10.43	-4.61	0.15	-5.99	-1.59	-0.70	1.99	2.45	4.63	1.12	0.60	0.46	19.58	0.54	0.41	0.68
-8.12	-31.34	20.40	0.15	-1.23	-4.76	3.10	1.92	1.62	2.77	1.11	0.60	0.46	19.53	0.54	0.41	0.68
-10.03	-1.27	-4.58	0.15	-1.52	-0.19	-0.69	2.41	0.19	1.94	1.10	0.61	0.46	19.48	0.55	0.42	0.69
5.04	27.68	-6.51	0.15	0.76	4.18	-0.98	1.41	0.57	1.14	1.10	0.61	0.46	19.43	0.56	0.42	0.70
40.59	14.78	-12.15	0.17	6.74	2.45	-2.02	1.78	0.87	0.52	0.99	0.44	0.54	20.90	0.44	0.55	0.71
12.53	2.75	-21.04	0.17	2.07	0.46	-3.48	3.05	0.32	0.74	0.99	0.44	0.54	20.85	0.44	0.54	0.70

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
22.04	12.61	9.54	0.15	3.32	1.90	1.44	1.96	1.26	0.59	1.09	0.62	0.46	19.38	0.57	0.43	0.71
29.99	18.55	-20.39	0.15	4.50	2.78	-3.06	3.87	1.52	1.46	1.08	0.62	0.46	19.34	0.58	0.43	0.72
40.91	42.43	-28.24	0.15	6.12	6.34	-4.22	5.81	1.54	1.91	1.06	0.63	0.47	19.29	0.59	0.44	0.74
43.79	32.28	-0.14	0.15	6.53	4.81	-0.02	4.35	1.57	1.34	1.05	0.63	0.47	19.24	0.60	0.45	0.75
41.68	9.20	8.89	0.15	6.19	1.37	1.32	3.28	0.59	1.36	1.04	0.64	0.48	19.19	0.62	0.46	0.77
17.61	36.11	-8.06	0.15	2.61	5.34	-1.19	4.87	0.69	1.22	1.02	0.65	0.49	19.14	0.63	0.48	0.79
4.62	40.96	-4.98	0.15	0.68	6.04	-0.73	5.08	1.48	2.07	1.00	0.65	0.50	19.09	0.65	0.50	0.82
22.63	-0.12	13.05	0.15	3.33	-0.02	1.92	4.74	1.11	1.74	0.99	0.66	0.51	19.04	0.67	0.52	0.85
22.59	5.87	-0.92	0.15	3.31	0.86	-0.14	5.49	1.33	1.59	0.97	0.67	0.52	18.99	0.69	0.54	0.88
4.59	25.81	-8.85	0.15	0.67	3.77	-1.29	3.68	0.55	1.06	0.95	0.68	0.54	18.95	0.71	0.56	0.91
-32.30	-0.23	10.19	0.15	-4.70	-0.03	1.48	4.12	2.27	0.62	0.94	0.69	0.55	18.90	0.74	0.59	0.94
-28.12	-33.17	9.21	0.15	-4.08	-4.81	1.33	2.91	1.21	1.64	0.92	0.70	0.57	18.85	0.76	0.62	0.98
20.95	-21.05	6.22	0.14	3.03	-3.04	0.90	2.87	3.57	1.78	0.91	0.71	0.59	18.80	0.78	0.65	1.01
-0.04	-8.99	7.25	0.14	-0.01	-1.29	1.04	4.14	1.05	2.19	0.89	0.72	0.60	18.75	0.80	0.68	1.05
-24.94	-26.92	-1.71	0.14	-3.58	-3.86	-0.25	1.62	2.06	0.59	0.88	0.72	0.62	18.70	0.82	0.71	1.09
-16.80	-11.84	2.33	0.14	-2.40	-1.69	0.33	2.27	2.62	0.53	0.87	0.73	0.64	18.65	0.84	0.74	1.12
-16.67	5.18	10.36	0.14	-2.38	0.74	1.48	1.32	1.38	1.07	0.86	0.73	0.66	18.60	0.86	0.77	1.16
2.41	2.17	10.37	0.14	0.34	0.31	1.47	3.13	4.87	1.27	0.85	0.74	0.68	18.55	0.87	0.80	1.18
2.46	18.13	-3.60	0.14	0.35	2.57	-0.51	3.29	5.59	0.98	0.84	0.74	0.70	18.51	0.88	0.83	1.21
-28.44	25.05	-9.52	0.14	-4.01	3.53	-1.34	2.04	2.58	2.11	0.84	0.74	0.71	18.46	0.89	0.85	1.23
-26.27	1.00	16.51	0.14	-3.69	0.14	2.32	3.66	2.08	0.59	0.84	0.74	0.73	18.41	0.89	0.87	1.24
2.83	-26.95	29.47	0.14	0.40	-3.77	4.13	8.60	3.27	1.08	0.84	0.74	0.74	18.36	0.88	0.88	1.25
-7.10	-19.85	16.43	0.14	-0.99	-2.77	2.29	3.83	1.16	0.47	0.85	0.74	0.75	18.31	0.87	0.89	1.25
-37.96	-0.80	12.42	0.14	-5.28	-0.11	1.73	0.58	0.73	0.34	0.85	0.73	0.76	18.26	0.86	0.89	1.24
-21.78	-16.77	13.41	0.14	-3.02	-2.32	1.86	2.68	1.19	0.60	0.87	0.73	0.77	18.21	0.84	0.89	1.22
-8.66	-16.70	-5.55	0.14	-1.20	-2.30	-0.77	5.23	4.08	3.38	0.88	0.72	0.77	18.16	0.82	0.88	1.20
-31.52	11.32	-15.46	0.14	-4.33	1.56	-2.13	4.58	2.64	2.90	0.90	0.71	0.77	18.12	0.80	0.86	1.18
-17.37	9.28	9.60	0.14	-2.38	1.27	1.32	2.50	0.65	1.49	0.91	0.71	0.77	18.07	0.77	0.85	1.15
9.70	-7.72	23.58	0.14	1.32	-1.05	3.22	3.65	2.94	0.61	0.93	0.70	0.77	18.02	0.75	0.82	1.11
-12.23	8.28	12.56	0.14	-1.66	1.13	1.71	2.58	4.82	2.21	0.96	0.69	0.77	17.97	0.72	0.80	1.08
-23.11	26.22	6.57	0.14	-3.13	3.55	0.89	2.59	5.85	3.46	0.98	0.68	0.76	17.92	0.70	0.77	1.04
22.04	12.61	9.54	0.15	3.32	1.90	1.44	1.96	1.26	0.59	1.09	0.62	0.46	19.38	0.57	0.43	0.71
29.99	18.55	-20.39	0.15	4.50	2.78	-3.06	3.87	1.52	1.46	1.08	0.62	0.46	19.34	0.58	0.43	0.72

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
7.98	10.15	5.59	0.14	1.08	1.37	0.75	3.87	1.28	7.42	1.00	0.68	0.75	17.87	0.67	0.75	1.00
11.00	13.10	-5.36	0.13	1.48	1.76	-0.72	5.13	2.00	2.24	1.03	0.67	0.74	17.82	0.65	0.72	0.97
-3.96	29.02	-12.28	0.13	-0.53	3.89	-1.65	12.07	6.40	7.65	1.06	0.66	0.73	17.77	0.63	0.69	0.93
26.06	14.94	0.79	0.13	3.48	1.99	0.11	20.56	11.47	11.49	1.08	0.66	0.71	17.72	0.61	0.66	0.90
51.96	6.90	0.84	0.13	6.91	0.92	0.11	5.08	5.46	5.03	1.11	0.66	0.70	17.68	0.60	0.63	0.87
18.87	20.84	-11.09	0.13	2.50	2.76	-1.47	1.48	0.92	3.59	1.13	0.66	0.69	17.63	0.58	0.61	0.84
-1.11	20.76	-16.99	0.13	-0.15	2.74	-2.24	2.98	1.47	0.79	1.16	0.66	0.67	17.58	0.57	0.58	0.82
32.89	-3.27	-21.86	0.13	4.32	-0.43	-2.87	4.73	0.91	0.49	1.18	0.67	0.66	17.53	0.57	0.56	0.79
26.82	-2.26	-22.72	0.13	3.51	-0.30	-2.98	2.95	1.15	1.92	1.20	0.68	0.65	17.48	0.56	0.54	0.78
8.81	21.70	-33.56	0.13	1.15	2.83	-4.38	3.10	0.73	1.92	1.23	0.69	0.64	17.43	0.56	0.52	0.76
25.79	10.64	-19.40	0.13	3.35	1.38	-2.52	3.94	0.67	2.17	1.25	0.70	0.63	17.38	0.56	0.50	0.75
-7.19	-6.37	3.68	0.13	-0.93	-0.82	0.48	2.85	0.16	0.40	1.27	0.71	0.62	17.33	0.56	0.49	0.74
-23.07	-0.35	-12.26	0.13	-2.98	-0.05	-1.58	1.23	2.34	2.06	1.28	0.73	0.61	17.29	0.57	0.48	0.74
20.99	-1.34	-6.17	0.13	2.70	-0.17	-0.79	1.51	2.42	1.28	1.30	0.74	0.61	17.24	0.57	0.47	0.74
16.97	-12.32	12.87	0.13	2.17	-1.58	1.65	1.97	1.69	3.42	1.32	0.76	0.61	17.19	0.58	0.46	0.74
-6.00	-7.27	-0.11	0.13	-0.76	-0.93	-0.01	0.53	1.75	2.25	1.34	0.78	0.61	17.14	0.59	0.46	0.74
-10.91	-18.22	-2.06	0.13	-1.39	-2.31	-0.26	0.89	1.95	0.93	1.35	0.80	0.61	17.09	0.59	0.45	0.75
-5.82	-50.08	9.98	0.13	-0.74	-6.34	1.26	0.33	0.34	0.54	1.37	0.83	0.62	17.04	0.60	0.45	0.76
0.25	-37.90	9.99	0.13	0.03	-4.78	1.26	0.11	0.44	0.24	1.39	0.85	0.63	16.99	0.61	0.46	0.76
-34.63	-8.81	8.00	0.13	-4.35	-1.11	1.00	1.33	1.47	1.15	1.40	0.87	0.65	16.94	0.62	0.46	0.77
-31.44	-11.76	8.02	0.13	-3.93	-1.47	1.00	1.12	0.83	3.09	1.42	0.90	0.66	16.89	0.63	0.47	0.78
12.66	-17.70	16.02	0.12	1.58	-2.20	1.99	2.95	2.43	4.88	1.44	0.92	0.68	16.85	0.64	0.48	0.80
5.68	-10.64	18.00	0.12	0.70	-1.32	2.23	3.55	3.34	7.32	1.46	0.94	0.71	16.80	0.64	0.48	0.81
2.72	18.35	24.96	0.12	0.34	2.27	3.08	1.10	3.71	6.22	1.48	0.96	0.73	16.75	0.65	0.49	0.82
13.74	12.29	47.86	0.12	1.69	1.51	5.89	5.13	3.52	5.31	1.50	0.98	0.76	16.70	0.66	0.50	0.83
-18.20	-26.68	37.74	0.12	-2.23	-3.27	4.62	10.01	3.77	21.62	1.51	1.00	0.78	16.65	0.66	0.52	0.84
-32.04	-9.60	2.71	0.12	-3.91	-1.17	0.33	4.89	3.62	25.13	1.53	1.01	0.81	16.60	0.66	0.53	0.85
-7.90	-6.56	-2.25	0.12	-0.96	-0.80	-0.27	7.06	16.11	12.38	1.54	1.03	0.84	16.55	0.66	0.54	0.86
-10.81	-35.48	-4.18	0.12	-1.31	-4.29	-0.51	4.84	14.35	8.27	1.56	1.04	0.86	16.50	0.67	0.55	0.87
-42.64	-26.35	-24.08	0.12	-5.14	-3.18	-2.90	0.69	3.92	3.10	1.57	1.05	0.89	16.46	0.67	0.57	0.88
-14.47	-34.22	-28.93	0.12	-1.74	-4.11	-3.47	0.70	1.10	3.70	1.58	1.05	0.92	16.41	0.67	0.58	0.89
7.98	10.15	5.59	0.14	1.08	1.37	0.75	3.87	1.28	7.42	1.00	0.68	0.75	17.87	0.67	0.75	1.00
11.00	13.10	-5.36	0.13	1.48	1.76	-0.72	5.13	2.00	2.24	1.03	0.67	0.74	17.82	0.65	0.72	0.97

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
52.51	-48.05	-21.78	0.12	6.27	-5.74	-2.60	0.87	0.58	3.35	1.58	1.06	0.95	16.36	0.67	0.60	0.90
8.44	-13.93	-12.66	0.12	1.00	-1.66	-1.51	1.77	3.44	2.14	1.59	1.06	0.98	16.31	0.67	0.61	0.91
-45.43	4.10	-12.56	0.12	-5.38	0.49	-1.49	1.85	1.74	0.56	1.59	1.06	1.00	16.26	0.67	0.63	0.92
16.69	-10.88	-13.46	0.12	1.97	-1.28	-1.59	2.36	2.45	1.85	1.59	1.06	1.03	16.21	0.67	0.65	0.93
34.64	2.14	-5.37	0.12	4.07	0.25	-0.63	2.48	3.87	2.50	1.58	1.05	1.06	16.16	0.67	0.67	0.95
-6.36	41.06	-8.29	0.12	-0.74	4.80	-0.97	4.93	1.77	4.14	1.57	1.05	1.09	16.11	0.67	0.69	0.96
-0.29	43.89	-1.23	0.12	-0.03	5.11	-0.14	10.75	14.41	6.46	1.55	1.04	1.11	16.06	0.67	0.72	0.98
20.73	19.77	5.81	0.12	2.40	2.29	0.67	27.05	42.23	16.07	1.53	1.04	1.14	16.02	0.67	0.74	1.00
17.71	13.71	-20.11	0.12	2.05	1.58	-2.32	18.67	21.95	14.07	1.51	1.03	1.17	15.97	0.68	0.77	1.03
-6.26	14.65	-18.98	0.12	-0.72	1.68	-2.18	1.33	0.74	3.94	1.49	1.02	1.20	15.92	0.69	0.80	1.06
3.80	9.61	0.11	0.11	0.44	1.10	0.01	1.91	5.21	3.13	1.46	1.02	1.23	15.87	0.70	0.84	1.09
25.80	1.59	-15.81	0.11	2.94	0.18	-1.80	1.68	2.93	3.16	1.44	1.02	1.27	15.82	0.71	0.88	1.13
-10.17	-6.40	-21.69	0.11	-1.15	-0.73	-2.46	1.58	0.37	0.93	1.41	1.02	1.30	15.77	0.73	0.92	1.18
-22.05	-5.37	-7.58	0.11	-2.49	-0.61	-0.86	1.64	1.30	1.21	1.38	1.03	1.35	15.72	0.74	0.97	1.22
20.01	7.63	-1.51	0.11	2.25	0.86	-0.17	2.90	2.46	0.77	1.36	1.04	1.39	15.67	0.77	1.02	1.28
24.98	19.58	-10.44	0.11	2.80	2.19	-1.17	0.34	1.96	2.11	1.34	1.06	1.44	15.63	0.79	1.08	1.34
-3.01	22.50	-9.35	0.11	-0.34	2.51	-1.04	0.71	1.75	3.97	1.32	1.08	1.49	15.58	0.82	1.13	1.40
-5.94	3.45	17.68	0.11	-0.66	0.38	1.96	1.66	1.64	3.14	1.30	1.11	1.54	15.53	0.85	1.19	1.46
3.12	-5.55	14.67	0.11	0.35	-0.61	1.62	3.36	2.05	1.08	1.29	1.14	1.60	15.48	0.89	1.24	1.52
-2.82	18.43	-6.30	0.11	-0.31	2.03	-0.69	1.58	1.81	0.82	1.28	1.18	1.65	15.43	0.92	1.29	1.59
-27.70	9.38	8.74	0.11	-3.03	1.03	0.96	2.24	2.59	3.03	1.27	1.22	1.71	15.38	0.96	1.34	1.65
-39.51	-37.56	20.73	0.11	-4.31	-4.09	2.26	2.71	1.54	3.24	1.27	1.27	1.76	15.33	1.00	1.39	1.71
-18.34	-43.39	2.74	0.11	-1.99	-4.71	0.30	2.64	3.39	1.39	1.27	1.32	1.82	15.28	1.04	1.43	1.76
-3.24	-28.25	-1.22	0.11	-0.35	-3.05	-0.13	1.90	2.62	4.81	1.28	1.38	1.87	15.23	1.07	1.46	1.81
6.81	-40.11	21.79	0.11	0.73	-4.31	2.34	1.12	0.97	9.70	1.30	1.44	1.93	15.19	1.11	1.48	1.85
8.84	-27.97	33.73	0.11	0.95	-2.99	3.61	3.07	2.51	7.88	1.32	1.51	1.98	15.14	1.14	1.50	1.88
-4.11	-15.87	14.68	0.11	-0.44	-1.69	1.56	7.03	3.40	3.29	1.35	1.58	2.02	15.09	1.17	1.50	1.91
-0.05	-40.75	9.68	0.11	-0.01	-4.32	1.03	4.47	0.67	1.87	1.37	1.65	2.07	15.04	1.20	1.50	1.93
-1.99	-22.62	36.64	0.11	-0.21	-2.39	3.87	1.93	3.07	1.81	1.40	1.72	2.10	14.99	1.23	1.50	1.94
-28.87	21.39	22.57	0.11	-3.03	2.25	2.37	3.01	2.12	3.47	1.43	1.79	2.13	14.94	1.25	1.48	1.94
-36.68	13.32	-9.41	0.10	-3.83	1.39	-0.98	3.17	1.83	0.68	1.47	1.86	2.15	14.89	1.27	1.47	1.94
52.51	-48.05	-21.78	0.12	6.27	-5.74	-2.60	0.87	0.58	3.35	1.58	1.06	0.95	16.36	0.67	0.60	0.90
8.44	-13.93	-12.66	0.12	1.00	-1.66	-1.51	1.77	3.44	2.14	1.59	1.06	0.98	16.31	0.67	0.61	0.91

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
6.44	-4.69	7.64	0.10	0.67	-0.49	0.79	5.61	2.36	2.22	1.50	1.92	2.16	14.84	1.28	1.44	1.93
27.43	8.31	1.67	0.10	2.84	0.86	0.17	4.36	1.42	1.07	1.53	1.98	2.16	14.79	1.29	1.42	1.92
-22.52	18.26	-2.28	0.10	-2.32	1.88	-0.24	2.43	1.66	1.28	1.55	2.03	2.16	14.75	1.30	1.39	1.91
-20.38	2.22	16.74	0.10	-2.09	0.23	1.72	4.42	0.70	0.70	1.58	2.07	2.15	14.70	1.31	1.36	1.89
8.70	-10.76	-3.24	0.10	0.89	-1.10	-0.33	1.74	2.14	0.84	1.60	2.11	2.13	14.65	1.31	1.33	1.87
-43.17	4.26	-12.16	0.10	-4.38	0.43	-1.23	1.50	2.11	3.04	1.62	2.14	2.11	14.60	1.32	1.30	1.85
-25.97	5.25	7.89	0.10	-2.62	0.53	0.80	1.76	3.29	3.00	1.64	2.16	2.08	14.55	1.32	1.27	1.83
47.04	-7.74	3.92	0.10	4.73	-0.78	0.39	2.62	2.66	1.35	1.65	2.17	2.05	14.50	1.31	1.24	1.81
16.97	16.24	-25.99	0.10	1.70	1.62	-2.60	3.37	1.82	2.36	1.66	2.17	2.01	14.45	1.31	1.21	1.78
-10.98	32.15	-26.84	0.10	-1.09	3.20	-2.67	6.85	0.58	2.94	1.66	2.16	1.96	14.40	1.30	1.18	1.76
50.99	17.06	3.26	0.10	5.05	1.69	0.32	5.94	1.40	2.45	1.65	2.14	1.92	14.36	1.30	1.16	1.74
74.80	20.99	-3.69	0.10	7.37	2.07	-0.36	1.25	2.63	3.69	1.64	2.11	1.87	14.31	1.29	1.14	1.72
15.68	38.87	-29.58	0.10	1.54	3.81	-2.90	1.66	3.83	2.57	1.63	2.07	1.82	14.26	1.27	1.12	1.69
3.69	33.73	-7.45	0.10	0.36	3.29	-0.73	3.49	2.85	1.36	1.61	2.02	1.76	14.21	1.26	1.10	1.67
21.70	13.64	16.58	0.10	2.10	1.32	1.61	3.52	2.94	2.62	1.58	1.97	1.71	14.16	1.24	1.08	1.65
-20.25	14.58	-6.40	0.10	-1.95	1.41	-0.62	2.45	1.94	1.48	1.56	1.91	1.66	14.11	1.22	1.06	1.62
-64.02	21.51	-3.33	0.10	-6.15	2.07	-0.32	3.41	1.34	3.20	1.53	1.84	1.61	14.06	1.20	1.05	1.60
-42.75	1.47	27.67	0.10	-4.08	0.14	2.64	9.67	3.15	1.70	1.50	1.77	1.56	14.01	1.18	1.04	1.57
19.35	-5.52	8.65	0.10	1.84	-0.52	0.82	24.63	7.97	4.07	1.47	1.70	1.51	13.96	1.16	1.03	1.55
40.29	-6.49	-21.28	0.09	3.81	-0.61	-2.01	26.80	10.84	5.74	1.44	1.63	1.46	13.92	1.13	1.02	1.52
12.24	-33.41	-8.17	0.09	1.15	-3.14	-0.77	8.98	2.89	4.69	1.41	1.56	1.42	13.87	1.10	1.01	1.49
-1.72	-43.25	-1.10	0.09	-0.16	-4.04	-0.10	5.49	4.52	3.16	1.39	1.48	1.38	13.82	1.07	1.00	1.46
-33.59	-28.10	-17.02	0.09	-3.12	-2.61	-1.58	9.67	4.61	4.15	1.36	1.41	1.34	13.77	1.04	0.99	1.43
-35.40	-14.01	-22.89	0.09	-3.27	-1.30	-2.12	8.35	3.65	4.01	1.34	1.34	1.31	13.72	1.00	0.98	1.40
18.70	-13.95	0.20	0.09	1.72	-1.28	0.02	3.28	3.80	0.91	1.32	1.28	1.27	13.67	0.97	0.97	1.37
22.67	-16.89	14.22	0.09	2.07	-1.55	1.30	7.20	6.33	4.62	1.30	1.22	1.24	13.62	0.93	0.95	1.33
12.66	-9.83	-2.75	0.09	1.15	-0.89	-0.25	8.36	4.33	3.56	1.29	1.16	1.21	13.57	0.90	0.94	1.30
19.65	-19.77	0.30	0.09	1.78	-1.79	0.03	8.25	3.98	2.51	1.29	1.11	1.18	13.53	0.86	0.92	1.26
-2.33	-39.64	20.31	0.09	-0.21	-3.57	1.83	4.76	4.55	3.93	1.29	1.06	1.16	13.48	0.83	0.90	1.22
-32.20	-38.48	22.27	0.09	-2.88	-3.44	1.99	1.56	3.14	3.08	1.29	1.03	1.13	13.43	0.79	0.88	1.18
-46.99	-33.33	30.22	0.09	-4.18	-2.97	2.69	1.00	2.44	0.29	1.30	0.99	1.11	13.38	0.76	0.85	1.14
6.44	-4.69	7.64	0.10	0.67	-0.49	0.79	5.61	2.36	2.22	1.50	1.92	2.16	14.84	1.28	1.44	1.93
27.43	8.31	1.67	0.10	2.84	0.86	0.17	4.36	1.42	1.07	1.53	1.98	2.16	14.79	1.29	1.42	1.92

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-27.78	-31.20	34.14	0.09	-2.46	-2.76	3.02	0.49	6.19	2.95	1.32	0.97	1.09	13.33	0.73	0.83	1.11
-22.62	-12.10	9.10	0.09	-1.99	-1.07	0.80	3.51	4.39	2.77	1.35	0.95	1.08	13.28	0.71	0.80	1.07
-34.45	8.91	11.10	0.09	-3.01	0.78	0.97	5.69	3.22	1.87	1.38	0.94	1.06	13.23	0.68	0.77	1.03
10.66	0.89	26.08	0.09	0.93	0.08	2.27	5.82	1.64	1.03	1.41	0.93	1.05	13.18	0.66	0.74	0.99
21.65	3.89	6.06	0.09	1.87	0.34	0.52	4.96	1.72	1.16	1.45	0.93	1.04	13.13	0.64	0.71	0.96
-5.32	25.84	-1.90	0.09	-0.46	2.22	-0.16	2.72	2.26	1.78	1.50	0.93	1.03	13.09	0.62	0.68	0.93
8.73	28.73	16.12	0.09	0.75	2.46	1.38	2.71	1.40	0.88	1.55	0.94	1.02	13.04	0.61	0.66	0.89
1.77	16.65	23.09	0.09	0.15	1.42	1.96	5.09	2.29	1.79	1.61	0.96	1.02	12.99	0.59	0.63	0.87
-2.17	14.59	-6.90	0.08	-0.18	1.23	-0.58	3.27	3.83	2.91	1.67	0.97	1.01	12.94	0.58	0.61	0.84
11.87	10.55	-17.80	0.08	1.00	0.89	-1.50	1.41	3.78	2.20	1.74	1.00	1.01	12.89	0.57	0.58	0.82
15.87	-28.41	23.23	0.08	1.33	-2.37	1.94	2.48	1.75	0.66	1.80	1.02	1.01	12.84	0.57	0.56	0.80
15.86	-38.27	14.21	0.08	1.32	-3.18	1.18	3.61	3.37	2.10	1.87	1.05	1.01	12.79	0.56	0.54	0.78
-0.11	7.79	-33.71	0.08	-0.01	0.64	-2.78	5.76	4.23	4.90	1.94	1.08	1.02	12.74	0.56	0.52	0.76
10.93	13.75	-30.53	0.08	0.90	1.13	-2.50	7.94	4.01	12.50	2.00	1.11	1.02	12.70	0.55	0.51	0.75
29.90	-14.24	-20.38	0.08	2.44	-1.16	-1.66	6.39	2.02	12.81	2.07	1.14	1.02	12.65	0.55	0.50	0.74
-5.09	-0.20	-35.22	0.08	-0.41	-0.02	-2.85	3.97	14.41	3.91	2.13	1.17	1.03	12.60	0.55	0.48	0.73
-19.98	13.77	-36.03	0.08	-1.61	1.11	-2.90	14.78	11.41	8.88	2.19	1.20	1.04	12.55	0.55	0.47	0.72
3.11	-7.23	-23.86	0.08	0.25	-0.58	-1.91	16.79	9.83	11.41	2.24	1.23	1.04	12.50	0.55	0.47	0.72
-16.81	9.77	-23.72	0.08	-1.34	0.78	-1.89	5.31	5.89	3.30	2.29	1.26	1.05	12.45	0.55	0.46	0.72
-25.66	35.68	-12.60	0.08	-2.03	2.82	-1.00	3.99	2.76	1.09	2.33	1.29	1.06	12.40	0.55	0.45	0.72
19.41	10.59	2.47	0.08	1.52	0.83	0.19	1.85	0.81	1.04	2.37	1.32	1.07	12.35	0.56	0.45	0.72
32.36	-6.41	-0.49	0.08	2.52	-0.50	-0.04	1.26	4.41	3.13	2.40	1.34	1.07	12.30	0.56	0.45	0.72
-0.64	-3.39	-3.43	0.08	-0.05	-0.26	-0.27	2.28	0.59	2.42	2.42	1.37	1.08	12.26	0.57	0.45	0.72
-8.57	-13.35	-1.37	0.08	-0.66	-1.03	-0.11	3.41	0.83	2.59	2.43	1.39	1.09	12.21	0.57	0.45	0.72
11.49	-30.25	-0.32	0.08	0.88	-2.31	-0.02	3.10	4.36	5.87	2.43	1.41	1.09	12.16	0.58	0.45	0.73
11.50	-26.14	-10.25	0.08	0.87	-1.99	-0.78	2.86	2.91	4.89	2.43	1.42	1.10	12.11	0.59	0.45	0.74
-11.44	1.92	-8.16	0.08	-0.86	0.14	-0.62	1.54	1.94	1.50	2.42	1.44	1.10	12.06	0.59	0.46	0.75
3.63	27.86	2.90	0.08	0.27	2.09	0.22	1.77	5.92	1.23	2.40	1.45	1.11	12.01	0.60	0.46	0.76
27.62	36.74	-1.06	0.07	2.06	2.74	-0.08	5.70	8.56	4.96	2.38	1.46	1.12	11.96	0.61	0.47	0.77
-14.35	23.62	3.98	0.07	-1.06	1.75	0.29	7.06	10.31	5.69	2.35	1.47	1.12	11.91	0.62	0.48	0.79
-28.20	2.58	20.98	0.07	-2.07	0.19	1.54	4.01	8.72	4.48	2.32	1.47	1.13	11.87	0.64	0.49	0.80
-27.78	-31.20	34.14	0.09	-2.46	-2.76	3.02	0.49	6.19	2.95	1.32	0.97	1.09	13.33	0.73	0.83	1.11
-22.62	-12.10	9.10	0.09	-1.99	-1.07	0.80	3.51	4.39	2.77	1.35	0.95	1.08	13.28	0.71	0.80	1.07

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
12.89	-10.40	32.92	0.07	0.94	-0.76	2.40	2.45	4.17	0.99	2.28	1.48	1.14	11.82	0.65	0.50	0.82
-3.08	-2.37	26.85	0.07	-0.22	-0.17	1.95	2.99	1.89	4.15	2.25	1.48	1.16	11.77	0.66	0.52	0.84
-35.94	-9.34	2.84	0.07	-2.59	-0.67	0.20	3.98	1.42	0.50	2.21	1.49	1.17	11.72	0.67	0.53	0.86
-14.78	-36.25	1.88	0.07	-1.06	-2.59	0.13	4.30	2.66	3.87	2.17	1.49	1.19	11.67	0.69	0.55	0.88
5.30	-29.11	16.89	0.07	0.38	-2.07	1.20	2.36	1.39	1.23	2.13	1.50	1.21	11.62	0.70	0.57	0.90
-13.63	-10.03	11.88	0.07	-0.96	-0.71	0.84	3.83	0.61	3.88	2.10	1.51	1.22	11.57	0.72	0.58	0.93
14.43	-30.94	11.88	0.07	1.01	-2.17	0.83	3.56	2.64	2.72	2.06	1.52	1.25	11.52	0.73	0.60	0.95
63.33	-48.77	13.87	0.07	4.40	-3.39	0.96	5.16	8.27	7.80	2.03	1.52	1.27	11.47	0.75	0.62	0.98
11.24	-30.61	-1.10	0.07	0.78	-2.11	-0.08	5.62	10.52	9.06	2.00	1.53	1.29	11.43	0.77	0.65	1.00
-31.66	3.45	14.92	0.07	-2.17	0.24	1.02	2.66	6.33	1.54	1.97	1.54	1.32	11.38	0.78	0.67	1.03
-1.54	11.43	36.86	0.07	-0.10	0.78	2.51	1.83	6.40	2.78	1.95	1.55	1.34	11.33	0.80	0.69	1.05
-0.47	-0.58	11.81	0.07	-0.03	-0.04	0.80	5.35	5.98	4.00	1.93	1.57	1.37	11.28	0.81	0.71	1.08
-4.41	3.42	-0.17	0.07	-0.30	0.23	-0.01	3.84	5.24	5.85	1.91	1.58	1.39	11.23	0.83	0.73	1.10
14.63	2.41	10.86	0.07	0.97	0.16	0.72	0.80	5.25	4.34	1.89	1.59	1.42	11.18	0.84	0.75	1.13
10.64	6.40	-8.10	0.07	0.70	0.42	-0.53	3.14	5.88	2.85	1.88	1.61	1.44	11.13	0.86	0.77	1.15
-13.30	19.36	-35.96	0.07	-0.87	1.27	-2.36	3.52	3.79	1.81	1.86	1.62	1.46	11.08	0.87	0.78	1.17
-10.19	1.32	-34.78	0.07	-0.66	0.09	-2.26	2.80	1.81	2.69	1.85	1.64	1.48	11.04	0.88	0.80	1.19
0.88	-24.63	-15.63	0.06	0.06	-1.59	-1.01	2.68	3.09	0.28	1.84	1.65	1.50	10.99	0.90	0.82	1.21
-30.00	-8.55	-30.49	0.06	-1.92	-0.55	-1.95	6.43	7.92	1.25	1.83	1.67	1.52	10.94	0.91	0.83	1.23
-37.81	27.41	-48.28	0.06	-2.40	1.74	-3.07	12.61	14.97	8.25	1.81	1.68	1.53	10.89	0.93	0.84	1.25
15.30	6.35	-16.10	0.06	0.96	0.40	-1.01	6.44	5.64	2.38	1.80	1.69	1.54	10.84	0.94	0.85	1.27
21.28	-20.61	-4.01	0.06	1.33	-1.29	-0.25	1.81	4.16	3.20	1.78	1.71	1.54	10.79	0.96	0.86	1.29
-14.67	0.44	-18.92	0.06	-0.91	0.03	-1.17	2.12	3.70	2.79	1.77	1.72	1.54	10.74	0.97	0.87	1.31
15.39	9.42	-3.83	0.06	0.95	0.58	-0.24	3.54	6.34	3.93	1.75	1.73	1.54	10.69	0.99	0.88	1.32
48.32	1.41	19.19	0.06	2.95	0.09	1.17	1.25	6.52	1.65	1.73	1.73	1.54	10.64	1.00	0.89	1.34
19.24	-1.59	13.17	0.06	1.16	-0.10	0.80	3.00	2.86	6.57	1.71	1.74	1.53	10.60	1.02	0.90	1.36
4.25	-4.57	-10.78	0.06	0.25	-0.27	-0.65	2.14	2.34	7.47	1.69	1.75	1.53	10.55	1.04	0.91	1.38
9.28	-6.54	-15.68	0.06	0.55	-0.39	-0.93	2.25	3.25	3.15	1.67	1.76	1.52	10.50	1.06	0.91	1.39
-8.66	-9.50	-17.56	0.06	-0.51	-0.56	-1.04	2.76	4.07	1.04	1.65	1.77	1.51	10.45	1.07	0.92	1.41
-24.54	-8.46	-25.43	0.06	-1.44	-0.49	-1.49	4.38	2.41	2.99	1.63	1.78	1.50	10.40	1.09	0.92	1.43
-22.39	-11.41	-6.32	0.06	-1.30	-0.66	-0.37	5.51	1.64	1.40	1.60	1.79	1.49	10.35	1.11	0.93	1.45
12.89	-10.40	32.92	0.07	0.94	-0.76	2.40	2.45	4.17	0.99	2.28	1.48	1.14	11.82	0.65	0.50	0.82
-3.08	-2.37	26.85	0.07	-0.22	-0.17	1.95	2.99	1.89	4.15	2.25	1.48	1.16	11.77	0.66	0.52	0.84

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-4.27	-2.38	-3.25	0.06	-0.25	-0.14	-0.19	4.91	3.94	3.96	1.58	1.79	1.48	10.30	1.13	0.93	1.47
-7.19	17.60	-7.18	0.06	-0.41	1.00	-0.41	1.72	4.13	2.76	1.56	1.80	1.46	10.25	1.15	0.94	1.48
-28.06	8.55	16.85	0.06	-1.59	0.48	0.95	2.65	4.73	1.04	1.55	1.81	1.45	10.21	1.17	0.94	1.50
-16.92	-9.44	26.81	0.06	-0.95	-0.53	1.50	3.22	2.69	1.63	1.53	1.82	1.44	10.16	1.19	0.94	1.52
-7.81	-8.40	32.74	0.06	-0.43	-0.47	1.82	2.14	2.12	5.21	1.51	1.83	1.43	10.11	1.21	0.94	1.53
-4.72	4.62	32.66	0.06	-0.26	0.25	1.80	3.24	3.34	4.88	1.50	1.84	1.42	10.06	1.23	0.95	1.55
6.33	7.60	32.57	0.05	0.35	0.41	1.78	3.66	4.11	2.67	1.49	1.85	1.41	10.01	1.24	0.95	1.56
12.35	-4.40	39.48	0.05	0.67	-0.24	2.13	0.58	5.06	3.21	1.48	1.86	1.40	9.96	1.26	0.95	1.58
13.36	-6.37	15.42	0.05	0.71	-0.34	0.82	2.80	1.24	2.77	1.47	1.87	1.39	9.91	1.27	0.95	1.59
4.38	-4.34	3.42	0.05	0.23	-0.23	0.18	2.32	3.64	1.64	1.46	1.88	1.39	9.86	1.29	0.95	1.60
2.43	-20.29	20.42	0.05	0.13	-1.07	1.07	1.99	4.67	2.62	1.46	1.89	1.38	9.81	1.30	0.95	1.61
-5.51	-27.18	16.40	0.05	-0.29	-1.41	0.85	1.27	4.70	5.85	1.45	1.90	1.38	9.77	1.31	0.95	1.61
-33.37	-17.09	1.41	0.05	-1.72	-0.88	0.07	1.06	2.76	5.84	1.45	1.91	1.37	9.72	1.32	0.95	1.62
-23.20	-12.02	-1.54	0.05	-1.18	-0.61	-0.08	2.54	1.15	4.59	1.45	1.91	1.37	9.67	1.32	0.94	1.63
1.90	1.01	3.50	0.05	0.10	0.05	0.18	4.20	0.99	6.29	1.44	1.92	1.36	9.62	1.33	0.94	1.63
-8.02	15.98	-5.45	0.05	-0.40	0.80	-0.27	4.29	2.28	3.14	1.44	1.92	1.36	9.57	1.33	0.94	1.63
3.05	8.94	-9.37	0.05	0.15	0.44	-0.46	2.27	2.69	4.00	1.44	1.92	1.35	9.52	1.33	0.94	1.63
27.04	3.92	1.69	0.05	1.33	0.19	0.08	2.42	2.28	4.14	1.43	1.91	1.35	9.47	1.34	0.94	1.63
-14.92	21.87	-9.25	0.05	-0.72	1.06	-0.45	2.46	2.21	2.63	1.43	1.90	1.34	9.42	1.33	0.94	1.63
-39.75	36.76	-19.14	0.05	-1.91	1.76	-0.92	2.82	4.14	2.32	1.42	1.90	1.34	9.38	1.33	0.94	1.63
13.36	21.65	-9.04	0.05	0.63	1.03	-0.43	4.14	5.31	4.79	1.42	1.88	1.33	9.33	1.33	0.94	1.63
36.32	10.59	-16.94	0.05	1.71	0.50	-0.80	4.61	7.51	5.41	1.41	1.87	1.33	9.28	1.33	0.94	1.63
1.30	17.54	-24.81	0.05	0.06	0.82	-1.15	3.51	3.22	4.77	1.40	1.85	1.32	9.23	1.32	0.94	1.63
-26.59	4.51	-14.68	0.05	-1.22	0.21	-0.68	1.07	1.69	5.36	1.39	1.83	1.32	9.18	1.32	0.95	1.62
-8.46	-14.47	-16.57	0.05	-0.38	-0.66	-0.75	1.27	5.46	2.78	1.38	1.81	1.31	9.13	1.31	0.95	1.62
11.60	-23.38	-21.45	0.05	0.52	-1.05	-0.97	2.34	5.38	2.18	1.36	1.78	1.31	9.08	1.31	0.96	1.62
1.63	-16.30	-20.32	0.04	0.07	-0.73	-0.90	2.22	2.68	3.66	1.35	1.75	1.30	9.03	1.30	0.97	1.62
30.62	-9.24	-11.21	0.04	1.35	-0.41	-0.49	2.23	0.12	1.65	1.33	1.72	1.30	8.98	1.29	0.98	1.62
29.56	-8.20	-2.13	0.04	1.29	-0.36	-0.09	1.58	2.85	3.54	1.31	1.69	1.30	8.94	1.29	0.99	1.62
-15.41	5.81	-8.06	0.04	-0.66	0.25	-0.35	1.80	1.09	9.07	1.30	1.66	1.30	8.89	1.28	1.00	1.62
27.63	-1.19	0.00	0.04	1.17	-0.05	0.00	2.28	1.74	6.81	1.28	1.62	1.30	8.84	1.27	1.01	1.63
-4.27	-2.38	-3.25	0.06	-0.25	-0.14	-0.19	4.91	3.94	3.96	1.58	1.79	1.48	10.30	1.13	0.93	1.47
-7.19	17.60	-7.18	0.06	-0.41	1.00	-0.41	1.72	4.13	2.76	1.56	1.80	1.46	10.25	1.15	0.94	1.48

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
43.54	-14.15	13.03	0.04	1.83	-0.59	0.55	1.23	1.81	4.01	1.26	1.59	1.30	8.79	1.26	1.03	1.63
-25.44	-2.11	-2.95	0.04	-1.06	-0.09	-0.12	1.09	1.86	7.47	1.24	1.56	1.30	8.74	1.26	1.05	1.64
-19.29	1.89	-11.87	0.04	-0.79	0.08	-0.49	0.57	2.36	3.70	1.22	1.53	1.30	8.69	1.25	1.07	1.64
29.75	-7.09	-2.79	0.04	1.20	-0.29	-0.11	0.42	5.37	3.53	1.20	1.50	1.31	8.64	1.24	1.09	1.65
-8.23	-15.04	-9.72	0.04	-0.33	-0.60	-0.39	0.75	6.54	4.86	1.18	1.47	1.31	8.59	1.24	1.11	1.66
-80.00	-14.97	1.35	0.04	-3.16	-0.59	0.05	2.63	5.06	3.24	1.17	1.44	1.32	8.54	1.23	1.13	1.67
-47.68	-13.90	32.33	0.04	-1.86	-0.54	1.26	3.18	1.36	1.75	1.15	1.41	1.33	8.50	1.23	1.16	1.69
10.45	-21.82	31.25	0.04	0.40	-0.84	1.20	2.32	5.23	2.57	1.13	1.39	1.34	8.45	1.23	1.18	1.70
-12.49	-19.73	15.20	0.04	-0.47	-0.75	0.58	1.82	2.39	9.78	1.11	1.36	1.35	8.40	1.22	1.21	1.72
-17.37	-3.68	11.20	0.04	-0.65	-0.14	0.42	2.57	8.69	7.75	1.10	1.34	1.36	8.35	1.22	1.24	1.74
15.70	1.33	7.21	0.04	0.58	0.05	0.27	4.23	8.01	9.83	1.08	1.32	1.37	8.30	1.22	1.26	1.76
4.72	-4.65	3.24	0.04	0.17	-0.17	0.12	2.42	8.91	6.97	1.07	1.31	1.38	8.25	1.22	1.29	1.78
-16.20	5.35	4.27	0.04	-0.58	0.19	0.15	1.60	0.88	1.37	1.06	1.29	1.40	8.20	1.23	1.32	1.80
13.86	5.34	5.30	0.04	0.49	0.19	0.19	2.77	0.80	1.91	1.04	1.28	1.41	8.15	1.23	1.35	1.83
40.81	-3.66	-2.66	0.04	1.43	-0.13	-0.09	1.72	2.98	2.38	1.03	1.27	1.42	8.11	1.23	1.38	1.85
-5.20	1.36	-7.59	0.03	-0.18	0.05	-0.26	2.81	1.59	3.12	1.02	1.26	1.44	8.06	1.24	1.42	1.88
-58.01	-2.63	4.46	0.03	-1.97	-0.09	0.15	2.99	3.16	3.26	1.01	1.26	1.46	8.01	1.25	1.45	1.91
-29.78	-7.60	13.47	0.03	-1.00	-0.25	0.45	0.84	0.13	4.60	0.99	1.25	1.47	7.96	1.26	1.48	1.94
-4.65	9.40	3.49	0.03	-0.15	0.31	0.12	3.22	3.10	6.91	0.98	1.25	1.49	7.91	1.27	1.52	1.98
-35.51	8.37	-6.46	0.03	-1.15	0.27	-0.21	2.57	2.08	3.95	0.97	1.24	1.51	7.86	1.28	1.55	2.01
-21.33	-4.63	-3.39	0.03	-0.68	-0.15	-0.11	0.97	2.41	1.86	0.96	1.24	1.52	7.81	1.30	1.59	2.05
13.74	-0.61	-1.34	0.03	0.43	-0.02	-0.04	2.33	0.78	1.03	0.95	1.24	1.54	7.76	1.31	1.63	2.09
-9.21	19.36	-8.27	0.03	-0.29	0.60	-0.26	2.24	2.17	1.05	0.94	1.25	1.56	7.71	1.33	1.66	2.13
-10.11	32.26	3.79	0.03	-0.31	0.98	0.12	5.04	4.26	2.35	0.92	1.25	1.57	7.67	1.35	1.70	2.17
17.94	18.17	6.81	0.03	0.54	0.55	0.20	3.30	1.12	3.52	0.91	1.25	1.59	7.62	1.37	1.74	2.22
22.92	10.12	-16.12	0.03	0.68	0.30	-0.48	6.02	9.07	6.54	0.90	1.26	1.60	7.57	1.39	1.78	2.26
46.84	17.07	-16.01	0.03	1.36	0.50	-0.46	5.81	12.18	8.18	0.89	1.26	1.62	7.52	1.42	1.82	2.31
46.71	-0.95	-7.91	0.03	1.33	-0.03	-0.23	2.14	6.82	3.43	0.88	1.27	1.63	7.47	1.44	1.86	2.35
6.66	-19.90	-5.84	0.03	0.19	-0.56	-0.16	1.43	6.00	2.14	0.87	1.27	1.65	7.42	1.46	1.90	2.40
8.69	-23.81	-0.78	0.03	0.24	-0.65	-0.02	2.06	4.10	2.51	0.86	1.28	1.66	7.37	1.49	1.93	2.44
14.70	-22.71	-0.73	0.03	0.40	-0.61	-0.02	1.42	3.74	4.69	0.85	1.29	1.67	7.32	1.51	1.96	2.48
43.54	-14.15	13.03	0.04	1.83	-0.59	0.55	1.23	1.81	4.01	1.26	1.59	1.30	8.79	1.26	1.03	1.63
-25.44	-2.11	-2.95	0.04	-1.06	-0.09	-0.12	1.09	1.86	7.47	1.24	1.56	1.30	8.74	1.26	1.05	1.64

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-4.26	-9.64	1.32	0.03	-0.11	-0.26	0.04	0.83	1.92	3.47	0.84	1.29	1.68	7.28	1.53	1.99	2.52
0.81	-15.58	-5.62	0.03	0.02	-0.41	-0.15	2.61	1.15	2.91	0.84	1.30	1.69	7.23	1.55	2.02	2.55
15.84	-13.51	-6.55	0.03	0.40	-0.34	-0.17	2.38	0.59	5.45	0.83	1.31	1.70	7.18	1.57	2.04	2.58
2.86	-12.45	4.50	0.03	0.07	-0.31	0.11	3.03	2.15	4.51	0.83	1.32	1.71	7.13	1.59	2.06	2.60
-2.08	-33.35	-6.45	0.02	-0.05	-0.82	-0.16	5.38	3.90	5.07	0.83	1.33	1.71	7.08	1.60	2.07	2.62
7.96	-10.26	-10.36	0.02	0.19	-0.25	-0.25	2.00	2.31	3.44	0.83	1.33	1.71	7.03	1.62	2.08	2.63
-5.98	-0.23	14.67	0.02	-0.14	-0.01	0.34	3.85	4.33	2.36	0.83	1.34	1.71	6.98	1.62	2.07	2.63
-17.87	-20.18	29.63	0.02	-0.41	-0.46	0.68	3.16	9.04	4.85	0.83	1.35	1.71	6.93	1.63	2.07	2.63
-7.76	-9.11	34.55	0.02	-0.17	-0.20	0.78	2.03	5.32	3.13	0.83	1.35	1.71	6.88	1.62	2.05	2.62
14.28	-1.08	26.48	0.02	0.31	-0.02	0.58	3.55	1.86	1.09	0.84	1.36	1.71	6.84	1.62	2.03	2.60
15.28	-18.03	8.45	0.02	0.33	-0.39	0.18	2.65	3.01	0.66	0.85	1.36	1.70	6.79	1.61	2.01	2.58
-40.61	-16.95	16.45	0.02	-0.85	-0.36	0.35	3.19	1.89	0.68	0.85	1.37	1.69	6.74	1.60	1.98	2.55
-58.35	7.07	15.43	0.02	-1.20	0.15	0.32	4.00	3.78	2.16	0.86	1.37	1.68	6.69	1.59	1.94	2.51
9.81	3.06	10.43	0.02	0.20	0.06	0.21	2.16	3.08	4.72	0.88	1.38	1.67	6.64	1.58	1.91	2.47
36.78	-9.92	17.42	0.02	0.72	-0.19	0.34	4.12	2.06	6.57	0.89	1.38	1.66	6.59	1.56	1.87	2.43
5.75	14.09	-2.56	0.02	0.11	0.27	-0.05	3.12	0.54	5.55	0.90	1.39	1.64	6.54	1.54	1.83	2.39
-4.19	35.99	-13.48	0.02	-0.08	0.67	-0.25	4.01	3.74	3.03	0.91	1.39	1.63	6.49	1.53	1.78	2.35
1.87	10.91	-2.41	0.02	0.03	0.20	-0.04	9.73	10.18	8.47	0.93	1.40	1.61	6.45	1.51	1.74	2.30
-33.00	6.88	-1.35	0.02	-0.58	0.12	-0.02	14.20	14.17	11.67	0.94	1.40	1.59	6.40	1.49	1.70	2.26
-62.75	39.80	0.70	0.02	-1.07	0.68	0.01	19.64	9.21	2.27	0.95	1.40	1.58	6.35	1.47	1.66	2.22
-5.55	9.70	8.72	0.02	-0.09	0.16	0.14	14.73	9.73	1.57	0.97	1.41	1.56	6.30	1.46	1.62	2.18
32.45	-10.29	-3.24	0.02	0.52	-0.16	-0.05	4.29	6.63	10.06	0.98	1.41	1.55	6.25	1.44	1.58	2.13
-11.53	2.74	-23.14	0.02	-0.18	0.04	-0.36	2.29	5.29	9.26	0.99	1.41	1.53	6.20	1.42	1.54	2.10
-1.44	-22.22	-6.04	0.02	-0.02	-0.33	-0.09	2.04	3.59	3.28	1.01	1.42	1.52	6.15	1.41	1.50	2.06
32.56	-21.12	7.01	0.01	0.47	-0.31	0.10	5.99	17.72	3.50	1.02	1.42	1.50	6.10	1.39	1.47	2.02
5.54	-9.05	-16.92	0.01	0.08	-0.13	-0.24	7.93	25.49	14.50	1.04	1.43	1.49	6.05	1.37	1.43	1.98
8.57	-8.01	-15.81	0.01	0.12	-0.11	-0.21	53.86	13.93	54.09	1.06	1.44	1.48	6.01	1.36	1.40	1.95
47.52	-2.98	-7.72	0.01	0.62	-0.04	-0.10	57.17	15.38	44.65	1.08	1.45	1.47	5.96	1.34	1.37	1.92
27.43	-6.95	-27.60	0.01	0.34	-0.09	-0.34	12.24	0.97	8.63	1.10	1.45	1.46	5.91	1.33	1.33	1.88
-18.53	6.06	-39.42	0.01	-0.22	0.07	-0.47	3.31	3.93	3.22	1.12	1.47	1.46	5.86	1.31	1.30	1.85
16.53	-5.93	-32.23	0.01	0.19	-0.07	-0.37	2.65	5.88	8.16	1.14	1.48	1.46	5.81	1.29	1.27	1.81
-4.26	-9.64	1.32	0.03	-0.11	-0.26	0.04	0.83	1.92	3.47	0.84	1.29	1.68	7.28	1.53	1.99	2.52
0.81	-15.58	-5.62	0.03	0.02	-0.41	-0.15	2.61	1.15	2.91	0.84	1.30	1.69	7.23	1.55	2.02	2.55

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
46.47	-22.87	-12.09	0.01	0.51	-0.25	-0.13	9.49	4.42	17.72	1.17	1.49	1.46	5.76	1.27	1.24	1.78
0.43	11.17	3.97	0.01	0.00	0.12	0.04	2.92	5.51	11.30	1.21	1.51	1.46	5.71	1.25	1.21	1.74
-18.47	14.12	1.01	0.01	-0.18	0.14	0.01	5.82	8.59	4.43	1.25	1.53	1.48	5.66	1.22	1.18	1.70
3.62	2.10	-4.93	0.01	0.03	0.02	-0.05	4.76	4.85	8.93	1.29	1.55	1.49	5.62	1.20	1.16	1.66
-0.33	10.09	-13.85	0.01	0.00	0.09	-0.12	3.90	3.02	8.50	1.35	1.57	1.52	5.57	1.17	1.13	1.62
-12.24	-5.91	-7.76	0.01	-0.10	-0.05	-0.07	4.53	2.44	9.67	1.41	1.60	1.55	5.52	1.14	1.10	1.58
-2.16	-24.84	22.26	0.01	-0.02	-0.20	0.18	2.81	3.38	5.67	1.48	1.64	1.59	5.47	1.11	1.08	1.54
9.89	-27.73	30.21	0.01	0.07	-0.21	0.23	2.39	9.81	7.95	1.55	1.68	1.63	5.42	1.08	1.05	1.51
-5.06	-26.61	13.17	0.01	-0.04	-0.19	0.09	3.20	9.93	3.38	1.64	1.72	1.69	5.37	1.05	1.03	1.47
-16.96	-6.54	20.15	0.01	-0.11	-0.04	0.13	3.25	2.16	3.56	1.73	1.77	1.75	5.32	1.02	1.01	1.44
5.12	-19.47	35.08	0.01	0.03	-0.12	0.21	4.17	1.34	6.52	1.83	1.82	1.82	5.27	0.99	0.99	1.40
-3.82	-41.34	30.00	0.01	-0.02	-0.23	0.17	3.30	3.60	6.94	1.94	1.87	1.90	5.22	0.97	0.98	1.38
-17.72	4.74	23.94	0.01	-0.09	0.02	0.12	0.84	0.79	5.21	2.05	1.93	1.99	5.18	0.94	0.97	1.35
27.33	20.70	24.89	0.00	0.12	0.09	0.11	2.09	4.52	3.03	2.18	1.99	2.09	5.13	0.92	0.96	1.33
26.28	-10.31	22.84	0.00	0.11	-0.04	0.09	2.76	5.61	4.23	2.31	2.06	2.20	5.08	0.89	0.95	1.31
-26.66	11.69	11.82	0.00	-0.09	0.04	0.04	3.85	1.76	11.36	2.44	2.13	2.31	5.03	0.87	0.95	1.29
-19.51	26.63	11.81	0.00	-0.06	0.08	0.04	3.25	4.13	14.67	2.57	2.19	2.43	4.98	0.85	0.95	1.27
-1.41	-5.41	15.80	0.00	0.00	-0.01	0.04	2.05	1.69	1.85	2.71	2.26	2.56	4.93	0.84	0.94	1.26
-23.30	-2.38	-8.17	0.00	-0.05	0.00	-0.02	2.01	3.18	1.27	2.84	2.33	2.69	4.88	0.82	0.95	1.25
-27.14	12.61	-19.06	0.00	-0.04	0.02	-0.03	1.08	1.66	0.79	2.97	2.39	2.82	4.83	0.81	0.95	1.25
-3.02	-15.38	-4.97	0.00	0.00	-0.02	0.00	2.88	0.96	2.65	3.09	2.46	2.95	4.79	0.79	0.95	1.24
-17.91	-29.28	-4.90	0.00	-0.01	-0.01	0.00	0.67	0.95	3.50	3.20	2.51	3.07	4.74	0.78	0.96	1.24
-44.73	-7.20	-16.81	0.00	0.00	0.00	0.00	1.43	1.11	3.10	3.30	2.56	3.20	4.69	0.78	0.97	1.24

Microtremors Segment: B1-S2

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
43.75	19.37	3.73	0.26	11.35	7.34	0.97	2.59	0.70	1.16	2.54	1.21	0.96	30.03	0.48	0.38	0.61
18.68	28.28	13.75	0.26	4.84	5.23	3.56	6.75	0.79	1.41	2.52	1.20	0.94	29.98	0.48	0.37	0.60
6.67	20.19	-5.21	0.26	1.72	-1.77	-1.35	5.07	0.62	1.62	2.48	1.18	0.91	29.93	0.48	0.37	0.60
2.70	-6.84	-14.11	0.26	0.70	-6.65	-3.64	6.10	0.54	1.01	2.44	1.16	0.88	29.88	0.48	0.36	0.60
-15.23	-25.77	-3.02	0.26	-3.92	-4.04	-0.78	2.37	0.62	1.04	2.39	1.14	0.85	29.83	0.48	0.35	0.59
-22.10	-15.68	1.04	0.26	-5.68	-8.12	0.27	2.89	1.39	0.30	2.33	1.11	0.81	29.79	0.48	0.35	0.59
5.98	-31.58	10.07	0.26	1.53	-9.86	2.58	3.50	1.53	0.14	2.27	1.09	0.78	29.74	0.48	0.34	0.59
25.96	-38.44	3.10	0.26	6.65	1.44	0.79	1.86	1.58	1.08	2.20	1.06	0.74	29.69	0.48	0.34	0.59
-20.00	5.63	-23.80	0.26	-5.11	9.59	-6.08	2.80	1.32	1.30	2.13	1.03	0.70	29.64	0.48	0.33	0.58
-50.81	37.55	-34.63	0.26	-12.96	7.76	-8.83	2.22	1.13	2.12	2.06	0.99	0.67	29.59	0.48	0.32	0.58
1.33	30.42	-25.46	0.25	0.34	5.43	-6.48	1.34	0.57	3.02	1.99	0.96	0.63	29.54	0.48	0.32	0.58
10.36	21.32	-6.34	0.25	2.63	11.23	-1.61	2.57	1.06	3.54	1.91	0.93	0.60	29.49	0.49	0.31	0.58
-17.58	44.19	0.73	0.25	-4.46	13.44	0.19	3.12	2.26	0.67	1.84	0.90	0.57	29.44	0.49	0.31	0.58
4.50	53.00	-3.21	0.25	1.14	10.07	-0.81	1.74	1.53	2.38	1.77	0.87	0.55	29.39	0.49	0.31	0.58
15.50	39.82	-7.13	0.25	3.91	9.26	-1.80	2.81	1.65	3.88	1.70	0.84	0.52	29.35	0.50	0.31	0.58
-7.46	36.67	-24.01	0.25	-1.88	5.18	-6.05	1.40	1.45	0.25	1.64	0.82	0.50	29.30	0.50	0.31	0.59
-41.32	20.56	-12.88	0.25	-10.39	-0.87	-3.24	4.59	0.91	1.62	1.58	0.79	0.49	29.25	0.50	0.31	0.59
-19.15	-3.48	26.15	0.25	-4.81	-2.87	6.56	2.87	0.85	1.79	1.52	0.77	0.47	29.20	0.51	0.31	0.59
1.93	-11.44	20.11	0.25	0.48	-1.85	5.04	0.86	1.09	0.90	1.47	0.75	0.46	29.15	0.51	0.31	0.60
-52.92	-7.40	2.13	0.25	-13.23	-5.34	0.53	1.18	1.09	2.18	1.42	0.73	0.45	29.10	0.51	0.32	0.61
-20.72	-21.34	22.13	0.25	-5.17	-10.03	5.52	1.80	1.26	1.19	1.38	0.71	0.45	29.05	0.52	0.32	0.61
38.30	-40.22	12.12	0.25	9.54	-3.26	3.02	3.41	1.57	1.77	1.34	0.70	0.44	29.00	0.52	0.33	0.62
-23.69	-13.11	-17.81	0.25	-5.89	1.47	-4.43	0.93	2.26	2.46	1.31	0.68	0.44	28.96	0.52	0.34	0.62
-50.49	5.91	-3.71	0.25	-12.52	-5.22	-0.92	1.86	1.31	2.46	1.28	0.67	0.44	28.91	0.53	0.35	0.63
15.63	-21.05	23.31	0.25	3.87	-0.74	5.77	4.67	2.92	0.49	1.25	0.66	0.44	28.86	0.53	0.36	0.64
32.58	-3.00	30.25	0.25	8.05	5.42	7.47	11.35	2.97	3.92	1.23	0.65	0.45	28.81	0.53	0.36	0.64
6.56	21.96	22.21	0.25	1.62	-4.69	5.47	12.18	4.13	6.18	1.21	0.64	0.45	28.76	0.53	0.37	0.65
48.49	-19.04	10.20	0.25	11.93	-6.87	2.51	9.68	5.18	9.80	1.19	0.63	0.46	28.71	0.53	0.38	0.66
58.33	-27.94	-4.76	0.25	14.32	-0.46	-1.17	21.14	3.73	11.70	1.18	0.63	0.47	28.66	0.53	0.39	0.66
-35.67	-1.88	-21.65	0.25	-8.74	-3.15	-5.30	14.49	2.81	10.18	1.17	0.62	0.47	28.61	0.53	0.40	0.67
-54.44	-12.85	-25.50	0.24	-13.31	-8.25	-6.23	10.18	1.78	9.29	1.16	0.61	0.48	28.56	0.53	0.41	0.67
-9.26	-33.75	-15.36	0.24	-2.26	-5.77	-3.75	11.46	3.19	9.12	1.16	0.61	0.49	28.52	0.53	0.42	0.68
43.75	19.37	3.73	0.26	11.35	7.34	0.97	2.59	0.70	1.16	2.54	1.21	0.96	30.03	0.48	0.38	0.61

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-24.15	-23.63	-0.27	0.24	-5.88	-2.57	-0.07	11.53	1.05	7.43	1.15	0.60	0.50	28.47	0.52	0.44	0.68
-12.03	-10.56	16.75	0.24	-2.92	-6.68	4.07	7.61	1.34	4.90	1.15	0.60	0.51	28.42	0.52	0.45	0.68
37.97	-27.48	27.72	0.24	9.21	-4.94	6.72	8.43	1.32	5.09	1.15	0.59	0.53	28.37	0.51	0.46	0.69
46.85	-20.38	11.69	0.24	11.34	0.40	2.83	7.99	0.69	6.00	1.15	0.59	0.54	28.32	0.51	0.47	0.69
36.73	1.67	-6.26	0.24	8.87	-0.32	-1.51	10.28	1.41	5.24	1.16	0.58	0.56	28.27	0.50	0.48	0.69
30.64	-1.33	13.78	0.24	7.39	0.64	3.32	9.50	0.53	3.71	1.17	0.58	0.57	28.22	0.50	0.49	0.70
20.59	2.67	33.74	0.24	4.95	1.36	8.11	5.62	0.09	3.77	1.18	0.58	0.59	28.17	0.49	0.50	0.70
7.58	5.66	29.67	0.24	1.82	-1.76	7.12	6.26	1.41	4.75	1.19	0.58	0.61	28.13	0.48	0.52	0.71
-3.38	-7.33	30.60	0.24	-0.81	-3.66	7.33	6.17	2.06	2.76	1.21	0.58	0.64	28.08	0.48	0.53	0.71
-11.30	-15.28	33.53	0.24	-2.70	1.61	8.01	4.92	1.75	3.12	1.23	0.58	0.67	28.03	0.47	0.54	0.72
-31.17	6.74	15.49	0.24	-7.43	8.27	3.69	4.46	2.14	1.74	1.26	0.58	0.70	27.98	0.46	0.55	0.72
-46.96	34.66	-14.46	0.24	-11.18	6.08	-3.44	4.52	0.77	0.73	1.29	0.58	0.73	27.93	0.45	0.57	0.73
-37.75	25.54	-6.37	0.24	-8.96	3.67	-1.51	4.67	1.47	2.75	1.33	0.59	0.77	27.88	0.44	0.58	0.73
-31.56	15.47	19.66	0.24	-7.48	6.73	4.66	6.68	0.75	2.98	1.38	0.60	0.81	27.83	0.43	0.59	0.73
-26.39	28.38	-2.32	0.24	-6.24	7.63	-0.55	10.15	1.43	5.43	1.43	0.60	0.86	27.78	0.42	0.60	0.73
-10.27	32.26	-0.26	0.24	-2.42	6.64	-0.06	7.21	2.44	3.67	1.49	0.61	0.91	27.73	0.41	0.61	0.74
-10.18	28.15	27.74	0.24	-2.40	9.42	6.53	5.65	0.48	3.38	1.55	0.62	0.96	27.69	0.40	0.62	0.74
-31.05	40.01	6.73	0.24	-7.30	10.77	1.58	5.98	1.80	2.66	1.62	0.63	1.02	27.64	0.39	0.63	0.74
-13.91	45.84	-16.20	0.23	-3.26	4.39	-3.80	2.83	1.86	1.35	1.70	0.64	1.07	27.59	0.38	0.63	0.74
38.09	18.72	-15.08	0.23	8.91	1.09	-3.53	3.70	0.67	0.54	1.78	0.65	1.13	27.54	0.37	0.64	0.73
20.03	4.67	-13.97	0.23	4.68	2.25	-3.26	4.74	2.37	2.58	1.86	0.66	1.19	27.49	0.36	0.64	0.73
-14.93	9.64	-29.83	0.23	-3.48	-0.78	-6.95	2.32	3.05	1.72	1.95	0.67	1.25	27.44	0.35	0.64	0.73
25.10	-3.37	-43.62	0.23	5.83	-5.42	-10.14	4.72	0.80	1.15	2.04	0.68	1.32	27.39	0.34	0.64	0.73
18.06	-23.31	-37.40	0.23	4.19	-4.92	-8.68	2.88	2.87	2.72	2.13	0.69	1.38	27.34	0.33	0.65	0.72
-44.84	-21.22	-37.20	0.23	-10.38	0.65	-8.61	2.97	2.45	4.49	2.22	0.70	1.43	27.29	0.32	0.65	0.72
-36.63	2.82	-27.01	0.23	-8.46	0.65	-6.24	3.95	0.87	3.22	2.31	0.71	1.49	27.25	0.31	0.65	0.71
4.49	2.81	-5.89	0.23	1.03	-2.80	-1.36	3.40	3.43	1.68	2.39	0.71	1.54	27.20	0.30	0.64	0.71
4.52	-12.17	1.17	0.23	1.04	1.57	0.27	2.50	4.24	2.83	2.48	0.72	1.59	27.15	0.29	0.64	0.71
-7.42	6.85	12.20	0.23	-1.70	0.42	2.80	3.77	2.13	2.87	2.55	0.72	1.63	27.10	0.28	0.64	0.70
25.59	1.83	18.20	0.23	5.86	-5.30	4.17	1.34	1.71	1.63	2.62	0.72	1.67	27.05	0.28	0.64	0.70
33.52	-23.12	15.19	0.23	7.66	-1.16	3.47	3.18	1.62	1.89	2.68	0.72	1.70	27.00	0.27	0.64	0.69
-24.15	-23.63	-0.27	0.24	-5.88	-2.57	-0.07	11.53	1.05	7.43	1.15	0.60	0.50	28.47	0.52	0.44	0.68
-12.03	-10.56	16.75	0.24	-2.92	-6.68	4.07	7.61	1.34	4.90	1.15	0.60	0.51	28.42	0.52	0.45	0.68

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-23.45	-5.06	1.21	0.23	-5.35	-1.60	0.28	1.88	1.22	3.42	2.73	0.72	1.73	26.95	0.26	0.63	0.69
-4.35	-7.04	-15.70	0.23	-0.99	-6.36	-3.57	1.42	4.01	4.74	2.77	0.72	1.74	26.90	0.26	0.63	0.68
43.62	-27.96	-6.60	0.23	9.90	-5.42	-1.50	1.37	2.11	2.61	2.80	0.71	1.75	26.86	0.25	0.63	0.68
-4.40	-23.86	-5.52	0.23	-1.00	-8.77	-1.25	3.07	4.98	1.94	2.82	0.71	1.76	26.81	0.25	0.62	0.67
-34.28	-38.73	-10.43	0.23	-7.75	-10.52	-2.36	4.68	3.78	3.21	2.83	0.70	1.75	26.76	0.25	0.62	0.67
0.84	-46.55	6.63	0.23	0.19	-4.83	1.50	6.07	3.15	2.67	2.83	0.69	1.74	26.71	0.25	0.62	0.66
20.84	-21.41	15.64	0.23	4.69	0.14	3.52	6.68	2.07	2.28	2.82	0.69	1.73	26.66	0.24	0.61	0.66
18.81	0.63	6.65	0.22	4.22	2.38	1.49	3.59	1.43	4.21	2.80	0.68	1.70	26.61	0.24	0.61	0.65
35.75	10.61	5.69	0.22	8.01	0.13	1.27	5.44	3.44	5.17	2.77	0.67	1.67	26.56	0.24	0.60	0.65
43.64	0.60	15.70	0.22	9.75	-0.54	3.51	7.56	4.01	4.66	2.73	0.67	1.64	26.51	0.25	0.60	0.65
-16.36	-2.40	5.71	0.22	-3.65	4.36	1.27	7.76	3.78	3.48	2.68	0.66	1.61	26.46	0.25	0.60	0.65
-48.18	19.57	2.75	0.22	-10.72	3.45	0.61	6.52	1.74	2.95	2.63	0.66	1.57	26.42	0.25	0.60	0.65
-13.01	15.51	11.78	0.22	-2.89	-0.34	2.61	6.48	2.89	2.72	2.57	0.66	1.52	26.37	0.26	0.59	0.65
-30.88	-1.52	-9.17	0.22	-6.84	4.53	-2.03	8.53	3.03	2.66	2.51	0.66	1.48	26.32	0.26	0.59	0.65
-39.68	20.45	-27.04	0.22	-8.77	2.52	-5.98	10.73	0.51	2.06	2.44	0.66	1.44	26.27	0.27	0.59	0.65
12.42	11.39	-17.90	0.22	2.74	-4.32	-3.95	8.46	3.67	2.32	2.37	0.66	1.39	26.22	0.28	0.59	0.65
23.40	-19.59	-10.78	0.22	5.15	0.98	-2.37	8.19	4.02	3.27	2.30	0.67	1.35	26.17	0.29	0.59	0.66
7.39	4.44	-13.68	0.22	1.62	1.85	-3.00	10.10	1.65	4.25	2.22	0.68	1.31	26.12	0.30	0.59	0.66
-7.56	8.42	-6.58	0.22	-1.66	-3.63	-1.44	7.65	4.56	3.81	2.15	0.68	1.27	26.07	0.32	0.59	0.67
-17.46	-16.56	28.43	0.22	-3.82	-1.20	6.21	8.46	2.10	2.70	2.08	0.69	1.24	26.03	0.33	0.59	0.68
-19.34	-5.51	26.38	0.22	-4.22	4.03	5.75	6.96	3.60	3.18	2.02	0.71	1.21	25.98	0.35	0.60	0.69
-42.17	18.46	-11.59	0.22	-9.17	4.65	-2.52	5.34	0.51	4.27	1.96	0.72	1.18	25.93	0.37	0.60	0.71
-10.01	21.39	0.49	0.22	-2.17	2.02	0.11	6.30	3.22	2.53	1.90	0.74	1.15	25.88	0.39	0.61	0.72
4.05	9.33	13.51	0.22	0.88	1.80	2.93	5.72	2.81	0.84	1.85	0.75	1.13	25.83	0.41	0.61	0.74
-48.81	8.30	-18.42	0.22	-10.54	1.35	-3.98	6.48	0.74	1.84	1.80	0.77	1.12	25.78	0.43	0.62	0.75
-22.62	6.27	-23.28	0.22	-4.87	-2.52	-5.02	4.51	1.62	2.87	1.76	0.79	1.10	25.73	0.45	0.62	0.77
20.44	-11.71	-6.16	0.22	4.39	-2.72	-1.33	5.77	2.46	2.05	1.73	0.81	1.09	25.68	0.47	0.63	0.78
3.44	-12.66	-18.06	0.21	0.74	-0.14	-3.87	8.30	3.95	4.04	1.71	0.83	1.08	25.63	0.48	0.63	0.80
-19.48	-0.63	-38.89	0.21	-4.17	-2.27	-8.32	6.72	2.14	3.89	1.69	0.85	1.08	25.59	0.50	0.64	0.81
-1.38	-10.61	-9.73	0.21	-0.30	-1.62	-2.08	5.33	1.72	2.91	1.68	0.86	1.08	25.54	0.51	0.64	0.82
27.61	-7.57	16.31	0.21	5.88	2.43	3.47	4.95	2.95	2.89	1.68	0.88	1.08	25.49	0.52	0.64	0.83
-23.45	-5.06	1.21	0.23	-5.35	-1.60	0.28	1.88	1.22	3.42	2.73	0.72	1.73	26.95	0.26	0.63	0.69
-4.35	-7.04	-15.70	0.23	-0.99	-6.36	-3.57	1.42	4.01	4.74	2.77	0.72	1.74	26.90	0.26	0.63	0.68

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-21.35	11.43	3.33	0.21	-4.54	-2.03	0.71	6.89	1.53	1.76	1.69	0.90	1.08	25.44	0.53	0.64	0.83
-33.19	-9.57	18.34	0.21	-7.04	-9.00	3.89	4.16	2.55	1.65	1.70	0.92	1.09	25.39	0.54	0.64	0.83
46.84	-42.46	34.29	0.21	9.91	-4.09	7.25	4.43	3.21	0.70	1.72	0.93	1.09	25.34	0.54	0.63	0.83
37.72	-19.34	17.25	0.21	7.96	3.10	3.64	5.13	4.24	1.87	1.75	0.95	1.10	25.29	0.54	0.63	0.83
-31.25	14.68	-4.72	0.21	-6.58	0.14	-0.99	4.77	3.79	3.27	1.78	0.96	1.10	25.24	0.54	0.62	0.82
3.86	0.65	-2.65	0.21	0.81	-1.33	-0.56	2.86	2.24	1.32	1.82	0.98	1.11	25.20	0.54	0.61	0.81
32.84	-6.33	17.38	0.21	6.88	2.65	3.64	1.10	1.31	1.83	1.86	0.99	1.12	25.15	0.53	0.60	0.80
-24.13	12.66	17.36	0.21	-5.04	3.68	3.63	1.87	0.49	3.21	1.91	1.00	1.13	25.10	0.52	0.59	0.79
-18.00	17.60	19.35	0.21	-3.75	-0.51	4.03	3.39	1.40	4.60	1.96	1.01	1.13	25.05	0.51	0.58	0.77
21.05	-2.43	15.33	0.21	4.38	-2.58	3.19	2.94	2.26	4.16	2.01	1.01	1.14	25.00	0.50	0.57	0.76
-9.92	-12.39	-6.63	0.21	-2.06	2.20	-1.38	8.96	2.18	3.45	2.06	1.02	1.14	24.95	0.49	0.55	0.74
-41.77	10.61	-5.55	0.21	-8.65	-1.12	-1.15	12.26	2.66	8.73	2.11	1.02	1.15	24.90	0.48	0.54	0.73
0.36	-5.39	7.50	0.21	0.08	-2.96	1.55	10.74	3.18	7.56	2.16	1.02	1.15	24.85	0.47	0.53	0.71
57.30	-14.35	3.54	0.21	11.80	5.90	0.73	3.90	0.48	1.91	2.21	1.03	1.15	24.80	0.46	0.52	0.70
39.16	28.62	2.58	0.21	8.05	2.37	0.53	4.39	2.17	1.48	2.25	1.03	1.15	24.76	0.46	0.51	0.68
14.10	11.55	13.61	0.21	2.89	-2.55	2.79	7.21	1.85	2.40	2.29	1.02	1.15	24.71	0.45	0.50	0.67
19.08	-12.45	9.62	0.20	3.90	2.77	1.97	5.88	1.65	1.86	2.33	1.02	1.15	24.66	0.44	0.49	0.66
-0.90	13.55	-8.33	0.20	-0.18	3.37	-1.70	4.79	3.05	1.31	2.36	1.02	1.14	24.61	0.43	0.48	0.65
-25.80	16.50	-19.22	0.20	-5.25	0.30	-3.91	3.78	2.61	1.50	2.39	1.02	1.14	24.56	0.43	0.48	0.64
-27.64	1.46	-13.10	0.20	-5.61	-1.73	-2.66	2.85	2.78	1.54	2.41	1.01	1.14	24.51	0.42	0.47	0.63
-18.50	-8.52	-17.98	0.20	-3.75	-0.71	-3.64	6.28	2.87	1.04	2.42	1.01	1.13	24.46	0.42	0.47	0.63
-10.39	-3.49	-21.84	0.20	-2.10	-0.50	-4.41	7.56	1.02	1.70	2.43	1.00	1.13	24.41	0.41	0.46	0.62
3.67	-2.48	17.22	0.20	0.74	-4.52	3.47	3.59	0.34	1.77	2.43	0.99	1.12	24.37	0.41	0.46	0.62
4.71	-22.42	34.18	0.20	0.95	-1.08	6.87	2.43	1.16	1.88	2.43	0.99	1.11	24.32	0.41	0.46	0.61
-2.25	-5.36	5.15	0.20	-0.45	1.13	1.03	3.14	3.79	3.30	2.42	0.98	1.11	24.27	0.41	0.46	0.61
9.79	5.64	-1.80	0.20	1.96	-3.07	-0.36	4.44	6.39	5.21	2.41	0.97	1.10	24.22	0.40	0.46	0.61
-17.15	-15.34	5.25	0.20	-3.42	1.93	1.05	4.80	5.44	5.32	2.39	0.97	1.10	24.17	0.40	0.46	0.61
-58.95	9.68	-8.68	0.20	-11.73	4.90	-1.73	4.56	1.85	4.28	2.37	0.96	1.09	24.12	0.40	0.46	0.61
-35.70	24.61	-14.58	0.20	-7.09	-4.05	-2.89	9.14	0.52	1.61	2.35	0.95	1.09	24.07	0.41	0.46	0.62
13.39	-20.39	-1.49	0.20	2.65	-6.00	-0.30	31.99	14.63	4.54	2.32	0.95	1.09	24.02	0.41	0.47	0.62
36.34	-30.29	3.56	0.20	7.18	4.09	0.70	25.30	15.91	4.70	2.30	0.94	1.09	23.97	0.41	0.47	0.63
-21.35	11.43	3.33	0.21	-4.54	-2.03	0.71	6.89	1.53	1.76	1.69	0.90	1.08	25.44	0.53	0.64	0.83
-33.19	-9.57	18.34	0.21	-7.04	-9.00	3.89	4.16	2.55	1.65	1.70	0.92	1.09	25.39	0.54	0.64	0.83

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
18.28	20.73	-16.36	0.20	3.60	5.84	-3.22	8.27	4.00	4.24	2.27	0.93	1.09	23.93	0.41	0.48	0.63
7.28	29.64	-32.20	0.20	1.43	-0.87	-6.33	6.34	3.14	4.86	2.24	0.93	1.09	23.88	0.41	0.48	0.64
14.29	-4.41	-22.04	0.20	2.80	-2.62	-4.32	1.61	3.77	3.85	2.22	0.92	1.09	23.83	0.41	0.49	0.64
-28.63	-13.37	-29.88	0.20	-5.60	-4.16	-5.84	3.25	2.63	2.24	2.20	0.92	1.09	23.78	0.42	0.49	0.65
-61.40	-21.30	-28.70	0.20	-11.97	-6.47	-5.60	5.16	4.71	0.06	2.18	0.91	1.09	23.73	0.42	0.50	0.65
-20.18	-33.19	11.39	0.19	-3.93	-4.88	2.22	5.58	4.02	0.49	2.16	0.91	1.09	23.68	0.42	0.51	0.66
9.89	-25.07	13.40	0.19	1.92	-0.97	2.60	3.32	2.19	2.78	2.14	0.91	1.09	23.63	0.42	0.51	0.66
3.91	-5.00	-1.57	0.19	0.76	-0.38	-0.30	2.96	7.53	5.70	2.13	0.91	1.10	23.58	0.43	0.51	0.67
26.90	-1.98	21.45	0.19	5.19	-1.15	4.14	1.53	4.05	2.71	2.12	0.91	1.10	23.54	0.43	0.52	0.67
66.77	-5.96	31.40	0.19	12.85	0.97	6.04	0.42	2.59	2.59	2.12	0.91	1.10	23.49	0.43	0.52	0.68
31.62	5.04	7.38	0.19	6.07	0.97	1.42	1.53	1.43	2.72	2.12	0.92	1.11	23.44	0.43	0.52	0.68
-0.39	5.03	-0.58	0.19	-0.08	-1.53	-0.11	2.44	0.67	0.77	2.12	0.93	1.11	23.39	0.44	0.52	0.68
56.54	-7.96	11.46	0.19	10.80	-1.51	2.19	1.89	0.84	0.99	2.13	0.94	1.11	23.34	0.44	0.52	0.68
50.38	-7.93	21.45	0.19	9.60	1.35	4.09	2.52	0.65	1.36	2.15	0.95	1.12	23.29	0.44	0.52	0.68
-16.64	7.08	25.41	0.19	-3.16	-0.56	4.83	2.04	1.37	1.79	2.16	0.97	1.12	23.24	0.45	0.52	0.68
-3.55	-2.93	12.39	0.19	-0.67	-3.58	2.35	1.75	1.06	3.31	2.18	0.99	1.12	23.19	0.45	0.51	0.69
1.51	-18.88	-0.58	0.19	0.28	2.11	-0.11	0.77	1.38	1.44	2.20	1.01	1.12	23.14	0.46	0.51	0.69
-49.35	11.14	1.48	0.19	-9.30	0.96	0.28	1.58	2.12	1.83	2.23	1.04	1.13	23.10	0.46	0.50	0.69
-46.11	5.11	14.50	0.19	-8.67	-5.05	2.73	3.39	1.74	1.63	2.26	1.06	1.13	23.05	0.47	0.50	0.69
18.00	-26.84	23.48	0.19	3.37	-2.20	4.40	2.81	0.67	1.03	2.29	1.09	1.13	23.00	0.48	0.49	0.69
46.92	-11.76	8.48	0.19	8.77	1.73	1.58	3.37	0.53	0.48	2.31	1.12	1.13	22.95	0.49	0.49	0.69
10.85	9.25	-10.46	0.19	2.02	-0.89	-1.95	5.43	2.23	0.77	2.34	1.15	1.13	22.90	0.49	0.48	0.69
-22.07	-4.75	-10.37	0.19	-4.11	-1.81	-1.93	4.58	2.69	0.16	2.37	1.19	1.13	22.85	0.50	0.48	0.69
-34.91	-9.72	-16.26	0.19	-6.48	6.54	-3.02	4.41	1.12	1.27	2.39	1.22	1.13	22.80	0.51	0.47	0.70
-65.66	35.23	-22.12	0.19	-12.15	6.12	-4.09	2.99	8.59	5.18	2.41	1.25	1.13	22.75	0.52	0.47	0.70
-56.36	33.10	0.98	0.18	-10.40	-1.65	0.18	2.01	9.34	4.61	2.42	1.28	1.13	22.71	0.53	0.47	0.70
28.74	-8.94	9.01	0.18	5.29	1.85	1.66	5.03	4.14	4.28	2.43	1.31	1.13	22.66	0.54	0.46	0.71
62.61	10.06	-8.93	0.18	11.49	2.21	-1.64	6.26	1.97	2.27	2.44	1.34	1.13	22.61	0.55	0.46	0.72
26.48	12.02	-5.84	0.18	4.85	-3.84	-1.07	6.32	1.44	1.95	2.44	1.36	1.12	22.56	0.56	0.46	0.72
26.43	-20.96	4.21	0.18	4.82	-1.62	0.77	1.52	3.38	0.95	2.43	1.38	1.12	22.51	0.57	0.46	0.73
21.38	-8.90	-0.74	0.18	3.89	3.84	-0.13	2.56	1.21	1.20	2.42	1.40	1.11	22.46	0.58	0.46	0.74
18.28	20.73	-16.36	0.20	3.60	5.84	-3.22	8.27	4.00	4.24	2.27	0.93	1.09	23.93	0.41	0.48	0.63
7.28	29.64	-32.20	0.20	1.43	-0.87	-6.33	6.34	3.14	4.86	2.24	0.93	1.09	23.88	0.41	0.48	0.64

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-50.51	21.08	10.30	0.18	-9.17	2.73	1.87	0.80	1.00	1.44	2.40	1.41	1.10	22.41	0.59	0.46	0.75
-96.16	15.01	36.27	0.18	-17.41	-2.71	6.56	2.54	0.54	0.63	2.37	1.42	1.10	22.36	0.60	0.46	0.76
-36.85	-14.98	34.18	0.18	-6.65	-1.07	6.17	2.22	1.11	1.50	2.33	1.42	1.09	22.31	0.61	0.47	0.77
12.25	-5.94	7.15	0.18	2.21	3.97	1.29	0.60	2.42	0.40	2.29	1.42	1.08	22.27	0.62	0.47	0.78
0.28	22.03	-19.77	0.18	0.05	1.25	-3.55	2.82	0.36	1.67	2.24	1.41	1.06	22.22	0.63	0.47	0.79
34.26	6.98	-20.63	0.18	6.13	-1.43	-3.69	3.66	1.08	1.01	2.19	1.40	1.05	22.17	0.64	0.48	0.80
36.17	-8.01	-7.52	0.18	6.46	0.54	-1.34	5.31	1.10	1.13	2.13	1.39	1.04	22.12	0.65	0.49	0.81
-23.80	3.00	-21.40	0.18	-4.24	0.71	-3.81	1.91	0.26	0.62	2.07	1.37	1.02	22.07	0.66	0.49	0.83
-21.66	3.99	-23.25	0.18	-3.84	-1.07	-4.13	4.26	1.30	0.53	2.00	1.35	1.00	22.02	0.67	0.50	0.84
0.43	-6.00	-7.14	0.18	0.08	-0.17	-1.26	3.61	0.78	1.93	1.94	1.32	0.98	21.97	0.68	0.51	0.85
-9.50	-0.99	-20.03	0.18	-1.68	-1.58	-3.53	5.05	0.94	2.72	1.87	1.29	0.97	21.92	0.69	0.52	0.87
-3.42	-8.96	-15.90	0.18	-0.60	-4.91	-2.80	4.21	1.69	1.24	1.80	1.27	0.95	21.88	0.70	0.53	0.88
43.55	-27.88	2.19	0.18	7.64	-1.90	0.38	5.15	1.53	1.18	1.73	1.24	0.93	21.83	0.71	0.54	0.89
33.45	-10.80	2.24	0.18	5.85	2.13	0.39	0.48	1.73	1.50	1.67	1.21	0.91	21.78	0.72	0.54	0.90
-13.54	12.20	10.27	0.17	-2.36	0.90	1.79	4.38	2.83	0.07	1.61	1.18	0.89	21.73	0.73	0.55	0.92
48.44	5.17	16.27	0.17	8.43	-2.23	2.83	4.70	1.37	0.69	1.55	1.14	0.87	21.68	0.74	0.56	0.93
67.26	-12.81	10.28	0.17	11.67	-2.91	1.78	1.37	0.38	1.19	1.50	1.12	0.85	21.63	0.75	0.57	0.94
-28.77	-16.75	-11.66	0.17	-4.98	-0.47	-2.02	2.78	0.83	1.56	1.45	1.09	0.84	21.58	0.75	0.58	0.95
-21.62	-2.71	-15.55	0.17	-3.73	0.91	-2.68	5.21	2.16	3.03	1.40	1.06	0.82	21.53	0.76	0.58	0.95
16.44	5.29	10.51	0.17	2.83	3.83	1.81	7.06	5.01	2.56	1.36	1.03	0.80	21.48	0.76	0.59	0.96
-40.46	22.24	-12.43	0.17	-6.94	6.20	-2.13	4.44	2.75	1.34	1.33	1.01	0.79	21.44	0.76	0.59	0.96
-61.21	36.13	-29.28	0.17	-10.47	1.72	-5.01	1.26	1.60	0.71	1.30	0.99	0.77	21.39	0.76	0.59	0.96
3.96	10.04	13.80	0.17	0.68	-0.34	2.35	0.85	0.20	1.48	1.28	0.97	0.76	21.34	0.76	0.59	0.96
58.88	-1.97	19.79	0.17	10.01	2.89	3.36	1.12	1.08	0.72	1.26	0.95	0.74	21.29	0.75	0.59	0.95
17.78	17.00	-4.18	0.17	3.01	2.19	-0.71	2.62	0.67	1.04	1.25	0.93	0.73	21.24	0.74	0.58	0.95
-4.20	12.94	-10.09	0.17	-0.71	0.32	-1.71	5.52	0.23	1.50	1.24	0.91	0.72	21.19	0.74	0.58	0.94
47.77	1.92	-2.01	0.17	8.05	2.00	-0.34	5.15	0.89	2.01	1.23	0.90	0.71	21.14	0.73	0.57	0.93
11.70	11.89	9.03	0.17	1.97	1.15	1.52	3.96	0.74	1.76	1.23	0.88	0.69	21.09	0.72	0.57	0.91
-29.22	6.86	5.06	0.17	-4.89	-3.87	0.85	1.12	1.00	1.80	1.23	0.86	0.68	21.04	0.70	0.56	0.90
-0.11	-23.11	6.09	0.17	-0.02	-4.18	1.02	0.93	0.48	1.02	1.23	0.85	0.67	21.00	0.69	0.55	0.88
-17.02	-25.01	10.12	0.17	-2.83	-0.99	1.68	0.53	1.15	0.67	1.23	0.83	0.66	20.95	0.68	0.54	0.86
-50.51	21.08	10.30	0.18	-9.17	2.73	1.87	0.80	1.00	1.44	2.40	1.41	1.10	22.41	0.59	0.46	0.75
-96.16	15.01	36.27	0.18	-17.41	-2.71	6.56	2.54	0.54	0.63	2.37	1.42	1.10	22.36	0.60	0.46	0.76

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-35.87	-5.94	-8.83	0.17	-5.95	-3.96	-1.47	0.34	0.68	1.23	1.23	0.82	0.65	20.90	0.66	0.53	0.85
-19.71	-23.88	-21.71	0.17	-3.26	-4.93	-3.59	2.12	1.68	2.21	1.24	0.80	0.64	20.85	0.65	0.52	0.83
-11.59	-29.77	-18.57	0.17	-1.91	0.38	-3.06	1.08	1.81	2.42	1.24	0.78	0.63	20.80	0.63	0.51	0.81
-8.50	2.29	-17.44	0.16	-1.40	0.87	-2.87	3.62	1.31	1.91	1.25	0.77	0.62	20.75	0.61	0.50	0.79
-10.41	5.28	8.63	0.16	-1.71	-3.39	1.42	4.03	1.17	1.76	1.25	0.75	0.61	20.70	0.60	0.49	0.77
5.65	-20.68	35.60	0.16	0.92	-3.04	5.82	3.57	0.10	1.52	1.26	0.73	0.60	20.65	0.58	0.48	0.75
6.67	-18.60	23.54	0.16	1.09	-1.07	3.84	4.56	0.19	1.93	1.26	0.72	0.59	20.61	0.57	0.47	0.74
-30.23	-6.55	10.53	0.16	-4.91	-4.14	1.71	3.21	1.25	1.29	1.27	0.70	0.58	20.56	0.55	0.46	0.72
-12.09	-25.48	16.53	0.16	-1.96	-5.57	2.68	1.48	1.37	0.66	1.27	0.69	0.58	20.51	0.54	0.45	0.71
35.91	-34.35	7.54	0.16	5.80	-2.14	1.22	1.43	0.62	1.45	1.27	0.67	0.57	20.46	0.53	0.45	0.69
16.86	-13.25	-13.39	0.16	2.71	-0.20	-2.16	2.02	0.51	0.59	1.27	0.65	0.56	20.41	0.51	0.44	0.68
-1.12	-1.22	-1.30	0.16	-0.18	-0.35	-0.21	2.21	1.47	0.79	1.27	0.64	0.56	20.36	0.50	0.44	0.67
13.90	-2.21	15.73	0.16	2.22	1.41	2.52	0.98	1.18	2.13	1.27	0.62	0.55	20.31	0.49	0.43	0.66
9.90	8.78	-0.25	0.16	1.58	3.31	-0.04	5.04	2.45	3.01	1.27	0.61	0.55	20.26	0.48	0.43	0.65
8.92	20.73	-8.17	0.16	1.42	2.01	-1.30	8.08	1.13	3.85	1.27	0.60	0.54	20.21	0.47	0.43	0.64
13.92	12.67	1.89	0.16	2.21	2.63	0.30	3.59	0.95	1.07	1.26	0.59	0.54	20.17	0.46	0.43	0.63
-13.03	16.61	-7.04	0.16	-2.06	5.77	-1.11	0.88	0.89	2.25	1.26	0.58	0.54	20.12	0.46	0.43	0.63
-36.88	36.51	-5.95	0.16	-5.81	3.53	-0.94	0.67	2.13	3.41	1.25	0.56	0.54	20.07	0.45	0.43	0.62
-15.72	22.40	16.08	0.16	-2.47	-0.26	2.52	3.57	6.55	6.05	1.24	0.55	0.54	20.02	0.45	0.43	0.62
29.30	-1.64	18.07	0.16	4.59	0.68	2.83	3.39	3.44	3.27	1.23	0.55	0.54	19.97	0.44	0.44	0.62
51.19	4.36	10.07	0.16	7.99	0.83	1.57	0.92	0.35	2.28	1.22	0.54	0.54	19.92	0.44	0.44	0.62
44.05	5.34	1.11	0.16	6.85	-1.34	0.17	2.24	1.10	1.72	1.21	0.53	0.54	19.87	0.44	0.45	0.62
41.93	-8.65	-4.83	0.16	6.50	0.37	-0.75	1.74	1.16	1.04	1.20	0.52	0.54	19.82	0.43	0.45	0.63
-0.11	2.37	-4.75	0.15	-0.02	2.83	-0.73	1.77	0.96	1.27	1.19	0.51	0.55	19.78	0.43	0.46	0.63
-80.89	18.33	-18.65	0.15	-12.46	0.97	-2.87	1.26	1.39	1.93	1.18	0.51	0.55	19.73	0.43	0.47	0.64
-73.53	6.28	-6.54	0.15	-11.29	-0.26	-1.00	2.30	1.56	2.46	1.16	0.50	0.56	19.68	0.43	0.48	0.64
-14.31	-1.72	22.48	0.15	-2.19	3.40	3.44	3.75	0.90	2.36	1.15	0.49	0.56	19.63	0.43	0.49	0.65
-25.18	22.24	16.46	0.15	-3.84	6.12	2.51	1.69	0.25	0.95	1.14	0.49	0.57	19.58	0.43	0.50	0.66
-18.04	40.12	8.47	0.15	-2.74	1.67	1.29	1.84	1.15	2.19	1.12	0.48	0.57	19.53	0.43	0.51	0.66
39.97	11.02	11.48	0.15	6.06	0.30	1.74	1.74	1.13	3.23	1.11	0.48	0.58	19.48	0.43	0.52	0.67
21.89	2.00	5.51	0.15	3.31	4.07	0.83	1.89	2.06	2.34	1.10	0.47	0.58	19.43	0.43	0.53	0.68
-35.87	-5.94	-8.83	0.17	-5.95	-3.96	-1.47	0.34	0.68	1.23	1.23	0.82	0.65	20.90	0.66	0.53	0.85
-19.71	-23.88	-21.71	0.17	-3.26	-4.93	-3.59	2.12	1.68	2.21	1.24	0.80	0.64	20.85	0.65	0.52	0.83

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-27.04	26.94	17.52	0.15	-4.07	0.58	2.64	3.10	1.74	1.39	1.09	0.47	0.59	19.38	0.43	0.55	0.70
-10.92	3.88	37.46	0.15	-1.64	-1.37	5.62	2.37	1.91	1.30	1.08	0.47	0.60	19.34	0.43	0.56	0.71
26.10	-9.11	26.39	0.15	3.90	1.03	3.95	1.57	1.30	1.98	1.07	0.46	0.61	19.29	0.44	0.57	0.72
-6.88	6.90	3.39	0.15	-1.03	-3.59	0.50	2.18	1.96	1.53	1.06	0.46	0.62	19.24	0.44	0.59	0.73
-35.75	-24.06	-6.55	0.15	-5.31	-6.97	-0.97	4.38	2.66	0.47	1.05	0.46	0.63	19.19	0.44	0.60	0.75
27.32	-46.92	-5.47	0.15	4.04	-1.75	-0.81	2.95	1.32	0.80	1.04	0.47	0.64	19.14	0.45	0.61	0.76
27.26	-11.79	-13.38	0.15	4.02	1.51	-1.97	0.07	0.61	0.99	1.03	0.47	0.65	19.09	0.45	0.63	0.77
-45.65	10.21	-9.27	0.15	-6.71	-1.73	-1.36	0.98	1.09	1.19	1.03	0.47	0.66	19.04	0.46	0.64	0.79
-15.48	-11.78	27.74	0.15	-2.27	-3.33	4.06	0.88	2.13	0.79	1.02	0.48	0.67	18.99	0.46	0.66	0.81
52.50	-22.71	41.66	0.15	7.67	0.34	6.08	3.56	0.86	2.47	1.02	0.48	0.68	18.95	0.47	0.67	0.82
29.39	2.34	26.58	0.15	4.28	1.36	3.87	2.01	1.27	3.52	1.01	0.49	0.70	18.90	0.48	0.69	0.84
-17.59	9.32	14.55	0.15	-2.55	-2.71	2.11	1.30	0.98	1.67	1.01	0.49	0.71	18.85	0.49	0.70	0.86
-3.49	-18.66	7.56	0.14	-0.50	-2.97	1.09	2.85	1.10	1.72	1.00	0.50	0.72	18.80	0.50	0.72	0.87
3.56	-20.58	0.60	0.14	0.51	1.79	0.09	3.14	1.43	1.71	1.00	0.51	0.73	18.75	0.51	0.73	0.89
-36.33	12.44	-16.31	0.14	-5.21	3.64	-2.34	1.87	1.65	1.80	0.99	0.52	0.74	18.70	0.52	0.74	0.91
-11.18	25.37	-20.18	0.14	-1.60	3.47	-2.89	2.04	1.65	0.73	0.99	0.52	0.75	18.65	0.53	0.76	0.92
46.80	24.27	-15.05	0.14	6.67	2.88	-2.15	2.44	1.29	0.74	0.98	0.53	0.76	18.60	0.54	0.77	0.94
12.73	20.19	-29.91	0.14	1.81	-0.12	-4.25	1.61	0.80	0.76	0.98	0.54	0.77	18.55	0.55	0.78	0.96
-1.24	-0.85	-38.72	0.14	-0.18	-0.40	-5.48	4.97	1.26	1.53	0.97	0.54	0.77	18.51	0.56	0.80	0.97
43.73	-2.84	-40.50	0.14	6.17	2.98	-5.71	3.14	1.93	1.56	0.96	0.55	0.78	18.46	0.57	0.81	0.99
26.64	21.13	-50.26	0.14	3.74	5.62	-7.06	6.37	0.66	2.01	0.96	0.56	0.78	18.41	0.58	0.82	1.00
10.61	40.01	-17.07	0.14	1.49	1.53	-2.39	9.71	2.30	1.93	0.95	0.56	0.78	18.36	0.59	0.83	1.02
37.56	10.91	13.00	0.14	5.24	-3.36	1.81	5.75	2.29	1.34	0.94	0.57	0.78	18.31	0.60	0.83	1.03
22.49	-24.06	-6.96	0.14	3.13	-0.70	-0.97	2.64	3.09	1.39	0.93	0.57	0.78	18.26	0.61	0.84	1.04
-17.47	-5.00	-7.87	0.14	-2.42	0.55	-1.09	1.54	1.23	2.16	0.92	0.57	0.78	18.21	0.62	0.85	1.05
4.61	4.00	-10.78	0.14	0.64	-1.65	-1.49	2.67	1.53	1.05	0.92	0.57	0.78	18.16	0.63	0.85	1.05
21.61	-11.98	-30.64	0.14	2.97	-1.91	-4.21	1.86	2.08	1.24	0.91	0.57	0.77	18.12	0.63	0.85	1.06
-41.31	-13.92	-18.48	0.14	-5.66	-0.40	-2.53	5.03	2.88	3.74	0.90	0.57	0.77	18.07	0.64	0.85	1.06
-40.09	-2.89	-9.37	0.14	-5.47	0.29	-1.28	2.46	1.94	2.98	0.90	0.57	0.76	18.02	0.64	0.85	1.06
31.97	2.12	-15.26	0.14	4.35	0.42	-2.08	2.53	2.85	3.64	0.89	0.57	0.75	17.97	0.64	0.84	1.06
-1.04	3.11	-18.13	0.14	-0.14	2.58	-2.46	2.00	3.28	4.24	0.89	0.57	0.74	17.92	0.64	0.83	1.05
-27.04	26.94	17.52	0.15	-4.07	0.58	2.64	3.10	1.74	1.39	1.09	0.47	0.59	19.38	0.43	0.55	0.70
-10.92	3.88	37.46	0.15	-1.64	-1.37	5.62	2.37	1.91	1.30	1.08	0.47	0.60	19.34	0.43	0.56	0.71

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-62.86	19.07	-11.02	0.14	-8.49	1.35	-1.49	3.57	6.99	10.90	0.89	0.57	0.73	17.87	0.64	0.83	1.05
-24.63	10.01	11.04	0.13	-3.31	-1.48	1.48	4.31	6.83	6.54	0.89	0.57	0.72	17.82	0.64	0.82	1.04
9.45	-10.98	24.03	0.13	1.27	1.21	3.22	3.50	3.47	4.88	0.89	0.57	0.71	17.77	0.64	0.80	1.03
-10.50	9.02	30.98	0.13	-1.40	1.07	4.14	10.16	8.08	9.54	0.89	0.57	0.70	17.72	0.64	0.79	1.02
-5.42	7.99	33.90	0.13	-0.72	-2.79	4.51	3.57	6.87	6.38	0.89	0.57	0.69	17.68	0.63	0.78	1.00
25.59	-20.98	39.81	0.13	3.39	-3.69	5.28	2.68	1.33	2.78	0.90	0.57	0.68	17.63	0.63	0.76	0.99
11.57	-27.88	43.70	0.13	1.53	-4.46	5.77	0.64	1.16	0.60	0.91	0.57	0.68	17.58	0.62	0.74	0.97
-42.32	-33.75	26.62	0.13	-5.56	-5.73	3.50	0.29	1.12	2.64	0.92	0.57	0.67	17.53	0.62	0.73	0.96
-47.09	-43.59	28.56	0.13	-6.17	-5.95	3.74	2.15	1.81	3.43	0.93	0.57	0.66	17.48	0.61	0.71	0.94
-41.86	-45.41	38.49	0.13	-5.46	-3.30	5.02	1.22	1.32	5.66	0.95	0.57	0.66	17.43	0.61	0.70	0.93
-67.59	-25.27	18.43	0.13	-8.79	-0.94	2.40	1.94	0.66	2.91	0.96	0.58	0.66	17.38	0.60	0.69	0.91
-32.33	-7.20	-0.55	0.13	-4.19	-2.22	-0.07	1.71	1.61	1.48	0.98	0.59	0.66	17.33	0.60	0.68	0.90
30.72	-17.14	12.48	0.13	3.96	-1.56	1.61	1.61	2.83	1.65	1.00	0.59	0.67	17.29	0.59	0.67	0.90
36.64	-12.08	37.44	0.13	4.71	0.25	4.81	2.13	4.02	0.84	1.02	0.60	0.68	17.24	0.59	0.66	0.89
41.53	1.94	31.35	0.13	5.32	-0.77	4.01	1.05	2.31	0.90	1.04	0.62	0.69	17.19	0.59	0.66	0.89
77.35	-6.04	14.32	0.13	9.86	0.00	1.83	2.55	0.44	1.99	1.06	0.63	0.70	17.14	0.59	0.66	0.89
55.13	-0.03	16.31	0.13	7.00	3.17	2.07	2.48	1.56	2.21	1.08	0.65	0.72	17.09	0.60	0.66	0.89
-10.91	24.93	-6.65	0.13	-1.38	2.51	-0.84	1.07	1.25	0.63	1.10	0.67	0.74	17.04	0.60	0.67	0.90
-22.79	19.84	-25.53	0.13	-2.87	-0.40	-3.22	3.33	3.17	1.15	1.13	0.69	0.76	16.99	0.61	0.67	0.91
2.30	-3.19	10.55	0.13	0.29	-0.15	1.32	4.47	3.18	3.02	1.15	0.71	0.78	16.94	0.62	0.68	0.92
3.34	-1.18	17.55	0.13	0.42	0.35	2.19	2.36	1.93	4.93	1.17	0.73	0.81	16.89	0.63	0.70	0.94
4.38	2.83	-20.39	0.12	0.54	-0.39	-2.54	2.93	6.59	6.48	1.18	0.76	0.84	16.85	0.64	0.71	0.96
15.39	-3.17	-23.24	0.12	1.91	0.48	-2.88	2.32	5.51	6.56	1.20	0.78	0.87	16.80	0.65	0.73	0.98
-9.57	3.83	-13.12	0.12	-1.18	1.95	-1.62	2.06	2.00	6.36	1.21	0.81	0.91	16.75	0.67	0.75	1.00
-25.45	15.80	-30.97	0.12	-3.13	2.18	-3.81	5.89	9.66	15.95	1.22	0.84	0.94	16.70	0.68	0.77	1.03
8.63	17.73	-14.82	0.12	1.06	2.04	-1.82	17.26	18.34	42.11	1.23	0.86	0.98	16.65	0.70	0.79	1.06
14.64	16.67	14.23	0.12	1.79	2.51	1.74	8.88	3.60	31.92	1.24	0.89	1.02	16.60	0.72	0.82	1.09
-0.34	20.60	4.25	0.12	-0.04	1.89	0.52	8.72	14.01	15.22	1.24	0.91	1.05	16.55	0.74	0.85	1.12
25.66	15.53	12.27	0.12	3.10	-1.39	1.49	4.51	10.27	8.02	1.24	0.94	1.09	16.50	0.76	0.88	1.16
40.57	-11.48	11.28	0.12	4.89	-3.18	1.36	2.41	1.78	3.71	1.24	0.97	1.13	16.46	0.78	0.91	1.19
19.50	-26.40	-21.64	0.12	2.34	0.32	-2.60	4.20	0.93	4.64	1.24	0.99	1.16	16.41	0.80	0.94	1.23
-62.86	19.07	-11.02	0.14	-8.49	1.35	-1.49	3.57	6.99	10.90	0.89	0.57	0.73	17.87	0.64	0.83	1.05
-24.63	10.01	11.04	0.13	-3.31	-1.48	1.48	4.31	6.83	6.54	0.89	0.57	0.72	17.82	0.64	0.82	1.04

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
1.51	2.65	-33.47	0.12	0.18	0.67	-4.00	1.11	0.25	1.31	1.23	1.01	1.20	16.36	0.82	0.97	1.27
5.55	5.64	-23.30	0.12	0.66	-2.89	-2.77	4.23	1.30	3.20	1.23	1.03	1.24	16.31	0.84	1.01	1.32
-1.41	-24.32	-7.19	0.12	-0.17	-0.86	-0.85	2.48	2.16	1.77	1.22	1.06	1.27	16.26	0.87	1.05	1.36
-52.25	-7.25	0.88	0.12	-6.17	-0.15	0.10	2.53	3.57	2.95	1.21	1.08	1.31	16.21	0.89	1.08	1.40
-42.01	-1.23	1.93	0.12	-4.94	-2.84	0.23	2.91	2.33	3.35	1.20	1.10	1.35	16.16	0.91	1.12	1.45
13.10	-24.17	-5.00	0.12	1.53	-1.65	-0.59	3.90	5.08	1.36	1.19	1.11	1.39	16.11	0.93	1.16	1.49
-15.85	-14.09	-9.92	0.12	-1.85	0.69	-1.16	3.17	9.59	2.66	1.18	1.13	1.43	16.06	0.96	1.21	1.54
-56.65	5.93	-5.83	0.12	-6.57	-0.24	-0.68	11.48	32.25	9.08	1.17	1.15	1.47	16.02	0.98	1.25	1.59
-25.44	-2.08	5.23	0.12	-2.94	0.57	0.60	23.57	38.70	16.32	1.17	1.17	1.51	15.97	1.00	1.29	1.63
-1.33	4.92	31.21	0.12	-0.15	2.97	3.59	9.74	9.89	8.25	1.16	1.18	1.56	15.92	1.02	1.34	1.68
-6.27	25.86	41.12	0.11	-0.72	0.55	4.71	4.28	2.63	1.01	1.16	1.20	1.61	15.87	1.04	1.38	1.73
33.73	4.81	30.04	0.11	3.85	-1.50	3.42	3.32	1.81	1.87	1.17	1.23	1.66	15.82	1.05	1.43	1.77
37.64	-13.17	14.00	0.11	4.27	0.21	1.59	1.57	1.94	2.51	1.17	1.25	1.72	15.77	1.07	1.47	1.82
-35.31	1.85	0.03	0.11	-3.99	0.66	0.00	2.40	1.57	3.80	1.18	1.28	1.79	15.72	1.08	1.51	1.86
-38.12	5.84	-1.91	0.11	-4.29	-0.36	-0.21	1.71	1.87	3.65	1.20	1.31	1.86	15.67	1.10	1.55	1.90
17.98	-3.16	-1.85	0.11	2.01	-0.80	-0.21	0.97	3.81	3.42	1.22	1.35	1.93	15.63	1.11	1.59	1.94
42.90	-7.14	-3.78	0.11	4.78	-0.68	-0.42	4.07	3.15	2.95	1.24	1.39	2.01	15.58	1.12	1.62	1.97
-0.13	-6.11	-4.71	0.11	-0.01	-0.01	-0.52	5.45	2.50	1.68	1.26	1.43	2.08	15.53	1.13	1.65	2.00
-22.04	-0.09	10.34	0.11	-2.43	0.98	1.14	2.15	0.56	1.38	1.29	1.48	2.16	15.48	1.14	1.67	2.03
44.97	8.90	19.33	0.11	4.95	2.51	2.13	2.40	1.35	1.19	1.32	1.53	2.24	15.43	1.15	1.69	2.05
30.87	22.84	-10.63	0.11	3.38	1.84	-1.16	3.90	2.28	2.18	1.36	1.58	2.32	15.38	1.16	1.70	2.06
-9.12	16.76	-23.50	0.11	-0.99	-0.79	-2.56	3.10	1.76	3.40	1.40	1.64	2.39	15.33	1.17	1.71	2.08
43.86	-7.25	-1.40	0.11	4.76	-0.46	-0.15	2.35	1.77	5.05	1.44	1.70	2.46	15.28	1.18	1.72	2.08
27.76	-4.23	2.66	0.11	3.00	-0.24	0.29	5.29	1.47	2.60	1.48	1.76	2.53	15.23	1.19	1.71	2.09
-27.19	-2.21	1.70	0.11	-2.92	-3.24	0.18	6.71	0.27	5.63	1.52	1.83	2.59	15.19	1.20	1.71	2.09
-19.05	-30.14	8.74	0.11	-2.04	-4.81	0.93	5.46	3.78	4.00	1.56	1.90	2.65	15.14	1.21	1.69	2.08
-11.93	-44.99	1.77	0.11	-1.27	-2.65	0.19	8.63	7.10	2.83	1.61	1.97	2.70	15.09	1.22	1.68	2.08
-16.82	-24.84	-7.16	0.11	-1.78	0.76	-0.76	4.45	4.73	4.19	1.65	2.04	2.73	15.04	1.23	1.66	2.07
-13.71	7.20	-5.08	0.11	-1.45	0.97	-0.54	1.42	4.05	2.57	1.69	2.10	2.76	14.99	1.24	1.63	2.05
23.32	9.17	-11.99	0.11	2.45	0.23	-1.26	0.80	0.50	3.40	1.73	2.17	2.78	14.94	1.25	1.60	2.04
33.26	2.15	-17.87	0.10	3.48	2.31	-1.87	4.19	1.81	1.22	1.76	2.22	2.78	14.89	1.26	1.57	2.02
1.51	2.65	-33.47	0.12	0.18	0.67	-4.00	1.11	0.25	1.31	1.23	1.01	1.20	16.36	0.82	0.97	1.27
5.55	5.64	-23.30	0.12	0.66	-2.89	-2.77	4.23	1.30	3.20	1.23	1.03	1.24	16.31	0.84	1.01	1.32

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-4.75	22.10	2.21	0.10	-0.49	1.98	0.23	2.26	2.42	3.10	1.80	2.28	2.77	14.84	1.27	1.54	1.99
24.26	19.03	19.23	0.10	2.51	-1.14	1.99	0.84	0.72	5.31	1.82	2.32	2.74	14.79	1.27	1.50	1.97
43.17	-10.99	24.20	0.10	4.45	0.42	2.49	1.78	0.47	3.38	1.85	2.37	2.71	14.75	1.28	1.47	1.95
-27.81	4.03	34.13	0.10	-2.85	2.15	3.50	0.41	2.69	4.00	1.87	2.40	2.67	14.70	1.28	1.43	1.92
-52.59	20.98	33.06	0.10	-5.36	0.30	3.37	5.83	3.66	4.59	1.89	2.43	2.62	14.65	1.29	1.39	1.89
-22.39	2.94	33.98	0.10	-2.27	0.20	3.45	3.04	0.40	4.67	1.90	2.45	2.56	14.60	1.29	1.35	1.87
-23.25	1.93	33.89	0.10	-2.35	0.40	3.42	2.68	1.18	1.08	1.91	2.46	2.49	14.55	1.29	1.31	1.84
-11.13	3.93	15.85	0.10	-1.12	-1.01	1.59	2.35	1.85	2.35	1.91	2.46	2.42	14.50	1.29	1.27	1.81
-5.05	-10.06	14.84	0.10	-0.50	-1.50	1.48	5.97	3.99	2.52	1.91	2.45	2.35	14.45	1.28	1.23	1.78
-35.92	-15.00	11.84	0.10	-3.57	0.00	1.18	8.46	4.68	1.86	1.91	2.43	2.27	14.40	1.28	1.19	1.74
-38.71	0.03	-9.11	0.10	-3.83	1.88	-0.90	8.20	3.97	0.72	1.90	2.40	2.19	14.36	1.27	1.15	1.71
-21.54	19.00	-11.01	0.10	-2.12	0.68	-1.08	4.78	1.57	1.54	1.89	2.37	2.10	14.31	1.26	1.12	1.68
-18.41	6.95	2.06	0.10	-1.80	0.58	0.20	2.55	0.83	3.32	1.87	2.32	2.02	14.26	1.24	1.08	1.65
-18.28	5.93	17.08	0.10	-1.78	2.91	1.66	1.11	0.41	1.42	1.85	2.26	1.94	14.21	1.22	1.05	1.61
-12.17	29.86	22.05	0.10	-1.18	1.05	2.14	4.39	4.49	1.60	1.83	2.20	1.86	14.16	1.21	1.02	1.58
15.87	10.78	17.03	0.10	1.53	-0.79	1.64	2.43	4.84	3.15	1.80	2.14	1.79	14.11	1.18	0.99	1.55
46.80	-8.22	0.05	0.10	4.49	0.65	0.00	7.18	2.85	0.82	1.78	2.06	1.72	14.06	1.16	0.97	1.51
23.71	6.78	-26.84	0.10	2.26	-0.59	-2.56	6.18	3.64	5.65	1.75	1.99	1.66	14.01	1.14	0.95	1.48
9.69	-6.21	-38.66	0.10	0.92	-2.20	-3.67	14.25	7.22	7.31	1.72	1.91	1.60	13.96	1.11	0.93	1.45
20.68	-23.15	-11.50	0.09	1.95	-1.33	-1.09	15.82	8.62	3.42	1.70	1.83	1.55	13.92	1.08	0.91	1.41
-32.24	-14.07	14.55	0.09	-3.03	-1.50	1.37	2.60	3.21	1.07	1.67	1.76	1.50	13.87	1.05	0.90	1.38
-51.02	-16.01	-0.43	0.09	-4.77	-2.42	-0.04	1.32	1.76	3.75	1.64	1.68	1.46	13.82	1.02	0.89	1.35
7.12	-25.92	-9.35	0.09	0.66	-1.29	-0.87	8.49	3.42	4.61	1.62	1.60	1.42	13.77	0.99	0.88	1.32
34.09	-13.84	-0.28	0.09	3.15	0.85	-0.03	9.05	1.55	3.91	1.59	1.53	1.38	13.72	0.96	0.87	1.29
24.02	9.17	-21.18	0.09	2.21	0.01	-1.95	1.78	3.34	2.05	1.57	1.45	1.35	13.67	0.92	0.86	1.26
12.00	0.16	-30.02	0.09	1.10	-0.72	-2.75	9.09	7.40	3.00	1.55	1.39	1.33	13.62	0.89	0.85	1.24
13.00	-7.82	-4.90	0.09	1.18	0.84	-0.45	8.98	6.74	1.92	1.54	1.32	1.30	13.57	0.86	0.85	1.21
8.01	9.18	-10.81	0.09	0.72	0.38	-0.98	3.21	2.47	2.91	1.52	1.27	1.28	13.53	0.83	0.84	1.18
16.01	4.16	-5.72	0.09	1.44	-0.97	-0.52	3.24	1.57	2.07	1.51	1.22	1.26	13.48	0.80	0.84	1.16
55.92	-10.82	13.32	0.09	5.00	-0.34	1.19	5.35	2.50	2.22	1.50	1.17	1.25	13.43	0.78	0.83	1.14
32.79	-3.79	-8.64	0.09	2.92	0.73	-0.77	5.58	2.01	1.77	1.50	1.14	1.23	13.38	0.76	0.82	1.12
-4.75	22.10	2.21	0.10	-0.49	1.98	0.23	2.26	2.42	3.10	1.80	2.28	2.77	14.84	1.27	1.54	1.99
24.26	19.03	19.23	0.10	2.51	-1.14	1.99	0.84	0.72	5.31	1.82	2.32	2.74	14.79	1.27	1.50	1.97

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-24.17	8.20	-19.53	0.09	-2.14	-0.69	-1.73	6.12	2.12	4.59	1.50	1.11	1.22	13.33	0.74	0.81	1.10
-12.05	-7.79	-11.41	0.09	-1.06	-0.59	-1.00	4.40	1.48	3.95	1.51	1.08	1.21	13.28	0.72	0.80	1.08
-3.97	-6.76	-6.32	0.09	-0.35	1.68	-0.55	1.60	4.79	0.92	1.52	1.06	1.20	13.23	0.70	0.79	1.06
-37.83	19.22	-1.25	0.09	-3.29	-0.24	-0.11	2.96	4.52	0.27	1.53	1.05	1.19	13.18	0.69	0.78	1.04
-19.67	-2.81	-2.18	0.09	-1.70	-2.23	-0.19	2.84	1.82	2.85	1.55	1.04	1.18	13.13	0.67	0.76	1.02
42.34	-25.75	2.87	0.09	3.64	0.03	0.25	1.97	3.52	3.42	1.57	1.04	1.18	13.09	0.66	0.75	1.00
23.26	0.31	1.92	0.09	1.99	2.24	0.16	2.53	1.05	1.69	1.59	1.04	1.17	13.04	0.65	0.73	0.98
-49.64	26.26	-3.02	0.09	-4.22	2.73	-0.26	0.61	2.17	4.49	1.62	1.04	1.16	12.99	0.64	0.72	0.96
-13.46	32.14	22.99	0.08	-1.14	2.20	1.94	1.78	2.09	3.61	1.65	1.05	1.15	12.94	0.64	0.70	0.94
34.55	26.03	56.89	0.08	2.90	1.84	4.78	5.98	2.23	3.28	1.69	1.07	1.15	12.89	0.63	0.68	0.93
-13.45	21.94	53.72	0.08	-1.12	0.57	4.49	10.46	4.30	2.58	1.72	1.08	1.14	12.84	0.63	0.66	0.91
5.62	6.88	30.61	0.08	0.47	-2.83	2.54	5.62	3.61	4.25	1.76	1.10	1.13	12.79	0.62	0.65	0.90
54.55	-34.06	16.56	0.08	4.50	-3.46	1.37	0.94	3.28	3.68	1.79	1.11	1.13	12.74	0.62	0.63	0.88
-3.50	-41.90	-12.39	0.08	-0.29	-2.03	-1.02	9.11	1.72	9.12	1.83	1.13	1.12	12.70	0.62	0.61	0.87
-64.31	-24.77	-33.24	0.08	-5.24	-3.31	-2.71	8.97	7.34	12.35	1.86	1.15	1.12	12.65	0.62	0.60	0.86
-67.00	-40.63	-14.09	0.08	-5.43	-3.28	-1.14	4.04	4.13	5.56	1.90	1.17	1.12	12.60	0.62	0.59	0.85
-34.74	-40.46	17.95	0.08	-2.80	-0.67	1.45	15.40	3.72	6.99	1.93	1.19	1.11	12.55	0.62	0.58	0.84
1.37	-8.36	44.88	0.08	0.11	-0.51	3.59	12.99	4.02	11.84	1.96	1.21	1.11	12.50	0.61	0.57	0.84
16.39	-6.33	43.76	0.08	1.30	-2.17	3.48	2.74	1.56	9.66	1.99	1.22	1.11	12.45	0.61	0.56	0.83
34.34	-27.25	32.66	0.08	2.71	-1.20	2.58	1.58	2.81	1.69	2.01	1.24	1.11	12.40	0.61	0.55	0.83
15.29	-15.16	18.61	0.08	1.20	0.62	1.46	1.59	2.35	3.24	2.03	1.25	1.11	12.35	0.62	0.55	0.82
-10.67	7.86	-2.37	0.08	-0.83	-0.40	-0.18	1.02	4.57	1.56	2.05	1.26	1.11	12.30	0.62	0.54	0.82
28.35	-5.15	-5.30	0.08	2.20	-0.24	-0.41	0.94	5.87	0.68	2.06	1.27	1.12	12.26	0.62	0.54	0.82
24.30	-3.12	-7.22	0.08	1.87	1.61	-0.56	1.99	3.15	2.28	2.07	1.28	1.12	12.21	0.62	0.54	0.82
-15.67	20.85	-16.12	0.08	-1.20	0.14	-1.23	2.41	3.11	6.40	2.07	1.28	1.13	12.16	0.62	0.54	0.82
3.41	1.81	-15.00	0.08	0.26	-1.23	-1.14	0.52	3.31	6.15	2.07	1.28	1.13	12.11	0.62	0.55	0.83
1.45	-16.16	-6.91	0.08	0.11	-0.08	-0.52	1.78	1.63	1.24	2.06	1.29	1.14	12.06	0.62	0.55	0.83
-34.44	-1.12	-19.80	0.08	-2.58	0.07	-1.48	7.48	4.45	4.69	2.06	1.29	1.15	12.01	0.63	0.56	0.84
-16.28	0.88	-40.62	0.07	-1.21	-0.38	-3.03	8.93	1.36	6.33	2.05	1.28	1.16	11.96	0.63	0.57	0.85
17.77	-5.10	-32.42	0.07	1.31	0.95	-2.40	8.38	5.39	5.13	2.03	1.28	1.18	11.91	0.63	0.58	0.86
18.74	12.89	-25.25	0.07	1.38	1.90	-1.86	8.97	4.02	3.28	2.02	1.28	1.20	11.87	0.63	0.59	0.87
-24.17	8.20	-19.53	0.09	-2.14	-0.69	-1.73	6.12	2.12	4.59	1.50	1.11	1.22	13.33	0.74	0.81	1.10
-12.05	-7.79	-11.41	0.09	-1.06	-0.59	-1.00	4.40	1.48	3.95	1.51	1.08	1.21	13.28	0.72	0.80	1.08

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
24.71	25.81	-26.09	0.07	1.80	0.42	-1.90	5.53	1.43	1.23	2.00	1.27	1.22	11.82	0.63	0.61	0.88
43.62	5.76	-6.97	0.07	3.16	-0.16	-0.51	5.23	0.71	2.85	1.99	1.27	1.24	11.77	0.64	0.62	0.89
33.52	-2.25	4.09	0.07	2.41	2.07	0.29	7.90	0.64	1.61	1.97	1.26	1.26	11.72	0.64	0.64	0.90
-27.45	28.70	-2.86	0.07	-1.96	2.26	-0.20	3.24	3.60	2.56	1.96	1.25	1.29	11.67	0.64	0.66	0.92
-19.30	31.59	7.19	0.07	-1.37	0.25	0.51	1.59	2.94	0.77	1.94	1.25	1.32	11.62	0.64	0.68	0.94
47.69	3.52	18.19	0.07	3.36	0.04	1.28	2.41	2.57	2.35	1.93	1.24	1.35	11.57	0.65	0.70	0.95
-30.29	0.52	3.20	0.07	-2.12	0.04	0.22	0.75	2.51	2.06	1.91	1.24	1.38	11.52	0.65	0.72	0.97
-116.95	0.52	-5.74	0.07	-8.13	-0.73	-0.40	2.44	8.11	7.89	1.90	1.23	1.41	11.47	0.65	0.74	0.99
-32.59	-10.46	3.32	0.07	-2.25	-0.58	0.23	4.33	11.22	9.79	1.89	1.23	1.45	11.43	0.65	0.76	1.00
43.44	-8.41	-1.62	0.07	2.98	0.66	-0.11	2.27	4.56	1.62	1.88	1.23	1.48	11.38	0.65	0.79	1.02
4.39	9.59	0.43	0.07	0.30	1.60	0.03	5.79	2.08	2.11	1.87	1.23	1.51	11.33	0.66	0.81	1.04
-3.56	23.53	32.42	0.07	-0.24	0.57	2.19	3.26	2.62	3.44	1.87	1.23	1.54	11.28	0.66	0.83	1.06
31.44	8.47	54.30	0.07	2.11	0.30	3.64	1.65	0.58	3.39	1.86	1.23	1.57	11.23	0.66	0.85	1.07
-5.56	4.44	51.15	0.07	-0.37	1.36	3.40	1.76	1.29	2.84	1.86	1.23	1.60	11.18	0.66	0.86	1.09
-31.44	20.40	55.99	0.07	-2.07	0.48	3.70	1.67	1.89	1.30	1.86	1.23	1.63	11.13	0.66	0.88	1.10
10.65	7.35	62.80	0.07	0.70	-0.04	4.11	2.55	1.52	2.93	1.85	1.23	1.65	11.08	0.67	0.89	1.11
1.68	-0.66	47.63	0.07	0.11	1.06	3.10	3.78	3.16	3.04	1.85	1.24	1.67	11.04	0.67	0.90	1.12
-34.20	16.31	20.55	0.06	-2.21	-0.05	1.33	2.59	1.92	4.68	1.85	1.24	1.69	10.99	0.67	0.91	1.13
-12.06	-0.72	-15.41	0.06	-0.77	-1.90	-0.99	1.91	6.28	12.39	1.85	1.24	1.70	10.94	0.67	0.92	1.14
9.00	-29.65	-42.24	0.06	0.57	-0.99	-2.68	12.51	6.42	16.57	1.84	1.24	1.71	10.89	0.68	0.93	1.15
-10.94	-15.56	-34.04	0.06	-0.69	0.22	-2.14	6.14	0.99	10.02	1.84	1.25	1.71	10.84	0.68	0.93	1.15
-28.81	3.47	-28.86	0.06	-1.80	-0.97	-1.80	3.67	2.01	2.61	1.83	1.25	1.71	10.79	0.68	0.93	1.16
3.29	-15.50	-17.71	0.06	0.20	-1.64	-1.10	4.45	1.43	1.81	1.82	1.25	1.70	10.74	0.69	0.94	1.16
40.25	-26.42	0.38	0.06	2.48	0.04	0.02	2.57	0.48	0.63	1.81	1.25	1.70	10.69	0.69	0.94	1.16
21.18	0.64	-13.54	0.06	1.29	-0.20	-0.83	0.96	4.37	3.04	1.80	1.26	1.69	10.64	0.70	0.94	1.17
9.17	-3.35	-3.45	0.06	0.56	-1.47	-0.21	1.82	3.43	4.82	1.79	1.26	1.67	10.60	0.70	0.94	1.17
9.19	-24.29	11.59	0.06	0.55	-0.01	0.70	2.69	3.75	1.88	1.77	1.26	1.66	10.55	0.71	0.93	1.17
-7.76	-0.24	-15.35	0.06	-0.46	0.64	-0.91	2.98	5.15	2.17	1.76	1.26	1.64	10.50	0.72	0.93	1.18
14.28	10.75	-20.23	0.06	0.84	-0.96	-1.19	1.41	2.36	0.65	1.74	1.26	1.62	10.45	0.72	0.93	1.18
40.22	-16.24	-3.13	0.06	2.35	-1.35	-0.18	1.07	1.09	3.05	1.73	1.26	1.61	10.40	0.73	0.93	1.18
29.13	-23.16	-15.04	0.06	1.69	-0.99	-0.87	4.50	1.99	4.35	1.71	1.26	1.59	10.35	0.74	0.93	1.19
24.71	25.81	-26.09	0.07	1.80	0.42	-1.90	5.53	1.43	1.23	2.00	1.27	1.22	11.82	0.63	0.61	0.88
43.62	5.76	-6.97	0.07	3.16	-0.16	-0.51	5.23	0.71	2.85	1.99	1.27	1.24	11.77	0.64	0.62	0.89

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
17.09	-17.07	-21.91	0.06	0.98	-1.84	-1.26	2.68	2.79	5.56	1.69	1.26	1.57	10.30	0.74	0.93	1.19
2.10	-31.97	-6.80	0.06	0.12	-1.64	-0.39	2.50	4.52	6.29	1.67	1.26	1.56	10.25	0.75	0.93	1.20
-5.84	-28.84	-10.71	0.06	-0.33	0.29	-0.60	4.98	4.24	2.62	1.65	1.26	1.54	10.21	0.76	0.94	1.21
-20.74	5.21	-23.58	0.06	-1.16	1.35	-1.32	3.03	2.93	4.63	1.63	1.25	1.53	10.16	0.77	0.94	1.22
-22.60	24.16	-10.46	0.06	-1.25	0.62	-0.58	3.68	1.52	0.77	1.60	1.25	1.52	10.11	0.78	0.95	1.23
34.43	11.09	6.60	0.06	1.89	0.66	0.36	2.26	5.29	4.72	1.58	1.25	1.52	10.06	0.79	0.96	1.24
63.28	12.05	-1.35	0.05	3.45	1.63	-0.07	3.99	6.83	7.92	1.56	1.25	1.51	10.01	0.80	0.97	1.26
18.17	29.97	-12.27	0.05	0.98	1.02	-0.66	1.92	3.89	9.61	1.54	1.25	1.51	9.96	0.81	0.98	1.27
14.15	18.88	15.78	0.05	0.76	1.33	0.84	2.21	3.73	10.30	1.52	1.24	1.52	9.91	0.82	1.00	1.29
18.14	24.80	30.74	0.05	0.96	2.31	1.63	2.70	0.50	7.08	1.50	1.24	1.52	9.86	0.83	1.02	1.31
-34.78	43.66	16.70	0.05	-1.83	1.18	0.88	1.48	1.56	3.33	1.48	1.24	1.53	9.81	0.84	1.04	1.33
-19.62	22.53	31.65	0.05	-1.02	0.34	1.65	0.91	0.91	3.14	1.46	1.23	1.54	9.77	0.84	1.05	1.35
10.45	6.48	33.58	0.05	0.54	0.69	1.73	1.40	4.54	3.10	1.44	1.23	1.55	9.72	0.85	1.08	1.37
-49.42	13.44	-5.43	0.05	-2.52	0.53	-0.28	1.12	3.76	0.44	1.43	1.22	1.56	9.67	0.86	1.10	1.39
-62.15	10.40	-25.31	0.05	-3.14	-0.59	-1.28	1.69	2.19	1.89	1.41	1.22	1.58	9.62	0.87	1.12	1.42
-6.96	-11.60	-19.17	0.05	-0.35	-0.93	-0.96	2.07	2.17	3.19	1.39	1.21	1.59	9.57	0.87	1.14	1.44
-17.86	-18.53	-2.07	0.05	-0.88	0.17	-0.10	0.91	2.93	2.99	1.37	1.21	1.60	9.52	0.88	1.17	1.46
-62.64	3.50	27.93	0.05	-3.07	-0.02	1.37	0.72	3.27	1.28	1.36	1.20	1.62	9.47	0.89	1.19	1.48
3.53	-0.50	43.84	0.05	0.17	-1.23	2.13	0.74	0.80	1.95	1.34	1.20	1.63	9.42	0.89	1.21	1.51
84.40	-25.44	31.74	0.05	4.05	-0.64	1.52	2.26	5.27	2.49	1.33	1.19	1.64	9.38	0.90	1.24	1.53
26.23	-13.36	13.71	0.05	1.25	-0.16	0.65	6.86	3.23	3.13	1.31	1.19	1.65	9.33	0.91	1.26	1.55
-2.77	-3.33	-1.26	0.05	-0.13	-1.00	-0.06	6.29	6.17	6.60	1.30	1.19	1.66	9.28	0.91	1.28	1.57
49.19	-21.27	-5.20	0.05	2.29	-0.75	-0.24	1.33	6.69	4.61	1.28	1.18	1.67	9.23	0.92	1.30	1.60
12.12	-16.19	-11.11	0.05	0.56	0.31	-0.51	0.84	6.49	4.44	1.27	1.18	1.68	9.18	0.93	1.32	1.62
-56.74	6.83	-15.01	0.05	-2.58	-0.24	-0.68	0.37	7.54	5.36	1.26	1.18	1.68	9.13	0.94	1.34	1.64
-28.52	-5.17	-2.92	0.05	-1.28	-1.53	-0.13	3.52	2.27	4.74	1.24	1.18	1.69	9.08	0.95	1.36	1.66
13.56	-34.09	10.12	0.04	0.60	-1.16	0.45	3.98	5.11	2.49	1.22	1.18	1.69	9.03	0.96	1.38	1.68
-43.33	-25.96	8.14	0.04	-1.91	-0.35	0.36	3.16	3.35	1.09	1.21	1.18	1.69	8.98	0.97	1.40	1.70
-64.06	-7.89	17.14	0.04	-2.79	-0.43	0.75	2.34	1.97	3.38	1.19	1.18	1.69	8.94	0.99	1.42	1.73
-2.87	-9.85	35.09	0.04	-0.12	-0.08	1.51	2.80	4.59	5.03	1.17	1.18	1.69	8.89	1.00	1.44	1.75
-3.81	-1.82	14.04	0.04	-0.16	0.47	0.60	1.56	4.75	5.19	1.16	1.18	1.68	8.84	1.02	1.46	1.78
17.09	-17.07	-21.91	0.06	0.98	-1.84	-1.26	2.68	2.79	5.56	1.69	1.26	1.57	10.30	0.74	0.93	1.19
2.10	-31.97	-6.80	0.06	0.12	-1.64	-0.39	2.50	4.52	6.29	1.67	1.26	1.56	10.25	0.75	0.93	1.20

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-12.72	11.17	-5.92	0.04	-0.53	-0.04	-0.25	2.35	3.93	2.64	1.14	1.18	1.68	8.79	1.04	1.48	1.81
35.28	-0.85	5.14	0.04	1.46	-0.70	0.21	4.21	6.64	2.11	1.12	1.19	1.68	8.74	1.06	1.50	1.83
68.13	-16.81	-2.82	0.04	2.79	0.17	-0.12	3.31	6.26	0.75	1.10	1.19	1.67	8.69	1.08	1.52	1.86
66.91	4.22	-19.72	0.04	2.71	0.78	-0.80	1.02	5.70	2.42	1.08	1.20	1.67	8.64	1.10	1.54	1.89
50.72	19.18	-27.57	0.04	2.03	0.13	-1.10	0.87	2.48	3.05	1.07	1.20	1.66	8.59	1.13	1.55	1.92
43.58	3.14	-23.41	0.04	1.72	0.83	-0.92	2.24	3.70	1.39	1.05	1.21	1.65	8.54	1.15	1.57	1.95
32.48	21.09	-6.30	0.04	1.27	1.33	-0.25	2.04	6.42	2.69	1.03	1.22	1.64	8.50	1.18	1.59	1.98
2.46	33.99	1.76	0.04	0.09	0.15	0.07	4.46	7.02	3.77	1.01	1.22	1.63	8.45	1.21	1.61	2.01
-1.49	3.92	3.81	0.04	-0.06	0.00	0.14	7.53	3.64	2.75	1.00	1.23	1.62	8.40	1.24	1.62	2.04
-5.43	-0.09	-2.14	0.04	-0.20	0.93	-0.08	2.05	3.96	7.84	0.98	1.25	1.61	8.35	1.27	1.64	2.07
-49.27	24.87	-7.07	0.04	-1.82	0.51	-0.26	6.25	11.48	10.58	0.97	1.26	1.60	8.30	1.30	1.65	2.10
-38.04	13.79	1.99	0.04	-1.39	-0.74	0.07	4.10	12.34	11.07	0.96	1.27	1.58	8.25	1.33	1.66	2.12
1.08	-20.19	12.02	0.04	0.04	-0.04	0.43	1.80	5.95	8.47	0.94	1.29	1.57	8.20	1.36	1.66	2.15
-38.79	-1.14	12.02	0.04	-1.38	1.38	0.43	1.62	5.13	4.79	0.94	1.30	1.55	8.15	1.39	1.66	2.17
-21.62	38.79	17.02	0.04	-0.76	0.90	0.60	2.68	3.05	5.39	0.93	1.32	1.54	8.11	1.42	1.66	2.19
40.39	25.66	38.96	0.03	1.39	0.50	1.34	1.86	3.03	5.23	0.92	1.34	1.52	8.06	1.45	1.65	2.20
-2.63	14.58	48.84	0.03	-0.09	0.87	1.66	1.62	4.08	3.47	0.92	1.36	1.51	8.01	1.48	1.65	2.21
-38.50	25.51	28.73	0.03	-1.29	0.25	0.96	1.60	2.38	1.73	0.91	1.38	1.49	7.96	1.51	1.64	2.22
-17.34	7.44	15.70	0.03	-0.57	-0.45	0.52	2.14	1.32	4.13	0.91	1.40	1.48	7.91	1.54	1.62	2.23
-0.25	-13.54	-11.26	0.03	-0.01	0.05	-0.37	2.64	1.89	7.03	0.91	1.43	1.47	7.86	1.56	1.61	2.24
-19.16	1.49	-37.11	0.03	-0.61	-0.08	-1.19	2.81	3.13	4.90	0.92	1.45	1.45	7.81	1.59	1.59	2.24
-35.00	-2.51	-17.95	0.03	-1.10	-1.18	-0.57	2.63	5.31	3.63	0.92	1.48	1.44	7.76	1.61	1.57	2.25
12.10	-37.43	9.12	0.03	0.37	-0.88	0.28	2.35	4.56	2.14	0.93	1.51	1.43	7.71	1.63	1.55	2.25
18.09	-28.29	23.11	0.03	0.55	0.08	0.70	1.04	1.87	1.34	0.93	1.53	1.43	7.67	1.65	1.53	2.25
-23.85	2.77	11.09	0.03	-0.72	-0.49	0.33	1.95	6.15	6.76	0.94	1.56	1.42	7.62	1.67	1.51	2.25
9.23	-16.20	-2.87	0.03	0.27	-0.80	-0.08	7.42	12.23	5.42	0.95	1.59	1.42	7.57	1.68	1.50	2.25
36.19	-27.11	-6.80	0.03	1.05	0.00	-0.20	7.14	8.91	2.84	0.96	1.62	1.41	7.52	1.70	1.48	2.25
-12.80	-0.05	-26.68	0.03	-0.36	-0.03	-0.76	2.13	1.96	2.01	0.97	1.65	1.42	7.47	1.71	1.47	2.25
-33.66	-1.05	-29.51	0.03	-0.94	-0.62	-0.83	0.58	4.32	3.66	0.98	1.68	1.42	7.42	1.72	1.46	2.25
7.44	-22.00	-19.36	0.03	0.20	-0.41	-0.53	1.94	5.04	5.06	0.99	1.71	1.43	7.37	1.73	1.45	2.26
17.45	-14.92	-29.21	0.03	0.47	-0.19	-0.79	0.36	4.61	1.35	1.00	1.73	1.44	7.32	1.74	1.44	2.26
-12.72	11.17	-5.92	0.04	-0.53	-0.04	-0.25	2.35	3.93	2.64	1.14	1.18	1.68	8.79	1.04	1.48	1.81
35.28	-0.85	5.14	0.04	1.46	-0.70	0.21	4.21	6.64	2.11	1.12	1.19	1.68	8.74	1.06	1.50	1.83

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-10.52	-6.87	-29.04	0.03	-0.28	-0.63	-0.77	2.29	3.86	3.72	1.01	1.76	1.45	7.28	1.75	1.44	2.26
20.51	-23.81	-20.89	0.03	0.53	-0.67	-0.54	2.57	3.07	5.44	1.02	1.78	1.46	7.23	1.75	1.44	2.27
50.42	-25.70	-18.75	0.03	1.29	0.01	-0.48	1.51	0.72	2.53	1.03	1.80	1.48	7.18	1.76	1.44	2.28
-0.63	0.35	-1.66	0.03	-0.02	-0.07	-0.04	4.61	3.35	3.42	1.03	1.83	1.50	7.13	1.77	1.45	2.28
-6.56	-2.64	19.36	0.02	-0.16	-0.65	0.47	3.17	5.52	2.10	1.04	1.84	1.52	7.08	1.77	1.46	2.29
46.41	-26.57	30.32	0.02	1.11	-0.42	0.73	2.09	4.70	5.70	1.05	1.86	1.54	7.03	1.77	1.47	2.30
20.33	-17.48	17.27	0.02	0.48	0.11	0.41	4.03	10.46	7.89	1.05	1.87	1.56	6.98	1.78	1.48	2.31
-3.66	4.55	-10.69	0.02	-0.08	0.04	-0.25	4.19	10.42	5.82	1.06	1.88	1.58	6.93	1.78	1.49	2.32
37.33	1.54	-4.60	0.02	0.84	0.01	-0.10	2.23	4.57	0.25	1.06	1.89	1.60	6.88	1.78	1.50	2.33
38.22	0.54	-3.53	0.02	0.84	0.45	-0.08	2.23	5.37	4.16	1.07	1.90	1.62	6.84	1.78	1.52	2.34
3.19	20.51	-18.43	0.02	0.07	0.61	-0.40	0.69	6.02	6.59	1.07	1.90	1.64	6.79	1.78	1.53	2.35
-13.74	28.41	2.65	0.02	-0.29	0.53	0.06	2.00	4.74	1.98	1.07	1.90	1.66	6.74	1.78	1.54	2.35
14.31	25.31	16.67	0.02	0.29	0.56	0.34	1.91	3.68	4.71	1.07	1.91	1.67	6.69	1.77	1.56	2.36
29.27	27.21	-1.31	0.02	0.59	0.20	-0.03	1.85	3.88	4.53	1.07	1.91	1.69	6.64	1.77	1.57	2.37
-22.69	10.14	-2.25	0.02	-0.44	-0.35	-0.04	3.69	4.18	3.73	1.07	1.90	1.70	6.59	1.77	1.58	2.37
-27.54	-17.84	8.79	0.02	-0.52	-0.19	0.17	4.63	3.99	3.31	1.07	1.90	1.71	6.54	1.77	1.59	2.38
-9.42	-9.78	11.80	0.02	-0.17	0.58	0.22	4.92	7.80	8.72	1.07	1.89	1.71	6.49	1.77	1.60	2.38
-47.25	31.18	25.78	0.02	-0.85	0.51	0.46	2.08	16.57	20.19	1.07	1.89	1.71	6.45	1.77	1.60	2.39
-33.04	28.07	54.67	0.02	-0.58	0.05	0.96	15.16	12.39	15.27	1.06	1.88	1.71	6.40	1.77	1.61	2.39
-7.91	3.01	61.49	0.02	-0.13	0.03	1.05	21.74	13.58	4.28	1.06	1.88	1.71	6.35	1.77	1.61	2.39
-37.77	2.00	44.33	0.02	-0.62	-0.05	0.73	11.64	7.90	5.09	1.06	1.87	1.70	6.30	1.77	1.61	2.39
-18.60	-2.99	37.22	0.02	-0.30	-0.24	0.60	2.44	2.47	3.40	1.06	1.87	1.70	6.25	1.77	1.61	2.39
10.46	-14.95	18.16	0.02	0.16	0.05	0.28	1.79	3.68	3.12	1.05	1.86	1.69	6.20	1.77	1.60	2.38
-32.44	3.07	-7.81	0.02	-0.49	0.45	-0.12	2.52	6.36	7.03	1.05	1.86	1.68	6.15	1.77	1.60	2.38
-54.21	30.01	8.24	0.01	-0.79	0.04	0.12	6.66	17.01	21.50	1.05	1.86	1.67	6.10	1.77	1.59	2.38
-19.02	2.95	24.23	0.01	-0.27	-0.18	0.34	25.43	38.40	46.70	1.05	1.86	1.67	6.05	1.77	1.58	2.37
-0.92	-13.03	22.19	0.01	-0.01	0.18	0.30	66.27	34.00	68.41	1.06	1.87	1.66	6.01	1.77	1.57	2.36
-13.84	12.98	29.14	0.01	-0.18	0.05	0.38	49.56	17.51	50.59	1.06	1.88	1.65	5.96	1.77	1.56	2.36
21.19	3.95	25.08	0.01	0.26	-0.25	0.31	1.10	2.99	16.90	1.07	1.89	1.65	5.91	1.77	1.55	2.35
60.08	-20.02	14.05	0.01	0.72	-0.32	0.17	2.37	2.26	8.89	1.08	1.90	1.65	5.86	1.76	1.53	2.34
-22.94	-26.92	4.07	0.01	-0.26	-0.18	0.05	1.22	4.98	5.59	1.09	1.92	1.66	5.81	1.75	1.52	2.32
-10.52	-6.87	-29.04	0.03	-0.28	-0.63	-0.77	2.29	3.86	3.72	1.01	1.76	1.45	7.28	1.75	1.44	2.26
20.51	-23.81	-20.89	0.03	0.53	-0.67	-0.54	2.57	3.07	5.44	1.02	1.78	1.46	7.23	1.75	1.44	2.27

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-73.69	-15.83	-12.87	0.01	-0.81	-0.21	-0.14	3.46	5.86	7.68	1.11	1.94	1.68	5.76	1.74	1.51	2.30
0.50	-18.76	-21.75	0.01	0.01	-0.30	-0.23	2.90	7.04	4.63	1.14	1.97	1.70	5.71	1.73	1.49	2.28
-1.44	-28.66	-29.59	0.01	-0.01	-0.02	-0.30	5.79	8.07	5.06	1.17	2.00	1.73	5.66	1.71	1.48	2.26
-57.27	-1.59	-34.41	0.01	-0.54	-0.03	-0.33	3.96	2.29	1.69	1.21	2.03	1.77	5.62	1.68	1.46	2.23
-17.07	-3.58	-23.24	0.01	-0.15	-0.11	-0.21	3.62	5.87	2.80	1.26	2.08	1.82	5.57	1.65	1.45	2.20
39.94	-12.54	-21.10	0.01	0.34	0.21	-0.18	3.42	4.91	0.41	1.31	2.13	1.88	5.52	1.62	1.44	2.17
23.86	24.44	-23.96	0.01	0.19	0.24	-0.19	2.08	2.22	2.47	1.37	2.18	1.96	5.47	1.59	1.42	2.13
36.79	30.34	-9.84	0.01	0.28	-0.09	-0.07	1.04	6.23	4.04	1.45	2.24	2.04	5.42	1.55	1.41	2.09
93.58	-11.70	2.23	0.01	0.66	-0.10	0.02	1.65	7.19	6.21	1.53	2.30	2.14	5.37	1.51	1.40	2.06
51.34	-13.64	1.27	0.01	0.33	0.15	0.01	2.51	4.65	5.29	1.62	2.37	2.25	5.32	1.46	1.39	2.02
-11.69	22.35	15.29	0.01	-0.07	0.14	0.09	4.51	4.52	3.28	1.72	2.44	2.37	5.27	1.42	1.38	1.98
14.36	23.26	20.27	0.01	0.08	0.05	0.11	4.54	3.82	2.40	1.83	2.52	2.50	5.22	1.38	1.37	1.94
46.29	8.20	-0.72	0.01	0.23	0.09	0.00	1.49	2.81	3.26	1.94	2.60	2.64	5.18	1.34	1.36	1.91
24.20	18.15	-10.64	0.00	0.11	0.12	-0.05	0.34	1.84	2.30	2.07	2.69	2.80	5.13	1.30	1.35	1.88
-4.79	26.07	-15.54	0.00	-0.02	0.05	-0.06	0.24	3.26	1.13	2.20	2.77	2.96	5.08	1.26	1.35	1.85
5.26	12.99	-21.41	0.00	0.02	0.06	-0.07	4.19	3.78	6.20	2.33	2.86	3.13	5.03	1.23	1.34	1.82
-6.69	16.93	-10.30	0.00	-0.02	0.09	-0.03	9.10	6.90	16.05	2.47	2.94	3.31	4.98	1.19	1.34	1.79
-53.52	30.84	6.76	0.00	-0.13	0.00	0.02	3.53	2.02	6.29	2.61	3.03	3.48	4.93	1.16	1.33	1.77
-62.23	0.78	4.79	0.00	-0.12	-0.03	0.01	1.15	3.24	2.41	2.74	3.11	3.65	4.88	1.13	1.33	1.75
-62.93	-15.19	-11.14	0.00	-0.09	0.03	-0.02	0.55	2.14	0.88	2.87	3.18	3.81	4.83	1.11	1.33	1.73
-35.68	17.81	-12.04	0.00	-0.04	0.02	-0.01	2.15	1.88	2.00	2.99	3.25	3.97	4.79	1.09	1.33	1.71
19.40	16.75	7.02	0.00	0.01	-0.01	0.00	2.49	1.46	1.19	3.11	3.31	4.11	4.74	1.07	1.32	1.70

Microtremors Segment: B1-S3

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
50.46	22.69	26.24	0.26	13.09	5.89	6.81	6.77	1.51	2.20	3.54	1.16	0.92	30.03	0.33	0.26	0.42
63.28	32.59	36.17	0.26	16.39	8.44	9.37	2.39	1.20	2.11	3.54	1.15	0.90	29.98	0.32	0.26	0.41
32.13	44.43	16.12	0.26	8.31	11.49	4.17	1.29	1.91	1.53	3.52	1.13	0.89	29.93	0.32	0.25	0.41
1.11	18.31	10.13	0.26	0.29	4.72	2.61	0.44	2.24	1.77	3.50	1.11	0.87	29.88	0.32	0.25	0.40
-25.80	-33.66	7.15	0.26	-6.64	-8.67	1.84	4.15	3.64	3.25	3.46	1.09	0.85	29.83	0.32	0.25	0.40
-26.65	-46.50	-8.79	0.26	-6.85	-11.95	-2.26	8.39	1.81	3.72	3.41	1.07	0.83	29.79	0.31	0.24	0.40
8.43	-24.35	3.27	0.26	2.16	-6.25	0.84	0.73	2.16	0.39	3.36	1.05	0.81	29.74	0.31	0.24	0.39
53.35	2.69	20.28	0.26	13.66	0.69	5.19	3.17	3.56	3.26	3.29	1.03	0.79	29.69	0.31	0.24	0.39
18.25	24.64	5.28	0.26	4.66	6.30	1.35	6.60	2.69	0.94	3.22	1.00	0.77	29.64	0.31	0.24	0.39
-53.64	27.54	-11.65	0.26	-13.68	7.02	-2.97	5.13	1.31	0.92	3.15	0.98	0.75	29.59	0.31	0.24	0.39
-52.38	19.45	-3.56	0.25	-13.33	4.95	-0.91	7.77	0.63	1.57	3.07	0.96	0.73	29.54	0.31	0.24	0.39
-12.21	10.39	-11.48	0.25	-3.10	2.64	-2.92	4.72	2.02	1.64	2.99	0.94	0.72	29.49	0.32	0.24	0.40
14.83	6.36	-39.32	0.25	3.76	1.61	-9.97	5.33	1.07	1.11	2.92	0.93	0.70	29.44	0.32	0.24	0.40
50.74	-7.64	-36.11	0.25	12.84	-1.93	-9.14	5.93	0.60	3.52	2.84	0.91	0.69	29.39	0.32	0.24	0.40
65.55	-7.61	-2.98	0.25	16.55	-1.92	-0.75	2.97	1.75	5.17	2.77	0.90	0.68	29.35	0.32	0.25	0.41
-3.53	28.35	10.06	0.25	-0.89	7.15	2.54	2.38	0.12	3.69	2.70	0.88	0.68	29.30	0.33	0.25	0.41
-43.39	33.23	-7.89	0.25	-10.91	8.36	-1.98	3.37	2.22	1.72	2.63	0.87	0.68	29.25	0.33	0.26	0.42
13.71	17.13	-17.78	0.25	3.44	4.30	-4.46	1.97	2.85	0.98	2.57	0.86	0.67	29.20	0.34	0.26	0.43
33.66	6.09	-23.64	0.25	8.43	1.52	-5.92	4.08	1.59	2.90	2.51	0.86	0.67	29.15	0.34	0.27	0.43
5.62	-20.88	-26.48	0.25	1.41	-5.22	-6.62	4.38	3.03	1.48	2.46	0.85	0.68	29.10	0.35	0.28	0.44
-14.32	-39.76	-8.36	0.25	-3.57	-9.92	-2.08	2.03	3.20	1.16	2.41	0.85	0.68	29.05	0.35	0.28	0.45
-48.15	-43.59	-0.28	0.25	-11.99	-10.85	-0.07	2.12	2.31	2.15	2.37	0.85	0.69	29.00	0.36	0.29	0.46
-63.88	-40.42	12.75	0.25	-15.87	-10.04	3.17	7.94	1.32	1.81	2.34	0.85	0.69	28.96	0.36	0.30	0.47
-51.60	-40.26	27.72	0.25	-12.80	-9.98	6.88	23.88	4.36	9.85	2.30	0.84	0.70	28.91	0.37	0.30	0.48
-30.40	-37.10	6.71	0.25	-7.52	-9.18	1.66	55.68	15.53	34.07	2.27	0.84	0.71	28.86	0.37	0.31	0.48
9.69	-4.01	-5.24	0.25	2.39	-0.99	-1.29	31.70	20.36	23.47	2.25	0.85	0.72	28.81	0.38	0.32	0.49
5.70	25.94	0.83	0.25	1.41	6.40	0.20	5.34	7.09	3.19	2.23	0.85	0.72	28.76	0.38	0.33	0.50
1.73	13.87	7.87	0.25	0.43	3.41	1.94	9.22	8.82	0.81	2.21	0.85	0.73	28.71	0.38	0.33	0.51
34.70	12.82	27.85	0.25	8.52	3.15	6.84	3.12	1.53	2.43	2.19	0.85	0.74	28.66	0.39	0.34	0.52
15.65	28.74	21.81	0.25	3.83	7.04	5.34	3.47	3.93	1.03	2.18	0.85	0.76	28.61	0.39	0.35	0.52
6.65	13.65	0.82	0.24	1.63	3.34	0.20	5.39	2.38	2.16	2.17	0.85	0.77	28.56	0.39	0.35	0.53
-8.31	6.61	-4.12	0.24	-2.03	1.61	-1.00	5.13	4.28	2.23	2.16	0.85	0.78	28.52	0.40	0.36	0.54
50.46	22.69	26.24	0.26	13.09	5.89	6.81	6.77	1.51	2.20	3.54	1.16	0.92	30.03	0.33	0.26	0.42

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-35.17	7.59	-16.02	0.24	-8.57	1.85	-3.90	8.86	2.76	3.28	2.15	0.86	0.80	28.47	0.40	0.37	0.54
-31.00	0.57	-10.91	0.24	-7.53	0.14	-2.65	6.01	0.71	3.99	2.14	0.86	0.81	28.42	0.40	0.38	0.55
-14.86	5.56	17.13	0.24	-3.60	1.35	4.15	8.48	0.35	3.92	2.14	0.86	0.83	28.37	0.40	0.39	0.56
45.12	-7.43	29.10	0.24	10.92	-1.80	7.04	5.55	0.93	2.27	2.14	0.87	0.85	28.32	0.41	0.40	0.57
29.02	-19.38	24.04	0.24	7.01	-4.68	5.81	11.46	0.82	0.99	2.15	0.88	0.87	28.27	0.41	0.41	0.58
-23.95	-18.30	6.04	0.24	-5.77	-4.41	1.46	6.71	2.69	2.34	2.16	0.89	0.90	28.22	0.41	0.42	0.58
-23.81	-8.24	-23.87	0.24	-5.73	-1.98	-5.74	4.49	1.17	0.67	2.18	0.90	0.93	28.17	0.41	0.43	0.59
-17.68	17.74	-35.69	0.24	-4.24	4.26	-8.57	3.04	4.01	2.66	2.20	0.91	0.96	28.13	0.41	0.44	0.60
32.34	5.69	-18.53	0.24	7.74	1.36	-4.44	13.49	1.48	2.96	2.23	0.93	1.00	28.08	0.42	0.45	0.61
72.17	-27.26	7.55	0.24	17.25	-6.52	1.80	10.65	4.99	6.09	2.27	0.95	1.04	28.03	0.42	0.46	0.62
73.92	-23.16	7.58	0.24	17.63	-5.52	1.81	7.87	2.46	8.45	2.31	0.97	1.08	27.98	0.42	0.47	0.63
-18.15	-11.09	-19.35	0.24	-4.32	-2.64	-4.60	2.10	3.37	5.31	2.37	1.00	1.13	27.93	0.42	0.48	0.64
-103.86	5.93	-27.20	0.24	-24.67	1.41	-6.46	8.95	3.04	1.47	2.43	1.03	1.17	27.88	0.42	0.48	0.64
-23.56	24.87	-24.04	0.24	-5.58	5.89	-5.70	10.47	0.92	5.39	2.49	1.06	1.23	27.83	0.42	0.49	0.65
28.47	26.77	-23.88	0.24	6.73	6.33	-5.65	10.28	2.10	8.41	2.56	1.09	1.28	27.78	0.43	0.50	0.66
57.35	19.67	-10.76	0.24	13.53	4.64	-2.54	8.04	1.23	6.58	2.63	1.13	1.33	27.73	0.43	0.51	0.66
115.04	6.62	13.29	0.24	27.09	1.56	3.13	3.39	1.89	5.19	2.71	1.16	1.38	27.69	0.43	0.51	0.67
51.75	-5.38	23.28	0.24	12.16	-1.26	5.47	4.12	5.17	3.70	2.79	1.20	1.44	27.64	0.43	0.52	0.67
-56.20	-23.32	12.26	0.23	-13.18	-5.47	2.88	7.17	2.97	1.48	2.87	1.24	1.49	27.59	0.43	0.52	0.68
-77.89	-44.18	14.27	0.23	-18.23	-10.34	3.34	3.03	4.93	4.32	2.95	1.27	1.54	27.54	0.43	0.52	0.68
-18.65	-40.01	13.27	0.23	-4.35	-9.34	3.10	7.22	5.78	3.67	3.03	1.31	1.59	27.49	0.43	0.52	0.68
-26.51	-24.88	-0.70	0.23	-6.18	-5.80	-0.16	2.33	2.30	2.79	3.11	1.34	1.63	27.44	0.43	0.53	0.68
-54.31	-29.77	-0.64	0.23	-12.63	-6.92	-0.15	6.54	4.56	2.89	3.18	1.37	1.67	27.39	0.43	0.53	0.68
34.77	-48.61	11.39	0.23	8.07	-11.28	2.64	9.41	1.86	3.38	3.25	1.40	1.71	27.34	0.43	0.53	0.68
41.67	-38.43	14.40	0.23	9.65	-8.90	3.33	9.51	1.64	1.66	3.31	1.42	1.74	27.29	0.43	0.53	0.68
-40.29	-15.32	-1.57	0.23	-9.31	-3.54	-0.36	5.94	3.91	1.55	3.36	1.44	1.77	27.25	0.43	0.53	0.68
-48.07	-14.25	-1.51	0.23	-11.08	-3.29	-0.35	4.00	3.69	2.99	3.41	1.46	1.79	27.20	0.43	0.53	0.68
-51.83	6.77	6.54	0.23	-11.92	1.56	1.50	5.23	1.42	3.78	3.44	1.46	1.80	27.15	0.43	0.52	0.68
-91.50	31.69	-3.41	0.23	-21.00	7.27	-0.78	7.62	6.74	3.41	3.46	1.47	1.81	27.10	0.42	0.52	0.67
-72.12	18.60	19.61	0.23	-16.52	4.26	4.49	11.11	3.84	2.59	3.47	1.47	1.81	27.05	0.42	0.52	0.67
4.06	27.51	43.54	0.23	0.93	6.29	9.95	7.12	1.93	1.36	3.47	1.46	1.81	27.00	0.42	0.52	0.67
-35.17	7.59	-16.02	0.24	-8.57	1.85	-3.90	8.86	2.76	3.28	2.15	0.86	0.80	28.47	0.40	0.37	0.54
-31.00	0.57	-10.91	0.24	-7.53	0.14	-2.65	6.01	0.71	3.99	2.14	0.86	0.81	28.42	0.40	0.38	0.55

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
36.03	56.34	30.45	0.23	8.21	12.85	6.94	8.76	1.92	2.93	3.47	1.45	1.81	26.95	0.42	0.52	0.67
39.92	54.12	21.40	0.23	9.08	12.31	4.87	9.51	2.55	5.47	3.45	1.44	1.80	26.90	0.42	0.52	0.67
65.75	50.91	2.41	0.23	14.93	11.56	0.55	3.04	4.61	4.33	3.43	1.42	1.78	26.86	0.41	0.52	0.66
63.54	27.76	-12.52	0.23	14.39	6.29	-2.84	6.72	2.17	4.37	3.40	1.40	1.77	26.81	0.41	0.52	0.66
7.44	-12.27	-5.43	0.23	1.68	-2.77	-1.23	7.37	0.68	5.36	3.37	1.38	1.75	26.76	0.41	0.52	0.66
-24.48	-41.16	5.63	0.23	-5.52	-9.28	1.27	8.71	1.84	6.00	3.33	1.35	1.73	26.71	0.41	0.52	0.66
-4.38	-68.94	16.64	0.23	-0.99	-15.51	3.74	1.99	5.57	2.67	3.28	1.33	1.71	26.66	0.40	0.52	0.66
9.65	-47.70	30.60	0.22	2.17	-10.71	6.87	3.56	0.81	1.26	3.23	1.30	1.69	26.61	0.40	0.52	0.66
16.65	-6.59	37.52	0.22	3.73	-1.48	8.40	8.72	3.90	2.22	3.18	1.28	1.66	26.56	0.40	0.52	0.66
21.61	4.42	13.47	0.22	4.83	0.99	3.01	11.48	3.41	3.79	3.13	1.26	1.64	26.51	0.40	0.52	0.66
-4.38	31.35	-17.47	0.22	-0.98	6.99	-3.89	5.09	2.67	4.60	3.07	1.23	1.62	26.46	0.40	0.53	0.66
-21.28	46.19	-27.32	0.22	-4.74	10.28	-6.08	3.36	1.29	3.14	3.02	1.21	1.60	26.42	0.40	0.53	0.66
1.80	24.06	-20.17	0.22	0.40	5.34	-4.48	9.08	2.10	3.05	2.97	1.19	1.57	26.37	0.40	0.53	0.67
4.83	32.94	-8.06	0.22	1.07	7.30	-1.79	11.90	0.82	3.71	2.92	1.18	1.56	26.32	0.40	0.53	0.67
7.85	52.77	-11.96	0.22	1.74	11.66	-2.64	9.79	0.46	1.48	2.88	1.17	1.54	26.27	0.41	0.53	0.67
25.83	40.59	-6.87	0.22	5.70	8.95	-1.51	9.50	1.56	2.59	2.83	1.16	1.52	26.22	0.41	0.54	0.67
16.79	36.43	12.17	0.22	3.69	8.02	2.68	10.31	2.42	2.53	2.80	1.15	1.50	26.17	0.41	0.54	0.68
20.76	25.31	8.19	0.22	4.56	5.56	1.80	8.55	3.95	4.25	2.76	1.14	1.49	26.12	0.41	0.54	0.68
7.74	-2.73	-21.73	0.22	1.70	-0.60	-4.76	3.38	1.82	1.77	2.73	1.14	1.48	26.07	0.42	0.54	0.68
-4.22	-21.69	-41.55	0.22	-0.92	-4.74	-9.08	3.77	3.56	2.74	2.71	1.14	1.46	26.03	0.42	0.54	0.68
13.80	-50.54	-6.39	0.22	3.01	-11.02	-1.39	5.26	1.13	2.25	2.69	1.14	1.45	25.98	0.42	0.54	0.69
-20.14	-54.33	23.63	0.22	-4.38	-11.82	5.14	7.83	2.87	2.05	2.67	1.14	1.44	25.93	0.43	0.54	0.69
-21.01	-46.12	-7.35	0.22	-4.56	-10.01	-1.59	3.47	2.49	1.66	2.65	1.14	1.42	25.88	0.43	0.54	0.69
33.00	-58.91	-4.27	0.22	7.15	-12.75	-0.92	5.69	3.49	2.83	2.64	1.14	1.41	25.83	0.43	0.54	0.69
33.91	-37.72	27.74	0.22	7.33	-8.15	5.99	6.58	3.39	1.28	2.63	1.14	1.40	25.78	0.43	0.53	0.69
-14.08	-7.62	25.69	0.22	-3.03	-1.64	5.54	7.50	1.86	2.00	2.62	1.14	1.39	25.73	0.43	0.53	0.68
-33.94	-14.58	10.67	0.22	-7.30	-3.13	2.29	4.37	2.40	2.00	2.62	1.14	1.38	25.68	0.43	0.53	0.68
-17.79	-13.52	-4.29	0.21	-3.82	-2.90	-0.92	3.86	1.79	2.00	2.62	1.14	1.37	25.63	0.43	0.52	0.68
-21.67	0.51	-1.22	0.21	-4.64	0.11	-0.26	10.29	2.78	2.21	2.62	1.13	1.36	25.59	0.43	0.52	0.68
-30.52	-1.48	8.82	0.21	-6.52	-0.32	1.88	7.65	4.60	0.98	2.62	1.13	1.35	25.54	0.43	0.51	0.67
-22.37	17.49	0.85	0.21	-4.77	3.73	0.18	5.50	3.65	0.77	2.62	1.12	1.33	25.49	0.43	0.51	0.67
36.03	56.34	30.45	0.23	8.21	12.85	6.94	8.76	1.92	2.93	3.47	1.45	1.81	26.95	0.42	0.52	0.67
39.92	54.12	21.40	0.23	9.08	12.31	4.87	9.51	2.55	5.47	3.45	1.44	1.80	26.90	0.42	0.52	0.67

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-23.24	46.36	-4.08	0.21	-4.94	9.85	-0.87	8.62	2.45	2.00	2.63	1.12	1.32	25.44	0.43	0.50	0.66
-19.11	28.22	-2.02	0.21	-4.05	5.98	-0.43	6.60	0.52	0.66	2.63	1.11	1.31	25.39	0.42	0.50	0.65
-3.02	2.16	2.04	0.21	-0.64	0.46	0.43	7.12	0.85	3.95	2.64	1.10	1.30	25.34	0.42	0.49	0.65
-5.96	11.13	4.08	0.21	-1.26	2.35	0.86	5.22	1.48	4.45	2.64	1.09	1.29	25.29	0.41	0.49	0.64
-11.87	6.10	-18.83	0.21	-2.50	1.28	-3.96	0.26	3.40	4.93	2.65	1.08	1.28	25.24	0.41	0.48	0.63
13.17	-30.85	-24.69	0.21	2.77	-6.48	-5.18	2.85	3.38	2.19	2.66	1.07	1.27	25.20	0.40	0.48	0.62
32.12	-47.69	5.41	0.21	6.73	-9.99	1.13	4.22	1.70	2.94	2.66	1.05	1.26	25.15	0.40	0.47	0.62
-6.88	-32.53	-8.53	0.21	-1.44	-6.80	-1.78	3.42	1.69	2.65	2.67	1.04	1.25	25.10	0.39	0.47	0.61
-38.75	-18.42	-23.41	0.21	-8.08	-3.84	-4.88	5.15	4.91	1.66	2.67	1.03	1.23	25.05	0.39	0.46	0.60
1.37	-13.35	5.68	0.21	0.29	-2.78	1.18	1.72	1.94	3.07	2.67	1.02	1.22	25.00	0.38	0.46	0.59
30.35	-7.31	6.71	0.21	6.30	-1.52	1.39	14.82	5.71	3.99	2.67	1.00	1.21	24.95	0.38	0.45	0.59
24.29	7.69	-10.23	0.21	5.03	1.59	-2.12	11.88	0.33	4.69	2.67	0.99	1.19	24.90	0.37	0.45	0.58
41.20	8.66	0.85	0.21	8.51	1.79	0.18	9.34	4.15	9.85	2.67	0.98	1.17	24.85	0.37	0.44	0.57
35.09	9.63	4.89	0.21	7.23	1.98	1.01	4.28	1.78	7.21	2.67	0.97	1.16	24.80	0.37	0.43	0.57
-24.88	43.53	-12.04	0.21	-5.11	8.94	-2.47	9.00	0.43	3.67	2.66	0.97	1.14	24.76	0.36	0.43	0.56
-47.69	30.38	-9.94	0.21	-9.78	6.23	-2.04	8.84	1.81	3.86	2.65	0.96	1.13	24.71	0.36	0.42	0.56
11.42	0.32	3.13	0.20	2.34	0.07	0.64	7.31	2.98	1.77	2.65	0.95	1.11	24.66	0.36	0.42	0.55
32.38	28.27	5.17	0.20	6.61	5.77	1.06	4.90	4.05	3.26	2.63	0.95	1.09	24.61	0.36	0.41	0.55
-2.64	19.17	9.20	0.20	-0.54	3.90	1.87	1.24	2.05	3.08	2.62	0.94	1.08	24.56	0.36	0.41	0.55
43.33	-20.82	10.22	0.20	8.80	-4.23	2.07	8.26	3.63	1.85	2.61	0.94	1.06	24.51	0.36	0.41	0.54
67.15	-33.71	10.23	0.20	13.60	-6.83	2.07	6.04	2.03	3.20	2.59	0.94	1.04	24.46	0.36	0.40	0.54
-30.88	-39.56	0.27	0.20	-6.24	-7.99	0.05	2.30	3.93	5.00	2.57	0.94	1.03	24.41	0.36	0.40	0.54
-49.68	-49.38	-15.65	0.20	-10.01	-9.95	-3.15	4.46	5.16	5.01	2.56	0.93	1.02	24.37	0.37	0.40	0.54
32.40	-54.17	-1.56	0.20	6.51	-10.89	-0.31	3.52	0.99	1.56	2.54	0.93	1.01	24.32	0.37	0.40	0.54
27.33	-42.97	13.48	0.20	5.48	-8.62	2.70	3.13	3.72	2.95	2.52	0.94	1.00	24.27	0.37	0.40	0.54
-49.59	-40.80	15.47	0.20	-9.92	-8.16	3.09	10.78	1.36	3.78	2.50	0.94	1.00	24.22	0.37	0.40	0.55
-39.36	-37.64	39.42	0.20	-7.85	-7.51	7.86	19.09	4.14	7.42	2.48	0.94	0.99	24.17	0.38	0.40	0.55
26.71	8.42	47.30	0.20	5.31	1.68	9.41	17.19	2.85	3.54	2.46	0.94	0.99	24.12	0.38	0.40	0.56
-0.30	44.32	29.20	0.20	-0.06	8.80	5.80	13.12	2.14	0.89	2.45	0.94	1.00	24.07	0.39	0.41	0.56
-39.18	36.16	35.13	0.20	-7.76	7.16	6.96	14.54	9.79	5.21	2.43	0.95	1.00	24.02	0.39	0.41	0.57
-7.04	39.02	25.06	0.20	-1.39	7.71	4.95	1.28	7.08	8.21	2.42	0.95	1.01	23.97	0.39	0.42	0.57
-23.24	46.36	-4.08	0.21	-4.94	9.85	-0.87	8.62	2.45	2.00	2.63	1.12	1.32	25.44	0.43	0.50	0.66
-19.11	28.22	-2.02	0.21	-4.05	5.98	-0.43	6.60	0.52	0.66	2.63	1.11	1.31	25.39	0.42	0.50	0.65

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-11.96	54.83	-11.91	0.20	-2.36	10.80	-2.35	12.33	1.56	8.72	2.41	0.95	1.02	23.93	0.40	0.42	0.58
-22.85	52.62	-1.83	0.20	-4.49	10.34	-0.36	6.15	0.32	5.98	2.40	0.96	1.04	23.88	0.40	0.43	0.59
8.23	39.44	15.20	0.20	1.61	7.73	2.98	7.50	0.60	5.62	2.39	0.96	1.05	23.83	0.40	0.44	0.60
16.22	28.30	8.21	0.20	3.17	5.53	1.60	7.85	1.77	6.23	2.38	0.97	1.07	23.78	0.41	0.45	0.61
-14.74	13.22	12.22	0.20	-2.87	2.58	2.38	5.97	6.75	3.15	2.38	0.97	1.09	23.73	0.41	0.46	0.61
-53.55	-13.78	10.23	0.19	-10.42	-2.68	1.99	4.93	7.18	2.62	2.38	0.97	1.12	23.68	0.41	0.47	0.62
-45.31	-17.71	10.24	0.19	-8.79	-3.44	1.99	5.62	0.31	0.36	2.38	0.98	1.14	23.63	0.41	0.48	0.63
-34.11	-1.67	-10.70	0.19	-6.60	-0.32	-2.07	6.64	5.46	5.74	2.39	0.99	1.17	23.58	0.41	0.49	0.64
-47.90	-9.64	-42.54	0.19	-9.24	-1.86	-8.21	5.43	0.64	7.14	2.40	0.99	1.19	23.54	0.41	0.50	0.65
-16.72	-25.57	-27.34	0.19	-3.22	-4.92	-5.26	10.98	2.64	7.40	2.41	1.00	1.22	23.49	0.41	0.51	0.65
19.32	-17.48	-37.16	0.19	3.71	-3.36	-7.13	7.26	5.23	5.80	2.42	1.01	1.25	23.44	0.41	0.51	0.66
-0.67	-10.43	-58.91	0.19	-0.13	-2.00	-11.28	14.38	5.78	10.38	2.44	1.01	1.27	23.39	0.41	0.52	0.67
4.37	-30.34	-17.70	0.19	0.83	-5.80	-3.38	9.35	1.13	6.50	2.46	1.02	1.30	23.34	0.41	0.53	0.67
24.36	-19.24	-6.60	0.19	4.64	-3.66	-1.26	2.52	3.27	8.13	2.49	1.03	1.33	23.29	0.41	0.53	0.68
0.35	19.76	-25.48	0.19	0.07	3.75	-4.84	3.78	1.77	7.73	2.51	1.04	1.36	23.24	0.41	0.54	0.68
-9.58	22.68	2.62	0.19	-1.82	4.30	0.50	7.30	3.77	10.01	2.54	1.05	1.38	23.19	0.41	0.54	0.68
29.42	28.58	3.67	0.19	5.56	5.40	0.69	6.85	4.96	8.24	2.57	1.06	1.41	23.14	0.41	0.55	0.69
61.29	58.41	-37.21	0.19	11.55	11.01	-7.01	5.90	4.41	8.79	2.60	1.07	1.43	23.10	0.41	0.55	0.69
63.08	54.18	-42.99	0.19	11.86	10.19	-8.08	3.31	3.54	5.19	2.64	1.09	1.46	23.05	0.41	0.55	0.69
38.92	31.01	-17.81	0.19	7.30	5.82	-3.34	3.40	3.86	5.03	2.67	1.10	1.49	23.00	0.41	0.56	0.69
-4.10	21.91	4.27	0.19	-0.77	4.10	0.80	4.48	0.66	3.95	2.71	1.11	1.51	22.95	0.41	0.56	0.69
-33.98	6.85	13.29	0.19	-6.34	1.28	2.48	2.72	5.95	0.47	2.74	1.13	1.54	22.90	0.41	0.56	0.70
-10.85	-19.12	17.29	0.19	-2.02	-3.56	3.22	2.84	6.26	2.75	2.77	1.14	1.56	22.85	0.41	0.56	0.70
57.10	-39.01	12.28	0.19	10.59	-7.24	2.28	1.30	3.29	3.55	2.81	1.15	1.59	22.80	0.41	0.57	0.70
34.96	-27.87	-25.63	0.19	6.47	-5.16	-4.74	6.57	4.20	4.09	2.84	1.17	1.62	22.75	0.41	0.57	0.70
-64.93	-32.75	-48.43	0.18	-11.98	-6.04	-8.93	7.89	2.91	7.44	2.87	1.18	1.64	22.71	0.41	0.57	0.71
-62.63	-58.56	-17.24	0.18	-11.52	-10.78	-3.17	9.32	3.25	8.05	2.89	1.19	1.67	22.66	0.41	0.58	0.71
-14.43	-29.38	-1.14	0.18	-2.65	-5.39	-0.21	5.17	3.04	5.78	2.92	1.21	1.70	22.61	0.41	0.58	0.72
-2.36	12.65	17.88	0.18	-0.43	2.32	3.27	7.12	3.77	3.95	2.94	1.22	1.73	22.56	0.42	0.59	0.72
16.66	31.57	40.82	0.18	3.04	5.76	7.45	8.38	0.85	4.48	2.95	1.23	1.76	22.51	0.42	0.60	0.73
12.65	37.43	7.78	0.18	2.30	6.81	1.42	10.78	3.33	4.49	2.96	1.25	1.80	22.46	0.42	0.61	0.74
-11.96	54.83	-11.91	0.20	-2.36	10.80	-2.35	12.33	1.56	8.72	2.41	0.95	1.02	23.93	0.40	0.42	0.58
-22.85	52.62	-1.83	0.20	-4.49	10.34	-0.36	6.15	0.32	5.98	2.40	0.96	1.04	23.88	0.40	0.43	0.59

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-27.28	34.29	-16.15	0.18	-4.95	6.22	-2.93	6.94	7.12	3.36	2.97	1.26	1.83	22.41	0.42	0.62	0.75
-36.11	32.16	-4.05	0.18	-6.54	5.82	-0.73	5.48	5.49	2.11	2.97	1.27	1.86	22.36	0.43	0.63	0.76
17.97	-3.90	8.00	0.18	3.24	-0.70	1.44	6.92	1.64	4.91	2.97	1.28	1.90	22.31	0.43	0.64	0.77
51.88	-28.83	21.00	0.18	9.34	-5.19	3.78	6.83	3.69	4.05	2.96	1.29	1.93	22.27	0.43	0.65	0.78
5.81	-20.73	21.97	0.18	1.04	-3.72	3.94	8.11	5.60	4.63	2.94	1.29	1.96	22.22	0.44	0.67	0.80
-30.10	-39.61	9.96	0.18	-5.39	-7.09	1.78	4.49	5.46	4.98	2.93	1.30	1.99	22.17	0.44	0.68	0.81
-18.95	-56.42	-3.00	0.18	-3.38	-10.07	-0.53	2.38	6.03	5.09	2.90	1.31	2.02	22.12	0.45	0.70	0.83
-26.82	-57.18	6.05	0.18	-4.77	-10.18	1.08	5.64	2.50	2.58	2.88	1.32	2.05	22.07	0.46	0.71	0.85
-55.61	-51.96	28.04	0.18	-9.87	-9.22	4.98	7.60	7.51	3.16	2.85	1.32	2.08	22.02	0.46	0.73	0.86
-36.38	-20.81	35.97	0.18	-6.44	-3.68	6.37	13.98	7.10	2.36	2.82	1.33	2.10	21.97	0.47	0.75	0.88
17.71	18.19	36.88	0.18	3.13	3.21	6.51	16.40	3.94	5.82	2.78	1.33	2.12	21.92	0.48	0.76	0.90
-3.28	39.08	31.80	0.18	-0.58	6.88	5.60	11.00	4.78	2.29	2.75	1.34	2.14	21.88	0.49	0.78	0.92
-31.16	36.93	25.74	0.18	-5.47	6.48	4.52	6.93	3.10	0.54	2.71	1.34	2.16	21.83	0.50	0.80	0.94
7.93	34.79	12.72	0.18	1.39	6.09	2.23	6.58	4.92	2.87	2.67	1.35	2.17	21.78	0.51	0.81	0.96
-18.00	29.66	-1.25	0.17	-3.14	5.18	-0.22	5.69	7.88	2.48	2.63	1.36	2.18	21.73	0.52	0.83	0.97
-39.84	-7.38	20.76	0.17	-6.93	-1.28	3.61	8.56	7.57	2.27	2.59	1.36	2.18	21.68	0.52	0.84	0.99
17.25	-31.30	36.70	0.17	2.99	-5.43	6.37	2.22	10.51	2.15	2.56	1.37	2.18	21.63	0.53	0.85	1.01
22.22	-24.18	2.68	0.17	3.84	-4.18	0.46	6.81	9.39	3.28	2.53	1.38	2.17	21.58	0.54	0.86	1.02
25.17	-14.11	-27.22	0.17	4.34	-2.43	-4.69	2.51	6.43	4.28	2.50	1.38	2.16	21.53	0.55	0.87	1.03
34.10	-16.04	-25.06	0.17	5.86	-2.76	-4.31	5.83	6.40	3.85	2.47	1.39	2.15	21.48	0.56	0.87	1.04
16.04	-8.99	-36.88	0.17	2.75	-1.54	-6.32	9.42	3.70	2.29	2.45	1.40	2.13	21.44	0.57	0.87	1.04
28.00	-4.96	-56.63	0.17	4.79	-0.85	-9.68	11.20	3.75	1.96	2.43	1.41	2.11	21.39	0.58	0.87	1.04
37.91	-17.91	-47.37	0.17	6.46	-3.05	-8.08	9.15	8.25	3.05	2.42	1.42	2.09	21.34	0.59	0.86	1.04
48.79	11.11	-13.19	0.17	8.29	1.89	-2.24	6.67	4.65	3.08	2.41	1.44	2.06	21.29	0.60	0.85	1.04
4.72	50.98	1.89	0.17	0.80	8.64	0.32	2.34	9.24	1.68	2.41	1.45	2.03	21.24	0.60	0.84	1.04
-72.10	49.78	-13.03	0.17	-12.18	8.41	-2.20	4.23	7.07	2.37	2.41	1.47	2.00	21.19	0.61	0.83	1.03
-13.88	37.61	-20.91	0.17	-2.34	6.34	-3.52	9.72	5.01	5.24	2.42	1.49	1.96	21.14	0.61	0.81	1.02
45.10	29.48	-22.77	0.17	7.58	4.95	-3.82	13.98	6.83	6.25	2.43	1.51	1.93	21.09	0.62	0.79	1.01
-16.91	13.39	-27.61	0.17	-2.83	2.24	-4.62	11.92	2.33	5.42	2.44	1.53	1.89	21.04	0.63	0.78	1.00
-23.78	-24.58	-18.46	0.17	-3.97	-4.11	-3.08	14.00	7.34	4.14	2.46	1.55	1.85	21.00	0.63	0.75	0.98
-1.69	-39.45	2.63	0.17	-0.28	-6.57	0.44	11.45	3.55	3.86	2.48	1.58	1.81	20.95	0.64	0.73	0.97
-27.28	34.29	-16.15	0.18	-4.95	6.22	-2.93	6.94	7.12	3.36	2.97	1.26	1.83	22.41	0.42	0.62	0.75
-36.11	32.16	-4.05	0.18	-6.54	5.82	-0.73	5.48	5.49	2.11	2.97	1.27	1.86	22.36	0.43	0.63	0.76

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-45.54	-33.30	1.68	0.17	-7.56	-5.53	0.28	11.25	10.28	7.13	2.50	1.60	1.77	20.90	0.64	0.71	0.96
-58.29	-39.16	1.73	0.17	-9.65	-6.48	0.29	5.55	2.69	1.38	2.52	1.63	1.73	20.85	0.65	0.69	0.94
13.84	-12.05	15.75	0.17	2.28	-1.99	2.60	7.80	5.15	3.23	2.55	1.66	1.70	20.80	0.65	0.66	0.93
39.78	18.94	6.76	0.16	6.54	3.12	1.11	7.77	4.49	5.60	2.58	1.70	1.66	20.75	0.66	0.64	0.92
-40.17	20.86	21.76	0.16	-6.59	3.42	3.57	7.69	3.76	8.50	2.61	1.73	1.62	20.70	0.66	0.62	0.91
-41.96	29.76	47.68	0.16	-6.86	4.87	7.80	13.39	7.97	6.93	2.63	1.76	1.58	20.65	0.67	0.60	0.90
23.13	33.63	47.55	0.16	3.77	5.48	7.75	15.06	2.05	6.00	2.66	1.80	1.55	20.61	0.68	0.58	0.89
-1.87	40.49	45.42	0.16	-0.30	6.58	7.38	7.09	1.63	2.15	2.69	1.84	1.52	20.56	0.68	0.56	0.89
-38.74	47.31	42.30	0.16	-6.28	7.66	6.85	3.63	5.44	5.47	2.71	1.87	1.49	20.51	0.69	0.55	0.88
-16.59	35.15	40.19	0.16	-2.68	5.68	6.49	5.79	4.98	2.40	2.74	1.91	1.46	20.46	0.70	0.53	0.88
12.47	19.04	11.14	0.16	2.01	3.07	1.79	5.72	8.01	1.77	2.77	1.95	1.43	20.41	0.70	0.52	0.87
-10.49	-7.98	-8.81	0.16	-1.68	-1.28	-1.41	10.47	5.23	3.60	2.79	1.98	1.41	20.36	0.71	0.50	0.87
-24.37	-41.88	11.24	0.16	-3.90	-6.70	1.80	11.38	4.82	1.21	2.82	2.02	1.39	20.31	0.72	0.49	0.87
13.70	-65.66	-14.70	0.16	2.18	-10.47	-2.34	13.37	3.28	6.90	2.84	2.05	1.37	20.26	0.72	0.48	0.87
4.71	-75.38	-39.53	0.16	0.75	-11.99	-6.29	12.08	5.15	12.29	2.86	2.08	1.35	20.21	0.73	0.47	0.87
1.74	-57.11	-24.35	0.16	0.28	-9.05	-3.86	3.62	2.40	6.37	2.89	2.11	1.34	20.17	0.73	0.46	0.87
53.68	-20.95	-23.20	0.16	8.48	-3.31	-3.67	7.24	4.85	4.02	2.91	2.13	1.33	20.12	0.73	0.46	0.86
41.53	30.03	-27.04	0.16	6.54	4.73	-4.26	11.14	6.24	5.36	2.93	2.16	1.32	20.07	0.74	0.45	0.86
-12.48	64.84	-28.87	0.16	-1.96	10.18	-4.53	12.52	6.81	5.21	2.95	2.18	1.32	20.02	0.74	0.45	0.86
-21.37	62.59	-6.75	0.16	-3.34	9.80	-1.06	7.03	7.29	5.65	2.98	2.19	1.32	19.97	0.74	0.44	0.86
10.70	50.36	14.29	0.16	1.67	7.86	2.23	5.70	8.70	6.73	3.00	2.21	1.33	19.92	0.74	0.44	0.86
41.64	14.23	11.30	0.16	6.48	2.21	1.76	4.36	3.95	2.56	3.02	2.22	1.34	19.87	0.73	0.44	0.86
29.55	-22.75	11.31	0.16	4.58	-3.53	1.75	8.82	2.03	2.74	3.05	2.22	1.35	19.82	0.73	0.44	0.85
39.45	-26.65	6.33	0.15	6.10	-4.12	0.98	7.37	5.56	1.45	3.07	2.23	1.36	19.78	0.72	0.44	0.85
28.36	-15.56	-5.61	0.15	4.37	-2.40	-0.86	4.52	6.95	0.95	3.10	2.22	1.38	19.73	0.72	0.44	0.84
-32.58	-20.49	-25.50	0.15	-5.00	-3.14	-3.91	9.95	1.18	3.94	3.13	2.22	1.40	19.68	0.71	0.45	0.84
9.51	-40.36	-37.31	0.15	1.45	-6.18	-5.71	9.86	3.79	0.95	3.15	2.21	1.42	19.63	0.70	0.45	0.83
50.43	-36.21	-52.08	0.15	7.69	-5.52	-7.94	1.42	7.96	4.69	3.18	2.20	1.44	19.58	0.69	0.45	0.83
3.37	-38.06	-54.81	0.15	0.51	-5.78	-8.33	7.82	5.94	1.89	3.20	2.19	1.46	19.53	0.68	0.46	0.82
-16.56	-38.90	-14.61	0.15	-2.51	-5.89	-2.21	2.02	3.25	5.68	3.23	2.18	1.49	19.48	0.68	0.46	0.82
-27.43	-8.80	9.46	0.15	-4.14	-1.33	1.43	6.25	6.65	4.75	3.25	2.16	1.51	19.43	0.67	0.46	0.81
-45.54	-33.30	1.68	0.17	-7.56	-5.53	0.28	11.25	10.28	7.13	2.50	1.60	1.77	20.90	0.64	0.71	0.96
-58.29	-39.16	1.73	0.17	-9.65	-6.48	0.29	5.55	2.69	1.38	2.52	1.63	1.73	20.85	0.65	0.69	0.94

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-35.26	5.21	9.48	0.15	-5.31	0.78	1.43	2.79	11.11	4.31	3.27	2.15	1.54	19.38	0.66	0.47	0.81
-28.08	7.18	18.48	0.15	-4.21	1.08	2.77	3.51	13.25	3.33	3.29	2.13	1.56	19.34	0.65	0.47	0.80
-0.98	21.13	16.47	0.15	-0.15	3.16	2.46	2.94	7.58	1.60	3.31	2.11	1.58	19.29	0.64	0.48	0.80
1.07	39.01	9.47	0.15	0.16	5.81	1.41	4.76	4.83	5.97	3.33	2.09	1.61	19.24	0.63	0.48	0.79
-77.73	36.86	9.49	0.15	-11.54	5.47	1.41	7.87	5.93	3.78	3.34	2.07	1.63	19.19	0.62	0.49	0.79
-47.44	4.78	27.48	0.15	-7.02	0.71	4.07	6.97	9.32	1.24	3.35	2.06	1.65	19.14	0.62	0.49	0.79
48.61	6.76	59.36	0.15	7.17	1.00	8.76	1.68	9.75	5.38	3.35	2.04	1.67	19.09	0.61	0.50	0.79
8.54	30.68	39.22	0.15	1.26	4.51	5.76	5.73	7.24	8.20	3.35	2.03	1.69	19.04	0.61	0.50	0.79
-22.39	27.57	3.19	0.15	-3.28	4.04	0.47	6.84	3.39	2.41	3.35	2.02	1.70	18.99	0.60	0.51	0.79
-2.29	27.46	23.19	0.15	-0.33	4.01	3.39	5.83	5.81	3.13	3.34	2.01	1.71	18.95	0.60	0.51	0.79
-1.24	28.35	36.13	0.15	-0.18	4.12	5.26	7.75	5.54	5.04	3.33	2.00	1.72	18.90	0.60	0.52	0.79
-16.15	10.27	31.05	0.15	-2.34	1.49	4.50	7.01	2.87	6.60	3.31	1.99	1.72	18.85	0.60	0.52	0.80
-15.05	-3.74	32.98	0.14	-2.17	-0.54	4.77	6.31	7.61	3.59	3.29	1.99	1.73	18.80	0.61	0.53	0.80
19.99	3.26	21.92	0.14	2.88	0.47	3.16	2.30	7.39	0.35	3.26	1.99	1.73	18.75	0.61	0.53	0.81
-22.96	3.25	9.91	0.14	-3.29	0.47	1.42	8.02	2.36	3.31	3.23	1.99	1.73	18.70	0.62	0.53	0.81
-51.76	-25.71	13.92	0.14	-7.40	-3.68	1.99	6.78	4.01	2.52	3.20	2.00	1.72	18.65	0.62	0.54	0.82
5.38	-46.56	26.89	0.14	0.77	-6.63	3.83	3.85	5.87	3.67	3.16	2.00	1.71	18.60	0.63	0.54	0.83
7.40	-58.35	24.84	0.14	1.05	-8.29	3.53	5.18	4.58	5.74	3.12	2.01	1.71	18.55	0.64	0.55	0.84
-38.49	-56.12	13.82	0.14	-5.45	-7.94	1.96	7.69	1.02	2.27	3.08	2.03	1.69	18.51	0.66	0.55	0.86
-31.30	-33.93	-3.15	0.14	-4.41	-4.78	-0.44	8.08	2.69	1.43	3.03	2.04	1.68	18.46	0.67	0.55	0.87
9.79	-16.83	-22.04	0.14	1.38	-2.36	-3.10	7.54	5.22	3.52	2.98	2.06	1.67	18.41	0.69	0.56	0.89
-13.16	8.19	-32.88	0.14	-1.84	1.15	-4.60	8.64	3.83	5.86	2.93	2.08	1.65	18.36	0.71	0.56	0.91
-6.07	36.10	-40.67	0.14	-0.85	5.04	-5.67	9.50	3.04	3.69	2.88	2.10	1.64	18.31	0.73	0.57	0.92
64.86	49.93	-24.49	0.14	9.02	6.94	-3.40	3.76	3.58	2.09	2.83	2.12	1.62	18.26	0.75	0.57	0.94
37.70	73.69	-19.35	0.14	5.22	10.21	-2.68	6.74	5.68	3.03	2.77	2.14	1.60	18.21	0.77	0.58	0.97
2.67	73.39	-18.21	0.14	0.37	10.13	-2.51	8.14	5.14	7.28	2.72	2.17	1.59	18.16	0.80	0.58	0.99
44.62	35.17	3.87	0.14	6.14	4.84	0.53	12.27	6.01	4.83	2.67	2.19	1.57	18.12	0.82	0.59	1.01
42.49	6.09	3.91	0.14	5.82	0.83	0.54	14.74	7.99	9.53	2.62	2.21	1.56	18.07	0.84	0.59	1.03
-3.54	-39.84	-2.04	0.14	-0.48	-5.44	-0.28	1.62	5.45	1.98	2.57	2.23	1.54	18.02	0.87	0.60	1.05
-2.48	-82.59	-1.97	0.14	-0.34	-11.23	-0.27	3.70	1.94	2.25	2.52	2.25	1.53	17.97	0.89	0.61	1.08
45.48	-61.31	-14.88	0.14	6.16	-8.31	-2.02	5.86	4.24	1.91	2.48	2.26	1.52	17.92	0.91	0.61	1.10
-35.26	5.21	9.48	0.15	-5.31	0.78	1.43	2.79	11.11	4.31	3.27	2.15	1.54	19.38	0.66	0.47	0.81
-28.08	7.18	18.48	0.15	-4.21	1.08	2.77	3.51	13.25	3.33	3.29	2.13	1.56	19.34	0.65	0.47	0.80

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
17.40	-33.11	-15.77	0.14	2.35	-4.47	-2.13	3.03	10.48	8.77	2.44	2.28	1.51	17.87	0.93	0.62	1.12
-49.49	-34.98	-7.66	0.13	-6.66	-4.70	-1.03	4.54	9.43	12.50	2.40	2.29	1.49	17.82	0.95	0.62	1.14
-16.31	-15.87	-8.58	0.13	-2.19	-2.13	-1.15	6.67	3.00	0.39	2.37	2.30	1.49	17.77	0.97	0.63	1.15
-3.23	26.11	-20.46	0.13	-0.43	3.49	-2.73	11.65	3.94	6.89	2.34	2.30	1.48	17.72	0.98	0.63	1.17
-30.11	31.99	-30.30	0.13	-4.01	4.26	-4.03	10.45	3.00	5.28	2.32	2.30	1.47	17.68	0.99	0.63	1.18
5.98	15.90	-21.14	0.13	0.79	2.11	-2.80	0.96	2.12	2.90	2.30	2.30	1.47	17.63	1.00	0.64	1.18
27.96	7.85	-19.01	0.13	3.69	1.04	-2.51	1.70	5.28	5.21	2.29	2.29	1.46	17.58	1.00	0.64	1.19
-3.05	-0.16	-15.88	0.13	-0.40	-0.02	-2.09	2.91	4.17	4.63	2.28	2.28	1.46	17.53	1.00	0.64	1.19
-22.95	-1.16	9.19	0.13	-3.01	-0.15	1.20	5.02	1.52	2.60	2.28	2.27	1.46	17.48	1.00	0.64	1.18
19.11	11.82	34.16	0.13	2.49	1.54	4.46	4.80	2.48	4.81	2.28	2.25	1.46	17.43	0.99	0.64	1.18
23.07	24.75	29.09	0.13	3.00	3.22	3.78	6.12	4.19	1.66	2.28	2.23	1.46	17.38	0.98	0.64	1.17
-40.85	10.68	9.07	0.13	-5.29	1.38	1.17	5.70	3.07	5.97	2.29	2.21	1.46	17.33	0.97	0.64	1.16
-6.71	-9.32	14.08	0.13	-0.87	-1.20	1.82	5.43	4.35	5.84	2.30	2.19	1.47	17.29	0.95	0.64	1.14
31.29	-2.29	29.05	0.13	4.02	-0.29	3.73	6.73	7.11	5.12	2.31	2.16	1.47	17.24	0.93	0.64	1.13
-46.63	4.70	37.97	0.13	-5.97	0.60	4.86	8.25	7.81	0.82	2.33	2.13	1.48	17.19	0.92	0.63	1.11
-69.35	-11.28	44.86	0.13	-8.84	-1.44	5.72	11.34	7.21	1.99	2.35	2.11	1.49	17.14	0.90	0.63	1.10
-7.15	-20.22	35.75	0.13	-0.91	-2.57	4.54	6.45	4.14	2.42	2.37	2.08	1.49	17.09	0.88	0.63	1.08
13.88	-3.17	15.71	0.13	1.76	-0.40	1.99	3.96	6.46	3.93	2.38	2.05	1.50	17.04	0.86	0.63	1.07
-15.07	-21.12	2.72	0.13	-1.90	-2.66	0.34	5.42	9.46	5.30	2.40	2.02	1.51	16.99	0.84	0.63	1.05
-22.95	-42.99	-12.20	0.13	-2.88	-5.40	-1.53	1.70	5.53	2.27	2.42	2.00	1.53	16.94	0.83	0.63	1.04
-6.84	-24.85	-29.06	0.13	-0.85	-3.11	-3.63	9.67	0.93	4.22	2.44	1.97	1.54	16.89	0.81	0.63	1.03
-16.74	-28.74	-27.89	0.12	-2.08	-3.58	-3.47	10.45	2.02	5.75	2.45	1.95	1.55	16.85	0.80	0.63	1.02
-17.63	-24.63	-24.73	0.12	-2.19	-3.05	-3.07	10.92	6.58	3.13	2.46	1.93	1.56	16.80	0.78	0.63	1.01
31.39	18.38	-29.57	0.12	3.88	2.27	-3.65	10.96	5.19	7.26	2.47	1.91	1.58	16.75	0.77	0.64	1.00
49.28	46.25	-16.42	0.12	6.06	5.69	-2.02	8.80	14.04	12.12	2.48	1.89	1.59	16.70	0.76	0.64	1.00
5.22	44.07	7.65	0.12	0.64	5.40	0.94	5.49	41.58	24.23	2.49	1.88	1.61	16.65	0.75	0.65	0.99
16.22	29.93	10.67	0.12	1.98	3.65	1.30	12.66	17.36	21.73	2.49	1.86	1.62	16.60	0.75	0.65	0.99
57.12	38.79	0.71	0.12	6.94	4.71	0.09	8.17	15.15	13.69	2.49	1.85	1.63	16.55	0.74	0.66	0.99
17.02	48.62	3.75	0.12	2.06	5.88	0.45	4.24	6.24	11.69	2.49	1.85	1.65	16.50	0.74	0.66	0.99
-1.96	24.47	11.78	0.12	-0.24	2.95	1.42	9.75	0.98	4.86	2.48	1.84	1.66	16.46	0.74	0.67	1.00
47.99	25.37	-1.19	0.12	5.76	3.04	-0.14	9.85	3.44	7.27	2.48	1.84	1.67	16.41	0.74	0.67	1.00
17.40	-33.11	-15.77	0.14	2.35	-4.47	-2.13	3.03	10.48	8.77	2.44	2.28	1.51	17.87	0.93	0.62	1.12
-49.49	-34.98	-7.66	0.13	-6.66	-4.70	-1.03	4.54	9.43	12.50	2.40	2.29	1.49	17.82	0.95	0.62	1.14

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
34.87	21.28	-4.12	0.12	4.17	2.54	-0.49	8.19	4.94	6.94	2.47	1.84	1.68	16.36	0.74	0.68	1.01
-27.10	-24.72	8.93	0.12	-3.22	-2.94	1.06	9.91	4.96	7.41	2.46	1.84	1.70	16.31	0.75	0.69	1.02
-18.96	-51.56	0.96	0.12	-2.25	-6.11	0.11	11.56	1.18	11.35	2.46	1.85	1.71	16.26	0.75	0.70	1.03
13.10	-64.33	-4.97	0.12	1.55	-7.59	-0.59	6.28	3.60	3.56	2.45	1.86	1.72	16.21	0.76	0.70	1.04
-19.84	-64.07	13.07	0.12	-2.33	-7.53	1.54	8.67	3.29	7.46	2.44	1.88	1.74	16.16	0.77	0.71	1.05
-15.73	-46.85	32.03	0.12	-1.84	-5.48	3.75	0.36	7.22	1.78	2.44	1.89	1.75	16.11	0.78	0.72	1.06
38.27	-30.69	37.95	0.12	4.46	-3.58	4.42	6.82	13.61	5.87	2.44	1.91	1.77	16.06	0.79	0.73	1.07
-14.73	-11.60	8.91	0.12	-1.71	-1.35	1.03	23.09	32.40	11.72	2.44	1.94	1.79	16.02	0.80	0.73	1.08
-73.50	-8.56	-38.98	0.12	-8.49	-0.99	-4.50	32.72	36.75	17.51	2.44	1.97	1.81	15.97	0.81	0.74	1.10
-21.27	-5.53	-63.72	0.12	-2.45	-0.64	-7.33	10.20	8.01	9.09	2.44	2.00	1.83	15.92	0.82	0.75	1.11
11.80	15.45	-51.43	0.11	1.35	1.77	-5.89	2.69	5.24	2.47	2.45	2.04	1.86	15.87	0.83	0.76	1.13
-1.17	9.40	-0.27	0.11	-0.13	1.07	-0.03	7.16	5.56	3.71	2.46	2.09	1.90	15.82	0.85	0.77	1.14
5.86	-4.60	47.69	0.11	0.67	-0.52	5.41	7.15	7.97	2.71	2.48	2.14	1.93	15.77	0.86	0.78	1.16
8.88	20.37	56.54	0.11	1.00	2.30	6.39	8.76	5.31	6.17	2.50	2.19	1.98	15.72	0.88	0.79	1.18
-15.06	36.26	31.42	0.11	-1.69	4.08	3.53	4.08	2.69	2.40	2.53	2.25	2.02	15.67	0.89	0.80	1.20
-26.93	27.13	4.40	0.11	-3.02	3.04	0.49	7.28	1.82	4.53	2.56	2.32	2.07	15.63	0.91	0.81	1.22
-5.82	24.03	-8.53	0.11	-0.65	2.68	-0.95	3.92	3.19	2.86	2.59	2.39	2.13	15.58	0.92	0.82	1.23
-22.71	4.97	-12.44	0.11	-2.52	0.55	-1.38	11.20	0.83	1.20	2.63	2.46	2.19	15.53	0.93	0.83	1.25
-59.50	-20.00	5.63	0.11	-6.57	-2.21	0.62	9.59	1.51	1.69	2.67	2.53	2.25	15.48	0.95	0.84	1.27
6.65	-20.91	28.62	0.11	0.73	-2.30	3.15	8.66	1.06	5.52	2.71	2.60	2.31	15.43	0.96	0.85	1.28
52.58	-0.87	32.55	0.11	5.76	-0.09	3.56	17.31	3.36	1.55	2.76	2.68	2.38	15.38	0.97	0.86	1.30
-34.41	10.12	33.47	0.11	-3.75	1.10	3.65	11.78	4.84	6.74	2.81	2.75	2.44	15.33	0.98	0.87	1.31
-60.17	-2.90	40.38	0.11	-6.53	-0.31	4.38	13.23	7.69	11.14	2.86	2.83	2.51	15.28	0.99	0.88	1.32
6.99	7.10	33.29	0.11	0.75	0.77	3.60	12.59	1.75	8.01	2.91	2.90	2.57	15.23	1.00	0.89	1.33
24.97	39.00	11.25	0.11	2.68	4.19	1.21	24.74	5.38	3.59	2.96	2.98	2.64	15.19	1.01	0.89	1.34
8.95	30.87	-23.67	0.11	0.96	3.30	-2.53	21.15	6.86	9.14	3.01	3.05	2.70	15.14	1.01	0.90	1.35
24.93	23.76	-51.46	0.11	2.65	2.53	-5.48	15.98	8.74	10.57	3.07	3.12	2.75	15.09	1.02	0.90	1.36
39.85	41.63	-51.20	0.11	4.22	4.41	-5.43	12.75	2.52	5.55	3.12	3.18	2.80	15.04	1.02	0.90	1.36
3.81	22.50	-42.96	0.11	0.40	2.37	-4.53	15.68	3.19	7.63	3.17	3.23	2.84	14.99	1.02	0.90	1.36
13.82	-8.53	-26.76	0.11	1.45	-0.90	-2.81	21.46	4.21	5.00	3.23	3.28	2.88	14.94	1.02	0.89	1.35
53.73	-9.49	-17.62	0.10	5.61	-0.99	-1.84	13.65	8.69	1.65	3.28	3.32	2.90	14.89	1.01	0.89	1.35
34.87	21.28	-4.12	0.12	4.17	2.54	-0.49	8.19	4.94	6.94	2.47	1.84	1.68	16.36	0.74	0.68	1.01
-27.10	-24.72	8.93	0.12	-3.22	-2.94	1.06	9.91	4.96	7.41	2.46	1.84	1.70	16.31	0.75	0.69	1.02

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
7.65	-8.46	-23.48	0.10	0.80	-0.88	-2.44	12.82	2.64	4.02	3.33	3.35	2.92	14.84	1.01	0.88	1.34
-27.26	-12.42	-17.34	0.10	-2.82	-1.28	-1.79	17.67	0.92	4.07	3.38	3.37	2.93	14.79	1.00	0.87	1.32
4.83	-2.39	-3.24	0.10	0.50	-0.25	-0.33	13.77	3.55	5.75	3.43	3.39	2.93	14.75	0.99	0.86	1.31
11.84	5.61	5.81	0.10	1.21	0.57	0.60	9.55	4.42	5.63	3.47	3.39	2.92	14.70	0.98	0.84	1.29
-33.07	4.59	13.82	0.10	-3.37	0.47	1.41	8.45	6.90	2.72	3.52	3.38	2.90	14.65	0.96	0.82	1.27
-9.93	-5.41	15.82	0.10	-1.01	-0.55	1.61	6.83	5.46	2.88	3.57	3.37	2.88	14.60	0.94	0.81	1.24
61.01	-17.36	15.81	0.10	6.16	-1.75	1.60	5.71	0.16	4.49	3.62	3.35	2.85	14.55	0.93	0.79	1.22
-2.06	-20.29	22.79	0.10	-0.21	-2.04	2.29	5.84	5.45	2.58	3.67	3.32	2.81	14.50	0.90	0.77	1.19
-45.92	-43.16	21.76	0.10	-4.59	-4.32	2.18	7.07	8.30	3.06	3.72	3.28	2.77	14.45	0.88	0.75	1.16
18.19	-57.96	-1.23	0.10	1.81	-5.77	-0.12	8.61	6.67	4.38	3.77	3.23	2.73	14.40	0.86	0.72	1.12
-16.77	-33.77	-6.16	0.10	-1.66	-3.34	-0.61	10.81	2.25	2.74	3.82	3.18	2.68	14.36	0.83	0.70	1.09
-50.59	-24.65	3.90	0.10	-4.98	-2.43	0.38	14.02	3.20	7.16	3.88	3.11	2.63	14.31	0.80	0.68	1.05
1.56	-4.59	-4.04	0.10	0.15	-0.45	-0.40	10.59	5.44	8.12	3.93	3.04	2.57	14.26	0.77	0.65	1.01
8.58	56.31	-8.96	0.10	0.84	5.49	-0.87	5.56	4.88	6.47	3.99	2.96	2.52	14.21	0.74	0.63	0.98
-17.35	61.07	-21.84	0.10	-1.68	5.92	-2.12	8.71	1.94	4.13	4.05	2.88	2.47	14.16	0.71	0.61	0.94
-36.20	28.89	-17.71	0.10	-3.49	2.79	-1.71	10.22	4.21	4.25	4.10	2.80	2.42	14.11	0.68	0.59	0.90
-3.07	29.78	16.35	0.10	-0.29	2.86	1.57	5.47	5.05	1.81	4.16	2.72	2.37	14.06	0.65	0.57	0.87
21.94	13.69	12.35	0.10	2.10	1.31	1.18	9.55	3.93	3.90	4.22	2.64	2.32	14.01	0.62	0.55	0.83
-8.04	-25.29	11.36	0.10	-0.76	-2.40	1.08	11.51	10.02	2.81	4.28	2.55	2.28	13.96	0.60	0.53	0.80
18.99	-39.16	30.33	0.09	1.79	-3.70	2.87	29.35	7.91	7.85	4.34	2.47	2.24	13.92	0.57	0.52	0.77
31.93	-26.03	14.30	0.09	3.00	-2.45	1.34	22.56	2.41	2.70	4.40	2.39	2.20	13.87	0.54	0.50	0.74
-27.03	-30.91	12.30	0.09	-2.53	-2.89	1.15	14.81	4.70	5.43	4.46	2.32	2.17	13.82	0.52	0.49	0.71
-28.87	-42.76	47.23	0.09	-2.69	-3.98	4.39	12.15	4.69	7.69	4.51	2.24	2.14	13.77	0.50	0.47	0.69
14.21	-16.64	41.11	0.09	1.31	-1.54	3.80	15.06	7.21	8.64	4.55	2.17	2.11	13.72	0.48	0.46	0.67
7.21	4.39	28.03	0.09	0.66	0.40	2.58	11.49	3.57	4.59	4.60	2.11	2.09	13.67	0.46	0.45	0.65
-3.75	-2.62	38.95	0.09	-0.34	-0.24	3.56	5.46	1.41	4.27	4.63	2.05	2.06	13.62	0.44	0.45	0.63
32.24	-12.58	12.90	0.09	2.93	-1.15	1.17	3.61	4.51	6.46	4.66	1.99	2.04	13.57	0.43	0.44	0.61
28.17	1.44	-12.05	0.09	2.55	0.13	-1.09	2.55	4.73	0.66	4.68	1.95	2.02	13.53	0.42	0.43	0.60
-19.80	28.38	3.02	0.09	-1.78	2.55	0.27	3.81	5.82	2.93	4.70	1.90	2.00	13.48	0.40	0.43	0.59
-4.71	17.29	15.04	0.09	-0.42	1.55	1.35	3.33	4.75	3.01	4.71	1.87	1.99	13.43	0.40	0.42	0.58
25.30	31.20	12.04	0.09	2.25	2.78	1.07	3.98	4.93	3.56	4.71	1.84	1.97	13.38	0.39	0.42	0.57
7.65	-8.46	-23.48	0.10	0.80	-0.88	-2.44	12.82	2.64	4.02	3.33	3.35	2.92	14.84	1.01	0.88	1.34
-27.26	-12.42	-17.34	0.10	-2.82	-1.28	-1.79	17.67	0.92	4.07	3.38	3.37	2.93	14.79	1.00	0.87	1.32

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
9.28	55.02	0.07	0.09	0.82	4.87	0.01	4.08	8.11	8.19	4.71	1.81	1.96	13.33	0.38	0.42	0.57
2.30	31.85	-12.85	0.09	0.20	2.80	-1.13	7.58	4.24	3.77	4.70	1.79	1.94	13.28	0.38	0.41	0.56
29.29	33.72	-29.71	0.09	2.56	2.95	-2.60	4.67	8.96	6.21	4.68	1.78	1.93	13.23	0.38	0.41	0.56
57.16	30.59	-46.51	0.09	4.97	2.66	-4.05	6.42	5.61	5.30	4.66	1.77	1.92	13.18	0.38	0.41	0.56
13.06	-0.47	-45.27	0.09	1.13	-0.04	-3.92	5.55	2.15	3.74	4.63	1.76	1.90	13.13	0.38	0.41	0.56
-6.90	-7.45	-30.06	0.09	-0.59	-0.64	-2.59	5.82	3.38	0.51	4.60	1.75	1.89	13.09	0.38	0.41	0.56
37.08	-10.42	-22.90	0.09	3.17	-0.89	-1.96	9.51	11.04	7.09	4.56	1.75	1.88	13.04	0.38	0.41	0.56
-23.90	-16.37	-8.78	0.09	-2.03	-1.39	-0.75	13.77	5.97	8.86	4.52	1.75	1.86	12.99	0.39	0.41	0.57
-88.62	-23.29	5.28	0.08	-7.49	-1.97	0.45	11.45	11.29	8.08	4.48	1.75	1.85	12.94	0.39	0.41	0.57
-8.38	-37.16	-4.66	0.08	-0.70	-3.12	-0.39	12.48	7.83	8.79	4.44	1.76	1.84	12.89	0.40	0.42	0.57
41.60	-43.00	0.40	0.08	3.47	-3.59	0.03	18.78	11.05	8.98	4.40	1.77	1.83	12.84	0.40	0.42	0.58
-18.40	-34.85	10.43	0.08	-1.53	-2.89	0.87	15.35	9.30	10.86	4.35	1.77	1.83	12.79	0.41	0.42	0.58
-15.29	-11.75	27.41	0.08	-1.26	-0.97	2.26	18.76	11.18	10.67	4.31	1.78	1.82	12.74	0.41	0.42	0.59
10.77	9.26	46.32	0.08	0.88	0.76	3.80	4.24	5.12	7.15	4.26	1.79	1.81	12.70	0.42	0.43	0.60
-71.06	18.20	25.23	0.08	-5.79	1.48	2.06	15.02	7.23	11.84	4.22	1.80	1.81	12.65	0.43	0.43	0.60
-91.69	16.13	12.21	0.08	-7.43	1.31	0.99	26.06	4.27	7.91	4.17	1.81	1.81	12.60	0.43	0.43	0.61
-4.45	-2.89	30.18	0.08	-0.36	-0.23	2.43	26.06	12.93	11.06	4.13	1.82	1.81	12.55	0.44	0.44	0.62
8.59	-7.87	28.12	0.08	0.69	-0.63	2.25	12.99	4.08	3.32	4.09	1.84	1.81	12.50	0.45	0.44	0.63
-14.35	4.14	14.09	0.08	-1.14	0.33	1.12	25.41	12.70	14.13	4.04	1.85	1.81	12.45	0.46	0.45	0.64
24.68	17.10	17.08	0.08	1.95	1.35	1.35	22.10	2.78	11.42	4.00	1.87	1.81	12.40	0.47	0.45	0.65
25.62	34.00	23.05	0.08	2.01	2.67	1.81	23.27	16.45	15.63	3.96	1.88	1.82	12.35	0.48	0.46	0.66
-43.29	15.90	23.01	0.08	-3.38	1.24	1.79	18.56	5.95	10.72	3.92	1.90	1.83	12.30	0.48	0.47	0.67
-34.09	-4.13	24.97	0.08	-2.64	-0.32	1.94	21.72	16.50	10.83	3.89	1.92	1.84	12.26	0.49	0.47	0.68
30.97	0.88	23.92	0.08	2.38	0.07	1.84	18.40	2.36	7.54	3.85	1.94	1.86	12.21	0.50	0.48	0.70
21.91	-25.07	16.90	0.08	1.68	-1.92	1.29	17.97	15.05	13.94	3.82	1.97	1.88	12.16	0.51	0.49	0.71
-17.05	-46.93	10.89	0.08	-1.30	-3.57	0.83	14.52	2.88	1.80	3.80	1.99	1.90	12.11	0.53	0.50	0.72
35.96	-21.79	-6.06	0.08	2.71	-1.64	-0.46	7.78	4.80	6.78	3.77	2.02	1.92	12.06	0.54	0.51	0.74
66.80	0.26	-25.95	0.08	5.01	0.02	-1.95	8.88	0.84	3.09	3.76	2.05	1.95	12.01	0.55	0.52	0.75
-9.27	1.25	-21.80	0.07	-0.69	0.09	-1.62	4.56	7.18	1.13	3.75	2.09	1.98	11.96	0.56	0.53	0.77
-20.16	6.24	-8.68	0.07	-1.49	0.46	-0.64	5.58	10.43	10.82	3.75	2.13	2.02	11.91	0.57	0.54	0.78
12.90	7.21	-12.59	0.07	0.95	0.53	-0.93	6.20	2.13	6.14	3.76	2.17	2.06	11.87	0.58	0.55	0.79
9.28	55.02	0.07	0.09	0.82	4.87	0.01	4.08	8.11	8.19	4.71	1.81	1.96	13.33	0.38	0.42	0.57
2.30	31.85	-12.85	0.09	0.20	2.80	-1.13	7.58	4.24	3.77	4.70	1.79	1.94	13.28	0.38	0.41	0.56

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
11.90	-8.78	-23.46	0.07	0.87	-0.64	-1.71	6.26	4.99	2.51	3.78	2.21	2.10	11.82	0.58	0.56	0.81
20.88	-15.73	-22.32	0.07	1.51	-1.14	-1.62	6.27	0.24	2.25	3.81	2.25	2.15	11.77	0.59	0.56	0.82
27.83	-2.69	-20.18	0.07	2.00	-0.19	-1.45	7.57	3.38	5.05	3.85	2.30	2.20	11.72	0.60	0.57	0.83
31.76	14.29	-10.06	0.07	2.27	1.02	-0.72	4.54	5.64	9.81	3.90	2.34	2.25	11.67	0.60	0.58	0.83
20.70	17.22	-1.98	0.07	1.47	1.22	-0.14	3.90	3.96	8.59	3.97	2.39	2.31	11.62	0.60	0.58	0.84
9.68	0.19	-14.90	0.07	0.68	0.01	-1.05	4.17	8.00	4.39	4.04	2.44	2.37	11.57	0.60	0.59	0.84
12.68	10.17	-3.80	0.07	0.89	0.71	-0.27	4.19	6.48	3.35	4.12	2.48	2.43	11.52	0.60	0.59	0.84
-3.29	19.11	8.24	0.07	-0.23	1.33	0.57	4.32	9.66	11.98	4.22	2.53	2.49	11.47	0.60	0.59	0.84
-2.23	-13.90	-15.69	0.07	-0.15	-0.96	-1.08	5.28	11.14	11.35	4.32	2.58	2.55	11.43	0.60	0.59	0.84
7.80	-25.82	-29.55	0.07	0.53	-1.77	-2.02	3.50	3.88	1.31	4.42	2.62	2.62	11.38	0.59	0.59	0.84
-15.13	-22.72	-21.39	0.07	-1.03	-1.54	-1.45	3.62	3.19	4.41	4.53	2.66	2.68	11.33	0.59	0.59	0.83
-13.03	-33.61	-1.29	0.07	-0.88	-2.27	-0.09	5.48	4.47	2.08	4.64	2.70	2.74	11.28	0.58	0.59	0.83
33.97	-38.46	21.73	0.07	2.28	-2.58	1.46	5.07	1.45	3.24	4.74	2.74	2.80	11.23	0.58	0.59	0.83
21.91	-43.29	21.69	0.07	1.46	-2.88	1.44	3.80	3.18	2.21	4.84	2.77	2.85	11.18	0.57	0.59	0.82
-32.03	-18.17	16.67	0.07	-2.11	-1.20	1.10	5.96	4.81	4.62	4.94	2.79	2.90	11.13	0.57	0.59	0.82
-24.86	9.85	18.65	0.07	-1.63	0.65	1.22	6.87	1.61	5.46	5.02	2.81	2.94	11.08	0.56	0.59	0.81
-11.74	13.80	15.64	0.07	-0.76	0.90	1.02	5.37	2.66	4.30	5.10	2.83	2.98	11.04	0.56	0.58	0.81
-14.65	12.75	20.62	0.06	-0.94	0.82	1.33	4.39	4.49	2.58	5.15	2.84	3.01	10.99	0.55	0.58	0.80
9.41	-1.27	27.58	0.06	0.60	-0.08	1.76	10.64	1.99	6.65	5.20	2.84	3.03	10.94	0.55	0.58	0.80
36.37	-4.26	14.55	0.06	2.31	-0.27	0.92	9.99	19.38	2.43	5.22	2.84	3.05	10.89	0.54	0.58	0.80
14.31	8.74	6.56	0.06	0.90	0.55	0.41	8.37	11.85	7.07	5.23	2.83	3.06	10.84	0.54	0.59	0.80
-50.57	6.71	11.58	0.06	-3.16	0.42	0.72	8.10	3.24	3.67	5.21	2.82	3.06	10.79	0.54	0.59	0.80
-42.34	-5.29	6.59	0.06	-2.62	-0.33	0.41	1.07	0.96	7.83	5.18	2.80	3.05	10.74	0.54	0.59	0.80
-1.20	-9.26	0.63	0.06	-0.07	-0.57	0.04	2.36	0.53	10.07	5.12	2.78	3.04	10.69	0.54	0.59	0.80
-39.07	-7.23	7.67	0.06	-2.38	-0.44	0.47	2.42	6.84	5.01	5.05	2.75	3.01	10.64	0.55	0.60	0.81
-56.83	-3.20	8.69	0.06	-3.44	-0.19	0.53	2.98	4.77	7.99	4.95	2.72	2.98	10.60	0.55	0.60	0.81
17.29	4.79	4.71	0.06	1.04	0.29	0.28	2.17	8.41	2.05	4.84	2.68	2.95	10.55	0.55	0.61	0.82
45.22	13.76	15.73	0.06	2.69	0.82	0.94	2.29	9.28	4.71	4.72	2.65	2.91	10.50	0.56	0.62	0.83
-33.76	9.71	13.72	0.06	-1.99	0.57	0.81	2.17	3.67	4.20	4.58	2.60	2.86	10.45	0.57	0.62	0.84
-35.57	-3.30	0.74	0.06	-2.08	-0.19	0.04	4.34	4.77	2.78	4.43	2.56	2.81	10.40	0.58	0.63	0.86
41.46	7.70	0.79	0.06	2.40	0.45	0.05	2.21	3.33	4.64	4.27	2.52	2.76	10.35	0.59	0.65	0.87
11.90	-8.78	-23.46	0.07	0.87	-0.64	-1.71	6.26	4.99	2.51	3.78	2.21	2.10	11.82	0.58	0.56	0.81
20.88	-15.73	-22.32	0.07	1.51	-1.14	-1.62	6.27	0.24	2.25	3.81	2.25	2.15	11.77	0.59	0.56	0.82

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
24.38	24.63	9.83	0.06	1.40	1.42	0.56	1.65	5.13	2.95	4.11	2.47	2.70	10.30	0.60	0.66	0.89
11.36	18.55	21.82	0.06	0.65	1.06	1.24	1.85	6.66	4.67	3.94	2.43	2.65	10.25	0.62	0.67	0.91
57.26	16.48	5.81	0.06	3.24	0.93	0.33	4.67	3.19	7.39	3.78	2.38	2.59	10.21	0.63	0.69	0.93
14.17	19.41	-12.12	0.06	0.79	1.09	-0.68	2.36	1.69	7.94	3.61	2.34	2.53	10.16	0.65	0.70	0.96
-56.70	-1.63	-4.04	0.06	-3.15	-0.09	-0.22	1.25	1.71	1.62	3.45	2.30	2.48	10.11	0.67	0.72	0.98
-13.51	-24.57	-4.97	0.06	-0.74	-1.35	-0.27	4.16	4.24	2.70	3.29	2.26	2.42	10.06	0.69	0.74	1.01
23.52	-27.47	-15.87	0.05	1.28	-1.50	-0.87	2.06	3.04	0.85	3.14	2.23	2.37	10.01	0.71	0.76	1.04
-33.42	-16.38	-14.76	0.05	-1.80	-0.88	-0.80	0.99	1.89	2.61	2.99	2.20	2.32	9.96	0.73	0.78	1.07
-38.23	2.65	-13.65	0.05	-2.05	0.14	-0.73	2.68	2.73	5.84	2.86	2.17	2.27	9.91	0.76	0.80	1.10
35.83	9.63	-22.52	0.05	1.90	0.51	-1.19	0.74	5.26	2.91	2.73	2.14	2.23	9.86	0.78	0.82	1.13
52.70	14.58	-19.38	0.05	2.77	0.77	-1.02	1.14	2.71	5.98	2.61	2.12	2.19	9.81	0.81	0.84	1.16
-11.34	27.50	3.70	0.05	-0.59	1.43	0.19	1.25	1.17	3.49	2.51	2.09	2.15	9.77	0.84	0.86	1.20
-21.23	31.38	11.72	0.05	-1.09	1.62	0.60	1.23	2.06	1.66	2.41	2.07	2.11	9.72	0.86	0.88	1.23
33.80	39.24	-9.23	0.05	1.72	2.00	-0.47	3.43	1.51	3.13	2.32	2.06	2.08	9.67	0.89	0.90	1.26
0.77	25.11	-21.11	0.05	0.04	1.27	-1.07	4.04	3.57	2.35	2.24	2.04	2.05	9.62	0.91	0.92	1.29
-55.07	-1.94	-15.99	0.05	-2.75	-0.10	-0.80	1.48	3.91	1.10	2.16	2.03	2.03	9.57	0.94	0.94	1.33
14.06	-5.92	-11.88	0.05	0.70	-0.29	-0.59	2.79	2.34	7.06	2.09	2.02	2.00	9.52	0.96	0.96	1.36
33.01	-23.86	-10.78	0.05	1.62	-1.17	-0.53	2.25	2.70	5.85	2.03	2.00	1.98	9.47	0.99	0.97	1.39
-34.94	-31.75	-21.66	0.05	-1.69	-1.54	-1.05	2.44	3.31	3.46	1.97	1.99	1.96	9.42	1.01	0.99	1.42
3.17	-13.66	-15.53	0.05	0.15	-0.66	-0.75	7.50	9.13	2.29	1.92	1.98	1.94	9.38	1.03	1.01	1.45
17.18	0.37	5.55	0.05	0.82	0.02	0.26	6.85	5.23	3.81	1.87	1.97	1.93	9.33	1.06	1.03	1.48
-43.72	10.35	-3.40	0.05	-2.05	0.49	-0.16	8.18	6.57	8.03	1.82	1.96	1.91	9.28	1.08	1.05	1.50
-24.53	-4.66	-7.33	0.05	-1.14	-0.22	-0.34	7.70	4.60	4.80	1.77	1.95	1.89	9.23	1.10	1.07	1.53
23.52	-26.60	2.73	0.05	1.08	-1.22	0.13	3.84	1.18	1.36	1.72	1.93	1.88	9.18	1.12	1.09	1.56
-3.48	-17.51	5.77	0.05	-0.16	-0.80	0.26	2.02	1.89	3.78	1.68	1.91	1.86	9.13	1.14	1.11	1.59
-29.36	-4.46	21.77	0.05	-1.32	-0.20	0.98	2.44	1.98	7.04	1.63	1.90	1.85	9.08	1.16	1.13	1.62
32.68	-0.45	40.70	0.04	1.45	-0.02	1.81	2.36	2.34	7.33	1.58	1.87	1.83	9.03	1.18	1.16	1.66
35.59	14.52	38.59	0.04	1.57	0.64	1.70	2.38	3.34	6.68	1.54	1.85	1.82	8.98	1.20	1.18	1.69
-58.32	18.45	24.52	0.04	-2.54	0.80	1.07	0.80	1.70	5.42	1.49	1.83	1.80	8.94	1.23	1.21	1.72
-42.07	2.41	18.49	0.04	-1.81	0.10	0.80	2.45	1.96	6.94	1.45	1.80	1.78	8.89	1.24	1.23	1.75
28.01	5.40	27.45	0.04	1.19	0.23	1.17	2.51	1.79	2.00	1.40	1.78	1.77	8.84	1.26	1.26	1.78
24.38	24.63	9.83	0.06	1.40	1.42	0.56	1.65	5.13	2.95	4.11	2.47	2.70	10.30	0.60	0.66	0.89
11.36	18.55	21.82	0.06	0.65	1.06	1.24	1.85	6.66	4.67	3.94	2.43	2.65	10.25	0.62	0.67	0.91

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-10.98	-5.60	21.40	0.04	-0.46	-0.24	0.90	1.42	4.26	6.26	1.36	1.75	1.75	8.79	1.28	1.28	1.81
-14.88	-32.52	10.39	0.04	-0.62	-1.35	0.43	3.13	5.32	7.52	1.32	1.72	1.73	8.74	1.30	1.31	1.84
62.07	-15.43	17.39	0.04	2.55	-0.63	0.71	0.64	2.06	2.39	1.29	1.69	1.71	8.69	1.31	1.33	1.87
37.92	2.60	0.41	0.04	1.54	0.11	0.02	1.54	3.74	8.69	1.25	1.65	1.69	8.64	1.32	1.35	1.89
-29.05	3.59	-15.51	0.04	-1.16	0.14	-0.62	1.65	6.97	4.78	1.22	1.62	1.68	8.59	1.33	1.37	1.91
-22.90	5.57	-7.41	0.04	-0.90	0.22	-0.29	1.81	6.63	3.61	1.19	1.59	1.66	8.54	1.33	1.39	1.93
2.19	-4.43	-14.31	0.04	0.09	-0.17	-0.56	1.09	8.37	4.21	1.17	1.56	1.64	8.50	1.33	1.41	1.94
9.22	-10.40	-30.17	0.04	0.35	-0.40	-1.16	2.67	8.45	2.76	1.15	1.53	1.63	8.45	1.33	1.42	1.94
25.20	-6.36	-31.99	0.04	0.96	-0.24	-1.22	1.88	6.00	4.72	1.13	1.50	1.62	8.40	1.32	1.43	1.94
58.08	10.63	-22.83	0.04	2.18	0.40	-0.86	3.03	5.88	7.70	1.12	1.47	1.61	8.35	1.31	1.43	1.94
25.95	35.54	-18.69	0.04	0.96	1.31	-0.69	2.58	11.38	6.99	1.12	1.45	1.60	8.30	1.30	1.43	1.93
-45.96	44.38	-4.59	0.04	-1.68	1.62	-0.17	1.12	2.74	3.17	1.11	1.43	1.59	8.25	1.28	1.43	1.92
-34.75	27.23	6.46	0.04	-1.25	0.98	0.23	3.26	3.13	1.81	1.11	1.41	1.59	8.20	1.27	1.43	1.91
21.33	10.16	-5.49	0.04	0.76	0.36	-0.19	1.33	2.57	1.84	1.11	1.39	1.59	8.15	1.25	1.43	1.90
8.31	-6.85	0.57	0.04	0.29	-0.24	0.02	1.30	0.21	5.29	1.11	1.37	1.59	8.11	1.23	1.43	1.89
-46.56	-36.76	4.61	0.03	-1.61	-1.27	0.16	2.95	3.66	5.08	1.12	1.36	1.59	8.06	1.22	1.43	1.88
-28.37	-36.61	-5.33	0.03	-0.96	-1.24	-0.18	1.26	2.43	1.35	1.12	1.35	1.60	8.01	1.20	1.42	1.87
-4.25	-44.45	4.72	0.03	-0.14	-1.49	0.16	1.25	5.12	3.40	1.13	1.35	1.61	7.96	1.19	1.43	1.86
5.79	-66.23	0.77	0.03	0.19	-2.19	0.03	2.43	3.98	3.05	1.14	1.35	1.62	7.91	1.18	1.43	1.86
29.77	-47.99	3.81	0.03	0.97	-1.56	0.12	1.50	4.42	5.44	1.14	1.35	1.64	7.86	1.18	1.43	1.86
-26.19	-22.85	28.80	0.03	-0.84	-0.73	0.92	2.20	5.43	7.72	1.15	1.35	1.65	7.81	1.18	1.44	1.86
-91.91	-1.80	17.76	0.03	-2.90	-0.06	0.56	0.31	7.73	2.73	1.15	1.35	1.67	7.76	1.18	1.45	1.87
-65.54	-6.78	-4.21	0.03	-2.03	-0.21	-0.13	2.02	7.99	3.38	1.15	1.36	1.69	7.71	1.18	1.46	1.88
2.63	-22.72	-7.14	0.03	0.08	-0.69	-0.22	1.58	6.00	4.41	1.15	1.37	1.70	7.67	1.19	1.48	1.90
38.60	-5.66	2.92	0.03	1.16	-0.17	0.09	2.18	5.34	6.41	1.15	1.39	1.72	7.62	1.21	1.50	1.93
32.51	4.35	13.94	0.03	0.96	0.13	0.41	3.53	9.35	11.51	1.14	1.40	1.74	7.57	1.23	1.53	1.96
35.42	5.33	12.94	0.03	1.03	0.15	0.38	5.95	13.15	6.34	1.13	1.42	1.76	7.52	1.26	1.55	2.00
12.37	4.31	14.94	0.03	0.35	0.12	0.43	1.93	5.92	3.61	1.12	1.44	1.77	7.47	1.29	1.58	2.04
-32.54	-4.68	0.96	0.03	-0.91	-0.13	0.03	1.30	2.87	4.82	1.10	1.46	1.79	7.42	1.32	1.62	2.09
-18.39	-16.64	-5.98	0.03	-0.51	-0.46	-0.16	5.83	4.16	7.72	1.09	1.48	1.80	7.37	1.36	1.65	2.14
22.65	-13.58	11.07	0.03	0.61	-0.37	0.30	4.72	1.60	11.22	1.07	1.50	1.81	7.32	1.41	1.69	2.20
-10.98	-5.60	21.40	0.04	-0.46	-0.24	0.90	1.42	4.26	6.26	1.36	1.75	1.75	8.79	1.28	1.28	1.81
-14.88	-32.52	10.39	0.04	-0.62	-1.35	0.43	3.13	5.32	7.52	1.32	1.72	1.73	8.74	1.30	1.31	1.84

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
15.62	18.42	8.08	0.03	0.41	0.49	0.21	1.55	3.36	7.80	1.05	1.53	1.82	7.28	1.45	1.73	2.26
-24.31	38.30	9.10	0.03	-0.63	1.00	0.24	1.33	1.71	2.68	1.03	1.55	1.83	7.23	1.51	1.77	2.33
-0.21	44.14	14.11	0.03	-0.01	1.13	0.36	1.03	2.06	3.36	1.01	1.58	1.83	7.18	1.57	1.82	2.40
4.82	52.95	9.11	0.03	0.12	1.32	0.23	1.50	3.99	2.07	0.99	1.61	1.83	7.13	1.63	1.86	2.47
-49.04	33.78	16.12	0.02	-1.20	0.83	0.39	1.88	1.87	2.12	0.96	1.63	1.84	7.08	1.69	1.90	2.55
-14.86	13.68	21.09	0.02	-0.36	0.33	0.51	2.28	4.77	3.97	0.94	1.66	1.84	7.03	1.76	1.95	2.62
-17.75	6.64	3.10	0.02	-0.42	0.16	0.07	4.57	2.40	3.10	0.92	1.68	1.83	6.98	1.82	1.99	2.70
-66.53	-4.36	-12.83	0.02	-1.53	-0.10	-0.30	7.66	3.21	1.38	0.90	1.71	1.83	6.93	1.89	2.03	2.77
20.61	-5.34	-2.75	0.02	0.46	-0.12	-0.06	5.05	2.19	2.98	0.88	1.73	1.83	6.88	1.96	2.07	2.85
113.39	-3.32	-7.67	0.02	2.49	-0.07	-0.17	0.83	2.34	10.10	0.87	1.76	1.83	6.84	2.02	2.10	2.92
81.05	-7.30	-24.56	0.02	1.74	-0.16	-0.53	1.18	2.15	9.40	0.85	1.78	1.82	6.79	2.09	2.13	2.98
4.93	-16.25	-41.37	0.02	0.10	-0.34	-0.87	1.95	3.54	2.12	0.84	1.80	1.82	6.74	2.14	2.16	3.04
11.94	-17.19	-44.15	0.02	0.24	-0.35	-0.91	1.41	3.36	3.08	0.83	1.82	1.82	6.69	2.19	2.18	3.09
38.89	0.85	-15.97	0.02	0.78	0.02	-0.32	3.53	4.25	4.04	0.83	1.84	1.82	6.64	2.23	2.20	3.13
-33.08	17.81	-11.86	0.02	-0.64	0.35	-0.23	5.41	5.63	3.64	0.82	1.86	1.82	6.59	2.26	2.21	3.16
-36.89	12.75	-17.75	0.02	-0.70	0.24	-0.34	1.61	4.51	8.34	0.82	1.87	1.82	6.54	2.29	2.22	3.19
52.13	1.72	10.32	0.02	0.96	0.03	0.19	3.70	3.16	6.23	0.82	1.88	1.82	6.49	2.30	2.22	3.20
16.04	1.72	9.33	0.02	0.29	0.03	0.17	6.94	12.25	1.19	0.82	1.89	1.82	6.45	2.31	2.22	3.20
-32.88	-14.26	-7.62	0.02	-0.58	-0.25	-0.13	9.37	12.41	13.60	0.82	1.90	1.82	6.40	2.30	2.21	3.19
41.15	-33.16	10.43	0.02	0.70	-0.56	0.18	9.09	4.49	7.10	0.83	1.90	1.83	6.35	2.29	2.21	3.18
43.03	-31.03	16.43	0.02	0.71	-0.51	0.27	11.71	5.21	9.34	0.84	1.90	1.84	6.30	2.27	2.19	3.16
-51.90	-27.91	0.45	0.02	-0.83	-0.45	0.01	2.04	5.68	6.31	0.85	1.90	1.84	6.25	2.24	2.18	3.13
-58.63	-30.79	2.50	0.02	-0.91	-0.48	0.04	5.97	4.25	5.34	0.86	1.89	1.85	6.20	2.21	2.16	3.09
3.52	-30.67	10.53	0.02	0.05	-0.46	0.16	7.96	8.89	1.73	0.87	1.89	1.86	6.15	2.17	2.14	3.04
-9.42	-12.58	-9.42	0.01	-0.14	-0.18	-0.14	3.34	12.80	15.28	0.89	1.88	1.87	6.10	2.12	2.11	2.99
-31.29	-4.54	-32.29	0.01	-0.44	-0.06	-0.45	12.51	26.86	14.78	0.90	1.87	1.88	6.05	2.07	2.08	2.94
49.72	2.47	-13.14	0.01	0.67	0.03	-0.18	57.96	17.45	35.96	0.92	1.85	1.89	6.01	2.02	2.05	2.88
79.51	22.42	-0.06	0.01	1.03	0.29	0.00	48.14	18.17	41.29	0.94	1.84	1.89	5.96	1.96	2.02	2.81
2.40	29.32	-11.98	0.01	0.03	0.37	-0.15	0.78	3.84	7.12	0.96	1.82	1.90	5.91	1.90	1.99	2.75
-18.52	24.21	4.09	0.01	-0.22	0.29	0.05	1.62	6.50	8.68	0.98	1.81	1.91	5.86	1.84	1.95	2.68
-5.43	29.11	40.05	0.01	-0.06	0.33	0.46	4.46	0.50	11.57	1.01	1.79	1.92	5.81	1.78	1.91	2.61
15.62	18.42	8.08	0.03	0.41	0.49	0.21	1.55	3.36	7.80	1.05	1.53	1.82	7.28	1.45	1.73	2.26
-24.31	38.30	9.10	0.03	-0.63	1.00	0.24	1.33	1.71	2.68	1.03	1.55	1.83	7.23	1.51	1.77	2.33

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-32.31	19.01	40.94	0.01	-0.36	0.21	0.45	5.55	4.85	13.84	1.04	1.78	1.94	5.76	1.71	1.87	2.53
-36.12	-32.96	22.87	0.01	-0.38	-0.35	0.24	3.10	1.01	9.54	1.07	1.77	1.95	5.71	1.65	1.82	2.46
0.00	-46.80	30.82	0.01	0.00	-0.47	0.31	0.42	6.54	6.34	1.11	1.76	1.97	5.66	1.58	1.77	2.38
-0.95	-12.68	8.79	0.01	-0.01	-0.12	0.08	2.24	5.36	3.52	1.15	1.75	1.98	5.62	1.52	1.72	2.30
-36.83	-3.64	-17.14	0.01	-0.33	-0.03	-0.15	3.19	5.61	3.41	1.20	1.75	2.01	5.57	1.46	1.67	2.22
-18.67	2.36	20.90	0.01	-0.16	0.02	0.18	3.71	1.21	5.76	1.25	1.75	2.03	5.52	1.40	1.62	2.15
2.41	23.31	43.83	0.01	0.02	0.19	0.35	2.33	2.73	2.85	1.31	1.76	2.06	5.47	1.35	1.57	2.07
-43.46	37.19	21.75	0.01	-0.33	0.28	0.16	2.60	6.35	4.49	1.38	1.78	2.10	5.42	1.29	1.53	2.00
-12.29	29.06	14.73	0.01	-0.09	0.20	0.10	1.27	3.04	8.74	1.45	1.80	2.14	5.37	1.24	1.48	1.93
70.64	10.98	30.69	0.01	0.46	0.07	0.20	2.57	1.91	7.51	1.52	1.82	2.19	5.32	1.20	1.44	1.87
35.47	-5.03	17.64	0.01	0.21	-0.03	0.11	3.02	1.76	5.86	1.61	1.86	2.24	5.27	1.15	1.39	1.81
-19.51	-28.96	-13.31	0.01	-0.11	-0.16	-0.07	3.19	1.86	7.20	1.70	1.90	2.30	5.22	1.12	1.36	1.76
7.56	-27.84	5.75	0.01	0.04	-0.14	0.03	2.91	2.93	1.72	1.80	1.94	2.37	5.18	1.08	1.32	1.71
37.52	-6.77	20.75	0.00	0.17	-0.03	0.09	2.89	0.81	2.78	1.90	1.99	2.45	5.13	1.05	1.29	1.66
11.47	-9.74	-0.24	0.00	0.05	-0.04	0.00	2.76	4.63	1.49	2.01	2.05	2.53	5.08	1.02	1.26	1.62
-15.48	-28.66	-7.17	0.00	-0.05	-0.10	-0.03	5.00	4.52	4.53	2.12	2.11	2.62	5.03	1.00	1.24	1.59
-8.38	-21.56	-15.07	0.00	-0.03	-0.06	-0.05	8.02	5.07	15.35	2.23	2.17	2.71	4.98	0.97	1.22	1.56
-12.29	18.45	-40.91	0.00	-0.03	0.05	-0.10	3.31	1.58	8.03	2.34	2.23	2.80	4.93	0.95	1.20	1.53
-13.19	40.34	-49.68	0.00	-0.03	0.08	-0.10	1.83	1.91	4.76	2.45	2.29	2.90	4.88	0.94	1.18	1.51
11.86	35.19	-21.48	0.00	0.02	0.05	-0.03	4.88	2.03	2.73	2.55	2.35	2.99	4.83	0.92	1.17	1.49
15.85	36.05	-4.38	0.00	0.02	0.04	0.00	3.95	2.67	2.16	2.65	2.40	3.09	4.79	0.91	1.16	1.48
-19.09	21.93	-19.28	0.00	-0.01	0.01	-0.01	1.79	4.24	6.09	2.75	2.45	3.18	4.74	0.89	1.16	1.46
-9.99	-7.10	-13.16	0.00	0.00	0.00	0.00	2.39	2.04	3.85	2.83	2.50	3.27	4.69	0.88	1.15	1.45

Microtremors Segment: B1-S4

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-36.13	24.31	18.56	0.26	-9.38	6.31	4.82	5.13	2.42	2.83	3.91	1.04	1.19	30.03	0.27	0.30	0.40
2.99	18.24	24.51	0.26	0.77	4.72	6.35	5.70	1.52	4.61	3.83	1.02	1.17	29.98	0.27	0.30	0.40
17.00	14.19	26.45	0.26	4.39	3.67	6.84	4.27	4.17	4.58	3.75	1.01	1.14	29.93	0.27	0.30	0.41
19.98	-6.81	9.42	0.26	5.15	-1.76	2.43	3.81	3.30	3.21	3.65	0.99	1.11	29.88	0.27	0.31	0.41
-10.99	-31.71	4.43	0.26	-2.83	-8.17	1.14	3.07	4.00	2.70	3.54	0.97	1.09	29.83	0.27	0.31	0.41
-29.86	-17.60	-2.53	0.26	-7.67	-4.52	-0.65	5.78	3.49	3.43	3.42	0.95	1.06	29.79	0.28	0.31	0.42
-21.70	-15.52	-36.41	0.26	-5.57	-3.98	-9.34	8.78	3.36	3.50	3.29	0.93	1.03	29.74	0.28	0.31	0.42
-30.54	-38.39	-21.26	0.26	-7.82	-9.83	-5.44	8.66	5.58	1.95	3.16	0.91	1.00	29.69	0.29	0.32	0.43
3.56	-21.25	6.81	0.26	0.91	-5.43	1.74	6.89	6.66	2.02	3.03	0.90	0.97	29.64	0.30	0.32	0.44
13.58	11.78	-14.13	0.26	3.46	3.00	-3.60	2.11	1.41	1.00	2.89	0.88	0.94	29.59	0.30	0.33	0.45
-10.37	-5.22	-24.02	0.25	-2.64	-1.33	-6.11	2.09	0.67	2.73	2.76	0.86	0.92	29.54	0.31	0.33	0.46
48.60	-16.16	-2.92	0.25	12.35	-4.10	-0.74	1.28	1.32	2.54	2.62	0.85	0.90	29.49	0.32	0.34	0.47
58.44	16.86	7.11	0.25	14.81	4.27	1.80	2.28	2.32	1.69	2.49	0.84	0.87	29.44	0.34	0.35	0.49
-5.61	13.81	-1.86	0.25	-1.42	3.50	-0.47	3.64	4.40	1.00	2.37	0.83	0.86	29.39	0.35	0.36	0.50
-9.53	-5.19	0.18	0.25	-2.41	-1.31	0.05	2.98	5.25	2.73	2.26	0.82	0.84	29.35	0.36	0.37	0.52
3.53	11.82	4.22	0.25	0.89	2.98	1.06	3.80	1.28	2.05	2.15	0.81	0.83	29.30	0.38	0.39	0.54
-2.42	23.76	-9.73	0.25	-0.61	5.98	-2.45	6.12	1.53	1.23	2.06	0.81	0.82	29.25	0.39	0.40	0.56
-9.34	9.71	-19.63	0.25	-2.34	2.44	-4.93	3.04	3.33	0.38	1.97	0.81	0.82	29.20	0.41	0.41	0.58
1.73	-13.26	-16.52	0.25	0.43	-3.32	-4.14	1.17	3.24	1.54	1.89	0.80	0.81	29.15	0.43	0.43	0.60
21.73	-15.19	-23.40	0.25	5.43	-3.80	-5.85	2.43	6.45	3.34	1.82	0.81	0.81	29.10	0.44	0.44	0.63
10.72	-10.12	-21.27	0.25	2.67	-2.53	-5.31	4.98	7.48	3.93	1.77	0.81	0.81	29.05	0.46	0.46	0.65
8.73	-20.05	-11.16	0.25	2.17	-4.99	-2.78	1.95	3.71	4.29	1.72	0.82	0.81	29.00	0.48	0.47	0.67
39.68	-20.95	-4.09	0.25	9.86	-5.21	-1.02	2.47	3.93	1.01	1.68	0.83	0.81	28.96	0.49	0.49	0.69
32.59	-8.87	6.95	0.25	8.08	-2.20	1.72	4.50	2.70	2.47	1.64	0.84	0.82	28.91	0.51	0.50	0.71
-10.40	4.16	11.95	0.25	-2.57	1.03	2.96	5.43	5.25	2.51	1.62	0.85	0.83	28.86	0.52	0.51	0.73
-16.30	11.14	21.92	0.25	-4.03	2.75	5.42	2.05	1.90	2.78	1.60	0.86	0.83	28.81	0.54	0.52	0.75
-16.18	25.09	19.88	0.25	-3.99	6.18	4.90	6.08	0.13	2.06	1.59	0.88	0.84	28.76	0.55	0.53	0.77
-18.06	24.00	4.87	0.25	-4.44	5.90	1.20	5.32	3.68	2.15	1.58	0.89	0.85	28.71	0.57	0.54	0.78
-5.96	-0.03	9.88	0.25	-1.46	-0.01	2.43	4.84	4.95	2.07	1.57	0.91	0.86	28.66	0.58	0.55	0.80
-10.88	14.96	7.89	0.25	-2.66	3.66	1.93	1.56	1.14	2.54	1.57	0.93	0.87	28.61	0.59	0.55	0.81
-35.73	27.89	-2.08	0.24	-8.74	6.82	-0.51	2.15	3.62	1.26	1.57	0.95	0.88	28.56	0.61	0.56	0.82
-34.54	-1.15	1.96	0.24	-8.43	-0.28	0.48	5.15	0.92	1.75	1.57	0.97	0.88	28.52	0.62	0.56	0.84
-36.13	24.31	18.56	0.26	-9.38	6.31	4.82	5.13	2.42	2.83	3.91	1.04	1.19	30.03	0.27	0.30	0.40

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
21.54	7.85	5.99	0.24	5.25	1.91	1.46	2.89	1.69	1.36	1.57	1.00	0.89	28.47	0.63	0.57	0.85
46.46	27.80	0.01	0.24	11.29	6.76	0.00	4.63	2.61	2.61	1.58	1.02	0.90	28.42	0.65	0.57	0.86
13.39	-0.24	-4.94	0.24	3.25	-0.06	-1.20	3.92	1.47	4.01	1.58	1.04	0.90	28.37	0.66	0.57	0.87
17.38	-18.19	4.11	0.24	4.21	-4.40	0.99	5.06	2.58	2.69	1.58	1.06	0.90	28.32	0.67	0.57	0.88
26.34	-18.10	7.13	0.24	6.36	-4.37	1.72	4.34	3.94	2.30	1.58	1.08	0.91	28.27	0.68	0.57	0.89
5.33	-17.01	-2.84	0.24	1.28	-4.10	-0.69	4.52	2.57	4.02	1.58	1.10	0.91	28.22	0.70	0.58	0.91
-13.60	-6.95	19.17	0.24	-3.27	-1.67	4.61	5.88	2.78	3.05	1.58	1.12	0.91	28.17	0.71	0.58	0.92
-19.48	-7.90	27.11	0.24	-4.68	-1.90	6.51	3.20	1.88	2.60	1.57	1.14	0.91	28.13	0.73	0.58	0.93
6.59	0.13	-5.89	0.24	1.58	0.03	-1.41	4.70	1.02	3.69	1.57	1.16	0.91	28.08	0.74	0.58	0.94
-12.34	-9.83	-7.82	0.24	-2.95	-2.35	-1.87	6.52	1.21	3.29	1.56	1.17	0.91	28.03	0.75	0.58	0.95
-42.18	-28.74	2.23	0.24	-10.06	-6.85	0.53	1.45	2.72	3.74	1.55	1.19	0.91	27.98	0.77	0.58	0.96
13.93	3.33	-16.70	0.24	3.31	0.79	-3.97	1.30	2.45	4.31	1.54	1.20	0.91	27.93	0.78	0.59	0.97
5.94	5.33	-25.57	0.24	1.41	1.27	-6.07	1.89	1.44	2.44	1.53	1.21	0.90	27.88	0.79	0.59	0.99
-39.94	-12.64	-11.46	0.24	-9.47	-3.00	-2.72	5.22	2.07	2.53	1.52	1.22	0.90	27.83	0.80	0.59	1.00
9.17	3.39	-4.39	0.24	2.17	0.80	-1.04	3.53	2.76	2.73	1.51	1.23	0.90	27.78	0.81	0.59	1.00
37.13	-6.58	-5.33	0.24	8.76	-1.55	-1.26	3.14	2.00	0.11	1.51	1.24	0.89	27.73	0.82	0.59	1.01
-4.88	-9.53	-0.27	0.24	-1.15	-2.25	-0.06	2.59	2.34	2.45	1.50	1.24	0.89	27.69	0.83	0.60	1.02
-1.82	15.47	4.76	0.24	-0.43	3.64	1.12	1.49	2.24	3.19	1.49	1.24	0.89	27.64	0.83	0.60	1.03
53.13	25.41	10.77	0.23	12.46	5.96	2.52	4.69	2.53	1.71	1.48	1.24	0.89	27.59	0.84	0.60	1.03
39.99	7.36	6.77	0.23	9.36	1.72	1.58	4.23	2.42	1.55	1.47	1.24	0.89	27.54	0.84	0.60	1.04
25.91	-14.61	-6.19	0.23	6.05	-3.41	-1.44	1.41	0.59	2.08	1.46	1.23	0.89	27.49	0.84	0.61	1.04
75.76	14.41	-10.11	0.23	17.65	3.36	-2.36	0.83	2.02	2.40	1.46	1.23	0.89	27.44	0.84	0.61	1.04
17.62	31.33	-21.01	0.23	4.10	7.28	-4.88	4.22	1.10	4.28	1.46	1.22	0.89	27.39	0.84	0.61	1.04
-70.22	-2.71	-31.86	0.23	-16.29	-0.63	-7.39	2.12	1.47	4.59	1.45	1.21	0.90	27.34	0.83	0.62	1.04
-15.00	3.30	-12.73	0.23	-3.47	0.76	-2.95	2.97	1.31	3.56	1.45	1.20	0.90	27.29	0.82	0.62	1.03
17.05	25.26	-0.66	0.23	3.94	5.84	-0.15	4.15	2.84	2.92	1.45	1.18	0.90	27.25	0.82	0.62	1.03
-26.88	-6.76	-14.59	0.23	-6.20	-1.56	-3.36	5.01	5.30	2.92	1.45	1.17	0.91	27.20	0.81	0.63	1.02
3.22	-24.68	7.46	0.23	0.74	-5.68	1.72	2.72	4.08	2.12	1.45	1.15	0.92	27.15	0.79	0.63	1.01
28.20	10.37	23.44	0.23	6.47	2.38	5.38	1.80	2.47	1.98	1.45	1.13	0.92	27.10	0.78	0.64	1.01
-24.75	15.33	-8.55	0.23	-5.67	3.51	-1.96	1.39	1.82	1.39	1.45	1.11	0.93	27.05	0.77	0.64	1.00
-31.59	-23.64	8.50	0.23	-7.22	-5.40	1.94	2.72	1.32	2.30	1.45	1.10	0.94	27.00	0.76	0.65	0.99
21.54	7.85	5.99	0.24	5.25	1.91	1.46	2.89	1.69	1.36	1.57	1.00	0.89	28.47	0.63	0.57	0.85
46.46	27.80	0.01	0.24	11.29	6.76	0.00	4.63	2.61	2.61	1.58	1.02	0.90	28.42	0.65	0.57	0.86

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
23.48	-21.53	37.45	0.23	5.35	-4.91	8.54	1.06	2.97	3.10	1.45	1.08	0.95	26.95	0.74	0.65	0.99
34.41	-0.47	10.39	0.23	7.83	-0.11	2.36	4.18	3.43	2.64	1.45	1.06	0.95	26.90	0.73	0.66	0.98
2.39	-14.42	2.41	0.23	0.54	-3.27	0.55	3.44	2.76	3.23	1.45	1.04	0.96	26.86	0.72	0.66	0.98
7.42	-21.33	8.42	0.23	1.68	-4.83	1.91	3.14	1.97	2.63	1.45	1.02	0.97	26.81	0.70	0.67	0.97
22.41	-3.27	5.44	0.23	5.06	-0.74	1.23	4.03	0.26	3.97	1.44	1.00	0.98	26.76	0.69	0.68	0.97
1.41	-0.24	7.45	0.23	0.32	-0.06	1.68	5.49	2.89	3.55	1.44	0.98	0.99	26.71	0.68	0.69	0.97
-10.52	-20.19	19.44	0.23	-2.37	-4.54	4.37	2.38	2.80	2.74	1.43	0.96	0.99	26.66	0.67	0.69	0.97
17.52	-10.11	36.37	0.22	3.93	-2.27	8.16	3.69	2.87	0.86	1.42	0.95	1.00	26.61	0.66	0.70	0.97
16.50	16.89	25.28	0.22	3.70	3.78	5.66	4.58	2.10	2.62	1.41	0.93	1.01	26.56	0.66	0.71	0.97
-15.45	-0.12	8.26	0.22	-3.45	-0.03	1.85	2.44	3.76	3.74	1.40	0.92	1.01	26.51	0.65	0.72	0.97
-3.37	-1.10	13.25	0.22	-0.75	-0.25	2.96	2.00	4.29	3.66	1.39	0.90	1.02	26.46	0.65	0.73	0.98
-2.30	16.88	7.25	0.22	-0.51	3.76	1.61	5.50	1.94	1.82	1.38	0.89	1.02	26.42	0.65	0.74	0.98
-22.20	-6.12	-7.71	0.22	-4.93	-1.36	-1.71	2.88	1.83	1.37	1.37	0.88	1.03	26.37	0.64	0.75	0.99
-24.06	-9.07	-9.63	0.22	-5.33	-2.01	-2.13	0.83	2.76	2.31	1.35	0.87	1.03	26.32	0.65	0.76	1.00
-25.91	11.94	-16.54	0.22	-5.73	2.64	-3.66	1.16	1.14	0.99	1.34	0.87	1.03	26.27	0.65	0.77	1.01
-8.79	2.92	-26.41	0.22	-1.94	0.64	-5.82	3.30	1.76	2.09	1.32	0.86	1.03	26.22	0.65	0.78	1.02
-5.71	-25.02	-34.25	0.22	-1.26	-5.50	-7.54	1.03	1.14	1.85	1.31	0.86	1.03	26.17	0.66	0.79	1.03
-6.63	-22.90	-30.08	0.22	-1.46	-5.03	-6.60	5.14	2.15	1.04	1.29	0.85	1.04	26.12	0.66	0.80	1.04
18.39	6.15	-21.94	0.22	4.03	1.35	-4.80	3.86	2.77	1.23	1.28	0.85	1.04	26.07	0.67	0.81	1.05
12.38	-2.84	-40.77	0.22	2.71	-0.62	-8.91	2.94	3.55	1.59	1.26	0.85	1.04	26.03	0.67	0.82	1.06
10.39	-14.79	-42.56	0.22	2.26	-3.22	-9.28	2.74	4.89	1.43	1.25	0.85	1.04	25.98	0.68	0.83	1.07
22.37	8.24	-13.41	0.22	4.87	1.79	-2.92	2.24	4.81	0.61	1.24	0.86	1.04	25.93	0.69	0.84	1.09
9.36	6.23	-10.32	0.22	2.03	1.35	-2.24	2.86	2.70	3.36	1.23	0.86	1.03	25.88	0.70	0.84	1.10
2.38	-17.73	-14.23	0.22	0.52	-3.84	-3.08	4.59	3.97	5.40	1.21	0.86	1.03	25.83	0.71	0.85	1.11
4.42	-8.66	5.83	0.22	0.95	-1.87	1.26	4.61	2.69	4.21	1.21	0.87	1.03	25.78	0.72	0.86	1.12
-1.53	13.35	7.85	0.22	-0.33	2.88	1.69	3.41	1.99	2.37	1.20	0.87	1.03	25.73	0.73	0.86	1.13
21.48	4.33	6.86	0.22	4.62	0.93	1.47	1.52	2.36	1.42	1.19	0.88	1.03	25.68	0.74	0.86	1.13
37.41	-6.65	15.85	0.21	8.02	-1.43	3.40	1.61	1.86	2.27	1.18	0.88	1.02	25.63	0.74	0.87	1.14
12.36	12.36	1.86	0.21	2.64	2.64	0.40	1.38	3.22	1.85	1.18	0.89	1.02	25.59	0.75	0.87	1.15
4.37	9.33	-1.10	0.21	0.93	1.99	-0.23	3.33	5.11	0.89	1.18	0.89	1.02	25.54	0.76	0.87	1.15
9.40	-21.63	8.93	0.21	2.00	-4.61	1.90	3.16	1.26	2.17	1.17	0.90	1.01	25.49	0.77	0.86	1.16
23.48	-21.53	37.45	0.23	5.35	-4.91	8.54	1.06	2.97	3.10	1.45	1.08	0.95	26.95	0.74	0.65	0.99
34.41	-0.47	10.39	0.23	7.83	-0.11	2.36	4.18	3.43	2.64	1.45	1.06	0.95	26.90	0.73	0.66	0.98

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
1.42	-13.54	9.93	0.21	0.30	-2.88	2.11	2.80	5.65	1.34	1.17	0.91	1.01	25.44	0.78	0.86	1.16
-20.49	2.50	4.94	0.21	-4.34	0.53	1.05	3.17	2.43	3.71	1.17	0.91	1.00	25.39	0.78	0.86	1.16
-11.37	-21.44	2.97	0.21	-2.41	-4.54	0.63	3.38	2.63	2.51	1.17	0.92	1.00	25.34	0.79	0.85	1.16
27.64	-18.35	18.97	0.21	5.83	-3.87	4.00	3.92	2.49	3.82	1.17	0.93	0.99	25.29	0.79	0.85	1.16
8.62	21.67	29.91	0.21	1.81	4.56	6.30	4.26	4.99	1.65	1.17	0.93	0.99	25.24	0.80	0.84	1.16
-17.31	28.58	20.85	0.21	-3.64	6.00	4.38	4.42	4.71	1.37	1.17	0.94	0.98	25.20	0.80	0.84	1.16
-2.23	12.52	18.81	0.21	-0.47	2.62	3.94	1.55	1.12	1.68	1.17	0.94	0.97	25.15	0.81	0.83	1.16
-2.17	10.49	21.77	0.21	-0.45	2.19	4.55	1.72	2.03	1.60	1.17	0.95	0.96	25.10	0.81	0.82	1.16
-14.08	14.46	16.73	0.21	-2.94	3.01	3.49	2.89	3.03	3.56	1.17	0.96	0.95	25.05	0.82	0.82	1.16
-35.93	-2.55	23.69	0.21	-7.47	-0.53	4.93	8.09	3.66	5.97	1.17	0.97	0.95	25.00	0.83	0.81	1.16
-27.76	-12.50	29.62	0.21	-5.76	-2.59	6.15	13.77	4.17	6.02	1.17	0.97	0.94	24.95	0.83	0.80	1.16
10.33	9.52	1.60	0.21	2.14	1.97	0.33	13.01	3.61	10.32	1.17	0.98	0.93	24.90	0.84	0.79	1.16
-1.64	5.51	-14.33	0.21	-0.34	1.14	-2.96	7.48	1.45	8.94	1.17	0.99	0.92	24.85	0.85	0.79	1.16
7.40	-24.44	5.72	0.21	1.52	-5.03	1.18	3.19	2.91	3.51	1.17	1.00	0.91	24.80	0.85	0.78	1.16
31.37	-23.33	23.70	0.21	6.45	-4.79	4.87	2.64	5.10	1.37	1.17	1.00	0.90	24.76	0.86	0.78	1.16
3.35	-6.25	14.67	0.21	0.69	-1.28	3.01	3.82	1.94	0.74	1.17	1.01	0.90	24.71	0.87	0.77	1.16
-11.58	-18.18	-10.30	0.20	-2.37	-3.72	-2.11	4.54	4.13	2.71	1.17	1.02	0.89	24.66	0.87	0.76	1.16
-2.50	-20.09	0.76	0.20	-0.51	-4.10	0.15	1.36	1.82	1.14	1.17	1.03	0.89	24.61	0.88	0.76	1.16
-1.45	-2.03	1.79	0.20	-0.29	-0.41	0.36	1.43	2.86	3.91	1.17	1.04	0.88	24.56	0.89	0.76	1.17
0.61	-18.97	-30.11	0.20	0.12	-3.85	-6.11	3.12	3.75	3.89	1.17	1.05	0.88	24.51	0.89	0.75	1.17
9.64	-30.85	-16.98	0.20	1.95	-6.25	-3.44	3.49	2.91	0.93	1.18	1.06	0.88	24.46	0.90	0.75	1.17
32.60	15.20	-19.86	0.20	6.59	3.07	-4.01	2.44	1.36	3.24	1.18	1.07	0.88	24.41	0.90	0.75	1.17
32.52	36.12	-50.68	0.20	6.55	7.28	-10.21	3.66	0.90	4.92	1.19	1.08	0.88	24.37	0.91	0.74	1.17
0.50	13.04	-32.47	0.20	0.10	2.62	-6.53	7.61	3.54	2.08	1.20	1.09	0.89	24.32	0.91	0.74	1.17
14.52	12.00	-21.32	0.20	2.91	2.41	-4.28	5.26	2.05	1.70	1.21	1.10	0.90	24.27	0.91	0.74	1.17
23.50	13.97	-28.18	0.20	4.70	2.79	-5.64	4.20	3.36	1.33	1.22	1.11	0.91	24.22	0.91	0.74	1.17
-14.47	1.96	-11.06	0.20	-2.89	0.39	-2.21	14.54	5.46	3.78	1.24	1.12	0.92	24.17	0.90	0.74	1.17
8.59	-10.01	-1.00	0.20	1.71	-1.99	-0.20	6.44	6.48	6.68	1.25	1.12	0.93	24.12	0.90	0.74	1.16
49.52	-20.93	-16.92	0.20	9.83	-4.15	-3.36	4.47	3.56	3.96	1.27	1.13	0.94	24.07	0.89	0.74	1.16
23.42	-28.81	-19.81	0.20	4.64	-5.70	-3.92	8.32	8.05	2.27	1.30	1.14	0.96	24.02	0.88	0.74	1.15
2.42	-29.68	-5.71	0.20	0.48	-5.86	-1.13	9.24	4.65	3.14	1.32	1.15	0.98	23.97	0.87	0.74	1.14
1.42	-13.54	9.93	0.21	0.30	-2.88	2.11	2.80	5.65	1.34	1.17	0.91	1.01	25.44	0.78	0.86	1.16
-20.49	2.50	4.94	0.21	-4.34	0.53	1.05	3.17	2.43	3.71	1.17	0.91	1.00	25.39	0.78	0.86	1.16

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
36.39	12.38	-7.64	0.20	7.17	2.44	-1.51	3.61	2.03	3.52	1.34	1.15	1.00	23.93	0.86	0.74	1.13
39.29	35.30	-8.57	0.20	7.72	6.94	-1.68	0.67	4.87	3.66	1.37	1.16	1.02	23.88	0.84	0.74	1.12
-18.71	8.23	-4.50	0.20	-3.67	1.61	-0.88	7.14	5.96	0.95	1.40	1.16	1.04	23.83	0.83	0.74	1.11
-13.60	26.18	-4.44	0.20	-2.66	5.12	-0.87	5.20	3.98	2.89	1.43	1.17	1.06	23.78	0.82	0.74	1.10
15.45	40.06	1.61	0.20	3.01	7.81	0.31	0.80	2.57	1.79	1.46	1.17	1.08	23.73	0.80	0.74	1.09
-40.45	15.97	7.63	0.19	-7.87	3.11	1.48	4.32	0.88	2.43	1.49	1.18	1.10	23.68	0.79	0.74	1.08
-40.24	24.90	16.62	0.19	-7.81	4.83	3.22	0.32	1.28	2.55	1.52	1.18	1.12	23.63	0.77	0.74	1.07
7.87	36.80	34.56	0.19	1.52	7.12	6.69	8.81	4.23	9.94	1.55	1.18	1.14	23.58	0.76	0.74	1.06
-25.05	26.68	37.46	0.19	-4.83	5.15	7.23	8.38	3.09	4.85	1.59	1.19	1.16	23.54	0.75	0.73	1.05
-31.88	-2.35	26.37	0.19	-6.14	-0.45	5.08	8.37	3.15	4.58	1.62	1.19	1.18	23.49	0.74	0.73	1.04
9.21	-30.27	29.30	0.19	1.77	-5.81	5.63	5.97	1.90	6.20	1.65	1.19	1.20	23.44	0.72	0.73	1.03
10.22	-27.13	33.22	0.19	1.96	-5.20	6.36	5.24	1.95	2.10	1.68	1.19	1.21	23.39	0.71	0.72	1.02
-7.74	-29.00	22.14	0.19	-1.48	-5.54	4.23	4.84	2.42	0.18	1.70	1.20	1.23	23.34	0.70	0.72	1.01
-11.65	-20.89	18.10	0.19	-2.22	-3.98	3.45	3.75	1.59	1.97	1.73	1.20	1.24	23.29	0.69	0.72	1.00
-6.56	2.17	22.06	0.19	-1.25	0.41	4.19	1.33	1.01	0.83	1.76	1.21	1.25	23.24	0.69	0.71	0.99
-26.45	-0.82	10.04	0.19	-5.01	-0.15	1.90	5.51	1.99	1.29	1.78	1.21	1.26	23.19	0.68	0.71	0.98
-37.27	-17.76	-5.93	0.19	-7.04	-3.36	-1.12	2.49	1.82	3.54	1.81	1.22	1.27	23.14	0.67	0.70	0.97
-1.14	-14.68	6.11	0.19	-0.22	-2.77	1.15	1.63	0.63	2.98	1.83	1.22	1.27	23.10	0.67	0.70	0.97
2.90	-0.63	15.11	0.19	0.55	-0.12	2.84	3.88	4.45	0.45	1.85	1.23	1.27	23.05	0.67	0.69	0.96
-19.02	-8.60	5.11	0.19	-3.57	-1.61	0.96	2.23	2.03	1.62	1.86	1.24	1.28	23.00	0.66	0.68	0.95
-10.91	-5.55	14.11	0.19	-2.04	-1.04	2.64	3.75	2.77	0.77	1.88	1.24	1.28	22.95	0.66	0.68	0.95
-6.82	3.47	11.10	0.19	-1.27	0.65	2.07	4.05	2.60	2.34	1.90	1.25	1.27	22.90	0.66	0.67	0.94
3.24	-24.47	-9.87	0.19	0.60	-4.55	-1.84	5.33	1.61	5.40	1.91	1.26	1.27	22.85	0.66	0.67	0.94
26.23	-23.35	-7.79	0.19	4.87	-4.33	-1.45	2.79	2.39	5.58	1.92	1.27	1.27	22.80	0.66	0.66	0.93
15.19	-5.28	-12.71	0.19	2.81	-0.98	-2.35	5.91	5.94	3.03	1.93	1.27	1.27	22.75	0.66	0.66	0.93
17.18	-16.22	-15.61	0.18	3.17	-2.99	-2.88	9.76	6.25	8.92	1.94	1.28	1.26	22.71	0.66	0.65	0.92
50.09	-7.15	-6.53	0.18	9.22	-1.32	-1.20	2.50	4.38	6.69	1.95	1.28	1.26	22.66	0.66	0.65	0.92
28.98	5.87	-15.45	0.18	5.32	1.08	-2.83	9.15	4.76	5.65	1.96	1.28	1.26	22.61	0.66	0.64	0.92
15.94	14.85	-11.35	0.18	2.92	2.72	-2.08	1.98	5.89	5.79	1.96	1.29	1.25	22.56	0.65	0.64	0.91
43.87	15.80	-7.27	0.18	8.01	2.88	-1.33	5.57	3.70	6.30	1.97	1.29	1.25	22.51	0.65	0.64	0.91
23.78	-18.17	-14.19	0.18	4.33	-3.31	-2.58	0.75	4.65	1.40	1.97	1.28	1.25	22.46	0.65	0.63	0.91
36.39	12.38	-7.64	0.20	7.17	2.44	-1.51	3.61	2.03	3.52	1.34	1.15	1.00	23.93	0.86	0.74	1.13
39.29	35.30	-8.57	0.20	7.72	6.94	-1.68	0.67	4.87	3.66	1.37	1.16	1.02	23.88	0.84	0.74	1.12

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-2.21	-23.07	0.88	0.18	-0.40	-4.19	0.16	3.39	5.86	2.62	1.97	1.28	1.24	22.41	0.65	0.63	0.91
1.84	8.97	-1.08	0.18	0.33	1.62	-0.20	2.31	2.22	2.56	1.96	1.28	1.24	22.36	0.65	0.63	0.91
8.86	12.95	-3.03	0.18	1.60	2.34	-0.55	6.61	1.77	2.92	1.96	1.27	1.24	22.31	0.65	0.63	0.90
7.88	6.93	8.99	0.18	1.42	1.25	1.62	5.95	3.04	1.28	1.95	1.26	1.23	22.27	0.65	0.63	0.90
-12.07	13.90	-4.97	0.18	-2.17	2.50	-0.89	6.14	1.62	2.99	1.95	1.25	1.23	22.22	0.64	0.63	0.90
-3.99	13.87	-7.91	0.18	-0.71	2.48	-1.42	2.19	0.70	4.77	1.94	1.24	1.23	22.17	0.64	0.63	0.90
-0.93	8.84	6.14	0.18	-0.17	1.58	1.10	2.09	2.52	0.86	1.93	1.23	1.23	22.12	0.64	0.64	0.90
-26.83	15.81	-0.83	0.18	-4.78	2.81	-0.15	3.03	4.50	4.21	1.91	1.22	1.23	22.07	0.64	0.64	0.90
-5.71	30.73	-5.78	0.18	-1.01	5.45	-1.03	4.07	3.75	3.45	1.90	1.20	1.23	22.02	0.63	0.65	0.90
0.35	14.66	2.27	0.18	0.06	2.59	0.40	1.43	1.21	1.35	1.89	1.19	1.23	21.97	0.63	0.65	0.91
-3.60	1.64	1.30	0.18	-0.64	0.29	0.23	8.79	3.61	0.78	1.87	1.18	1.23	21.92	0.63	0.66	0.91
12.43	22.61	5.33	0.18	2.19	3.98	0.94	0.56	2.17	2.79	1.85	1.17	1.23	21.88	0.63	0.66	0.92
-8.53	0.58	19.32	0.18	-1.50	0.10	3.39	4.56	3.20	2.86	1.84	1.16	1.23	21.83	0.63	0.67	0.92
-2.46	-31.34	29.26	0.18	-0.43	-5.48	5.12	5.09	3.94	0.43	1.82	1.15	1.23	21.78	0.63	0.68	0.93
-10.38	-17.22	26.19	0.17	-1.81	-3.01	4.57	3.61	1.92	1.22	1.80	1.14	1.24	21.73	0.63	0.69	0.94
-49.22	-10.15	18.14	0.17	-8.56	-1.77	3.16	1.84	0.67	1.13	1.79	1.14	1.24	21.68	0.64	0.70	0.94
-27.01	-9.10	13.12	0.17	-4.69	-1.58	2.28	6.22	4.39	3.24	1.77	1.14	1.25	21.63	0.64	0.71	0.95
0.09	-1.06	1.13	0.17	0.02	-0.18	0.19	4.28	2.60	3.50	1.75	1.14	1.25	21.58	0.65	0.72	0.97
2.13	1.96	-6.82	0.17	0.37	0.34	-1.18	4.30	0.41	1.83	1.74	1.14	1.26	21.53	0.65	0.73	0.98
-12.80	-6.02	1.23	0.17	-2.20	-1.03	0.21	14.13	2.62	7.65	1.72	1.14	1.27	21.48	0.66	0.73	0.99
-25.67	-16.95	4.26	0.17	-4.40	-2.91	0.73	3.08	0.56	6.48	1.71	1.14	1.27	21.44	0.67	0.74	1.00
13.40	2.10	-11.69	0.17	2.29	0.36	-2.00	2.51	1.79	2.44	1.70	1.15	1.28	21.39	0.68	0.75	1.01
18.39	8.09	-24.58	0.17	3.14	1.38	-4.19	2.15	3.85	1.52	1.69	1.16	1.28	21.34	0.69	0.76	1.03
2.39	-12.88	-18.45	0.17	0.41	-2.19	-3.14	3.16	4.87	2.46	1.68	1.17	1.29	21.29	0.70	0.77	1.04
32.37	-21.79	-7.36	0.17	5.49	-3.69	-1.25	1.43	1.77	1.90	1.67	1.17	1.30	21.24	0.70	0.78	1.05
18.32	-33.66	-4.30	0.17	3.10	-5.69	-0.73	3.61	2.29	1.61	1.66	1.18	1.30	21.19	0.71	0.78	1.06
15.30	-43.49	-0.25	0.17	2.58	-7.33	-0.04	3.64	4.71	1.73	1.65	1.19	1.30	21.14	0.72	0.79	1.07
53.21	-26.33	-1.21	0.17	8.94	-4.42	-0.20	5.59	4.25	0.96	1.64	1.20	1.30	21.09	0.73	0.79	1.08
24.11	-6.24	-10.14	0.17	4.04	-1.05	-1.70	2.29	2.59	1.86	1.64	1.20	1.30	21.04	0.74	0.80	1.08
-10.87	-7.20	-29.02	0.17	-1.82	-1.20	-4.85	1.29	4.67	3.23	1.63	1.21	1.30	21.00	0.74	0.80	1.09
-4.79	-20.12	-15.89	0.17	-0.80	-3.35	-2.65	2.04	5.63	3.51	1.63	1.21	1.30	20.95	0.75	0.80	1.09
-2.21	-23.07	0.88	0.18	-0.40	-4.19	0.16	3.39	5.86	2.62	1.97	1.28	1.24	22.41	0.65	0.63	0.91
1.84	8.97	-1.08	0.18	0.33	1.62	-0.20	2.31	2.22	2.56	1.96	1.28	1.24	22.36	0.65	0.63	0.91

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
14.23	-11.04	12.15	0.17	2.36	-1.83	2.02	4.26	4.49	1.89	1.62	1.21	1.29	20.90	0.75	0.80	1.09
19.21	15.97	-2.82	0.17	3.18	2.64	-0.47	0.78	5.79	2.35	1.62	1.21	1.28	20.85	0.75	0.79	1.09
-3.77	26.90	15.19	0.17	-0.62	4.44	2.51	3.36	3.83	2.05	1.61	1.21	1.27	20.80	0.75	0.79	1.09
5.28	35.79	36.13	0.16	0.87	5.89	5.94	2.13	1.40	2.22	1.61	1.21	1.26	20.75	0.75	0.78	1.08
32.25	33.67	9.08	0.16	5.29	5.52	1.49	4.23	2.30	0.79	1.61	1.20	1.25	20.70	0.75	0.78	1.08
18.19	9.60	8.08	0.16	2.97	1.57	1.32	0.91	2.92	3.22	1.60	1.20	1.23	20.65	0.75	0.77	1.07
13.18	3.60	12.08	0.16	2.15	0.59	1.97	1.54	2.85	4.06	1.60	1.19	1.22	20.61	0.74	0.76	1.06
38.12	21.56	3.09	0.16	6.19	3.50	0.50	3.93	2.66	2.01	1.60	1.18	1.20	20.56	0.74	0.75	1.05
11.07	20.50	5.11	0.16	1.79	3.32	0.83	5.04	2.62	1.81	1.59	1.17	1.19	20.51	0.73	0.74	1.05
-10.88	1.47	1.14	0.16	-1.76	0.24	0.18	6.90	3.68	2.67	1.59	1.16	1.17	20.46	0.73	0.74	1.04
3.18	1.48	5.17	0.16	0.51	0.24	0.83	2.82	2.30	2.27	1.58	1.15	1.15	20.41	0.73	0.73	1.03
-18.74	13.47	5.19	0.16	-3.01	2.16	0.83	4.27	2.58	1.77	1.58	1.14	1.13	20.36	0.72	0.72	1.02
-30.60	6.45	-7.77	0.16	-4.90	1.03	-1.24	5.81	3.96	2.35	1.57	1.13	1.12	20.31	0.72	0.71	1.01
-31.43	-0.54	2.28	0.16	-5.01	-0.09	0.36	0.53	4.10	0.17	1.57	1.12	1.10	20.26	0.72	0.70	1.01
-15.29	24.43	17.28	0.16	-2.43	3.88	2.75	3.11	2.39	5.25	1.56	1.12	1.09	20.21	0.72	0.70	1.00
3.78	28.34	21.24	0.16	0.60	4.49	3.37	1.78	2.96	5.37	1.55	1.11	1.07	20.17	0.72	0.69	1.00
-1.17	10.28	29.18	0.16	-0.19	1.62	4.61	3.58	4.52	4.30	1.54	1.11	1.06	20.12	0.72	0.69	0.99
9.86	15.25	25.11	0.16	1.55	2.40	3.96	0.40	3.90	2.35	1.53	1.11	1.05	20.07	0.72	0.68	0.99
-42.03	7.22	13.07	0.16	-6.60	1.13	2.05	3.59	5.86	7.71	1.52	1.11	1.03	20.02	0.73	0.68	0.99
-68.76	-16.75	13.06	0.16	-10.76	-2.62	2.04	1.33	6.11	2.08	1.51	1.11	1.02	19.97	0.73	0.68	1.00
-2.57	-28.64	6.06	0.16	-0.40	-4.47	0.95	2.13	4.59	0.88	1.50	1.11	1.01	19.92	0.74	0.68	1.00
-16.48	-35.49	0.09	0.16	-2.56	-5.52	0.01	3.88	2.01	0.25	1.48	1.12	1.01	19.87	0.75	0.68	1.01
-25.35	-31.34	-4.87	0.16	-3.93	-4.86	-0.75	5.04	1.12	3.07	1.47	1.12	1.00	19.82	0.76	0.68	1.02
16.71	-22.21	-29.76	0.15	2.58	-3.43	-4.60	7.51	2.34	3.96	1.45	1.13	0.99	19.78	0.78	0.68	1.04
-6.26	-12.13	-38.58	0.15	-0.96	-1.87	-5.94	4.56	0.92	4.18	1.43	1.14	0.99	19.73	0.79	0.69	1.05
-8.18	-14.06	-32.40	0.15	-1.26	-2.16	-4.97	3.24	3.04	2.48	1.42	1.15	0.98	19.68	0.81	0.69	1.07
5.87	-26.95	-33.23	0.15	0.90	-4.12	-5.08	3.17	3.55	1.83	1.40	1.16	0.98	19.63	0.83	0.70	1.08
-7.08	-10.86	-2.12	0.15	-1.08	-1.66	-0.32	3.34	2.86	4.25	1.38	1.17	0.97	19.58	0.85	0.70	1.10
20.94	24.13	17.89	0.15	3.18	3.67	2.72	2.65	1.97	3.28	1.37	1.18	0.97	19.53	0.86	0.71	1.12
33.88	31.04	-5.10	0.15	5.13	4.70	-0.77	4.13	3.19	1.13	1.35	1.19	0.97	19.48	0.88	0.71	1.14
26.81	23.95	-9.03	0.15	4.05	3.62	-1.36	3.58	3.30	1.85	1.34	1.20	0.96	19.43	0.90	0.72	1.16
14.23	-11.04	12.15	0.17	2.36	-1.83	2.02	4.26	4.49	1.89	1.62	1.21	1.29	20.90	0.75	0.80	1.09
19.21	15.97	-2.82	0.17	3.18	2.64	-0.47	0.78	5.79	2.35	1.62	1.21	1.28	20.85	0.75	0.79	1.09

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
35.73	16.89	1.03	0.15	5.38	2.54	0.15	6.75	4.11	2.73	1.32	1.22	0.96	19.38	0.92	0.73	1.18
7.69	6.86	4.05	0.15	1.15	1.03	0.61	2.46	3.72	0.86	1.31	1.23	0.96	19.34	0.94	0.74	1.19
-2.27	10.84	9.07	0.15	-0.34	1.62	1.36	4.64	3.14	0.85	1.29	1.24	0.97	19.29	0.96	0.75	1.21
8.76	12.81	15.06	0.15	1.31	1.91	2.24	3.69	3.60	2.48	1.28	1.24	0.97	19.24	0.97	0.76	1.23
-0.21	9.78	7.05	0.15	-0.03	1.45	1.05	3.54	2.47	3.69	1.27	1.25	0.97	19.19	0.99	0.76	1.25
39.76	20.74	-15.89	0.15	5.88	3.07	-2.35	2.55	1.33	2.52	1.26	1.26	0.97	19.14	1.00	0.77	1.26
34.66	10.69	-11.80	0.15	5.11	1.58	-1.74	2.29	0.87	3.20	1.25	1.26	0.98	19.09	1.01	0.78	1.28
10.61	-1.31	3.26	0.15	1.56	-0.19	0.48	4.26	1.06	1.98	1.25	1.27	0.98	19.04	1.02	0.79	1.29
42.55	6.70	-4.70	0.15	6.23	0.98	-0.69	6.64	0.97	1.56	1.24	1.27	0.99	18.99	1.02	0.79	1.30
24.46	-0.30	-7.63	0.15	3.57	-0.04	-1.11	5.59	4.21	2.94	1.24	1.27	0.99	18.95	1.03	0.80	1.30
35.39	8.70	10.40	0.15	5.15	1.27	1.51	4.54	2.85	1.44	1.24	1.28	1.00	18.90	1.03	0.81	1.31
45.27	28.65	25.37	0.15	6.56	4.15	3.68	2.29	1.38	2.23	1.24	1.28	1.01	18.85	1.03	0.81	1.31
-23.72	1.60	17.32	0.14	-3.43	0.23	2.50	2.87	2.53	2.03	1.24	1.27	1.01	18.80	1.03	0.82	1.31
-39.55	-18.35	9.31	0.14	-5.70	-2.64	1.34	4.04	1.89	0.49	1.24	1.27	1.02	18.75	1.02	0.82	1.31
-46.33	9.69	17.29	0.14	-6.65	1.39	2.48	3.98	1.98	1.37	1.25	1.27	1.03	18.70	1.02	0.82	1.31
-53.09	15.65	8.28	0.14	-7.59	2.24	1.18	2.28	2.94	1.10	1.25	1.27	1.03	18.65	1.01	0.82	1.30
-13.91	-21.32	-12.67	0.14	-1.98	-3.04	-1.81	3.09	3.02	1.01	1.26	1.26	1.04	18.60	1.00	0.82	1.29
-9.81	-32.19	-8.59	0.14	-1.39	-4.57	-1.22	4.43	2.60	1.09	1.27	1.26	1.04	18.55	0.99	0.82	1.29
-15.71	-14.08	-3.53	0.14	-2.22	-1.99	-0.50	2.81	2.18	1.17	1.28	1.25	1.04	18.51	0.98	0.82	1.28
-17.60	-22.99	-15.45	0.14	-2.48	-3.24	-2.18	1.07	2.52	1.42	1.29	1.24	1.05	18.46	0.97	0.81	1.26
-17.48	-28.87	-5.37	0.14	-2.46	-4.06	-0.75	3.47	3.86	0.95	1.30	1.24	1.05	18.41	0.95	0.81	1.25
2.60	-1.79	7.67	0.14	0.36	-0.25	1.07	5.11	0.45	0.34	1.31	1.23	1.05	18.36	0.94	0.80	1.23
-4.35	8.22	-5.30	0.14	-0.61	1.15	-0.74	3.54	3.75	1.17	1.32	1.22	1.04	18.31	0.92	0.79	1.22
-1.30	-14.75	-2.25	0.14	-0.18	-2.05	-0.31	5.20	3.31	1.49	1.33	1.21	1.04	18.26	0.91	0.78	1.20
29.70	-27.65	4.79	0.14	4.11	-3.83	0.66	4.65	3.40	4.67	1.34	1.20	1.03	18.21	0.89	0.77	1.18
-4.31	-20.53	-3.18	0.14	-0.59	-2.83	-0.44	6.63	2.17	4.84	1.35	1.18	1.03	18.16	0.88	0.76	1.16
-48.16	-24.42	-7.12	0.14	-6.62	-3.36	-0.98	4.19	2.66	1.40	1.36	1.17	1.02	18.12	0.86	0.75	1.14
-31.95	-32.29	-6.05	0.14	-4.38	-4.42	-0.83	1.75	0.71	2.41	1.37	1.16	1.01	18.07	0.84	0.74	1.12
-21.79	-25.16	-3.99	0.14	-2.97	-3.43	-0.54	2.36	3.61	2.68	1.38	1.14	1.00	18.02	0.83	0.72	1.10
-12.68	-21.04	-22.90	0.14	-1.72	-2.86	-3.11	3.97	5.52	4.03	1.39	1.13	0.98	17.97	0.81	0.71	1.08
4.39	-5.97	-37.74	0.14	0.59	-0.81	-5.11	2.53	2.89	4.43	1.40	1.12	0.97	17.92	0.80	0.69	1.06
35.73	16.89	1.03	0.15	5.38	2.54	0.15	6.75	4.11	2.73	1.32	1.22	0.96	19.38	0.92	0.73	1.18
7.69	6.86	4.05	0.15	1.15	1.03	0.61	2.46	3.72	0.86	1.31	1.23	0.96	19.34	0.94	0.74	1.19

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
18.39	13.03	-27.57	0.14	2.48	1.76	-3.72	5.04	6.91	12.68	1.41	1.10	0.96	17.87	0.78	0.68	1.04
23.36	18.99	-19.43	0.13	3.14	2.55	-2.61	5.16	6.40	10.06	1.41	1.09	0.94	17.82	0.77	0.67	1.02
-6.63	27.92	-17.32	0.13	-0.89	3.74	-2.32	4.24	1.59	3.96	1.42	1.07	0.92	17.77	0.76	0.65	1.00
22.39	29.82	4.75	0.13	2.99	3.98	0.63	8.24	7.28	7.75	1.43	1.06	0.91	17.72	0.74	0.64	0.98
59.27	36.70	25.73	0.13	7.88	4.88	3.42	0.73	7.43	6.52	1.43	1.05	0.89	17.68	0.73	0.62	0.96
1.19	41.57	16.68	0.13	0.16	5.51	2.21	4.89	2.17	2.59	1.43	1.04	0.88	17.63	0.72	0.61	0.95
12.21	8.48	18.65	0.13	1.61	1.12	2.46	1.52	4.12	2.01	1.44	1.03	0.86	17.58	0.71	0.60	0.93
49.14	-16.48	28.59	0.13	6.46	-2.17	3.76	2.37	1.75	0.43	1.44	1.02	0.85	17.53	0.71	0.59	0.92
-11.89	-2.43	26.52	0.13	-1.56	-0.32	3.47	2.35	2.33	1.70	1.44	1.01	0.84	17.48	0.70	0.58	0.91
-25.77	6.58	27.45	0.13	-3.36	0.86	3.58	1.61	2.64	5.62	1.44	1.00	0.82	17.43	0.69	0.57	0.90
22.29	9.57	14.41	0.13	2.90	1.24	1.87	2.48	2.08	5.76	1.44	1.00	0.82	17.38	0.69	0.57	0.89
25.24	12.54	-9.56	0.13	3.27	1.62	-1.24	2.87	4.61	3.15	1.44	0.99	0.81	17.33	0.69	0.56	0.89
-11.74	15.50	-24.46	0.13	-1.51	2.00	-3.15	2.55	3.26	3.44	1.44	0.99	0.81	17.29	0.69	0.56	0.89
-27.62	21.45	-15.34	0.13	-3.55	2.76	-1.97	0.49	3.03	4.83	1.44	0.99	0.81	17.24	0.69	0.56	0.89
-4.51	13.40	8.72	0.13	-0.58	1.71	1.12	1.42	3.77	2.03	1.44	1.00	0.81	17.19	0.69	0.56	0.89
3.54	13.36	16.70	0.13	0.45	1.70	2.13	3.23	1.89	1.74	1.44	1.00	0.82	17.14	0.70	0.57	0.90
-8.40	19.31	16.68	0.13	-1.07	2.45	2.12	3.20	1.81	0.49	1.44	1.01	0.83	17.09	0.70	0.58	0.91
4.65	15.26	28.62	0.13	0.59	1.93	3.62	1.39	0.17	1.38	1.44	1.02	0.84	17.04	0.71	0.59	0.92
16.66	8.23	33.54	0.13	2.10	1.04	4.23	3.18	2.37	2.72	1.44	1.03	0.86	16.99	0.72	0.60	0.94
-10.31	-9.75	8.49	0.13	-1.29	-1.22	1.07	2.55	1.23	1.83	1.43	1.04	0.88	16.94	0.73	0.62	0.95
-39.16	-30.65	-6.47	0.13	-4.90	-3.83	-0.81	4.36	4.26	2.83	1.43	1.06	0.91	16.89	0.74	0.64	0.97
-41.95	-16.54	10.56	0.12	-5.22	-2.06	1.31	4.46	4.27	3.69	1.43	1.07	0.94	16.85	0.75	0.66	1.00
-36.75	2.51	13.55	0.12	-4.56	0.31	1.68	4.09	7.89	2.57	1.43	1.09	0.97	16.80	0.76	0.68	1.02
-34.56	-4.47	-4.43	0.12	-4.27	-0.55	-0.55	5.15	6.11	3.98	1.42	1.11	1.01	16.75	0.78	0.71	1.05
-15.41	-0.44	-6.37	0.12	-1.90	-0.05	-0.78	0.66	9.34	18.46	1.42	1.13	1.04	16.70	0.79	0.73	1.08
-4.32	5.56	-3.32	0.12	-0.53	0.68	-0.41	11.32	16.70	34.74	1.42	1.15	1.08	16.65	0.81	0.76	1.11
-19.23	-1.43	-17.24	0.12	-2.35	-0.17	-2.10	12.97	12.57	13.36	1.41	1.17	1.12	16.60	0.83	0.79	1.15
-8.12	-4.40	-11.14	0.12	-0.99	-0.53	-1.35	7.43	14.24	8.30	1.40	1.19	1.16	16.55	0.85	0.82	1.18
5.93	0.63	-2.08	0.12	0.72	0.08	-0.25	5.09	13.50	5.63	1.40	1.21	1.19	16.50	0.86	0.85	1.21
-9.02	4.64	-20.99	0.12	-1.09	0.56	-2.53	3.11	1.01	3.12	1.39	1.22	1.23	16.46	0.88	0.89	1.25
16.02	-14.33	-17.88	0.12	1.92	-1.72	-2.15	3.51	2.77	1.62	1.38	1.24	1.27	16.41	0.90	0.92	1.29
18.39	13.03	-27.57	0.14	2.48	1.76	-3.72	5.04	6.91	12.68	1.41	1.10	0.96	17.87	0.78	0.68	1.04
23.36	18.99	-19.43	0.13	3.14	2.55	-2.61	5.16	6.40	10.06	1.41	1.09	0.94	17.82	0.77	0.67	1.02

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
33.96	-32.22	-9.78	0.12	4.06	-3.85	-1.17	2.75	1.57	1.77	1.37	1.26	1.31	16.36	0.92	0.96	1.33
4.93	-22.09	-17.69	0.12	0.59	-2.63	-2.10	2.62	4.08	0.75	1.36	1.28	1.35	16.31	0.94	0.99	1.36
0.97	-30.96	-12.59	0.12	0.11	-3.67	-1.49	3.17	1.81	1.09	1.35	1.30	1.38	16.26	0.96	1.02	1.40
-3.98	-42.80	-21.48	0.12	-0.47	-5.05	-2.53	2.56	4.05	1.52	1.34	1.31	1.41	16.21	0.98	1.05	1.44
29.02	-7.68	-31.33	0.12	3.41	-0.90	-3.68	3.29	6.18	2.14	1.33	1.33	1.44	16.16	1.00	1.09	1.48
58.89	23.31	-27.18	0.12	6.89	2.73	-3.18	6.96	2.05	2.49	1.32	1.35	1.47	16.11	1.02	1.12	1.51
-6.17	14.25	-38.01	0.12	-0.72	1.66	-4.43	12.05	10.71	7.31	1.31	1.37	1.50	16.06	1.04	1.14	1.55
-13.08	16.21	-35.82	0.12	-1.52	1.88	-4.15	27.39	38.48	18.82	1.30	1.38	1.53	16.02	1.06	1.17	1.58
5.98	28.14	-24.66	0.12	0.69	3.25	-2.85	16.58	23.51	11.64	1.30	1.40	1.55	15.97	1.08	1.20	1.61
-28.93	12.08	-20.53	0.12	-3.33	1.39	-2.36	7.08	2.93	4.96	1.29	1.42	1.58	15.92	1.10	1.22	1.65
13.15	4.06	-1.44	0.11	1.51	0.47	-0.17	2.57	3.22	6.01	1.29	1.45	1.61	15.87	1.12	1.24	1.68
62.05	18.04	7.59	0.11	7.07	2.06	0.86	7.08	9.83	4.29	1.29	1.47	1.63	15.82	1.14	1.27	1.70
44.88	1.02	-1.38	0.11	5.09	0.12	-0.16	6.31	7.25	0.77	1.30	1.50	1.66	15.77	1.16	1.28	1.73
19.80	-26.91	-7.33	0.11	2.24	-3.04	-0.83	1.08	2.68	3.96	1.31	1.54	1.69	15.72	1.18	1.30	1.75
1.80	-6.83	1.73	0.11	0.20	-0.77	0.19	3.95	2.78	4.67	1.32	1.58	1.73	15.67	1.20	1.31	1.77
5.83	10.19	4.75	0.11	0.65	1.14	0.53	3.97	0.60	4.06	1.34	1.62	1.76	15.63	1.21	1.32	1.79
-14.11	-7.80	-2.21	0.11	-1.57	-0.87	-0.25	0.35	4.07	4.12	1.36	1.67	1.79	15.58	1.23	1.32	1.80
-23.98	-13.74	6.82	0.11	-2.66	-1.53	0.76	4.06	4.78	3.89	1.38	1.71	1.83	15.53	1.24	1.32	1.81
25.06	-6.68	10.83	0.11	2.77	-0.74	1.20	3.61	2.12	6.69	1.41	1.77	1.87	15.48	1.25	1.32	1.82
21.02	1.35	21.80	0.11	2.31	0.15	2.40	2.64	3.96	4.78	1.45	1.82	1.90	15.43	1.26	1.31	1.82
-24.93	8.35	41.71	0.11	-2.73	0.91	4.57	5.45	2.73	3.60	1.48	1.88	1.94	15.38	1.27	1.31	1.82
-12.81	17.31	41.59	0.11	-1.40	1.89	4.53	4.30	1.30	5.18	1.53	1.94	1.98	15.33	1.27	1.29	1.82
2.26	25.25	49.44	0.11	0.25	2.74	5.36	1.91	4.01	6.52	1.57	2.01	2.01	15.28	1.28	1.28	1.81
-11.68	6.20	50.28	0.11	-1.26	0.67	5.43	2.78	5.04	2.74	1.62	2.08	2.05	15.23	1.28	1.27	1.80
-12.58	-13.76	32.16	0.11	-1.35	-1.48	3.46	5.29	4.96	4.91	1.67	2.15	2.09	15.19	1.29	1.25	1.79
-20.47	-11.69	17.10	0.11	-2.19	-1.25	1.83	3.35	1.84	4.74	1.72	2.22	2.12	15.14	1.29	1.23	1.78
-38.30	-22.61	6.09	0.11	-4.08	-2.41	0.65	2.74	3.50	6.25	1.78	2.29	2.15	15.09	1.29	1.21	1.76
-43.09	-39.46	8.10	0.11	-4.57	-4.18	0.86	2.97	3.27	3.12	1.84	2.36	2.18	15.04	1.28	1.19	1.75
-29.90	-23.32	10.10	0.11	-3.15	-2.46	1.07	2.44	1.25	3.81	1.89	2.42	2.21	14.99	1.28	1.17	1.73
4.20	-16.22	6.10	0.11	0.44	-1.70	0.64	1.58	1.60	3.85	1.94	2.48	2.22	14.94	1.28	1.14	1.71
13.21	-28.11	1.13	0.10	1.38	-2.94	0.12	2.80	1.42	2.83	2.00	2.54	2.24	14.89	1.27	1.12	1.70
33.96	-32.22	-9.78	0.12	4.06	-3.85	-1.17	2.75	1.57	1.77	1.37	1.26	1.31	16.36	0.92	0.96	1.33
4.93	-22.09	-17.69	0.12	0.59	-2.63	-2.10	2.62	4.08	0.75	1.36	1.28	1.35	16.31	0.94	0.99	1.36

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
9.21	-5.03	-6.82	0.10	0.96	-0.52	-0.71	1.37	2.87	4.24	2.04	2.58	2.25	14.84	1.27	1.10	1.68
20.20	7.99	-3.76	0.10	2.09	0.83	-0.39	5.01	2.49	5.00	2.09	2.63	2.25	14.79	1.26	1.08	1.66
-19.75	-9.99	4.27	0.10	-2.03	-1.03	0.44	5.34	2.76	1.23	2.13	2.66	2.25	14.75	1.25	1.06	1.64
-29.60	-6.94	5.29	0.10	-3.03	-0.71	0.54	6.18	1.03	2.80	2.16	2.69	2.25	14.70	1.25	1.04	1.62
24.45	15.07	3.31	0.10	2.49	1.54	0.34	4.08	2.28	4.67	2.19	2.71	2.24	14.65	1.24	1.02	1.60
2.45	10.03	-6.64	0.10	0.25	1.02	-0.67	5.25	2.61	5.98	2.21	2.72	2.23	14.60	1.23	1.01	1.59
0.49	-16.93	-18.55	0.10	0.05	-1.71	-1.87	4.57	2.10	4.57	2.23	2.73	2.21	14.55	1.22	0.99	1.57
41.45	-5.87	-15.45	0.10	4.17	-0.59	-1.55	6.88	2.27	3.21	2.24	2.72	2.20	14.50	1.21	0.98	1.56
3.41	16.13	-23.33	0.10	0.34	1.61	-2.33	5.31	3.17	3.26	2.25	2.71	2.18	14.45	1.20	0.97	1.54
-11.53	-2.88	-38.17	0.10	-1.15	-0.29	-3.80	2.16	1.59	2.08	2.25	2.68	2.15	14.40	1.19	0.96	1.53
21.50	-3.84	-30.99	0.10	2.13	-0.38	-3.07	3.64	0.62	3.00	2.24	2.65	2.13	14.36	1.18	0.95	1.52
20.46	27.13	-17.85	0.10	2.02	2.67	-1.76	6.04	2.40	2.13	2.22	2.61	2.10	14.31	1.17	0.95	1.51
15.44	23.05	-11.75	0.10	1.51	2.26	-1.15	4.01	5.41	2.25	2.20	2.55	2.07	14.26	1.16	0.94	1.50
-1.54	3.01	-11.67	0.10	-0.15	0.29	-1.14	2.30	3.20	4.78	2.17	2.49	2.04	14.21	1.15	0.94	1.49
-15.46	16.00	-16.57	0.10	-1.50	1.55	-1.61	2.71	2.38	4.72	2.13	2.43	2.01	14.16	1.14	0.94	1.48
-8.37	33.91	-24.45	0.10	-0.81	3.27	-2.36	2.64	4.34	3.09	2.09	2.36	1.98	14.11	1.13	0.95	1.47
2.69	32.80	-21.32	0.10	0.26	3.15	-2.05	2.22	2.12	3.96	2.05	2.28	1.95	14.06	1.11	0.95	1.47
49.63	24.70	-11.21	0.10	4.74	2.36	-1.07	6.19	1.39	1.83	2.01	2.20	1.93	14.01	1.10	0.96	1.46
53.47	33.60	-13.12	0.10	5.08	3.19	-1.25	14.37	12.44	4.85	1.96	2.12	1.90	13.96	1.08	0.97	1.45
3.40	31.49	-4.05	0.09	0.32	2.98	-0.38	22.39	19.60	8.08	1.91	2.04	1.87	13.92	1.07	0.98	1.45
-2.55	2.44	13.97	0.09	-0.24	0.23	1.31	8.12	6.46	4.39	1.87	1.96	1.85	13.87	1.05	0.99	1.44
-10.48	0.45	19.94	0.09	-0.98	0.04	1.86	3.50	2.82	3.64	1.82	1.88	1.82	13.82	1.03	1.00	1.44
-28.36	9.45	17.91	0.09	-2.64	0.88	1.67	2.80	6.31	3.73	1.78	1.79	1.80	13.77	1.01	1.01	1.43
-1.25	-1.55	19.87	0.09	-0.12	-0.14	1.84	5.52	2.54	1.45	1.74	1.71	1.77	13.72	0.99	1.02	1.42
21.75	-20.49	24.82	0.09	2.00	-1.88	2.28	5.81	2.08	2.12	1.70	1.64	1.75	13.67	0.97	1.03	1.41
3.75	-33.36	5.80	0.09	0.34	-3.05	0.53	8.69	3.59	4.56	1.66	1.57	1.72	13.62	0.94	1.04	1.40
-26.16	-24.23	-8.16	0.09	-2.38	-2.20	-0.74	6.70	4.55	2.87	1.63	1.50	1.70	13.57	0.92	1.04	1.39
-15.03	-25.11	22.85	0.09	-1.36	-2.27	2.07	6.79	2.36	1.77	1.61	1.44	1.67	13.53	0.89	1.04	1.37
6.03	-25.99	35.78	0.09	0.54	-2.34	3.22	0.73	2.91	0.23	1.59	1.38	1.65	13.48	0.87	1.04	1.36
4.06	-6.91	14.71	0.09	0.36	-0.62	1.32	1.87	2.87	0.95	1.57	1.33	1.63	13.43	0.85	1.04	1.34
26.04	-17.84	19.68	0.09	2.32	-1.59	1.75	5.70	2.30	1.43	1.56	1.29	1.61	13.38	0.82	1.03	1.32
9.21	-5.03	-6.82	0.10	0.96	-0.52	-0.71	1.37	2.87	4.24	2.04	2.58	2.25	14.84	1.27	1.10	1.68
20.20	7.99	-3.76	0.10	2.09	0.83	-0.39	5.01	2.49	5.00	2.09	2.63	2.25	14.79	1.26	1.08	1.66

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
13.01	-7.77	22.64	0.09	1.15	-0.69	2.00	6.16	2.23	1.99	1.56	1.25	1.59	13.33	0.80	1.02	1.30
-42.88	20.23	-14.34	0.09	-3.77	1.78	-1.26	4.82	1.12	1.14	1.57	1.22	1.57	13.28	0.78	1.00	1.27
-38.67	-15.76	-26.22	0.09	-3.38	-1.38	-2.29	5.91	2.64	2.34	1.57	1.20	1.55	13.23	0.76	0.99	1.25
-1.55	-27.66	-9.11	0.09	-0.13	-2.41	-0.79	2.75	3.68	1.66	1.59	1.19	1.53	13.18	0.75	0.97	1.22
12.48	16.38	-15.02	0.09	1.08	1.42	-1.30	3.90	3.43	1.80	1.61	1.18	1.52	13.13	0.74	0.94	1.20
17.46	17.33	-21.91	0.09	1.50	1.49	-1.88	2.10	2.62	2.48	1.63	1.18	1.50	13.09	0.72	0.92	1.17
27.42	-4.67	-12.80	0.09	2.34	-0.40	-1.09	4.52	3.01	3.83	1.66	1.18	1.48	13.04	0.72	0.89	1.15
44.32	13.33	-7.72	0.09	3.77	1.13	-0.66	4.55	3.48	3.28	1.69	1.19	1.47	12.99	0.71	0.87	1.12
16.25	27.27	-6.65	0.08	1.37	2.30	-0.56	1.97	2.11	1.45	1.72	1.21	1.45	12.94	0.70	0.84	1.10
-27.68	0.23	-5.59	0.08	-2.33	0.02	-0.47	1.83	4.12	2.44	1.75	1.23	1.44	12.89	0.70	0.82	1.08
3.41	-9.73	3.45	0.08	0.28	-0.81	0.29	7.27	4.91	2.50	1.79	1.25	1.42	12.84	0.70	0.79	1.06
21.41	10.28	12.46	0.08	1.78	0.85	1.03	4.71	1.72	2.60	1.83	1.27	1.41	12.79	0.70	0.77	1.04
-23.54	-3.71	0.47	0.08	-1.94	-0.31	0.04	0.73	2.45	1.96	1.86	1.30	1.39	12.74	0.70	0.75	1.02
-23.40	-34.61	0.51	0.08	-1.92	-2.84	0.04	10.81	1.23	2.23	1.90	1.33	1.38	12.70	0.70	0.72	1.01
19.65	-10.51	9.53	0.08	1.60	-0.86	0.78	15.24	8.36	2.42	1.94	1.36	1.36	12.65	0.70	0.70	0.99
11.63	26.48	-14.42	0.08	0.94	2.15	-1.17	6.79	5.47	4.31	1.97	1.38	1.35	12.60	0.70	0.68	0.98
-11.32	13.42	-24.30	0.08	-0.91	1.08	-1.96	21.70	5.85	5.28	2.00	1.41	1.33	12.55	0.71	0.66	0.97
30.68	-4.58	-14.19	0.08	2.45	-0.37	-1.13	16.24	4.87	4.56	2.03	1.44	1.31	12.50	0.71	0.65	0.96
58.55	12.42	-23.07	0.08	4.65	0.99	-1.83	2.19	0.89	5.24	2.06	1.46	1.29	12.45	0.71	0.63	0.95
7.46	20.38	-16.95	0.08	0.59	1.61	-1.34	0.15	4.39	6.57	2.08	1.48	1.28	12.40	0.71	0.61	0.94
-32.44	14.33	-6.86	0.08	-2.55	1.12	-0.54	0.78	3.43	3.09	2.10	1.49	1.26	12.35	0.71	0.60	0.93
-11.31	24.27	-4.80	0.08	-0.88	1.89	-0.37	1.24	2.64	2.10	2.12	1.51	1.24	12.30	0.71	0.58	0.92
2.75	25.18	6.24	0.08	0.21	1.95	0.48	1.21	2.66	0.78	2.13	1.52	1.22	12.26	0.71	0.57	0.91
3.79	-2.84	9.25	0.08	0.29	-0.22	0.71	0.73	0.75	2.39	2.14	1.52	1.20	12.21	0.71	0.56	0.91
15.79	-9.80	16.23	0.08	1.21	-0.75	1.24	3.49	5.76	4.40	2.14	1.52	1.18	12.16	0.71	0.55	0.90
1.80	7.22	9.22	0.08	0.14	0.55	0.70	4.72	5.67	1.16	2.14	1.52	1.16	12.11	0.71	0.54	0.89
-36.08	-7.76	-20.71	0.08	-2.72	-0.59	-1.56	3.03	2.02	1.04	2.14	1.51	1.14	12.06	0.71	0.53	0.88
-28.91	-36.65	-9.61	0.08	-2.17	-2.75	-0.72	3.01	5.83	1.77	2.14	1.51	1.12	12.01	0.70	0.52	0.88
-4.80	-36.48	9.43	0.07	-0.36	-2.72	0.70	5.81	1.07	4.10	2.14	1.50	1.10	11.96	0.70	0.51	0.87
-22.70	-24.34	2.44	0.07	-1.68	-1.80	0.18	2.45	9.16	3.32	2.13	1.48	1.08	11.91	0.70	0.51	0.86
-35.53	-19.24	16.44	0.07	-2.61	-1.41	1.21	6.48	6.64	7.60	2.12	1.47	1.06	11.87	0.69	0.50	0.85
13.01	-7.77	22.64	0.09	1.15	-0.69	2.00	6.16	2.23	1.99	1.56	1.25	1.59	13.33	0.80	1.02	1.30
-42.88	20.23	-14.34	0.09	-3.77	1.78	-1.26	4.82	1.12	1.14	1.57	1.22	1.57	13.28	0.78	1.00	1.27

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-35.53	-19.24	16.44	0.07	-2.61	-1.41	1.21	6.48	6.64	7.60	2.12	1.47	1.06	11.87	0.69	0.50	0.85
-2.41	-5.17	18.41	0.07	-0.18	-0.38	1.34	9.08	4.72	7.57	2.12	1.45	1.05	11.82	0.69	0.50	0.85
-0.36	14.83	-3.58	0.07	-0.03	1.08	-0.26	6.47	7.74	4.65	2.11	1.44	1.04	11.77	0.68	0.49	0.84
-42.23	-9.16	13.44	0.07	-3.04	-0.66	0.97	3.89	4.07	5.85	2.10	1.42	1.03	11.72	0.68	0.49	0.83
-18.06	-25.08	27.40	0.07	-1.29	-1.79	1.96	3.01	0.78	4.42	2.10	1.41	1.02	11.67	0.67	0.49	0.83
17.99	7.98	6.37	0.07	1.28	0.57	0.45	4.13	3.43	2.39	2.09	1.39	1.01	11.62	0.66	0.48	0.82
-4.99	2.98	-0.60	0.07	-0.35	0.21	-0.04	2.25	4.47	2.69	2.09	1.38	1.01	11.57	0.66	0.48	0.82
-3.93	-12.99	5.43	0.07	-0.27	-0.91	0.38	1.62	1.19	3.59	2.09	1.37	1.01	11.52	0.66	0.49	0.82
12.10	5.05	3.45	0.07	0.84	0.35	0.24	8.39	12.98	9.64	2.08	1.36	1.01	11.47	0.65	0.49	0.81
-8.86	-4.93	-0.52	0.07	-0.61	-0.34	-0.04	10.06	15.00	12.65	2.08	1.35	1.02	11.43	0.65	0.49	0.81
3.20	-24.85	-7.46	0.07	0.22	-1.70	-0.51	2.96	6.49	6.25	2.08	1.35	1.03	11.38	0.65	0.49	0.81
43.15	1.21	-0.41	0.07	2.93	0.08	-0.03	6.15	2.21	6.00	2.08	1.34	1.04	11.33	0.65	0.50	0.82
24.06	37.16	-6.35	0.07	1.62	2.51	-0.43	7.03	4.64	5.33	2.08	1.35	1.05	11.28	0.65	0.50	0.82
5.05	22.06	-25.25	0.07	0.34	1.48	-1.69	1.39	3.98	3.76	2.08	1.35	1.06	11.23	0.65	0.51	0.83
32.02	-1.96	-16.13	0.07	2.13	-0.13	-1.07	2.94	4.71	2.32	2.08	1.36	1.08	11.18	0.65	0.52	0.83
23.96	28.00	-22.01	0.07	1.58	1.85	-1.45	5.78	1.66	2.22	2.08	1.37	1.10	11.13	0.66	0.53	0.84
-10.03	40.88	-29.87	0.07	-0.66	2.68	-1.96	3.40	5.56	3.87	2.08	1.38	1.12	11.08	0.66	0.54	0.85
-2.96	-4.17	-8.75	0.07	-0.19	-0.27	-0.57	2.89	4.39	2.97	2.07	1.39	1.14	11.04	0.67	0.55	0.87
35.03	-1.14	-0.69	0.06	2.26	-0.07	-0.04	3.30	1.01	2.26	2.07	1.41	1.16	10.99	0.68	0.56	0.88
30.94	40.79	-12.62	0.06	1.98	2.61	-0.81	9.22	6.33	3.78	2.06	1.43	1.19	10.94	0.69	0.58	0.90
-21.04	17.70	-33.49	0.06	-1.34	1.12	-2.13	12.78	11.74	12.70	2.05	1.44	1.21	10.89	0.70	0.59	0.92
-13.92	-2.32	-27.33	0.06	-0.88	-0.15	-1.72	3.74	11.39	8.71	2.04	1.47	1.24	10.84	0.72	0.61	0.94
28.10	18.67	-13.21	0.06	1.76	1.17	-0.83	1.48	3.83	1.40	2.02	1.49	1.27	10.79	0.73	0.63	0.97
10.06	20.61	-26.09	0.06	0.62	1.28	-1.62	0.47	2.03	1.56	2.01	1.51	1.29	10.74	0.75	0.64	0.99
-2.91	7.57	-18.96	0.06	-0.18	0.47	-1.17	1.80	2.23	3.22	1.99	1.53	1.32	10.69	0.77	0.66	1.02
40.06	2.57	-8.86	0.06	2.44	0.16	-0.54	3.97	5.94	5.60	1.97	1.56	1.35	10.64	0.79	0.69	1.05
49.93	-0.42	-14.77	0.06	3.02	-0.03	-0.89	2.69	4.98	5.26	1.96	1.59	1.38	10.60	0.81	0.71	1.08
-2.12	-15.37	0.30	0.06	-0.13	-0.92	0.02	2.49	3.86	5.63	1.94	1.61	1.41	10.55	0.83	0.73	1.11
-15.04	-6.31	14.31	0.06	-0.90	-0.38	0.85	2.22	3.92	2.92	1.92	1.64	1.44	10.50	0.85	0.75	1.14
18.99	13.69	10.30	0.06	1.12	0.81	0.61	1.74	6.61	1.22	1.90	1.67	1.47	10.45	0.88	0.77	1.17
4.99	0.68	12.30	0.06	0.29	0.04	0.72	3.00	2.73	3.73	1.89	1.69	1.51	10.40	0.90	0.80	1.20
-35.53	-19.24	16.44	0.07	-2.61	-1.41	1.21	6.48	6.64	7.60	2.12	1.47	1.06	11.87	0.69	0.50	0.85
-2.41	-5.17	18.41	0.07	-0.18	-0.38	1.34	9.08	4.72	7.57	2.12	1.45	1.05	11.82	0.69	0.50	0.85

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-17.94	-14.27	28.26	0.06	-1.04	-0.83	1.64	4.87	2.89	3.20	1.87	1.72	1.54	10.35	0.92	0.82	1.23
6.13	-17.19	35.17	0.06	0.35	-0.99	2.02	3.84	3.96	4.69	1.86	1.75	1.57	10.30	0.94	0.84	1.27
23.11	-19.10	21.10	0.06	1.32	-1.09	1.20	1.08	0.49	3.82	1.84	1.77	1.60	10.25	0.96	0.87	1.30
1.11	-39.97	8.08	0.06	0.06	-2.26	0.46	1.09	1.02	1.80	1.83	1.80	1.62	10.21	0.98	0.89	1.33
-28.79	-53.76	5.10	0.06	-1.61	-3.01	0.29	3.22	0.21	2.82	1.82	1.82	1.65	10.16	1.00	0.91	1.35
-23.65	-33.57	8.11	0.06	-1.31	-1.86	0.45	0.56	1.52	6.00	1.80	1.84	1.68	10.11	1.02	0.93	1.38
-17.52	-27.42	4.12	0.06	-0.96	-1.51	0.23	3.06	0.87	10.92	1.79	1.86	1.70	10.06	1.04	0.95	1.41
-29.38	-26.30	7.14	0.05	-1.60	-1.43	0.39	3.05	4.01	3.86	1.79	1.88	1.72	10.01	1.05	0.96	1.43
-17.24	-11.20	10.15	0.05	-0.93	-0.60	0.55	0.82	3.70	4.35	1.78	1.90	1.74	9.96	1.07	0.98	1.45
-8.15	-15.13	-3.83	0.05	-0.44	-0.81	-0.20	5.09	6.13	2.77	1.77	1.92	1.76	9.91	1.08	0.99	1.47
1.91	-19.04	6.21	0.05	0.10	-1.01	0.33	4.89	9.12	4.68	1.76	1.93	1.77	9.86	1.09	1.01	1.49
15.92	7.00	8.22	0.05	0.84	0.37	0.43	4.06	4.75	5.20	1.75	1.94	1.79	9.81	1.11	1.02	1.50
7.92	30.95	-14.73	0.05	0.41	1.61	-0.77	3.23	3.05	2.69	1.74	1.95	1.80	9.77	1.12	1.03	1.52
-9.04	20.86	-10.64	0.05	-0.47	1.07	-0.55	0.16	4.11	3.55	1.73	1.95	1.80	9.72	1.12	1.04	1.53
-14.94	5.83	-7.56	0.05	-0.76	0.30	-0.39	0.89	4.84	3.07	1.72	1.95	1.81	9.67	1.13	1.05	1.54
17.10	26.78	-11.48	0.05	0.86	1.35	-0.58	4.06	4.61	2.27	1.70	1.95	1.81	9.62	1.14	1.06	1.56
25.06	46.65	-21.37	0.05	1.25	2.33	-1.07	6.26	1.44	2.71	1.69	1.94	1.80	9.57	1.15	1.07	1.57
-13.92	20.54	-18.25	0.05	-0.69	1.02	-0.90	3.82	2.25	4.82	1.67	1.93	1.80	9.52	1.16	1.08	1.58
-2.84	4.51	10.80	0.05	-0.14	0.22	0.53	2.57	3.86	2.31	1.65	1.92	1.79	9.47	1.16	1.09	1.59
5.20	29.46	4.81	0.05	0.25	1.43	0.23	4.34	3.82	2.77	1.63	1.90	1.79	9.42	1.17	1.10	1.61
-22.72	23.37	-13.13	0.05	-1.09	1.12	-0.63	3.40	9.07	2.57	1.60	1.88	1.78	9.38	1.18	1.11	1.62
0.37	3.33	-15.04	0.05	0.02	0.16	-0.71	3.72	6.14	3.82	1.58	1.86	1.77	9.33	1.18	1.12	1.63
24.36	21.30	-23.92	0.05	1.15	1.00	-1.12	7.32	5.61	5.04	1.55	1.84	1.75	9.28	1.19	1.13	1.64
18.32	12.25	-12.80	0.05	0.85	0.57	-0.60	6.81	3.95	2.27	1.52	1.82	1.74	9.23	1.20	1.15	1.66
23.28	-12.73	-0.73	0.05	1.07	-0.59	-0.03	0.97	4.40	1.32	1.49	1.79	1.73	9.18	1.20	1.16	1.67
30.22	15.28	-2.69	0.05	1.37	0.70	-0.12	2.99	6.89	2.30	1.46	1.76	1.71	9.13	1.21	1.18	1.69
24.15	39.19	-4.63	0.05	1.09	1.76	-0.21	1.56	4.81	2.67	1.43	1.74	1.70	9.08	1.21	1.19	1.70
-0.85	11.11	-9.56	0.04	-0.04	0.49	-0.43	2.95	4.18	0.58	1.40	1.71	1.69	9.03	1.22	1.21	1.72
-2.80	-14.86	11.48	0.04	-0.12	-0.65	0.50	1.19	2.05	0.60	1.37	1.68	1.67	8.98	1.23	1.22	1.73
24.20	1.18	29.43	0.04	1.05	0.05	1.28	1.77	2.53	3.02	1.34	1.65	1.66	8.94	1.23	1.24	1.74
-1.80	10.18	16.38	0.04	-0.08	0.44	0.70	2.27	4.61	4.34	1.31	1.62	1.64	8.89	1.24	1.25	1.76
-17.94	-14.27	28.26	0.06	-1.04	-0.83	1.64	4.87	2.89	3.20	1.87	1.72	1.54	10.35	0.92	0.82	1.23
6.13	-17.19	35.17	0.06	0.35	-0.99	2.02	3.84	3.96	4.69	1.86	1.75	1.57	10.30	0.94	0.84	1.27

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-31.69	-18.79	28.33	0.04	-1.35	-0.80	1.20	1.08	2.83	4.68	1.29	1.60	1.63	8.84	1.24	1.26	1.77
-3.57	-22.69	43.23	0.04	-0.15	-0.95	1.82	1.27	6.05	5.16	1.27	1.58	1.62	8.79	1.24	1.28	1.78
-11.50	-21.58	17.15	0.04	-0.48	-0.90	0.71	1.36	10.82	5.23	1.25	1.56	1.60	8.74	1.25	1.29	1.79
-40.35	-36.45	-5.83	0.04	-1.65	-1.49	-0.24	3.16	5.86	5.16	1.23	1.54	1.59	8.69	1.25	1.29	1.80
-7.21	-22.31	2.21	0.04	-0.29	-0.90	0.09	2.36	5.90	4.76	1.21	1.52	1.58	8.64	1.25	1.30	1.81
16.81	-6.24	1.25	0.04	0.67	-0.25	0.05	3.09	5.35	3.95	1.20	1.51	1.56	8.59	1.26	1.30	1.81
4.81	-7.19	-18.68	0.04	0.19	-0.28	-0.74	3.82	0.79	4.57	1.19	1.50	1.55	8.54	1.26	1.30	1.81
2.84	-1.16	-2.60	0.04	0.11	-0.05	-0.10	2.52	6.47	3.09	1.18	1.49	1.53	8.50	1.26	1.30	1.81
-0.12	19.83	9.43	0.04	0.00	0.76	0.36	2.47	11.30	3.62	1.18	1.49	1.52	8.45	1.27	1.29	1.81
2.92	25.75	-5.54	0.04	0.11	0.98	-0.21	2.80	10.62	3.40	1.17	1.49	1.50	8.40	1.27	1.28	1.80
-4.03	-9.26	5.50	0.04	-0.15	-0.35	0.21	4.36	10.02	5.45	1.17	1.50	1.49	8.35	1.28	1.27	1.80
-24.93	-9.21	2.53	0.04	-0.92	-0.34	0.09	2.99	3.94	3.31	1.17	1.50	1.47	8.30	1.28	1.26	1.79
-34.77	13.80	-21.40	0.04	-1.27	0.50	-0.78	2.13	3.57	1.72	1.17	1.51	1.46	8.25	1.29	1.24	1.79
-40.57	1.79	-23.27	0.04	-1.46	0.06	-0.84	1.56	5.19	4.35	1.18	1.53	1.44	8.20	1.30	1.22	1.78
-26.39	-14.17	-7.16	0.04	-0.94	-0.50	-0.25	1.20	3.28	5.59	1.18	1.54	1.42	8.15	1.31	1.21	1.78
-15.26	-22.08	-8.09	0.04	-0.53	-0.77	-0.28	1.13	3.24	2.71	1.18	1.56	1.41	8.11	1.32	1.19	1.77
-25.14	-11.99	-20.00	0.03	-0.87	-0.41	-0.69	1.08	2.02	2.77	1.18	1.58	1.39	8.06	1.33	1.17	1.77
10.94	5.04	-1.91	0.03	0.37	0.17	-0.07	3.11	0.89	1.74	1.19	1.60	1.37	8.01	1.35	1.16	1.78
52.85	5.04	4.12	0.03	1.77	0.17	0.14	4.36	0.32	0.98	1.19	1.62	1.36	7.96	1.36	1.15	1.78
28.73	10.03	-14.81	0.03	0.95	0.33	-0.49	3.63	2.12	1.49	1.19	1.64	1.35	7.91	1.38	1.13	1.79
26.67	4.02	-10.72	0.03	0.87	0.13	-0.35	2.43	4.25	3.81	1.19	1.66	1.33	7.86	1.40	1.12	1.80
41.57	-2.96	-1.66	0.03	1.33	-0.09	-0.05	0.57	4.34	7.13	1.18	1.69	1.32	7.81	1.43	1.12	1.81
31.47	31.00	-5.60	0.03	0.99	0.98	-0.18	1.73	1.69	4.29	1.18	1.71	1.31	7.76	1.45	1.11	1.83
39.37	40.87	-6.54	0.03	1.22	1.27	-0.20	4.18	1.72	3.32	1.17	1.74	1.30	7.71	1.48	1.11	1.85
19.30	9.79	-5.47	0.03	0.59	0.30	-0.17	3.78	7.78	5.32	1.17	1.76	1.30	7.67	1.51	1.11	1.88
-0.70	13.76	-3.41	0.03	-0.02	0.41	-0.10	3.86	8.08	4.46	1.16	1.79	1.29	7.62	1.54	1.12	1.90
9.33	21.71	-12.34	0.03	0.28	0.64	-0.36	6.37	6.10	4.71	1.15	1.81	1.29	7.57	1.57	1.12	1.93
18.32	7.67	-20.23	0.03	0.53	0.22	-0.59	7.80	5.02	4.14	1.14	1.83	1.29	7.52	1.61	1.13	1.97
39.25	17.63	-11.13	0.03	1.12	0.50	-0.32	2.10	1.36	1.50	1.13	1.85	1.29	7.47	1.64	1.14	2.00
11.19	30.55	-29.01	0.03	0.31	0.86	-0.81	1.57	3.38	4.92	1.11	1.87	1.29	7.42	1.68	1.16	2.04
-29.73	19.47	-37.83	0.03	-0.82	0.54	-1.04	1.16	6.19	7.78	1.10	1.89	1.29	7.37	1.71	1.18	2.08
-31.69	-18.79	28.33	0.04	-1.35	-0.80	1.20	1.08	2.83	4.68	1.29	1.60	1.63	8.84	1.24	1.26	1.77
-3.57	-22.69	43.23	0.04	-0.15	-0.95	1.82	1.27	6.05	5.16	1.27	1.58	1.62	8.79	1.24	1.28	1.78

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-2.62	8.43	7.27	0.03	-0.07	0.23	0.20	3.64	4.00	10.45	1.09	1.90	1.30	7.32	1.75	1.20	2.12
18.39	17.40	11.28	0.03	0.49	0.46	0.30	2.96	3.75	6.89	1.07	1.91	1.31	7.28	1.78	1.22	2.16
2.39	8.36	-5.69	0.03	0.06	0.22	-0.15	0.47	12.42	2.97	1.06	1.92	1.31	7.23	1.81	1.24	2.20
-22.53	-25.59	15.33	0.03	-0.57	-0.65	0.39	2.12	13.94	2.31	1.05	1.93	1.32	7.18	1.84	1.26	2.23
1.56	-39.44	33.27	0.03	0.04	-0.99	0.83	3.83	6.96	2.19	1.04	1.94	1.33	7.13	1.87	1.28	2.26
36.52	-30.28	36.18	0.02	0.89	-0.74	0.89	8.39	2.59	1.12	1.03	1.94	1.34	7.08	1.89	1.30	2.29
-15.48	-28.15	29.09	0.02	-0.37	-0.68	0.70	7.26	1.33	6.26	1.02	1.94	1.35	7.03	1.90	1.32	2.31
-35.33	-39.99	35.00	0.02	-0.83	-0.94	0.82	2.11	4.53	5.55	1.01	1.94	1.36	6.98	1.91	1.34	2.33
19.74	-42.81	38.89	0.02	0.45	-0.98	0.89	4.38	4.43	3.32	1.01	1.93	1.36	6.93	1.92	1.35	2.35
13.72	-39.62	16.82	0.02	0.31	-0.89	0.38	0.29	5.20	2.48	1.00	1.92	1.37	6.88	1.92	1.37	2.35
-40.19	-31.46	19.78	0.02	-0.88	-0.69	0.44	0.49	10.16	4.80	1.00	1.91	1.38	6.84	1.91	1.38	2.36
-37.99	-12.36	26.73	0.02	-0.82	-0.27	0.57	2.10	7.01	8.09	1.00	1.90	1.39	6.79	1.90	1.39	2.35
-9.85	5.68	18.68	0.02	-0.21	0.12	0.39	0.31	4.65	5.31	1.00	1.89	1.40	6.74	1.88	1.40	2.35
-27.73	6.67	18.64	0.02	-0.57	0.14	0.38	5.30	3.13	3.91	1.01	1.88	1.41	6.69	1.86	1.40	2.33
-15.60	6.66	11.62	0.02	-0.31	0.13	0.23	3.87	2.30	1.25	1.01	1.86	1.42	6.64	1.84	1.40	2.31
29.42	29.61	-2.36	0.02	0.57	0.58	-0.05	3.02	4.44	7.57	1.02	1.85	1.43	6.59	1.81	1.40	2.29
15.37	30.51	-10.29	0.02	0.29	0.58	-0.20	1.83	3.85	2.39	1.03	1.84	1.44	6.54	1.79	1.40	2.27
-14.59	6.45	-12.21	0.02	-0.27	0.12	-0.23	12.14	9.26	16.85	1.04	1.82	1.45	6.49	1.76	1.40	2.25
-10.50	2.45	-7.13	0.02	-0.19	0.04	-0.13	9.38	6.93	13.71	1.05	1.81	1.46	6.45	1.73	1.39	2.22
-12.41	6.45	-3.07	0.02	-0.22	0.11	-0.05	3.08	10.76	5.53	1.06	1.80	1.47	6.40	1.70	1.39	2.20
-26.28	10.44	-17.99	0.02	-0.45	0.18	-0.31	4.78	6.96	13.31	1.07	1.79	1.48	6.35	1.68	1.39	2.17
-4.18	8.42	-32.85	0.02	-0.07	0.14	-0.54	3.87	4.91	7.09	1.08	1.79	1.50	6.30	1.65	1.38	2.15
18.83	24.37	-31.68	0.02	0.30	0.39	-0.51	4.32	2.37	8.68	1.10	1.79	1.51	6.25	1.63	1.38	2.13
-15.13	40.26	-38.49	0.02	-0.23	0.62	-0.60	3.95	4.14	7.62	1.11	1.79	1.53	6.20	1.61	1.37	2.12
-19.02	28.14	-25.33	0.02	-0.29	0.42	-0.38	9.66	7.71	12.94	1.13	1.79	1.54	6.15	1.59	1.37	2.10
37.99	34.03	-6.22	0.01	0.55	0.49	-0.09	6.08	7.78	25.39	1.14	1.80	1.56	6.10	1.58	1.37	2.09
48.86	47.88	-12.14	0.01	0.68	0.67	-0.17	7.68	17.45	23.40	1.16	1.81	1.58	6.05	1.57	1.37	2.08
19.76	37.73	3.91	0.01	0.27	0.51	0.05	56.51	32.57	55.32	1.17	1.82	1.60	6.01	1.56	1.37	2.07
23.72	18.63	11.92	0.01	0.31	0.24	0.15	53.28	33.18	47.93	1.19	1.84	1.62	5.96	1.55	1.37	2.07
38.64	4.60	2.93	0.01	0.48	0.06	0.04	7.23	13.03	9.28	1.20	1.86	1.65	5.91	1.55	1.37	2.07
7.59	-8.37	10.95	0.01	0.09	-0.10	0.13	1.65	5.80	5.50	1.22	1.88	1.68	5.86	1.54	1.38	2.07
-2.62	8.43	7.27	0.03	-0.07	0.23	0.20	3.64	4.00	10.45	1.09	1.90	1.30	7.32	1.75	1.20	2.12
18.39	17.40	11.28	0.03	0.49	0.46	0.30	2.96	3.75	6.89	1.07	1.91	1.31	7.28	1.78	1.22	2.16

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-17.35	-11.32	5.95	0.01	-0.20	-0.13	0.07	1.45	5.28	6.15	1.24	1.90	1.71	5.81	1.54	1.38	2.07
16.69	-7.26	0.98	0.01	0.18	-0.08	0.01	1.72	1.46	10.72	1.26	1.93	1.75	5.76	1.53	1.39	2.07
4.69	-22.19	-6.97	0.01	0.05	-0.23	-0.07	3.77	1.38	13.91	1.28	1.95	1.79	5.71	1.53	1.40	2.07
-47.18	-33.06	-9.89	0.01	-0.47	-0.33	-0.10	3.65	5.64	3.35	1.31	1.99	1.84	5.66	1.52	1.40	2.07
-0.04	-15.94	6.15	0.01	0.00	-0.15	0.06	1.74	3.66	3.36	1.34	2.02	1.89	5.62	1.51	1.41	2.07
28.94	-5.88	0.18	0.01	0.26	-0.05	0.00	6.02	2.37	2.35	1.37	2.05	1.95	5.57	1.49	1.42	2.06
-3.07	0.14	5.21	0.01	-0.03	0.00	0.04	3.90	2.83	4.30	1.41	2.09	2.02	5.52	1.48	1.43	2.06
12.96	13.14	33.18	0.01	0.10	0.11	0.27	1.62	2.68	5.79	1.46	2.13	2.10	5.47	1.46	1.44	2.05
-0.03	5.12	28.09	0.01	0.00	0.04	0.21	3.16	1.07	3.59	1.51	2.17	2.18	5.42	1.44	1.45	2.04
-36.91	-13.85	17.04	0.01	-0.26	-0.10	0.12	5.68	1.49	0.15	1.56	2.21	2.28	5.37	1.41	1.46	2.03
-6.78	-18.77	30.99	0.01	-0.04	-0.12	0.20	5.95	2.58	1.56	1.63	2.25	2.38	5.32	1.39	1.46	2.02
34.21	-8.69	21.92	0.01	0.21	-0.05	0.13	2.58	2.85	6.58	1.70	2.30	2.49	5.27	1.36	1.47	2.00
7.17	0.34	4.91	0.01	0.04	0.00	0.03	3.36	3.55	7.96	1.77	2.35	2.62	5.22	1.33	1.48	1.99
-48.71	-5.63	7.92	0.01	-0.24	-0.03	0.04	5.31	0.93	5.84	1.85	2.40	2.75	5.18	1.29	1.48	1.97
-20.53	-17.57	-1.05	0.00	-0.09	-0.08	0.00	3.11	1.91	4.89	1.94	2.45	2.88	5.13	1.26	1.48	1.95
6.54	-11.49	-9.99	0.00	0.03	-0.05	-0.04	1.47	1.66	5.21	2.04	2.51	3.03	5.08	1.23	1.48	1.93
-30.37	6.54	-7.92	0.00	-0.11	0.02	-0.03	0.70	4.40	7.03	2.14	2.56	3.18	5.03	1.20	1.48	1.91
-15.23	-12.44	1.14	0.00	-0.05	-0.04	0.00	4.86	1.22	8.92	2.24	2.62	3.32	4.98	1.17	1.48	1.89
-9.14	-12.37	15.14	0.00	-0.02	-0.03	0.04	5.82	2.79	9.14	2.35	2.67	3.47	4.93	1.14	1.48	1.87
-23.03	18.64	3.15	0.00	-0.05	0.04	0.01	3.94	0.53	1.34	2.45	2.72	3.62	4.88	1.11	1.48	1.85
23.01	-2.38	-8.80	0.00	0.03	0.00	-0.01	4.25	1.57	1.65	2.55	2.77	3.76	4.83	1.09	1.48	1.83
52.90	-13.33	8.24	0.00	0.05	-0.01	0.01	3.93	0.74	6.50	2.65	2.82	3.90	4.79	1.06	1.47	1.82
43.75	15.68	-0.74	0.00	0.02	0.01	0.00	0.43	1.16	4.32	2.74	2.85	4.02	4.74	1.04	1.47	1.80

Microtremors Segment: B1-S5

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
31.95	-12.77	-5.54	0.26	8.29	-3.31	-1.44	3.25	1.63	0.71	3.53	0.99	1.02	30.03	0.28	0.29	0.40
-6.05	-14.69	-13.47	0.26	-1.57	-3.80	-3.49	3.42	1.18	1.49	3.51	0.98	1.00	29.98	0.28	0.29	0.40
-16.95	-7.62	-3.40	0.26	-4.38	-1.97	-0.88	0.52	1.87	1.87	3.47	0.96	0.99	29.93	0.28	0.28	0.40
-0.87	-5.57	-9.34	0.26	-0.22	-1.44	-2.41	1.69	2.85	0.48	3.42	0.94	0.97	29.88	0.27	0.28	0.39
-49.72	-7.52	-7.27	0.26	-12.80	-1.94	-1.87	2.08	3.35	3.19	3.36	0.91	0.94	29.83	0.27	0.28	0.39
-49.47	17.48	10.76	0.26	-12.71	4.49	2.77	1.24	0.78	3.59	3.29	0.89	0.92	29.79	0.27	0.28	0.39
22.64	23.43	12.75	0.26	5.81	6.01	3.27	3.26	0.92	1.76	3.21	0.86	0.90	29.74	0.27	0.28	0.39
16.61	1.40	4.75	0.26	4.25	0.36	1.22	3.25	1.24	3.60	3.12	0.84	0.88	29.69	0.27	0.28	0.39
-39.30	-3.57	-2.22	0.26	-10.04	-0.91	-0.57	2.97	1.53	2.24	3.02	0.82	0.85	29.64	0.27	0.28	0.39
-19.13	1.45	5.81	0.26	-4.88	0.37	1.48	0.77	0.37	1.51	2.92	0.79	0.83	29.59	0.27	0.28	0.39
28.90	8.46	-1.16	0.25	7.36	2.15	-0.30	1.72	1.50	0.31	2.82	0.77	0.81	29.54	0.27	0.29	0.40
0.90	5.45	-28.07	0.25	0.23	1.39	-7.13	1.31	0.47	1.64	2.72	0.75	0.79	29.49	0.27	0.29	0.40
-1.05	8.45	-21.93	0.25	-0.27	2.14	-5.56	1.91	0.87	2.32	2.62	0.72	0.77	29.44	0.28	0.29	0.40
52.89	-0.54	-4.84	0.25	13.38	-0.14	-1.23	1.59	1.29	1.85	2.52	0.70	0.75	29.39	0.28	0.30	0.41
29.78	-25.47	-19.76	0.25	7.52	-6.43	-4.99	3.33	1.36	1.40	2.42	0.69	0.74	29.35	0.28	0.30	0.42
-16.20	-6.38	-29.62	0.25	-4.08	-1.61	-7.47	3.66	1.45	2.21	2.33	0.67	0.73	29.30	0.29	0.31	0.42
-6.11	1.65	-6.52	0.25	-1.54	0.42	-1.64	3.29	1.17	1.41	2.24	0.65	0.72	29.25	0.29	0.32	0.43
-17.01	-7.31	5.52	0.25	-4.27	-1.84	1.39	2.30	2.07	1.42	2.16	0.64	0.71	29.20	0.30	0.33	0.44
-29.86	11.70	6.54	0.25	-7.48	2.93	1.64	2.15	1.72	1.60	2.08	0.63	0.70	29.15	0.30	0.34	0.45
-7.74	3.69	25.51	0.25	-1.93	0.92	6.38	2.52	0.73	3.11	2.01	0.62	0.70	29.10	0.31	0.35	0.47
-18.63	5.70	24.44	0.25	-4.65	1.42	6.10	4.75	4.34	0.93	1.94	0.61	0.70	29.05	0.32	0.36	0.48
-35.48	5.70	-10.55	0.25	-8.83	1.42	-2.63	5.36	5.65	0.76	1.88	0.61	0.70	29.00	0.32	0.37	0.49
-0.35	-5.28	-17.46	0.25	-0.09	-1.31	-4.34	4.60	5.48	1.68	1.83	0.60	0.70	28.96	0.33	0.38	0.50
27.64	29.70	-5.38	0.25	6.86	7.36	-1.33	2.18	5.33	2.74	1.78	0.60	0.70	28.91	0.34	0.39	0.52
26.59	25.61	-10.31	0.25	6.58	6.34	-2.55	3.20	4.81	3.67	1.73	0.59	0.70	28.86	0.34	0.40	0.53
47.49	-3.41	-3.24	0.25	11.73	-0.84	-0.80	6.00	1.68	1.32	1.69	0.59	0.70	28.81	0.35	0.42	0.54
66.31	9.60	1.79	0.25	16.35	2.37	0.44	6.50	2.81	3.03	1.65	0.59	0.71	28.76	0.36	0.43	0.56
17.19	18.56	-18.14	0.25	4.23	4.57	-4.46	16.19	4.94	4.15	1.61	0.59	0.71	28.71	0.37	0.44	0.57
-49.69	16.52	-25.01	0.25	-12.20	4.05	-6.14	6.80	3.76	1.74	1.57	0.59	0.72	28.66	0.37	0.46	0.59
-42.46	4.50	-16.89	0.25	-10.40	1.10	-4.14	6.73	1.24	2.56	1.54	0.59	0.72	28.61	0.38	0.47	0.61
3.67	6.50	-11.80	0.24	0.90	1.59	-2.88	1.75	3.27	2.33	1.50	0.59	0.73	28.56	0.39	0.48	0.62
33.64	13.48	-13.71	0.24	8.21	3.29	-3.35	3.41	2.88	2.75	1.47	0.60	0.73	28.52	0.41	0.50	0.64
31.95	-12.77	-5.54	0.26	8.29	-3.31	-1.44	3.25	1.63	0.71	3.53	0.99	1.02	30.03	0.28	0.29	0.40

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
53.52	-6.51	-9.63	0.24	13.03	-1.59	-2.34	4.27	1.20	2.28	1.44	0.60	0.73	28.47	0.42	0.51	0.66
41.38	-8.46	0.43	0.24	10.06	-2.06	0.10	1.95	1.19	0.38	1.40	0.60	0.74	28.42	0.43	0.53	0.68
-8.64	2.58	-2.53	0.24	-2.09	0.62	-0.61	5.39	0.74	2.54	1.37	0.61	0.74	28.37	0.44	0.54	0.70
-40.49	-8.39	-7.47	0.24	-9.80	-2.03	-1.81	5.82	1.83	2.09	1.35	0.62	0.74	28.32	0.46	0.55	0.72
-21.32	-6.34	7.56	0.24	-5.15	-1.53	1.83	6.87	2.00	1.31	1.32	0.62	0.74	28.27	0.47	0.56	0.74
-6.21	4.69	10.56	0.24	-1.50	1.13	2.55	4.83	1.72	1.98	1.30	0.63	0.75	28.22	0.49	0.58	0.75
-45.06	-7.28	-12.40	0.24	-10.84	-1.75	-2.98	0.94	1.22	1.70	1.28	0.64	0.75	28.17	0.50	0.59	0.77
-48.82	-7.23	-8.32	0.24	-11.72	-1.74	-2.00	2.97	2.16	0.80	1.26	0.65	0.75	28.13	0.52	0.60	0.79
9.31	-3.19	14.71	0.24	2.23	-0.76	3.52	4.71	3.75	1.41	1.24	0.66	0.75	28.08	0.53	0.60	0.81
33.28	-17.12	11.69	0.24	7.95	-4.09	2.79	3.44	3.23	0.54	1.23	0.68	0.75	28.03	0.55	0.61	0.82
29.20	-17.03	19.66	0.24	6.96	-4.06	4.69	1.53	1.83	2.04	1.23	0.69	0.75	27.98	0.56	0.61	0.83
38.12	-1.97	39.58	0.24	9.07	-0.47	9.42	2.23	0.92	2.02	1.23	0.71	0.75	27.93	0.58	0.61	0.84
19.05	5.05	12.51	0.24	4.52	1.20	2.97	1.64	1.05	1.73	1.23	0.73	0.75	27.88	0.59	0.61	0.85
-26.88	-9.92	2.52	0.24	-6.37	-2.35	0.60	2.66	0.66	0.76	1.24	0.75	0.75	27.83	0.60	0.61	0.85
-55.67	-21.83	25.50	0.24	-13.17	-5.16	6.03	4.21	1.97	0.51	1.26	0.77	0.76	27.78	0.61	0.60	0.86
-53.40	-20.72	12.46	0.24	-12.60	-4.89	2.94	3.82	3.42	0.96	1.28	0.79	0.76	27.73	0.62	0.59	0.85
-37.17	-28.60	7.45	0.24	-8.75	-6.74	1.76	4.91	1.16	0.89	1.30	0.81	0.76	27.69	0.62	0.58	0.85
9.94	-24.47	15.44	0.24	2.34	-5.75	3.63	8.98	0.92	2.76	1.32	0.83	0.76	27.64	0.62	0.57	0.85
69.83	-14.37	11.42	0.23	16.37	-3.37	2.68	3.40	0.68	2.22	1.35	0.84	0.76	27.59	0.63	0.56	0.84
73.59	1.68	31.37	0.23	17.22	0.39	7.34	0.94	0.69	2.60	1.38	0.86	0.76	27.54	0.63	0.55	0.83
25.44	11.68	35.28	0.23	5.94	2.73	8.24	4.67	2.21	2.93	1.41	0.88	0.76	27.49	0.62	0.54	0.83
-31.50	-8.30	14.21	0.23	-7.34	-1.93	3.31	3.24	2.17	3.41	1.44	0.90	0.76	27.44	0.62	0.53	0.82
-28.33	0.74	6.21	0.23	-6.59	0.17	1.44	3.11	2.55	3.07	1.48	0.91	0.76	27.39	0.62	0.52	0.81
-15.19	35.69	-3.77	0.23	-3.52	8.28	-0.87	5.07	1.77	1.46	1.51	0.93	0.76	27.34	0.61	0.51	0.80
-19.07	35.57	-16.69	0.23	-4.41	8.23	-3.86	4.48	1.54	0.84	1.54	0.94	0.77	27.29	0.61	0.50	0.79
29.96	27.46	-23.57	0.23	6.92	6.34	-5.45	3.50	1.69	1.32	1.57	0.94	0.76	27.25	0.60	0.49	0.78
23.90	34.36	-30.43	0.23	5.51	7.92	-7.01	0.68	1.02	1.40	1.59	0.95	0.76	27.20	0.60	0.48	0.77
-42.01	20.28	-31.27	0.23	-9.66	4.66	-7.19	3.30	1.20	2.60	1.62	0.95	0.76	27.15	0.59	0.47	0.76
-38.80	8.24	-25.12	0.23	-8.90	1.89	-5.77	4.04	1.43	1.47	1.63	0.95	0.76	27.10	0.58	0.47	0.75
-15.64	17.22	-13.01	0.23	-3.58	3.94	-2.98	3.69	3.79	0.48	1.65	0.95	0.76	27.05	0.58	0.46	0.74
-35.49	3.20	-12.92	0.23	-8.11	0.73	-2.95	4.74	3.82	0.28	1.66	0.95	0.75	27.00	0.57	0.45	0.73
53.52	-6.51	-9.63	0.24	13.03	-1.59	-2.34	4.27	1.20	2.28	1.44	0.60	0.73	28.47	0.42	0.51	0.66
41.38	-8.46	0.43	0.24	10.06	-2.06	0.10	1.95	1.19	0.38	1.40	0.60	0.74	28.42	0.43	0.53	0.68

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-28.31	-9.77	-12.83	0.23	-6.45	-2.23	-2.93	3.57	5.02	2.68	1.67	0.94	0.75	26.95	0.56	0.45	0.72
40.72	3.27	6.21	0.23	9.26	0.74	1.41	1.32	4.01	2.11	1.67	0.93	0.75	26.90	0.56	0.45	0.71
63.56	12.26	18.20	0.23	14.43	2.78	4.13	2.34	4.18	1.32	1.67	0.92	0.74	26.86	0.55	0.44	0.71
17.45	7.24	19.16	0.23	3.95	1.64	4.34	0.91	3.68	2.28	1.67	0.91	0.73	26.81	0.54	0.44	0.70
35.39	-1.74	3.15	0.23	8.00	-0.39	0.71	1.16	3.37	1.73	1.66	0.89	0.73	26.76	0.54	0.44	0.69
55.26	12.26	-2.81	0.23	12.46	2.76	-0.63	2.24	2.83	1.98	1.65	0.88	0.72	26.71	0.53	0.44	0.69
-9.78	14.23	0.23	0.23	-2.20	3.20	0.05	1.25	1.17	3.37	1.64	0.86	0.72	26.66	0.53	0.44	0.68
-32.65	-16.74	-10.71	0.22	-7.33	-3.76	-2.41	1.01	1.87	3.42	1.62	0.85	0.71	26.61	0.52	0.44	0.68
-4.52	-9.67	5.33	0.22	-1.01	-2.17	1.19	2.00	2.67	3.15	1.61	0.83	0.70	26.56	0.52	0.44	0.68
-8.45	-9.61	11.33	0.22	-1.89	-2.15	2.53	1.46	1.65	1.59	1.59	0.82	0.70	26.51	0.51	0.44	0.68
-7.37	-37.49	-4.64	0.22	-1.64	-8.36	-1.04	2.53	0.77	2.07	1.57	0.80	0.69	26.46	0.51	0.44	0.67
43.61	-19.35	22.36	0.22	9.70	-4.31	4.97	2.77	0.14	1.48	1.55	0.79	0.69	26.42	0.51	0.44	0.67
91.39	4.70	19.31	0.22	20.29	1.04	4.29	3.78	0.29	2.86	1.53	0.78	0.68	26.37	0.51	0.45	0.68
15.22	-9.27	-18.66	0.22	3.37	-2.05	-4.13	3.20	1.68	1.16	1.51	0.77	0.68	26.32	0.51	0.45	0.68
-78.60	-1.22	-21.54	0.22	-17.37	-0.27	-4.76	4.84	2.92	1.47	1.49	0.76	0.68	26.27	0.51	0.45	0.68
-40.31	30.74	-5.45	0.22	-8.89	6.78	-1.20	4.70	1.87	3.72	1.47	0.75	0.67	26.22	0.51	0.46	0.69
-45.09	19.66	4.59	0.22	-9.92	4.33	1.01	8.52	0.33	2.50	1.45	0.75	0.67	26.17	0.52	0.46	0.69
-83.78	3.64	-13.36	0.22	-18.39	0.80	-2.93	5.17	2.68	1.79	1.43	0.75	0.67	26.12	0.52	0.47	0.70
1.43	9.64	-18.26	0.22	0.31	2.11	-4.00	6.58	3.22	2.25	1.41	0.75	0.67	26.07	0.53	0.48	0.71
66.35	18.60	-3.18	0.22	14.50	4.06	-0.70	2.00	2.75	1.70	1.39	0.75	0.67	26.03	0.54	0.48	0.72
36.19	20.55	-15.11	0.22	7.89	4.48	-3.29	4.40	2.53	2.33	1.38	0.75	0.68	25.98	0.55	0.49	0.73
11.15	-5.46	-14.02	0.22	2.42	-1.19	-3.05	3.07	1.67	0.91	1.36	0.76	0.68	25.93	0.56	0.50	0.75
4.17	-12.40	-1.95	0.22	0.90	-2.69	-0.42	1.91	2.49	1.30	1.34	0.76	0.68	25.88	0.57	0.51	0.76
-23.75	-11.33	-10.89	0.22	-5.14	-2.45	-2.36	1.30	1.19	2.82	1.32	0.77	0.69	25.83	0.58	0.52	0.78
-48.55	-38.21	-2.82	0.22	-10.49	-8.25	-0.61	1.61	2.15	4.22	1.30	0.78	0.69	25.78	0.60	0.53	0.80
-13.38	-24.06	8.20	0.22	-2.88	-5.19	1.77	2.88	1.25	1.61	1.29	0.79	0.69	25.73	0.61	0.54	0.82
28.64	-4.98	-10.76	0.22	6.16	-1.07	-2.31	0.14	0.52	2.42	1.27	0.80	0.70	25.68	0.63	0.55	0.84
13.61	-18.91	-18.66	0.21	2.92	-4.06	-4.00	6.17	1.75	0.50	1.25	0.81	0.70	25.63	0.64	0.56	0.86
28.57	-8.83	-6.58	0.21	6.11	-1.89	-1.41	4.60	1.99	1.48	1.24	0.82	0.71	25.59	0.66	0.57	0.87
78.41	8.19	-11.50	0.21	16.74	1.75	-2.46	2.06	2.38	1.76	1.22	0.83	0.72	25.54	0.68	0.58	0.89
39.22	5.19	-12.42	0.21	8.35	1.11	-2.65	0.17	0.91	2.20	1.21	0.84	0.72	25.49	0.69	0.60	0.91
-28.31	-9.77	-12.83	0.23	-6.45	-2.23	-2.93	3.57	5.02	2.68	1.67	0.94	0.75	26.95	0.56	0.45	0.72
40.72	3.27	6.21	0.23	9.26	0.74	1.41	1.32	4.01	2.11	1.67	0.93	0.75	26.90	0.56	0.45	0.71

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-28.31	-9.77	-12.83	0.23	-6.45	-2.23	-2.93	3.57	5.02	2.68	1.67	0.94	0.75	26.95	0.56	0.45	0.72
40.72	3.27	6.21	0.23	9.26	0.74	1.41	1.32	4.01	2.11	1.67	0.93	0.75	26.90	0.56	0.45	0.71
63.56	12.26	18.20	0.23	14.43	2.78	4.13	2.34	4.18	1.32	1.67	0.92	0.74	26.86	0.55	0.44	0.71
17.45	7.24	19.16	0.23	3.95	1.64	4.34	0.91	3.68	2.28	1.67	0.91	0.73	26.81	0.54	0.44	0.70
35.39	-1.74	3.15	0.23	8.00	-0.39	0.71	1.16	3.37	1.73	1.66	0.89	0.73	26.76	0.54	0.44	0.69
55.26	12.26	-2.81	0.23	12.46	2.76	-0.63	2.24	2.83	1.98	1.65	0.88	0.72	26.71	0.53	0.44	0.69
-9.78	14.23	0.23	0.23	-2.20	3.20	0.05	1.25	1.17	3.37	1.64	0.86	0.72	26.66	0.53	0.44	0.68
-32.65	-16.74	-10.71	0.22	-7.33	-3.76	-2.41	1.01	1.87	3.42	1.62	0.85	0.71	26.61	0.52	0.44	0.68
-4.52	-9.67	5.33	0.22	-1.01	-2.17	1.19	2.00	2.67	3.15	1.61	0.83	0.70	26.56	0.52	0.44	0.68
-8.45	-9.61	11.33	0.22	-1.89	-2.15	2.53	1.46	1.65	1.59	1.59	0.82	0.70	26.51	0.51	0.44	0.68
-7.37	-37.49	-4.64	0.22	-1.64	-8.36	-1.04	2.53	0.77	2.07	1.57	0.80	0.69	26.46	0.51	0.44	0.67
43.61	-19.35	22.36	0.22	9.70	-4.31	4.97	2.77	0.14	1.48	1.55	0.79	0.69	26.42	0.51	0.44	0.67
91.39	4.70	19.31	0.22	20.29	1.04	4.29	3.78	0.29	2.86	1.53	0.78	0.68	26.37	0.51	0.45	0.68
15.22	-9.27	-18.66	0.22	3.37	-2.05	-4.13	3.20	1.68	1.16	1.51	0.77	0.68	26.32	0.51	0.45	0.68
-78.60	-1.22	-21.54	0.22	-17.37	-0.27	-4.76	4.84	2.92	1.47	1.49	0.76	0.68	26.27	0.51	0.45	0.68
-40.31	30.74	-5.45	0.22	-8.89	6.78	-1.20	4.70	1.87	3.72	1.47	0.75	0.67	26.22	0.51	0.46	0.69
-45.09	19.66	4.59	0.22	-9.92	4.33	1.01	8.52	0.33	2.50	1.45	0.75	0.67	26.17	0.52	0.46	0.69
-83.78	3.64	-13.36	0.22	-18.39	0.80	-2.93	5.17	2.68	1.79	1.43	0.75	0.67	26.12	0.52	0.47	0.70
1.43	9.64	-18.26	0.22	0.31	2.11	-4.00	6.58	3.22	2.25	1.41	0.75	0.67	26.07	0.53	0.48	0.71
66.35	18.60	-3.18	0.22	14.50	4.06	-0.70	2.00	2.75	1.70	1.39	0.75	0.67	26.03	0.54	0.48	0.72
36.19	20.55	-15.11	0.22	7.89	4.48	-3.29	4.40	2.53	2.33	1.38	0.75	0.68	25.98	0.55	0.49	0.73
11.15	-5.46	-14.02	0.22	2.42	-1.19	-3.05	3.07	1.67	0.91	1.36	0.76	0.68	25.93	0.56	0.50	0.75
4.17	-12.40	-1.95	0.22	0.90	-2.69	-0.42	1.91	2.49	1.30	1.34	0.76	0.68	25.88	0.57	0.51	0.76
-23.75	-11.33	-10.89	0.22	-5.14	-2.45	-2.36	1.30	1.19	2.82	1.32	0.77	0.69	25.83	0.58	0.52	0.78
-48.55	-38.21	-2.82	0.22	-10.49	-8.25	-0.61	1.61	2.15	4.22	1.30	0.78	0.69	25.78	0.60	0.53	0.80
-13.38	-24.06	8.20	0.22	-2.88	-5.19	1.77	2.88	1.25	1.61	1.29	0.79	0.69	25.73	0.61	0.54	0.82
28.64	-4.98	-10.76	0.22	6.16	-1.07	-2.31	0.14	0.52	2.42	1.27	0.80	0.70	25.68	0.63	0.55	0.84
13.61	-18.91	-18.66	0.21	2.92	-4.06	-4.00	6.17	1.75	0.50	1.25	0.81	0.70	25.63	0.64	0.56	0.86
28.57	-8.83	-6.58	0.21	6.11	-1.89	-1.41	4.60	1.99	1.48	1.24	0.82	0.71	25.59	0.66	0.57	0.87
78.41	8.19	-11.50	0.21	16.74	1.75	-2.46	2.06	2.38	1.76	1.22	0.83	0.72	25.54	0.68	0.58	0.89
39.22	5.19	-12.42	0.21	8.35	1.11	-2.65	0.17	0.91	2.20	1.21	0.84	0.72	25.49	0.69	0.60	0.91
-28.31	-9.77	-12.83	0.23	-6.45	-2.23	-2.93	3.57	5.02	2.68	1.67	0.94	0.75	26.95	0.56	0.45	0.72
40.72	3.27	6.21	0.23	9.26	0.74	1.41	1.32	4.01	2.11	1.67	0.93	0.75	26.90	0.56	0.45	0.71

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
13.19	7.40	-18.80	0.20	2.60	1.46	-3.70	7.26	1.72	5.87	1.46	0.66	0.90	23.93	0.45	0.62	0.77
46.12	4.40	-27.67	0.20	9.06	0.86	-5.44	4.55	0.36	1.18	1.48	0.65	0.91	23.88	0.44	0.62	0.76
17.05	20.37	-46.49	0.20	3.34	3.99	-9.11	5.36	1.05	0.80	1.51	0.65	0.93	23.83	0.43	0.62	0.75
-38.86	14.33	-35.29	0.20	-7.60	2.80	-6.90	2.17	1.75	0.59	1.53	0.64	0.94	23.78	0.42	0.62	0.75
-4.72	-0.68	-12.16	0.20	-0.92	-0.13	-2.37	4.03	1.40	0.19	1.56	0.64	0.96	23.73	0.41	0.62	0.74
65.20	6.33	-15.07	0.19	12.68	1.23	-2.93	1.92	2.59	2.32	1.58	0.63	0.97	23.68	0.40	0.62	0.73
59.00	13.32	-16.96	0.19	11.45	2.58	-3.29	2.47	4.52	3.22	1.61	0.63	0.99	23.63	0.39	0.61	0.73
41.85	9.29	7.09	0.19	8.10	1.80	1.37	2.44	7.11	4.67	1.64	0.62	1.00	23.58	0.38	0.61	0.72
40.73	-3.70	10.09	0.19	7.86	-0.71	1.95	2.68	2.73	2.68	1.66	0.62	1.02	23.54	0.37	0.61	0.72
-14.27	-6.65	-16.86	0.19	-2.75	-1.28	-3.24	3.23	1.15	1.26	1.69	0.61	1.03	23.49	0.36	0.61	0.71
-64.07	-12.59	-11.76	0.19	-12.30	-2.42	-2.26	3.21	0.49	3.30	1.71	0.61	1.04	23.44	0.36	0.61	0.70
-25.84	-25.49	4.29	0.19	-4.95	-4.88	0.82	3.78	1.90	1.56	1.73	0.61	1.05	23.39	0.35	0.61	0.70
25.21	-8.40	2.31	0.19	4.82	-1.60	0.44	5.14	1.54	1.97	1.76	0.61	1.06	23.34	0.35	0.60	0.70
10.19	-19.32	-9.64	0.19	1.94	-3.68	-1.84	3.93	0.75	1.43	1.78	0.61	1.07	23.29	0.34	0.60	0.69
21.17	-30.20	-21.54	0.19	4.02	-5.74	-4.09	2.61	1.00	2.33	1.80	0.61	1.07	23.24	0.34	0.60	0.69
65.05	3.87	-11.43	0.19	12.33	0.73	-2.17	1.19	2.56	2.00	1.81	0.61	1.08	23.19	0.34	0.60	0.68
6.95	3.88	-3.37	0.19	1.31	0.73	-0.64	1.55	4.50	1.78	1.83	0.62	1.08	23.14	0.34	0.59	0.68
-72.87	-12.08	5.66	0.19	-13.74	-2.28	1.07	3.54	3.43	3.05	1.84	0.62	1.08	23.10	0.34	0.59	0.68
-35.60	-3.03	20.65	0.19	-6.69	-0.57	3.88	3.45	1.68	1.02	1.85	0.63	1.08	23.05	0.34	0.59	0.68
-8.46	13.98	11.62	0.19	-1.59	2.62	2.18	1.61	1.97	2.05	1.86	0.63	1.08	23.00	0.34	0.58	0.67
-45.31	13.94	3.63	0.19	-8.47	2.61	0.68	3.28	1.06	0.98	1.87	0.64	1.08	22.95	0.34	0.58	0.67
-21.13	-10.04	9.64	0.19	-3.94	-1.87	1.80	2.10	0.77	1.58	1.87	0.65	1.08	22.90	0.35	0.57	0.67
12.94	-1.99	-1.34	0.19	2.41	-0.37	-0.25	1.08	2.49	2.41	1.88	0.66	1.07	22.85	0.35	0.57	0.67
-4.03	-0.97	-7.29	0.19	-0.75	-0.18	-1.35	0.91	1.92	0.98	1.88	0.67	1.07	22.80	0.36	0.57	0.67
-3.96	-32.87	4.75	0.19	-0.73	-6.08	0.88	2.94	2.53	3.01	1.88	0.68	1.06	22.75	0.36	0.57	0.67
6.08	-7.77	3.77	0.18	1.12	-1.43	0.70	1.52	4.73	0.99	1.88	0.69	1.06	22.71	0.37	0.56	0.67
-17.85	25.22	-5.19	0.18	-3.28	4.64	-0.96	5.68	3.49	1.34	1.87	0.71	1.05	22.66	0.38	0.56	0.68
-25.71	-11.78	-0.14	0.18	-4.72	-2.16	-0.03	1.72	4.31	2.35	1.86	0.72	1.05	22.61	0.39	0.56	0.68
-0.61	-16.70	7.88	0.18	-0.11	-3.06	1.44	1.56	2.97	2.09	1.85	0.73	1.04	22.56	0.39	0.56	0.69
7.43	29.29	14.87	0.18	1.36	5.35	2.71	3.80	0.10	1.89	1.84	0.74	1.03	22.51	0.40	0.56	0.69
28.41	21.22	9.85	0.18	5.17	3.86	1.79	0.83	0.30	2.91	1.82	0.76	1.02	22.46	0.41	0.56	0.70
13.19	7.40	-18.80	0.20	2.60	1.46	-3.70	7.26	1.72	5.87	1.46	0.66	0.90	23.93	0.45	0.62	0.77
46.12	4.40	-27.67	0.20	9.06	0.86	-5.44	4.55	0.36	1.18	1.48	0.65	0.91	23.88	0.44	0.62	0.76

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
50.30	11.17	3.86	0.18	9.13	2.03	0.70	2.94	0.91	1.40	1.81	0.77	1.02	22.41	0.42	0.56	0.70
54.14	31.11	15.86	0.18	9.80	5.63	2.87	2.23	1.25	0.47	1.79	0.78	1.01	22.36	0.44	0.56	0.71
50.97	9.05	-0.14	0.18	9.20	1.63	-0.02	2.47	1.18	0.64	1.76	0.79	1.00	22.31	0.45	0.57	0.72
-0.08	-13.91	-13.07	0.18	-0.01	-2.50	-2.35	1.00	1.64	2.66	1.74	0.80	0.99	22.27	0.46	0.57	0.73
-17.00	-8.84	0.99	0.18	-3.05	-1.59	0.18	4.10	2.22	0.45	1.71	0.81	0.98	22.22	0.47	0.57	0.74
3.08	-1.80	-9.96	0.18	0.55	-0.32	-1.78	4.58	0.35	1.07	1.68	0.82	0.97	22.17	0.49	0.58	0.75
-16.85	-6.76	-18.86	0.18	-3.01	-1.21	-3.37	2.49	1.86	2.20	1.64	0.82	0.96	22.12	0.50	0.58	0.77
2.23	-10.70	-1.79	0.18	0.40	-1.90	-0.32	2.73	0.85	1.43	1.61	0.83	0.94	22.07	0.52	0.59	0.78
32.21	-1.65	1.25	0.18	5.72	-0.29	0.22	2.91	1.74	1.56	1.57	0.84	0.93	22.02	0.53	0.59	0.80
10.17	-1.62	-8.70	0.18	1.80	-0.29	-1.54	1.96	1.90	1.92	1.54	0.84	0.92	21.97	0.55	0.60	0.81
-16.77	0.40	-2.64	0.18	-2.96	0.07	-0.47	3.61	0.74	2.07	1.50	0.85	0.91	21.92	0.56	0.61	0.83
-5.68	15.39	4.39	0.18	-1.00	2.71	0.77	1.77	1.06	0.40	1.46	0.85	0.89	21.88	0.58	0.61	0.85
16.35	17.35	5.41	0.18	2.87	3.04	0.95	4.70	0.69	1.33	1.42	0.85	0.88	21.83	0.60	0.62	0.86
-5.62	5.33	19.40	0.18	-0.98	0.93	3.39	6.38	0.90	1.11	1.38	0.85	0.87	21.78	0.62	0.63	0.88
4.43	0.34	35.32	0.17	0.77	0.06	6.16	5.66	1.54	0.94	1.34	0.85	0.85	21.73	0.63	0.64	0.90
45.38	1.36	24.24	0.17	7.90	0.24	4.22	4.31	1.42	1.03	1.30	0.85	0.84	21.68	0.65	0.64	0.92
10.31	-11.60	-12.75	0.17	1.79	-2.01	-2.21	2.85	1.56	1.06	1.27	0.85	0.82	21.63	0.67	0.65	0.93
-37.59	-26.50	-16.65	0.17	-6.50	-4.58	-2.88	3.29	2.37	1.56	1.23	0.85	0.81	21.58	0.69	0.66	0.95
-24.42	-24.37	3.41	0.17	-4.21	-4.20	0.59	4.42	1.45	2.22	1.20	0.84	0.79	21.53	0.70	0.66	0.97
-9.30	-9.28	-18.53	0.17	-1.60	-1.60	-3.19	9.17	2.69	6.31	1.17	0.84	0.78	21.48	0.72	0.67	0.98
-22.19	-9.22	-15.42	0.17	-3.81	-1.58	-2.64	5.89	3.70	6.51	1.14	0.83	0.77	21.44	0.73	0.67	0.99
-21.05	-8.16	9.63	0.17	-3.60	-1.40	1.65	2.45	2.06	2.35	1.12	0.83	0.75	21.39	0.74	0.67	1.00
1.03	20.83	-4.35	0.17	0.18	3.55	-0.74	4.52	0.88	1.37	1.10	0.82	0.74	21.34	0.75	0.68	1.01
-8.90	27.76	-3.30	0.17	-1.51	4.72	-0.56	2.92	2.10	1.72	1.08	0.81	0.73	21.29	0.75	0.68	1.01
-6.82	9.71	1.74	0.17	-1.16	1.65	0.30	0.85	2.03	1.11	1.06	0.80	0.72	21.24	0.75	0.67	1.01
30.18	9.69	1.77	0.17	5.10	1.64	0.30	1.44	0.95	1.68	1.05	0.79	0.71	21.19	0.75	0.67	1.01
-3.83	-2.30	-1.19	0.17	-0.64	-0.39	-0.20	3.35	2.12	2.98	1.04	0.78	0.70	21.14	0.75	0.67	1.00
-74.62	-34.20	-13.13	0.17	-12.54	-5.75	-2.21	2.58	1.99	2.91	1.04	0.77	0.69	21.09	0.74	0.66	0.99
-58.30	-24.06	3.93	0.17	-9.77	-4.03	0.66	1.64	1.43	0.98	1.04	0.76	0.68	21.04	0.73	0.65	0.98
27.81	9.99	12.93	0.17	4.64	1.67	2.16	4.32	2.03	0.72	1.04	0.75	0.67	21.00	0.72	0.65	0.97
22.75	7.98	4.93	0.17	3.79	1.33	0.82	4.48	1.43	0.71	1.04	0.74	0.66	20.95	0.71	0.64	0.95
50.30	11.17	3.86	0.18	9.13	2.03	0.70	2.94	0.91	1.40	1.81	0.77	1.02	22.41	0.42	0.56	0.70
54.14	31.11	15.86	0.18	9.80	5.63	2.87	2.23	1.25	0.47	1.79	0.78	1.01	22.36	0.44	0.56	0.71

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-30.18	-6.00	4.94	0.17	-5.01	-1.00	0.82	3.56	2.00	0.89	1.05	0.73	0.66	20.90	0.69	0.63	0.93
14.90	-5.96	3.96	0.17	2.47	-0.99	0.66	3.20	2.31	1.53	1.06	0.71	0.65	20.85	0.67	0.62	0.91
35.84	-0.92	-1.01	0.17	5.91	-0.15	-0.17	0.13	1.75	0.97	1.07	0.70	0.65	20.80	0.65	0.60	0.89
11.80	5.10	-16.94	0.16	1.94	0.84	-2.79	3.50	0.54	2.14	1.09	0.69	0.65	20.75	0.63	0.59	0.87
19.78	12.09	-20.82	0.16	3.24	1.98	-3.42	4.99	0.81	2.18	1.11	0.68	0.64	20.70	0.61	0.58	0.85
23.74	32.02	-11.72	0.16	3.88	5.24	-1.92	3.23	0.76	1.62	1.12	0.67	0.64	20.65	0.59	0.57	0.83
17.71	35.91	-21.62	0.16	2.89	5.85	-3.52	0.27	0.85	1.77	1.14	0.66	0.64	20.61	0.58	0.56	0.81
10.70	14.83	-6.53	0.16	1.74	2.41	-1.06	1.83	1.74	1.47	1.16	0.65	0.65	20.56	0.56	0.56	0.79
46.63	16.79	8.51	0.16	7.55	2.72	1.38	2.06	0.40	1.14	1.18	0.64	0.65	20.51	0.54	0.55	0.77
54.48	15.75	-28.42	0.16	8.80	2.54	-4.59	2.73	0.88	0.87	1.20	0.64	0.65	20.46	0.53	0.54	0.76
-27.53	-0.26	-31.26	0.16	-4.43	-0.04	-5.03	5.27	0.70	0.83	1.22	0.63	0.66	20.41	0.51	0.54	0.74
-34.36	1.76	2.83	0.16	-5.51	0.28	0.45	4.01	1.06	0.73	1.24	0.62	0.66	20.36	0.50	0.53	0.73
2.75	3.77	1.86	0.16	0.44	0.60	0.30	2.47	1.97	1.25	1.26	0.62	0.67	20.31	0.49	0.53	0.72
-29.15	-1.22	-14.08	0.16	-4.65	-0.19	-2.25	3.45	2.34	2.12	1.28	0.62	0.67	20.26	0.48	0.53	0.71
-13.02	-5.18	-12.99	0.16	-2.07	-0.82	-2.07	0.46	4.53	4.91	1.30	0.62	0.68	20.21	0.48	0.52	0.71
31.99	-0.15	2.07	0.16	5.07	-0.02	0.33	3.70	4.69	1.84	1.31	0.62	0.69	20.17	0.47	0.52	0.70
24.93	12.85	1.10	0.16	3.94	2.03	0.17	7.17	1.41	1.05	1.32	0.62	0.69	20.12	0.47	0.52	0.70
13.90	-2.15	-9.84	0.16	2.19	-0.34	-1.55	4.52	5.53	5.17	1.33	0.62	0.70	20.07	0.46	0.52	0.70
6.90	-2.12	3.21	0.16	1.08	-0.33	0.50	0.85	7.41	4.73	1.34	0.62	0.70	20.02	0.46	0.52	0.70
13.91	21.87	8.22	0.16	2.18	3.42	1.29	1.97	1.98	4.76	1.35	0.62	0.71	19.97	0.46	0.53	0.70
3.92	3.84	1.24	0.16	0.61	0.60	0.19	3.69	1.16	2.36	1.35	0.62	0.71	19.92	0.46	0.53	0.70
-2.04	-7.13	8.26	0.16	-0.32	-1.11	1.28	2.14	0.60	3.49	1.35	0.62	0.72	19.87	0.46	0.53	0.70
30.95	-7.08	6.26	0.16	4.80	-1.10	0.97	1.52	1.17	2.20	1.35	0.63	0.72	19.82	0.46	0.53	0.71
-28.01	-20.01	7.27	0.15	-4.33	-3.09	1.12	2.90	0.81	2.52	1.34	0.63	0.72	19.78	0.47	0.54	0.71
-93.72	-15.91	25.24	0.15	-14.43	-2.45	3.89	4.35	2.28	1.60	1.33	0.63	0.72	19.73	0.47	0.54	0.72
-39.40	-6.84	25.18	0.15	-6.05	-1.05	3.87	2.92	1.23	1.72	1.33	0.63	0.72	19.68	0.48	0.54	0.72
-22.23	9.17	3.16	0.15	-3.40	1.40	0.48	1.66	2.09	2.05	1.32	0.63	0.72	19.63	0.48	0.55	0.73
-63.01	1.18	-13.78	0.15	-9.61	0.18	-2.10	1.38	3.22	1.68	1.31	0.64	0.72	19.58	0.49	0.55	0.74
-34.77	-5.79	-14.69	0.15	-5.28	-0.88	-2.23	2.21	2.41	2.53	1.29	0.64	0.72	19.53	0.49	0.56	0.74
10.33	9.22	-14.59	0.15	1.57	1.40	-2.21	2.77	2.38	1.70	1.28	0.64	0.72	19.48	0.50	0.56	0.75
5.35	8.21	-11.51	0.15	0.81	1.24	-1.74	2.49	3.29	0.99	1.27	0.64	0.71	19.43	0.51	0.56	0.76
-30.18	-6.00	4.94	0.17	-5.01	-1.00	0.82	3.56	2.00	0.89	1.05	0.73	0.66	20.90	0.69	0.63	0.93
14.90	-5.96	3.96	0.17	2.47	-0.99	0.66	3.20	2.31	1.53	1.06	0.71	0.65	20.85	0.67	0.62	0.91

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
13.36	25.17	2.55	0.15	2.01	3.79	0.38	5.14	0.95	1.68	1.25	0.64	0.71	19.38	0.51	0.57	0.77
46.29	23.09	4.57	0.15	6.94	3.46	0.69	3.98	2.00	0.38	1.24	0.65	0.71	19.34	0.52	0.57	0.78
52.14	-15.90	3.59	0.15	7.79	-2.38	0.54	3.62	2.88	2.70	1.23	0.65	0.71	19.29	0.53	0.58	0.79
9.07	-31.78	2.62	0.15	1.35	-4.74	0.39	4.93	3.63	2.36	1.22	0.66	0.71	19.24	0.54	0.59	0.80
-17.87	-24.64	-4.34	0.15	-2.65	-3.66	-0.65	3.40	1.84	1.85	1.20	0.66	0.71	19.19	0.55	0.59	0.81
-6.77	-13.55	7.69	0.15	-1.00	-2.00	1.14	0.77	3.81	0.27	1.19	0.67	0.72	19.14	0.56	0.60	0.82
-20.67	-17.46	16.67	0.15	-3.05	-2.58	2.46	3.65	2.01	2.97	1.18	0.68	0.72	19.09	0.57	0.61	0.84
-7.56	-13.37	12.65	0.15	-1.11	-1.97	1.86	3.03	0.61	2.02	1.17	0.69	0.72	19.04	0.58	0.62	0.85
46.41	17.64	12.64	0.15	6.80	2.58	1.85	6.61	1.62	1.25	1.17	0.69	0.73	18.99	0.60	0.63	0.86
36.29	24.58	12.62	0.15	5.30	3.59	1.84	3.19	2.31	1.82	1.16	0.70	0.74	18.95	0.61	0.64	0.88
-2.73	20.51	3.63	0.15	-0.40	2.98	0.53	3.63	2.11	3.35	1.15	0.72	0.74	18.90	0.62	0.65	0.90
-9.66	39.41	-8.33	0.15	-1.40	5.71	-1.21	2.51	2.08	4.38	1.15	0.73	0.75	18.85	0.63	0.66	0.91
-21.55	34.29	-9.26	0.14	-3.11	4.95	-1.34	8.31	3.38	3.30	1.14	0.74	0.76	18.80	0.65	0.67	0.93
-28.40	2.24	-16.17	0.14	-4.09	0.32	-2.33	3.30	0.86	2.48	1.14	0.75	0.77	18.75	0.66	0.68	0.94
-1.29	7.24	-8.09	0.14	-0.19	1.04	-1.16	1.47	1.20	2.10	1.14	0.76	0.78	18.70	0.67	0.69	0.96
23.71	6.24	3.96	0.14	3.39	0.89	0.57	3.71	2.75	1.77	1.14	0.78	0.79	18.65	0.68	0.70	0.98
23.66	-29.70	-8.99	0.14	3.37	-4.23	-1.28	4.88	1.69	1.36	1.14	0.79	0.80	18.60	0.69	0.71	0.99
33.60	-23.57	1.06	0.14	4.77	-3.35	0.15	3.20	1.01	2.07	1.14	0.80	0.81	18.55	0.71	0.72	1.00
38.50	13.48	11.07	0.14	5.45	1.91	1.57	0.99	1.93	1.36	1.14	0.81	0.82	18.51	0.72	0.72	1.02
2.47	18.43	8.07	0.14	0.35	2.60	1.14	2.15	1.55	1.93	1.14	0.82	0.83	18.46	0.72	0.73	1.03
-40.41	-4.57	7.07	0.14	-5.68	-0.64	0.99	2.04	0.98	3.70	1.14	0.83	0.84	18.41	0.73	0.73	1.04
-25.23	-13.51	-11.88	0.14	-3.53	-1.89	-1.66	3.38	1.54	3.03	1.14	0.84	0.84	18.36	0.74	0.74	1.04
7.85	0.54	-11.80	0.14	1.10	0.07	-1.65	1.60	1.21	1.11	1.14	0.85	0.85	18.31	0.74	0.74	1.05
-8.10	-7.43	-2.73	0.14	-1.13	-1.03	-0.38	4.05	0.73	3.13	1.15	0.85	0.85	18.26	0.74	0.74	1.05
-9.02	-0.39	-5.68	0.14	-1.25	-0.05	-0.79	2.80	1.17	4.39	1.15	0.86	0.85	18.21	0.75	0.74	1.05
17.01	26.58	9.35	0.14	2.35	3.67	1.29	4.64	0.89	1.02	1.16	0.86	0.85	18.16	0.75	0.74	1.05
-12.95	1.55	19.33	0.14	-1.78	0.21	2.66	2.86	2.68	1.43	1.16	0.87	0.85	18.12	0.74	0.73	1.04
-60.75	-17.40	15.30	0.14	-8.32	-2.38	2.10	1.72	3.35	4.90	1.17	0.87	0.85	18.07	0.74	0.73	1.04
-40.50	3.65	16.27	0.14	-5.53	0.50	2.22	4.60	3.67	5.25	1.18	0.87	0.85	18.02	0.74	0.72	1.03
1.62	2.66	19.23	0.14	0.22	0.36	2.62	3.09	2.03	1.05	1.19	0.87	0.85	17.97	0.73	0.71	1.02
0.67	-22.28	-0.77	0.14	0.09	-3.02	-0.10	3.76	2.79	4.80	1.19	0.86	0.84	17.92	0.72	0.71	1.01
13.36	25.17	2.55	0.15	2.01	3.79	0.38	5.14	0.95	1.68	1.25	0.64	0.71	19.38	0.51	0.57	0.77
46.29	23.09	4.57	0.15	6.94	3.46	0.69	3.98	2.00	0.38	1.24	0.65	0.71	19.34	0.52	0.57	0.78

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
4.71	-23.16	-22.68	0.14	0.64	-3.13	-3.06	5.89	7.01	14.45	1.20	0.86	0.84	17.87	0.72	0.70	1.00
59.63	-7.08	-14.57	0.13	8.02	-0.95	-1.96	3.87	7.77	11.07	1.21	0.86	0.84	17.82	0.71	0.69	0.99
51.45	-2.04	-12.48	0.13	6.89	-0.27	-1.67	8.24	2.78	1.00	1.22	0.85	0.84	17.77	0.70	0.69	0.98
-15.57	10.97	-15.39	0.13	-2.08	1.46	-2.05	15.27	7.27	4.37	1.23	0.84	0.83	17.72	0.69	0.68	0.97
7.49	3.96	-8.31	0.13	1.00	0.53	-1.10	15.90	8.96	5.82	1.24	0.84	0.83	17.68	0.68	0.67	0.95
39.44	-7.01	-0.25	0.13	5.23	-0.93	-0.03	6.46	3.08	2.56	1.24	0.83	0.83	17.63	0.67	0.67	0.94
5.40	9.01	0.78	0.13	0.71	1.19	0.10	4.96	0.53	0.41	1.25	0.82	0.83	17.58	0.66	0.67	0.94
-7.55	12.98	-6.17	0.13	-0.99	1.71	-0.81	8.61	2.01	1.62	1.26	0.82	0.84	17.53	0.65	0.66	0.93
-3.48	23.93	4.87	0.13	-0.46	3.14	0.64	7.73	4.25	1.75	1.27	0.81	0.84	17.48	0.64	0.66	0.92
-11.40	25.86	9.87	0.13	-1.49	3.37	1.29	8.01	3.66	1.01	1.28	0.81	0.85	17.43	0.63	0.66	0.92
-0.33	-12.15	6.88	0.13	-0.04	-1.58	0.89	2.31	2.72	4.01	1.29	0.80	0.86	17.38	0.62	0.67	0.91
32.65	-21.06	23.85	0.13	4.23	-2.73	3.09	0.76	0.82	3.04	1.29	0.80	0.87	17.33	0.62	0.67	0.91
29.58	-5.98	26.78	0.13	3.82	-0.77	3.46	2.00	1.18	2.22	1.30	0.79	0.88	17.29	0.61	0.68	0.91
-14.41	-5.94	6.75	0.13	-1.85	-0.76	0.87	1.71	1.47	3.05	1.31	0.79	0.89	17.24	0.60	0.68	0.91
-11.31	-1.90	-10.20	0.13	-1.45	-0.24	-1.31	2.15	1.00	2.77	1.32	0.79	0.91	17.19	0.60	0.69	0.91
33.69	-3.86	-24.10	0.13	4.30	-0.49	-3.07	2.84	0.26	1.92	1.34	0.80	0.93	17.14	0.60	0.70	0.92
29.61	-22.79	-31.95	0.13	3.76	-2.89	-4.06	2.70	1.30	0.56	1.35	0.80	0.95	17.09	0.59	0.70	0.92
6.59	-13.69	-31.79	0.13	0.83	-1.73	-4.02	0.98	0.48	4.24	1.37	0.81	0.97	17.04	0.59	0.71	0.93
40.54	18.32	-27.63	0.13	5.11	2.31	-3.48	1.66	1.88	3.17	1.38	0.82	1.00	16.99	0.59	0.72	0.93
25.45	17.27	-18.50	0.13	3.19	2.17	-2.32	1.57	4.25	2.06	1.40	0.83	1.02	16.94	0.59	0.73	0.94
-54.44	5.25	-21.39	0.13	-6.81	0.66	-2.67	5.08	2.78	2.34	1.42	0.84	1.05	16.89	0.59	0.74	0.94
-49.19	9.24	-33.24	0.12	-6.12	1.15	-4.14	5.29	5.82	2.62	1.45	0.86	1.08	16.85	0.59	0.74	0.95
-11.02	9.23	-30.07	0.12	-1.37	1.14	-3.73	3.46	7.91	0.84	1.47	0.87	1.10	16.80	0.59	0.75	0.95
-23.90	8.22	-18.94	0.12	-2.95	1.01	-2.34	1.58	6.02	1.52	1.50	0.89	1.13	16.75	0.59	0.75	0.96
-9.79	2.22	-4.85	0.12	-1.20	0.27	-0.60	2.30	1.69	2.68	1.53	0.91	1.16	16.70	0.59	0.75	0.96
22.23	-9.74	5.18	0.12	2.72	-1.19	0.63	3.81	17.70	12.22	1.57	0.93	1.18	16.65	0.60	0.75	0.96
-16.73	-13.67	24.16	0.12	-2.04	-1.67	2.95	8.65	21.11	9.73	1.60	0.96	1.21	16.60	0.60	0.75	0.96
-51.55	-9.60	57.04	0.12	-6.26	-1.17	6.93	4.25	11.95	2.49	1.63	0.98	1.23	16.55	0.60	0.75	0.96
0.60	-2.56	54.85	0.12	0.07	-0.31	6.64	3.92	9.16	3.58	1.67	1.00	1.25	16.50	0.60	0.75	0.96
35.58	1.47	34.71	0.12	4.29	0.18	4.18	3.34	3.72	2.36	1.70	1.03	1.27	16.46	0.60	0.75	0.96
4.54	0.49	31.61	0.12	0.55	0.06	3.79	2.94	0.57	2.84	1.73	1.05	1.28	16.41	0.61	0.74	0.96
4.71	-23.16	-22.68	0.14	0.64	-3.13	-3.06	5.89	7.01	14.45	1.20	0.86	0.84	17.87	0.72	0.70	1.00
59.63	-7.08	-14.57	0.13	8.02	-0.95	-1.96	3.87	7.77	11.07	1.21	0.86	0.84	17.82	0.71	0.69	0.99

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-24.37	11.48	26.53	0.12	-2.91	1.37	3.17	3.38	1.67	1.36	1.76	1.07	1.30	16.36	0.61	0.74	0.96
-39.19	37.41	19.47	0.12	-4.66	4.45	2.32	2.03	3.51	3.13	1.79	1.10	1.31	16.31	0.61	0.73	0.95
-48.97	30.30	18.43	0.12	-5.80	3.59	2.18	4.15	0.33	3.88	1.81	1.12	1.32	16.26	0.62	0.73	0.95
-23.78	0.26	12.40	0.12	-2.81	0.03	1.46	4.08	3.62	2.33	1.83	1.14	1.32	16.21	0.62	0.72	0.95
17.29	2.27	2.41	0.12	2.03	0.27	0.28	3.03	2.16	1.85	1.85	1.16	1.32	16.16	0.63	0.72	0.95
18.26	13.26	-6.55	0.12	2.14	1.55	-0.77	3.66	2.41	2.05	1.86	1.18	1.32	16.11	0.64	0.71	0.95
-7.71	1.26	4.49	0.12	-0.90	0.15	0.52	4.24	0.97	2.69	1.87	1.20	1.32	16.06	0.64	0.71	0.96
3.35	-13.70	12.49	0.12	0.39	-1.59	1.45	18.82	29.68	12.04	1.87	1.22	1.31	16.02	0.66	0.70	0.96
28.33	-14.62	3.50	0.12	3.27	-1.69	0.40	27.07	39.11	15.60	1.86	1.25	1.31	15.97	0.67	0.70	0.97
14.29	-15.53	0.52	0.12	1.64	-1.79	0.06	9.17	8.09	3.07	1.85	1.27	1.30	15.92	0.68	0.70	0.98
25.26	-10.46	-6.43	0.11	2.89	-1.20	-0.74	1.90	1.95	2.47	1.84	1.29	1.29	15.87	0.70	0.70	0.99
52.15	1.58	-9.36	0.11	5.95	0.18	-1.07	2.18	3.14	2.62	1.82	1.32	1.28	15.82	0.72	0.70	1.01
21.05	3.59	-17.27	0.11	2.39	0.41	-1.96	2.19	3.30	2.30	1.80	1.35	1.27	15.77	0.75	0.71	1.03
-24.89	-5.38	-23.16	0.11	-2.81	-0.61	-2.62	4.02	5.10	1.55	1.77	1.38	1.26	15.72	0.78	0.71	1.06
-16.76	-8.33	-9.06	0.11	-1.89	-0.94	-1.02	1.11	3.65	0.53	1.75	1.42	1.26	15.67	0.81	0.72	1.08
41.24	4.70	-3.99	0.11	4.62	0.53	-0.45	1.90	4.47	1.95	1.72	1.46	1.25	15.63	0.85	0.73	1.11
38.12	2.71	2.05	0.11	4.25	0.30	0.23	3.48	2.32	1.67	1.70	1.50	1.25	15.58	0.88	0.73	1.15
-39.83	-5.27	18.04	0.11	-4.42	-0.58	2.00	2.53	0.54	1.93	1.67	1.55	1.24	15.53	0.92	0.74	1.19
-31.64	6.75	23.99	0.11	-3.50	0.75	2.65	2.20	3.78	2.61	1.65	1.60	1.24	15.48	0.97	0.75	1.23
39.40	7.75	18.94	0.11	4.33	0.85	2.08	3.05	5.76	3.57	1.63	1.65	1.24	15.43	1.01	0.76	1.27
28.31	1.75	22.89	0.11	3.10	0.19	2.51	6.26	3.56	0.37	1.61	1.70	1.25	15.38	1.06	0.77	1.31
4.29	8.75	19.84	0.11	0.47	0.95	2.16	1.17	1.36	0.57	1.60	1.76	1.25	15.33	1.10	0.78	1.35
26.27	6.74	-16.13	0.11	2.85	0.73	-1.75	4.06	1.38	2.91	1.59	1.82	1.26	15.28	1.15	0.79	1.40
-4.72	10.73	-44.97	0.11	-0.51	1.16	-4.86	4.21	1.65	4.05	1.58	1.89	1.27	15.23	1.19	0.80	1.44
-55.56	10.71	-48.75	0.11	-5.97	1.15	-5.24	4.62	2.23	8.70	1.58	1.95	1.28	15.19	1.23	0.81	1.47
-14.37	-1.29	-58.50	0.11	-1.54	-0.14	-6.26	7.04	2.51	4.82	1.59	2.02	1.29	15.14	1.27	0.81	1.51
29.65	0.74	-59.23	0.11	3.16	0.08	-6.31	6.28	6.44	3.45	1.60	2.08	1.31	15.09	1.30	0.82	1.54
-1.36	-2.24	-51.97	0.11	-0.14	-0.24	-5.51	5.83	5.97	1.44	1.62	2.15	1.32	15.04	1.33	0.82	1.56
-3.31	1.79	-47.73	0.11	-0.35	0.19	-5.04	3.12	1.03	2.74	1.64	2.21	1.34	14.99	1.35	0.82	1.58
4.74	10.78	-29.54	0.11	0.50	1.13	-3.10	2.12	0.91	5.17	1.66	2.27	1.35	14.94	1.37	0.81	1.59
-36.15	-8.20	-9.42	0.10	-3.78	-0.86	-0.98	3.76	1.92	5.89	1.68	2.32	1.36	14.89	1.38	0.81	1.60
-24.37	11.48	26.53	0.12	-2.91	1.37	3.17	3.38	1.67	1.36	1.76	1.07	1.30	16.36	0.61	0.74	0.96
-39.19	37.41	19.47	0.12	-4.66	4.45	2.32	2.03	3.51	3.13	1.79	1.10	1.31	16.31	0.61	0.73	0.95

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-29.97	-21.12	0.63	0.10	-3.12	-2.20	0.07	4.07	2.46	5.27	1.71	2.36	1.37	14.84	1.38	0.80	1.60
11.11	-1.05	6.66	0.10	1.15	-0.11	0.69	1.69	3.05	2.85	1.74	2.40	1.38	14.79	1.38	0.79	1.59
-22.82	18.93	1.68	0.10	-2.35	1.95	0.17	1.90	2.84	2.88	1.77	2.44	1.39	14.75	1.38	0.79	1.59
-47.63	13.89	-5.28	0.10	-4.88	1.42	-0.54	0.95	1.50	3.69	1.79	2.47	1.40	14.70	1.37	0.78	1.58
6.50	11.86	13.74	0.10	0.66	1.21	1.40	2.36	5.02	2.56	1.82	2.49	1.40	14.65	1.37	0.77	1.57
26.48	12.83	16.72	0.10	2.69	1.30	1.70	4.23	1.22	3.30	1.84	2.50	1.40	14.60	1.36	0.76	1.55
-10.50	-6.16	6.71	0.10	-1.06	-0.62	0.68	5.96	4.82	1.34	1.86	2.50	1.40	14.55	1.34	0.75	1.54
-5.42	-10.10	21.69	0.10	-0.55	-1.02	2.18	6.35	6.78	1.89	1.88	2.50	1.40	14.50	1.33	0.75	1.52
19.60	-8.05	28.63	0.10	1.96	-0.80	2.86	6.30	4.74	6.27	1.90	2.49	1.40	14.45	1.31	0.74	1.51
4.59	-9.99	29.55	0.10	0.46	-0.99	2.94	6.14	2.46	6.70	1.91	2.47	1.40	14.40	1.30	0.73	1.49
-10.35	-11.92	29.46	0.10	-1.02	-1.18	2.92	5.87	2.36	2.39	1.91	2.44	1.39	14.36	1.28	0.73	1.47
11.70	-19.83	19.40	0.10	1.15	-1.95	1.91	2.75	2.15	6.35	1.91	2.41	1.38	14.31	1.26	0.72	1.45
30.66	-5.76	13.37	0.10	3.00	-0.56	1.31	2.97	4.40	6.84	1.91	2.36	1.37	14.26	1.24	0.72	1.43
-0.35	0.27	3.38	0.10	-0.03	0.03	0.33	7.23	4.93	4.40	1.90	2.31	1.36	14.21	1.22	0.72	1.41
-30.25	1.29	-9.58	0.10	-2.93	0.13	-0.93	6.90	4.09	3.97	1.89	2.26	1.35	14.16	1.20	0.72	1.39
-7.12	33.25	-21.48	0.10	-0.69	3.21	-2.07	3.99	0.13	2.58	1.87	2.20	1.34	14.11	1.17	0.72	1.38
2.93	27.15	-28.34	0.10	0.28	2.61	-2.72	4.51	3.51	2.11	1.85	2.13	1.33	14.06	1.15	0.72	1.36
-7.01	-3.88	-27.19	0.10	-0.67	-0.37	-2.60	2.95	2.16	4.71	1.83	2.07	1.32	14.01	1.13	0.72	1.34
5.04	-2.84	-19.06	0.10	0.48	-0.27	-1.81	11.32	3.04	3.07	1.81	2.00	1.31	13.96	1.11	0.73	1.33
1.07	2.18	-8.97	0.09	0.10	0.21	-0.85	26.28	19.21	2.29	1.78	1.93	1.31	13.92	1.08	0.73	1.31
-2.88	0.20	-11.89	0.09	-0.27	0.02	-1.12	15.49	13.49	0.52	1.76	1.87	1.30	13.87	1.06	0.74	1.30
46.09	-11.76	4.16	0.09	4.31	-1.10	0.39	5.25	3.31	1.43	1.73	1.80	1.30	13.82	1.04	0.75	1.28
81.88	-8.69	24.14	0.09	7.61	-0.81	2.25	7.79	7.66	2.89	1.71	1.74	1.30	13.77	1.02	0.76	1.27
27.70	-1.65	9.11	0.09	2.56	-0.15	0.84	3.20	6.44	2.31	1.69	1.67	1.30	13.72	0.99	0.77	1.26
-21.26	-5.61	8.11	0.09	-1.96	-0.52	0.75	1.71	2.38	1.61	1.67	1.61	1.30	13.67	0.97	0.78	1.24
-1.17	6.41	23.09	0.09	-0.11	0.59	2.11	7.53	4.31	3.10	1.65	1.56	1.30	13.62	0.94	0.79	1.23
-0.12	0.42	24.03	0.09	-0.01	0.04	2.19	5.22	6.10	2.30	1.64	1.51	1.31	13.57	0.92	0.80	1.22
-1.08	-8.55	22.97	0.09	-0.10	-0.77	2.08	5.23	2.19	3.88	1.63	1.46	1.31	13.53	0.90	0.81	1.21
36.90	17.46	16.93	0.09	3.32	1.57	1.52	6.26	2.78	3.23	1.62	1.43	1.32	13.48	0.88	0.81	1.20
11.85	25.40	7.91	0.09	1.06	2.27	0.71	7.45	1.46	1.90	1.62	1.39	1.33	13.43	0.86	0.82	1.19
-40.05	11.34	2.93	0.09	-3.56	1.01	0.26	6.64	5.94	0.77	1.62	1.37	1.34	13.38	0.84	0.82	1.18
-29.97	-21.12	0.63	0.10	-3.12	-2.20	0.07	4.07	2.46	5.27	1.71	2.36	1.37	14.84	1.38	0.80	1.60
11.11	-1.05	6.66	0.10	1.15	-0.11	0.69	1.69	3.05	2.85	1.74	2.40	1.38	14.79	1.38	0.79	1.59

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-21.88	1.34	2.95	0.09	-1.94	0.12	0.26	2.84	2.52	2.08	1.63	1.35	1.34	13.33	0.83	0.82	1.17
-23.74	-0.64	9.96	0.09	-2.09	-0.06	0.88	3.96	2.98	5.37	1.65	1.34	1.35	13.28	0.81	0.82	1.15
-26.60	12.36	10.96	0.09	-2.33	1.08	0.96	4.59	6.35	4.46	1.67	1.33	1.36	13.23	0.80	0.82	1.14
-1.49	14.33	-2.03	0.09	-0.13	1.25	-0.18	2.14	5.86	1.58	1.69	1.33	1.37	13.18	0.79	0.81	1.13
-20.40	22.28	-16.95	0.09	-1.76	1.93	-1.47	1.23	4.49	3.06	1.72	1.33	1.37	13.13	0.78	0.80	1.11
-32.25	24.20	-29.82	0.09	-2.77	2.08	-2.56	4.99	3.36	2.03	1.75	1.34	1.38	13.09	0.77	0.79	1.10
-24.09	-9.80	-36.65	0.09	-2.06	-0.84	-3.13	3.22	1.53	4.65	1.79	1.36	1.38	13.04	0.76	0.77	1.08
-2.99	-10.74	-28.49	0.09	-0.25	-0.91	-2.42	5.20	2.53	1.17	1.83	1.38	1.38	12.99	0.75	0.76	1.07
38.99	5.29	-24.34	0.08	3.29	0.45	-2.06	4.86	1.64	2.94	1.87	1.40	1.38	12.94	0.75	0.74	1.05
8.94	-19.66	-36.18	0.08	0.75	-1.65	-3.04	5.55	1.34	5.56	1.92	1.43	1.38	12.89	0.74	0.72	1.03
-55.92	-18.56	-36.00	0.08	-4.67	-1.55	-3.01	5.80	3.82	3.60	1.97	1.45	1.37	12.84	0.74	0.70	1.02
-29.70	-0.50	-21.85	0.08	-2.47	-0.04	-1.81	2.12	1.92	0.91	2.02	1.48	1.37	12.79	0.74	0.68	1.00
32.34	-10.46	-3.76	0.08	2.67	-0.86	-0.31	6.14	1.34	2.07	2.06	1.52	1.36	12.74	0.73	0.66	0.99
13.30	-9.39	15.25	0.08	1.09	-0.77	1.25	5.10	4.15	4.63	2.11	1.55	1.35	12.70	0.73	0.64	0.97
-13.66	11.62	26.21	0.08	-1.11	0.95	2.14	11.46	8.39	5.32	2.16	1.58	1.34	12.65	0.73	0.62	0.96
34.35	14.59	40.11	0.08	2.78	1.18	3.25	8.71	6.70	1.67	2.20	1.61	1.32	12.60	0.73	0.60	0.95
35.26	8.57	41.99	0.08	2.84	0.69	3.38	21.84	9.96	8.31	2.24	1.64	1.31	12.55	0.73	0.58	0.94
-34.70	26.52	31.87	0.08	-2.78	2.12	2.55	22.29	9.32	10.20	2.28	1.66	1.29	12.50	0.73	0.57	0.93
-41.50	37.41	32.78	0.08	-3.30	2.97	2.61	5.07	4.57	2.26	2.31	1.69	1.28	12.45	0.73	0.55	0.92
6.62	22.31	8.73	0.08	0.52	1.76	0.69	1.01	0.70	0.54	2.34	1.71	1.26	12.40	0.73	0.54	0.91
38.58	25.24	-22.20	0.08	3.03	1.98	-1.74	2.55	6.03	2.67	2.36	1.73	1.24	12.35	0.73	0.53	0.90
63.42	21.17	-9.11	0.08	4.95	1.65	-0.71	4.73	8.08	3.47	2.38	1.74	1.23	12.30	0.73	0.52	0.90
64.21	-5.84	-2.05	0.08	4.98	-0.45	-0.16	3.24	4.55	3.15	2.39	1.76	1.21	12.26	0.73	0.51	0.89
4.12	-20.77	-17.97	0.08	0.32	-1.60	-1.38	3.10	4.57	2.12	2.40	1.76	1.19	12.21	0.74	0.50	0.89
-7.83	-31.64	-26.84	0.08	-0.60	-2.42	-2.05	1.23	8.69	4.51	2.40	1.77	1.18	12.16	0.74	0.49	0.89
47.14	-28.50	-28.70	0.08	3.58	-2.17	-2.18	1.84	1.50	3.45	2.40	1.77	1.17	12.11	0.74	0.49	0.88
22.05	-13.39	-25.55	0.08	1.66	-1.01	-1.93	3.60	8.03	2.45	2.39	1.76	1.16	12.06	0.74	0.48	0.88
-31.89	-14.32	-23.42	0.08	-2.39	-1.07	-1.76	2.50	7.96	6.89	2.38	1.76	1.15	12.01	0.74	0.48	0.88
-21.74	5.72	-22.29	0.07	-1.62	0.43	-1.66	6.96	9.30	10.43	2.37	1.75	1.14	11.96	0.74	0.48	0.88
-4.64	9.71	-17.17	0.07	-0.34	0.72	-1.27	6.06	8.67	11.36	2.35	1.74	1.14	11.91	0.74	0.48	0.88
-34.51	-7.27	-13.07	0.07	-2.54	-0.53	-0.96	11.20	4.73	11.45	2.34	1.73	1.14	11.87	0.74	0.49	0.88
-21.88	1.34	2.95	0.09	-1.94	0.12	0.26	2.84	2.52	2.08	1.63	1.35	1.34	13.33	0.83	0.82	1.17
-23.74	-0.64	9.96	0.09	-2.09	-0.06	0.88	3.96	2.98	5.37	1.65	1.34	1.35	13.28	0.81	0.82	1.15

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-48.30	7.75	4.98	0.07	-3.53	0.57	0.36	8.36	8.67	8.93	2.33	1.72	1.14	11.82	0.74	0.49	0.89
24.79	13.73	16.98	0.07	1.80	1.00	1.23	3.32	3.85	3.31	2.31	1.71	1.14	11.77	0.74	0.49	0.89
42.70	9.70	4.97	0.07	3.07	0.70	0.36	5.03	2.40	3.03	2.30	1.70	1.15	11.72	0.74	0.50	0.89
-16.30	-0.30	3.99	0.07	-1.17	-0.02	0.29	4.83	0.65	3.56	2.29	1.69	1.15	11.67	0.74	0.50	0.89
4.77	-27.22	8.00	0.07	0.34	-1.93	0.57	2.73	1.10	1.80	2.28	1.68	1.17	11.62	0.74	0.51	0.90
27.75	-26.09	-7.96	0.07	1.96	-1.84	-0.56	3.16	3.15	0.66	2.27	1.67	1.18	11.57	0.74	0.52	0.90
-31.20	-22.97	-18.87	0.07	-2.18	-1.61	-1.32	5.29	4.07	2.60	2.27	1.67	1.20	11.52	0.74	0.53	0.91
-46.00	-26.85	4.20	0.07	-3.20	-1.87	0.29	8.30	9.58	11.17	2.26	1.67	1.21	11.47	0.74	0.54	0.91
7.13	-4.76	37.15	0.07	0.49	-0.33	2.56	10.90	12.11	13.67	2.26	1.67	1.23	11.43	0.74	0.55	0.92
4.15	7.26	30.05	0.07	0.28	0.50	2.06	5.48	4.84	4.22	2.26	1.68	1.25	11.38	0.74	0.55	0.93
-27.76	13.24	9.01	0.07	-1.89	0.90	0.61	1.79	2.17	1.31	2.27	1.69	1.28	11.33	0.74	0.56	0.93
-3.65	21.19	16.00	0.07	-0.25	1.43	1.08	2.44	2.18	1.38	2.27	1.70	1.30	11.28	0.75	0.57	0.94
10.39	0.17	7.99	0.07	0.70	0.01	0.54	2.62	1.38	1.86	2.28	1.72	1.33	11.23	0.75	0.58	0.95
-9.57	-8.79	-9.97	0.07	-0.64	-0.58	-0.66	2.56	2.71	1.88	2.28	1.74	1.36	11.18	0.76	0.59	0.96
-13.48	17.21	12.06	0.07	-0.89	1.14	0.80	1.58	0.07	0.89	2.29	1.76	1.39	11.13	0.77	0.61	0.98
16.56	20.16	18.04	0.07	1.08	1.32	1.18	3.33	1.59	3.28	2.30	1.78	1.42	11.08	0.78	0.62	0.99
27.52	-3.85	-13.93	0.07	1.79	-0.25	-0.91	2.45	2.13	3.13	2.30	1.81	1.45	11.04	0.79	0.63	1.01
-12.46	-3.81	-20.83	0.06	-0.80	-0.25	-1.34	3.40	2.18	2.10	2.31	1.84	1.48	10.99	0.80	0.64	1.02
-21.35	-0.78	-6.74	0.06	-1.37	-0.05	-0.43	8.00	9.33	8.47	2.31	1.86	1.52	10.94	0.81	0.66	1.04
-9.24	-3.75	-8.67	0.06	-0.59	-0.24	-0.55	17.21	2.35	15.71	2.31	1.89	1.55	10.89	0.82	0.67	1.06
-6.16	12.25	-1.61	0.06	-0.39	0.77	-0.10	9.32	6.33	7.50	2.30	1.91	1.58	10.84	0.83	0.69	1.08
30.84	27.19	18.39	0.06	1.93	1.70	1.15	2.20	7.07	1.26	2.29	1.94	1.62	10.79	0.85	0.71	1.10
32.75	37.09	20.35	0.06	2.03	2.30	1.26	3.84	4.12	0.47	2.28	1.96	1.65	10.74	0.86	0.72	1.12
-4.26	31.97	3.34	0.06	-0.26	1.97	0.21	3.95	2.49	0.12	2.27	1.98	1.68	10.69	0.87	0.74	1.14
-14.17	15.89	-7.61	0.06	-0.86	0.97	-0.46	1.59	5.99	1.21	2.25	1.99	1.71	10.64	0.89	0.76	1.17
-18.06	3.88	-6.55	0.06	-1.09	0.23	-0.40	1.27	2.81	5.32	2.23	2.01	1.73	10.60	0.90	0.78	1.19
5.01	-24.06	-11.48	0.06	0.30	-1.44	-0.69	0.65	2.40	2.66	2.21	2.01	1.76	10.55	0.91	0.80	1.21
38.97	-33.93	-17.38	0.06	2.32	-2.02	-1.03	2.53	4.49	3.81	2.19	2.02	1.78	10.50	0.92	0.81	1.23
29.88	-7.82	-17.28	0.06	1.76	-0.46	-1.02	2.64	4.89	3.87	2.17	2.02	1.81	10.45	0.93	0.83	1.25
20.82	-5.77	-11.18	0.06	1.22	-0.34	-0.65	3.67	4.90	3.89	2.15	2.02	1.82	10.40	0.94	0.85	1.27
-12.15	-17.70	-9.10	0.06	-0.70	-1.03	-0.53	4.88	4.43	3.30	2.12	2.01	1.84	10.35	0.95	0.87	1.28
-48.30	7.75	4.98	0.07	-3.53	0.57	0.36	8.36	8.67	8.93	2.33	1.72	1.14	11.82	0.74	0.49	0.89
24.79	13.73	16.98	0.07	1.80	1.00	1.23	3.32	3.85	3.31	2.31	1.71	1.14	11.77	0.74	0.49	0.89

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-33.01	-7.63	-2.04	0.06	-1.90	-0.44	-0.12	2.71	5.63	3.58	2.10	2.00	1.85	10.30	0.95	0.88	1.30
11.08	7.39	14.97	0.06	0.63	0.42	0.85	3.03	1.68	0.60	2.07	1.98	1.86	10.25	0.96	0.90	1.31
0.10	15.37	0.97	0.06	0.01	0.87	0.05	4.19	3.03	4.89	2.05	1.96	1.87	10.21	0.96	0.91	1.32
-33.79	6.35	-25.94	0.06	-1.89	0.36	-1.45	4.89	2.68	5.91	2.02	1.94	1.87	10.16	0.96	0.92	1.33
-8.66	1.35	-18.81	0.06	-0.48	0.07	-1.04	7.37	4.67	6.52	2.00	1.91	1.86	10.11	0.96	0.93	1.34
-0.59	7.35	-0.74	0.06	-0.03	0.40	-0.04	1.57	5.88	7.17	1.97	1.89	1.86	10.06	0.96	0.94	1.34
-19.50	-0.64	3.29	0.05	-1.06	-0.03	0.18	3.93	4.17	1.52	1.95	1.86	1.85	10.01	0.95	0.95	1.34
-15.39	-2.61	5.31	0.05	-0.83	-0.14	0.29	1.62	5.35	2.75	1.93	1.83	1.84	9.96	0.95	0.95	1.34
21.65	3.41	13.31	0.05	1.16	0.18	0.71	1.38	4.53	2.39	1.92	1.81	1.83	9.91	0.94	0.96	1.34
15.62	11.40	2.32	0.05	0.83	0.60	0.12	3.29	1.63	8.94	1.90	1.78	1.82	9.86	0.94	0.96	1.34
-18.33	22.36	-14.62	0.05	-0.96	1.17	-0.77	1.85	6.19	5.32	1.88	1.75	1.80	9.81	0.93	0.96	1.33
18.72	22.29	-10.53	0.05	0.97	1.16	-0.55	1.03	2.46	4.09	1.87	1.72	1.78	9.77	0.92	0.96	1.33
14.69	30.20	-7.46	0.05	0.76	1.56	-0.38	1.15	1.13	1.84	1.85	1.70	1.76	9.72	0.92	0.95	1.32
-35.22	31.10	-1.40	0.05	-1.80	1.59	-0.07	2.23	2.01	3.27	1.83	1.67	1.74	9.67	0.91	0.95	1.32
4.89	20.02	13.61	0.05	0.25	1.01	0.69	1.97	1.82	5.10	1.81	1.65	1.72	9.62	0.91	0.95	1.31
41.84	26.94	17.59	0.05	2.09	1.35	0.88	1.11	1.71	2.11	1.80	1.63	1.70	9.57	0.91	0.95	1.31
2.80	22.86	9.57	0.05	0.14	1.13	0.47	0.87	3.55	5.47	1.78	1.61	1.68	9.52	0.91	0.94	1.31
-28.11	2.83	13.56	0.05	-1.38	0.14	0.66	3.22	4.09	4.13	1.76	1.59	1.66	9.47	0.91	0.94	1.31
-18.96	-0.15	22.52	0.05	-0.92	-0.01	1.09	2.39	1.37	2.11	1.74	1.58	1.64	9.42	0.91	0.94	1.31
6.11	-14.10	9.50	0.05	0.29	-0.68	0.46	3.20	5.11	8.33	1.72	1.57	1.62	9.38	0.91	0.94	1.31
-9.84	-23.01	-13.46	0.05	-0.47	-1.09	-0.64	1.28	1.71	6.41	1.70	1.56	1.60	9.33	0.92	0.94	1.32
-18.73	3.05	-14.37	0.05	-0.88	0.14	-0.68	1.92	1.58	5.35	1.68	1.55	1.59	9.28	0.92	0.95	1.32
30.29	14.04	-11.28	0.05	1.41	0.65	-0.52	5.26	2.58	2.96	1.65	1.54	1.58	9.23	0.93	0.95	1.33
28.22	2.02	-29.16	0.05	1.30	0.09	-1.34	3.14	1.78	1.75	1.63	1.54	1.56	9.18	0.94	0.96	1.35
-8.78	-11.94	-31.00	0.05	-0.40	-0.54	-1.41	2.90	0.86	5.21	1.60	1.53	1.55	9.13	0.96	0.97	1.36
9.27	-11.87	-15.87	0.05	0.42	-0.53	-0.71	4.53	1.50	4.43	1.57	1.53	1.54	9.08	0.97	0.98	1.38
7.28	13.15	-11.78	0.04	0.32	0.59	-0.52	1.77	3.19	5.05	1.55	1.52	1.53	9.03	0.98	0.99	1.40
-4.68	27.09	-12.69	0.04	-0.21	1.19	-0.56	3.33	2.95	2.43	1.52	1.52	1.53	8.98	1.00	1.01	1.42
38.30	16.02	-2.62	0.04	1.67	0.70	-0.11	4.14	3.42	3.78	1.49	1.51	1.52	8.94	1.02	1.03	1.44
68.13	8.99	13.39	0.04	2.93	0.39	0.58	4.73	2.55	5.96	1.46	1.51	1.52	8.89	1.03	1.05	1.47
13.02	1.99	16.37	0.04	0.55	0.08	0.70	2.47	3.83	2.23	1.42	1.50	1.52	8.84	1.05	1.07	1.50
-33.01	-7.63	-2.04	0.06	-1.90	-0.44	-0.12	2.71	5.63	3.58	2.10	2.00	1.85	10.30	0.95	0.88	1.30
11.08	7.39	14.97	0.06	0.63	0.42	0.85	3.03	1.68	0.60	2.07	1.98	1.86	10.25	0.96	0.90	1.31

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-54.85	-10.97	20.34	0.04	-2.30	-0.46	0.85	0.62	0.29	1.42	1.39	1.49	1.52	8.79	1.07	1.09	1.53
-24.65	-11.91	21.29	0.04	-1.02	-0.49	0.88	0.92	4.45	2.96	1.36	1.48	1.52	8.74	1.09	1.12	1.56
-5.54	-16.83	1.28	0.04	-0.23	-0.69	0.05	0.39	1.19	1.41	1.33	1.47	1.53	8.69	1.10	1.15	1.59
-35.42	-41.69	-25.63	0.04	-1.43	-1.69	-1.04	0.97	3.21	4.16	1.30	1.46	1.53	8.64	1.12	1.18	1.62
12.68	-39.51	-23.50	0.04	0.51	-1.58	-0.94	2.54	2.58	3.55	1.27	1.45	1.54	8.59	1.14	1.21	1.66
25.65	-14.38	-17.38	0.04	1.01	-0.57	-0.69	3.20	4.49	4.30	1.24	1.43	1.54	8.54	1.15	1.24	1.69
-32.30	-12.31	-32.24	0.04	-1.26	-0.48	-1.26	0.48	1.16	7.12	1.22	1.42	1.55	8.50	1.16	1.27	1.72
-9.17	-22.22	-3.13	0.04	-0.35	-0.86	-0.12	0.65	5.37	4.87	1.19	1.40	1.55	8.45	1.18	1.31	1.76
47.80	-14.12	35.84	0.04	1.82	-0.54	1.36	0.64	8.82	5.94	1.16	1.38	1.56	8.40	1.19	1.34	1.79
27.70	7.91	8.79	0.04	1.04	0.30	0.33	0.94	11.84	5.80	1.14	1.36	1.56	8.35	1.19	1.38	1.82
-7.30	0.91	-10.17	0.04	-0.27	0.03	-0.38	2.10	17.73	6.71	1.11	1.33	1.57	8.30	1.20	1.41	1.85
20.72	-7.05	-0.11	0.04	0.76	-0.26	0.00	1.04	7.97	2.17	1.09	1.31	1.58	8.25	1.20	1.44	1.88
10.70	7.97	-9.05	0.04	0.39	0.29	-0.33	0.89	2.86	3.30	1.07	1.29	1.58	8.20	1.20	1.47	1.90
-65.14	0.97	-8.98	0.04	-2.31	0.03	-0.32	1.16	5.80	3.85	1.06	1.27	1.58	8.15	1.20	1.50	1.92
-54.86	-10.99	5.07	0.04	-1.92	-0.38	0.18	0.68	1.81	4.12	1.04	1.25	1.59	8.11	1.20	1.53	1.94
18.26	-0.94	9.07	0.03	0.63	-0.03	0.31	1.50	0.98	2.97	1.02	1.22	1.59	8.06	1.19	1.55	1.96
7.26	0.08	-6.89	0.03	0.25	0.00	-0.23	3.39	3.75	0.86	1.01	1.21	1.59	8.01	1.19	1.57	1.97
-23.66	-9.88	-20.80	0.03	-0.79	-0.33	-0.70	2.21	4.70	5.05	1.00	1.19	1.59	7.96	1.19	1.59	1.99
11.41	-5.83	-3.71	0.03	0.38	-0.19	-0.12	1.97	1.42	7.95	0.99	1.17	1.59	7.91	1.19	1.61	2.00
13.40	20.17	11.31	0.03	0.44	0.66	0.37	2.73	3.66	1.77	0.98	1.16	1.59	7.86	1.19	1.63	2.02
-13.55	15.12	-10.65	0.03	-0.43	0.48	-0.34	1.82	4.58	3.09	0.97	1.15	1.59	7.81	1.19	1.64	2.03
6.51	-12.87	-10.57	0.03	0.21	-0.41	-0.33	3.61	2.22	3.20	0.96	1.15	1.59	7.76	1.20	1.66	2.04
22.50	8.16	26.43	0.03	0.70	0.25	0.82	4.17	4.34	2.89	0.95	1.14	1.59	7.71	1.20	1.67	2.06
0.50	27.11	31.36	0.03	0.02	0.83	0.96	3.81	3.37	0.87	0.94	1.14	1.58	7.67	1.22	1.68	2.08
-15.43	13.05	14.30	0.03	-0.46	0.39	0.43	0.96	1.31	2.92	0.93	1.15	1.58	7.62	1.23	1.70	2.10
3.64	1.05	19.27	0.03	0.11	0.03	0.57	4.61	4.92	4.02	0.92	1.16	1.57	7.57	1.26	1.71	2.12
-11.30	-6.92	13.25	0.03	-0.33	-0.20	0.38	8.09	6.14	2.09	0.91	1.17	1.57	7.52	1.28	1.72	2.15
-65.10	-5.88	-8.73	0.03	-1.86	-0.17	-0.25	3.36	1.30	3.06	0.90	1.19	1.57	7.47	1.32	1.74	2.18
-37.85	-0.84	-14.64	0.03	-1.06	-0.02	-0.41	2.35	1.04	4.26	0.89	1.21	1.56	7.42	1.36	1.75	2.22
18.24	10.16	-24.53	0.03	0.50	0.28	-0.67	2.14	2.29	2.00	0.88	1.24	1.56	7.37	1.41	1.77	2.26
17.22	10.14	-28.38	0.03	0.46	0.27	-0.77	3.55	7.02	0.84	0.87	1.27	1.55	7.32	1.46	1.79	2.31
-54.85	-10.97	20.34	0.04	-2.30	-0.46	0.85	0.62	0.29	1.42	1.39	1.49	1.52	8.79	1.07	1.09	1.53
-24.65	-11.91	21.29	0.04	-1.02	-0.49	0.88	0.92	4.45	2.96	1.36	1.48	1.52	8.74	1.09	1.12	1.56

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
24.18	-8.84	-15.26	0.03	0.64	-0.23	-0.40	3.56	10.37	8.25	0.86	1.30	1.55	7.28	1.51	1.81	2.36
14.15	-2.80	-3.18	0.03	0.37	-0.07	-0.08	1.38	10.75	4.60	0.84	1.33	1.55	7.23	1.58	1.83	2.42
-14.80	12.21	-0.14	0.03	-0.38	0.31	0.00	2.45	11.63	7.38	0.83	1.36	1.54	7.18	1.64	1.85	2.47
-1.72	4.19	-9.08	0.03	-0.04	0.10	-0.23	6.10	10.86	6.20	0.82	1.40	1.54	7.13	1.71	1.87	2.53
29.27	7.19	-0.03	0.02	0.72	0.18	0.00	4.24	5.44	8.07	0.81	1.44	1.53	7.08	1.77	1.90	2.60
38.18	30.14	2.01	0.02	0.92	0.72	0.05	1.89	5.14	4.98	0.80	1.47	1.53	7.03	1.84	1.91	2.65
10.13	32.03	-17.92	0.02	0.24	0.75	-0.42	4.66	11.01	2.79	0.79	1.51	1.53	6.98	1.90	1.93	2.71
-6.83	6.97	-20.81	0.02	-0.16	0.16	-0.48	5.36	12.01	4.30	0.78	1.54	1.52	6.93	1.96	1.94	2.76
-6.76	-3.01	-10.70	0.02	-0.15	-0.07	-0.24	1.68	5.72	3.93	0.78	1.57	1.52	6.88	2.02	1.95	2.80
-40.62	-8.97	-10.62	0.02	-0.89	-0.20	-0.23	1.51	4.91	5.40	0.78	1.60	1.51	6.84	2.07	1.95	2.84
-29.43	-17.90	-6.55	0.02	-0.63	-0.38	-0.14	1.52	3.21	7.06	0.78	1.63	1.51	6.79	2.10	1.94	2.87
33.60	-5.83	7.49	0.02	0.71	-0.12	0.16	2.45	5.63	1.49	0.78	1.66	1.50	6.74	2.13	1.93	2.88
31.52	1.20	-0.49	0.02	0.65	0.02	-0.01	3.25	3.77	2.70	0.78	1.69	1.50	6.69	2.15	1.91	2.88
-31.44	-13.75	-12.42	0.02	-0.63	-0.28	-0.25	1.84	0.83	2.98	0.79	1.71	1.49	6.64	2.16	1.89	2.87
-47.23	-11.68	-2.36	0.02	-0.92	-0.23	-0.05	2.00	2.04	6.15	0.80	1.73	1.49	6.59	2.16	1.86	2.85
6.90	20.32	-8.30	0.02	0.13	0.39	-0.16	8.35	4.24	15.13	0.81	1.74	1.48	6.54	2.14	1.82	2.81
23.88	38.23	-12.22	0.02	0.44	0.71	-0.23	13.74	10.76	17.14	0.83	1.76	1.48	6.49	2.12	1.78	2.77
-3.12	21.13	6.83	0.02	-0.06	0.38	0.12	6.08	9.96	7.88	0.85	1.77	1.47	6.45	2.09	1.74	2.72
5.93	11.08	1.86	0.02	0.10	0.19	0.03	4.63	7.00	2.18	0.87	1.79	1.47	6.40	2.06	1.69	2.67
3.95	24.03	-14.08	0.02	0.07	0.41	-0.24	4.01	6.30	3.52	0.89	1.80	1.47	6.35	2.03	1.65	2.61
-19.97	14.97	-11.99	0.02	-0.33	0.25	-0.20	7.20	5.32	5.39	0.91	1.82	1.47	6.30	1.99	1.61	2.56
-8.87	-6.03	-1.92	0.02	-0.14	-0.10	-0.03	8.56	8.81	6.59	0.94	1.83	1.47	6.25	1.96	1.57	2.51
-2.80	-3.99	8.10	0.02	-0.04	-0.06	0.13	3.45	4.90	2.71	0.96	1.85	1.47	6.20	1.92	1.53	2.45
-26.69	-4.95	13.10	0.02	-0.40	-0.07	0.20	4.26	5.32	5.06	0.99	1.87	1.48	6.15	1.89	1.49	2.41
-5.58	-9.90	23.07	0.01	-0.08	-0.14	0.33	15.28	1.54	25.24	1.02	1.89	1.48	6.10	1.86	1.46	2.36
51.37	-5.85	17.02	0.01	0.72	-0.08	0.24	18.35	27.10	27.57	1.05	1.91	1.49	6.05	1.83	1.43	2.32
36.25	-13.79	-4.96	0.01	0.49	-0.19	-0.07	48.80	15.79	24.22	1.07	1.94	1.51	6.01	1.80	1.40	2.28
-14.75	-27.69	-0.91	0.01	-0.19	-0.36	-0.01	51.88	7.26	36.97	1.10	1.96	1.52	5.96	1.78	1.38	2.25
3.32	-22.56	-1.87	0.01	0.04	-0.28	-0.02	13.17	4.80	12.62	1.13	1.99	1.54	5.91	1.76	1.36	2.22
25.31	0.50	-16.79	0.01	0.30	0.01	-0.20	2.16	2.22	4.27	1.16	2.02	1.57	5.86	1.74	1.35	2.20
-6.69	-0.48	-31.66	0.01	-0.08	-0.01	-0.36	3.86	9.06	9.21	1.19	2.05	1.59	5.81	1.72	1.34	2.17
24.18	-8.84	-15.26	0.03	0.64	-0.23	-0.40	3.56	10.37	8.25	0.86	1.30	1.55	7.28	1.51	1.81	2.36
14.15	-2.80	-3.18	0.03	0.37	-0.07	-0.08	1.38	10.75	4.60	0.84	1.33	1.55	7.23	1.58	1.83	2.42

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-13.60	-25.41	-36.48	0.01	-0.15	-0.28	-0.40	4.06	5.81	13.39	1.23	2.08	1.63	5.76	1.69	1.33	2.15
22.43	-30.28	-28.31	0.01	0.24	-0.32	-0.30	3.67	3.61	10.47	1.26	2.11	1.67	5.71	1.67	1.32	2.13
25.38	-36.12	-25.16	0.01	0.25	-0.36	-0.25	4.25	6.56	8.38	1.30	2.15	1.71	5.66	1.65	1.31	2.11
-25.58	-50.93	1.92	0.01	-0.24	-0.48	0.02	5.43	5.36	5.63	1.35	2.18	1.76	5.62	1.62	1.30	2.08
-24.43	-42.72	25.90	0.01	-0.22	-0.38	0.23	3.94	3.55	1.89	1.40	2.22	1.81	5.57	1.59	1.30	2.05
25.61	-27.55	10.87	0.01	0.22	-0.23	0.09	1.45	1.50	2.67	1.45	2.25	1.87	5.52	1.55	1.29	2.02
-3.39	-14.45	3.88	0.01	-0.03	-0.12	0.03	2.25	3.70	3.28	1.51	2.29	1.94	5.47	1.51	1.28	1.98
-37.26	9.58	16.88	0.01	-0.28	0.07	0.13	4.74	1.07	3.57	1.58	2.32	2.01	5.42	1.47	1.27	1.95
-5.13	33.52	20.84	0.01	-0.04	0.23	0.15	5.60	3.02	7.53	1.65	2.35	2.08	5.37	1.43	1.26	1.91
-14.04	44.39	15.81	0.01	-0.09	0.29	0.10	3.53	2.15	1.91	1.73	2.38	2.16	5.32	1.38	1.25	1.86
-23.92	29.26	12.79	0.01	-0.14	0.18	0.08	1.71	3.86	3.22	1.81	2.40	2.25	5.27	1.33	1.24	1.82
48.08	26.17	-2.19	0.01	0.26	0.14	-0.01	1.12	5.95	2.45	1.90	2.43	2.34	5.22	1.28	1.23	1.77
56.91	31.08	-10.13	0.01	0.28	0.16	-0.05	1.49	5.21	5.02	2.00	2.45	2.44	5.18	1.22	1.22	1.73
-34.09	5.02	-2.07	0.00	-0.15	0.02	-0.01	2.34	2.37	2.88	2.11	2.47	2.54	5.13	1.17	1.20	1.68
-49.87	-12.94	3.97	0.00	-0.20	-0.05	0.02	1.82	2.27	3.31	2.23	2.50	2.64	5.08	1.12	1.19	1.63
9.25	-15.86	10.98	0.00	0.03	-0.06	0.04	2.57	1.96	5.22	2.35	2.51	2.75	5.03	1.07	1.17	1.59
-4.71	-19.77	2.99	0.00	-0.01	-0.06	0.01	8.13	7.00	15.12	2.47	2.53	2.86	4.98	1.02	1.16	1.55
-43.57	-1.70	12.00	0.00	-0.11	0.00	0.03	6.26	4.28	6.25	2.59	2.54	2.97	4.93	0.98	1.15	1.51
-7.42	19.28	35.94	0.00	-0.01	0.04	0.07	2.18	1.86	4.46	2.71	2.55	3.07	4.88	0.94	1.13	1.47
4.63	15.23	14.87	0.00	0.01	0.02	0.02	0.52	2.05	2.59	2.83	2.56	3.17	4.83	0.91	1.12	1.44
-29.27	-3.77	-4.11	0.00	-0.03	0.00	0.00	1.05	1.74	3.86	2.94	2.56	3.26	4.79	0.87	1.11	1.41
-30.10	-2.73	4.93	0.00	-0.02	0.00	0.00	3.35	3.93	6.69	3.04	2.56	3.35	4.74	0.84	1.10	1.39

Microtremors Segment: B1-T6

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
55.99	9.76	6.17	0.26	14.53	2.53	1.60	2.38	3.26	0.39	2.86	1.53	1.22	30.03	0.53	0.43	0.68
48.83	9.73	-19.74	0.26	12.65	2.52	-5.11	4.94	0.53	1.88	2.83	1.52	1.20	29.98	0.54	0.42	0.68
-12.19	-9.27	-13.62	0.26	-3.15	-2.40	-3.52	5.11	1.51	2.03	2.80	1.51	1.17	29.93	0.54	0.42	0.68
-5.11	-8.23	-10.52	0.26	-1.32	-2.12	-2.71	1.90	0.08	1.78	2.77	1.50	1.15	29.88	0.54	0.41	0.68
41.87	0.79	-14.41	0.26	10.78	0.20	-3.71	2.64	0.82	0.87	2.73	1.48	1.12	29.83	0.54	0.41	0.68
11.81	1.80	0.67	0.26	3.04	0.46	0.17	3.11	1.73	1.95	2.69	1.46	1.09	29.79	0.54	0.40	0.68
-4.16	10.78	0.72	0.26	-1.07	2.76	0.18	4.66	1.19	0.40	2.64	1.44	1.05	29.74	0.55	0.40	0.68
33.83	24.71	-1.22	0.26	8.66	6.33	-0.31	6.99	2.21	0.67	2.59	1.41	1.02	29.69	0.55	0.39	0.67
17.78	16.64	-3.16	0.26	4.54	4.25	-0.81	4.24	2.93	0.92	2.54	1.38	0.99	29.64	0.55	0.39	0.67
-3.20	0.61	-17.06	0.26	-0.82	0.15	-4.35	5.14	2.88	1.88	2.48	1.35	0.95	29.59	0.55	0.38	0.67
11.83	2.61	-4.96	0.25	3.01	0.66	-1.26	7.39	3.58	2.80	2.42	1.32	0.92	29.54	0.54	0.38	0.66
0.86	7.59	2.10	0.25	0.22	1.93	0.53	3.03	2.53	2.48	2.36	1.28	0.88	29.49	0.54	0.37	0.66
-30.04	-3.41	-8.84	0.25	-7.61	-0.86	-2.24	2.54	1.33	1.74	2.30	1.25	0.85	29.44	0.54	0.37	0.66
-23.88	-14.37	8.22	0.25	-6.04	-3.64	2.08	4.09	1.20	1.10	2.24	1.21	0.82	29.39	0.54	0.37	0.65
14.19	-15.30	15.23	0.25	3.58	-3.86	3.85	6.19	1.51	0.96	2.18	1.18	0.79	29.35	0.54	0.36	0.65
0.21	-35.20	16.22	0.25	0.05	-8.87	4.09	5.48	1.58	1.00	2.12	1.14	0.76	29.30	0.54	0.36	0.65
-33.67	-46.03	25.19	0.25	-8.47	-11.58	6.34	4.60	4.17	1.43	2.07	1.11	0.74	29.25	0.54	0.36	0.65
2.44	-23.88	32.13	0.25	0.61	-5.99	8.07	2.08	2.59	2.73	2.01	1.08	0.71	29.20	0.53	0.36	0.64
19.45	-7.81	40.04	0.25	4.87	-1.96	10.03	4.34	2.64	0.77	1.96	1.04	0.69	29.15	0.53	0.35	0.64
-23.50	-11.76	30.95	0.25	-5.87	-2.94	7.74	3.43	0.73	0.66	1.91	1.01	0.67	29.10	0.53	0.35	0.64
-11.38	-14.70	30.88	0.25	-2.84	-3.67	7.71	5.40	2.61	1.22	1.86	0.98	0.66	29.05	0.53	0.35	0.64
25.64	-1.66	30.81	0.25	6.39	-0.41	7.67	5.98	1.71	0.53	1.82	0.95	0.64	29.00	0.53	0.35	0.63
-0.36	-9.63	12.78	0.25	-0.09	-2.39	3.18	7.90	2.80	2.60	1.77	0.93	0.63	28.96	0.52	0.35	0.63
-26.25	-18.57	21.76	0.25	-6.51	-4.60	5.40	7.42	2.62	4.01	1.74	0.90	0.62	28.91	0.52	0.36	0.63
-11.13	-0.52	27.72	0.25	-2.75	-0.13	6.86	0.47	3.83	0.83	1.71	0.88	0.61	28.86	0.52	0.36	0.63
-28.00	-5.50	14.69	0.25	-6.92	-1.36	3.63	7.58	4.82	0.74	1.68	0.86	0.60	28.81	0.51	0.36	0.63
-54.78	-13.46	18.67	0.25	-13.50	-3.32	4.60	9.24	1.57	1.58	1.65	0.84	0.59	28.76	0.51	0.36	0.62
-20.58	-4.41	5.68	0.25	-5.06	-1.09	1.40	10.89	4.87	6.83	1.63	0.83	0.59	28.71	0.51	0.36	0.62
-10.47	-2.39	-21.24	0.25	-2.57	-0.59	-5.21	6.28	7.56	4.34	1.61	0.81	0.59	28.66	0.50	0.36	0.62
-42.31	-1.38	-15.12	0.25	-10.37	-0.34	-3.70	3.33	3.39	1.04	1.60	0.80	0.58	28.61	0.50	0.37	0.62
-3.17	13.61	-7.02	0.24	-0.78	3.33	-1.72	5.13	3.66	2.05	1.59	0.79	0.58	28.56	0.50	0.37	0.62
43.80	30.53	-14.92	0.24	10.69	7.45	-3.64	5.63	4.06	2.88	1.58	0.78	0.58	28.52	0.50	0.37	0.62
55.99	9.76	6.17	0.26	14.53	2.53	1.60	2.38	3.26	0.39	2.86	1.53	1.22	30.03	0.53	0.43	0.68

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
30.70	35.40	-16.80	0.24	7.48	8.62	-4.09	1.62	2.72	5.48	1.58	0.78	0.58	28.47	0.49	0.37	0.62
19.65	28.28	-3.71	0.24	4.78	6.87	-0.90	5.68	3.09	5.04	1.58	0.77	0.58	28.42	0.49	0.37	0.61
30.60	21.19	3.34	0.24	7.42	5.14	0.81	4.60	1.79	1.83	1.58	0.77	0.58	28.37	0.49	0.37	0.61
28.53	31.09	-14.58	0.24	6.90	7.52	-3.53	0.77	1.25	1.05	1.58	0.77	0.59	28.32	0.49	0.37	0.61
-6.46	29.98	-17.46	0.24	-1.56	7.24	-4.22	5.55	1.96	1.95	1.59	0.77	0.59	28.27	0.49	0.37	0.61
-1.40	22.88	-10.35	0.24	-0.34	5.51	-2.50	5.89	1.33	3.04	1.60	0.78	0.59	28.22	0.48	0.37	0.61
35.59	20.79	-11.26	0.24	8.56	5.00	-2.71	3.13	1.18	3.50	1.61	0.78	0.59	28.17	0.48	0.37	0.61
-1.43	-4.23	-11.16	0.24	-0.34	-1.02	-2.68	3.79	4.11	1.20	1.63	0.79	0.60	28.13	0.48	0.37	0.61
-30.32	-20.18	-15.05	0.24	-7.26	-4.83	-3.60	4.19	4.91	2.05	1.64	0.80	0.60	28.08	0.48	0.37	0.61
23.74	5.86	-5.96	0.24	5.67	1.40	-1.42	1.21	3.25	1.38	1.66	0.81	0.61	28.03	0.49	0.37	0.61
37.67	25.80	-5.88	0.24	8.98	6.15	-1.40	2.83	2.81	1.51	1.68	0.82	0.61	27.98	0.49	0.36	0.61
-0.35	6.74	-30.75	0.24	-0.08	1.60	-7.32	4.03	0.77	1.65	1.70	0.83	0.62	27.93	0.49	0.36	0.61
-9.29	-6.26	-26.58	0.24	-2.21	-1.49	-6.31	2.73	3.67	2.65	1.72	0.85	0.63	27.88	0.49	0.36	0.61
5.77	-7.22	-12.45	0.24	1.37	-1.71	-2.95	5.51	4.78	3.23	1.74	0.86	0.64	27.83	0.49	0.36	0.61
3.80	-30.14	-26.32	0.24	0.90	-7.13	-6.22	6.47	3.47	1.59	1.76	0.88	0.65	27.78	0.50	0.37	0.62
-14.13	-36.00	-14.18	0.24	-3.33	-8.50	-3.35	3.06	3.21	1.15	1.78	0.90	0.66	27.73	0.50	0.37	0.62
13.92	-9.90	12.88	0.24	3.28	-2.33	3.03	6.88	1.66	1.87	1.80	0.91	0.67	27.69	0.51	0.37	0.63
23.90	-20.84	8.89	0.24	5.62	-4.90	2.09	4.75	0.83	1.48	1.82	0.93	0.68	27.64	0.51	0.37	0.63
-25.05	-41.70	9.90	0.23	-5.87	-9.78	2.32	2.87	2.90	0.40	1.84	0.95	0.69	27.59	0.52	0.38	0.64
-25.90	-21.57	7.92	0.23	-6.06	-5.05	1.85	1.86	5.35	2.10	1.86	0.97	0.71	27.54	0.52	0.38	0.65
3.20	-12.49	-8.02	0.23	0.75	-2.92	-1.87	4.69	4.23	3.58	1.87	0.99	0.72	27.49	0.53	0.39	0.65
-10.74	-25.41	-3.94	0.23	-2.50	-5.92	-0.92	2.78	3.21	2.35	1.89	1.01	0.74	27.44	0.53	0.39	0.66
-25.62	-19.31	-3.87	0.23	-5.96	-4.49	-0.90	2.12	3.62	0.57	1.90	1.02	0.76	27.39	0.54	0.40	0.67
-17.48	-11.24	-11.79	0.23	-4.06	-2.61	-2.73	6.09	2.36	1.34	1.90	1.04	0.77	27.34	0.55	0.41	0.68
-24.34	-13.19	1.29	0.23	-5.64	-3.05	0.30	10.42	4.32	1.65	1.91	1.05	0.79	27.29	0.55	0.41	0.69
-24.20	-3.15	14.31	0.23	-5.59	-0.73	3.31	11.08	3.49	1.99	1.91	1.07	0.80	27.25	0.56	0.42	0.70
6.89	3.86	20.30	0.23	1.59	0.89	4.68	8.69	4.29	2.12	1.91	1.08	0.82	27.20	0.57	0.43	0.71
10.90	-13.11	28.25	0.23	2.51	-3.02	6.50	3.98	2.92	1.84	1.91	1.09	0.83	27.15	0.57	0.44	0.72
-18.03	-32.01	23.21	0.23	-4.14	-7.35	5.33	2.78	1.62	1.05	1.90	1.11	0.85	27.10	0.58	0.45	0.73
-17.91	-28.88	12.19	0.23	-4.10	-6.61	2.79	4.21	4.08	1.12	1.89	1.12	0.86	27.05	0.59	0.45	0.74
-5.81	-4.81	13.19	0.23	-1.33	-1.10	3.01	3.61	1.90	1.66	1.88	1.12	0.87	27.00	0.60	0.46	0.75
30.70	35.40	-16.80	0.24	7.48	8.62	-4.09	1.62	2.72	5.48	1.58	0.78	0.58	28.47	0.49	0.37	0.62
19.65	28.28	-3.71	0.24	4.78	6.87	-0.90	5.68	3.09	5.04	1.58	0.77	0.58	28.42	0.49	0.37	0.61

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-25.69	-6.78	8.20	0.23	-5.86	-1.54	1.87	6.70	1.68	1.40	1.87	1.13	0.88	26.95	0.61	0.47	0.77
-7.58	-23.71	-0.76	0.23	-1.72	-5.39	-0.17	7.60	2.76	2.32	1.85	1.14	0.88	26.90	0.61	0.48	0.78
56.38	-6.64	6.28	0.23	12.80	-1.51	1.43	2.65	1.86	3.12	1.84	1.14	0.89	26.86	0.62	0.48	0.79
44.23	16.35	12.30	0.23	10.02	3.70	2.79	4.57	2.31	1.78	1.82	1.14	0.89	26.81	0.63	0.49	0.79
0.19	26.28	8.31	0.23	0.04	5.94	1.88	7.71	5.63	2.07	1.81	1.15	0.89	26.76	0.63	0.49	0.80
20.20	36.16	23.30	0.23	4.55	8.15	5.25	4.73	4.17	3.46	1.79	1.15	0.89	26.71	0.64	0.50	0.81
46.11	39.02	20.27	0.23	10.38	8.78	4.56	1.47	1.22	2.21	1.78	1.15	0.89	26.66	0.65	0.50	0.82
15.04	14.92	0.28	0.22	3.38	3.35	0.06	8.03	3.92	0.72	1.76	1.15	0.88	26.61	0.65	0.50	0.82
-11.91	-10.09	14.30	0.22	-2.67	-2.26	3.20	10.05	2.80	3.28	1.75	1.15	0.87	26.56	0.66	0.50	0.83
18.12	-2.05	23.28	0.22	4.05	-0.46	5.20	3.74	1.35	5.71	1.74	1.15	0.87	26.51	0.66	0.50	0.83
9.12	-16.01	15.26	0.22	2.03	-3.57	3.40	4.08	1.95	4.42	1.73	1.15	0.86	26.46	0.67	0.50	0.83
-52.74	-39.89	10.26	0.22	-11.74	-8.88	2.28	5.76	3.23	3.50	1.72	1.15	0.85	26.42	0.67	0.49	0.83
-34.52	-24.75	4.28	0.22	-7.66	-5.49	0.95	5.73	1.59	2.00	1.72	1.15	0.84	26.37	0.67	0.49	0.83
28.54	-13.67	-13.65	0.22	6.32	-3.03	-3.02	3.30	1.50	1.68	1.72	1.16	0.82	26.32	0.67	0.48	0.83
1.53	-12.60	-42.48	0.22	0.34	-2.79	-9.39	2.36	4.29	1.42	1.72	1.16	0.81	26.27	0.67	0.47	0.82
-41.34	-0.57	-34.27	0.22	-9.11	-0.13	-7.56	6.28	4.62	2.46	1.72	1.16	0.80	26.22	0.67	0.47	0.82
-5.19	26.39	-8.13	0.22	-1.14	5.81	-1.79	3.79	2.14	2.53	1.73	1.16	0.79	26.17	0.67	0.46	0.81
24.82	43.26	-5.05	0.22	5.45	9.49	-1.11	1.64	0.54	2.28	1.74	1.16	0.78	26.12	0.67	0.45	0.80
-20.14	12.15	2.01	0.22	-4.41	2.66	0.44	4.26	1.25	3.94	1.75	1.16	0.77	26.07	0.66	0.44	0.80
-27.99	0.14	24.01	0.22	-6.12	0.03	5.25	4.03	1.76	4.32	1.77	1.16	0.76	26.03	0.66	0.43	0.79
32.05	8.13	38.93	0.22	6.99	1.77	8.49	2.17	1.98	0.46	1.78	1.16	0.76	25.98	0.65	0.43	0.78
-8.94	-17.84	16.87	0.22	-1.95	-3.88	3.67	2.15	2.11	1.66	1.80	1.16	0.75	25.93	0.65	0.42	0.77
-54.77	-17.76	2.89	0.22	-11.88	-3.85	0.63	4.20	3.07	1.21	1.82	1.16	0.75	25.88	0.64	0.41	0.76
6.38	-0.72	13.91	0.22	1.38	-0.16	3.01	7.76	1.22	0.72	1.83	1.16	0.75	25.83	0.63	0.41	0.75
-3.57	-17.67	5.92	0.22	-0.77	-3.82	1.28	7.22	0.71	1.74	1.85	1.16	0.75	25.78	0.63	0.40	0.74
-52.41	-25.58	0.96	0.22	-11.29	-5.51	0.21	5.62	0.30	3.02	1.87	1.16	0.75	25.73	0.62	0.40	0.74
-13.23	-6.50	-6.98	0.22	-2.84	-1.40	-1.50	0.85	1.76	2.07	1.89	1.16	0.75	25.68	0.61	0.40	0.73
11.83	8.50	-12.88	0.21	2.54	1.82	-2.76	5.38	3.09	0.83	1.90	1.15	0.75	25.63	0.61	0.40	0.72
-45.05	5.48	10.17	0.21	-9.64	1.17	2.18	5.30	1.73	2.14	1.92	1.15	0.76	25.59	0.60	0.40	0.72
-57.79	9.46	13.18	0.21	-12.34	2.02	2.81	2.60	2.80	1.95	1.93	1.14	0.77	25.54	0.59	0.40	0.71
8.36	23.40	17.17	0.21	1.78	4.98	3.66	0.85	6.52	2.17	1.94	1.14	0.77	25.49	0.58	0.40	0.71
-25.69	-6.78	8.20	0.23	-5.86	-1.54	1.87	6.70	1.68	1.40	1.87	1.13	0.88	26.95	0.61	0.47	0.77
-7.58	-23.71	-0.76	0.23	-1.72	-5.39	-0.17	7.60	2.76	2.32	1.85	1.14	0.88	26.90	0.61	0.48	0.78

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
24.35	22.32	21.15	0.21	5.17	4.74	4.49	3.49	5.22	3.42	1.95	1.13	0.78	25.44	0.58	0.40	0.70
-12.63	12.26	8.14	0.21	-2.68	2.60	1.73	2.95	4.08	2.44	1.95	1.12	0.79	25.39	0.57	0.41	0.70
-4.54	9.22	14.15	0.21	-0.96	1.95	2.99	4.21	3.51	0.67	1.96	1.11	0.80	25.34	0.57	0.41	0.70
7.51	6.20	11.15	0.21	1.58	1.31	2.35	5.44	0.99	3.70	1.96	1.10	0.82	25.29	0.56	0.42	0.70
-11.43	-8.79	5.17	0.21	-2.41	-1.85	1.09	4.52	4.33	3.12	1.95	1.09	0.83	25.24	0.56	0.42	0.70
4.63	-12.74	6.20	0.21	0.97	-2.67	1.30	3.22	2.59	1.45	1.95	1.08	0.84	25.20	0.55	0.43	0.70
41.59	10.28	-11.74	0.21	8.71	2.15	-2.46	2.36	3.42	1.63	1.94	1.07	0.85	25.15	0.55	0.44	0.70
26.51	25.21	-23.62	0.21	5.54	5.27	-4.94	7.42	3.45	2.85	1.93	1.05	0.86	25.10	0.55	0.44	0.70
9.49	25.12	-22.47	0.21	1.98	5.24	-4.69	7.98	2.85	2.98	1.92	1.04	0.87	25.05	0.54	0.45	0.71
39.44	20.04	-17.34	0.21	8.20	4.17	-3.61	10.62	3.16	5.15	1.91	1.03	0.88	25.00	0.54	0.46	0.71
38.34	5.99	-21.21	0.21	7.96	1.24	-4.40	12.15	3.22	1.62	1.89	1.02	0.88	24.95	0.54	0.47	0.71
18.28	9.97	-18.08	0.21	3.78	2.06	-3.74	8.39	3.52	10.71	1.87	1.00	0.89	24.90	0.54	0.48	0.72
50.19	34.89	7.00	0.21	10.36	7.20	1.45	2.94	5.46	8.71	1.86	0.99	0.90	24.85	0.54	0.48	0.72
57.03	42.74	12.01	0.21	11.75	8.80	2.47	2.10	6.69	2.50	1.84	0.98	0.90	24.80	0.53	0.49	0.73
-3.03	4.65	-6.94	0.21	-0.62	0.96	-1.43	3.90	2.58	1.75	1.82	0.97	0.90	24.76	0.54	0.50	0.73
-38.90	-25.30	-13.85	0.21	-7.97	-5.19	-2.84	6.91	1.47	1.61	1.80	0.96	0.90	24.71	0.54	0.50	0.73
-20.73	-9.23	5.22	0.20	-4.24	-1.89	1.07	5.98	2.49	2.03	1.78	0.96	0.90	24.66	0.54	0.51	0.74
-11.61	-1.20	-0.74	0.20	-2.37	-0.24	-0.15	3.27	3.17	0.84	1.76	0.95	0.90	24.61	0.54	0.51	0.74
-39.46	-26.14	-16.65	0.20	-8.03	-5.32	-3.39	2.04	0.42	1.33	1.75	0.95	0.90	24.56	0.54	0.52	0.75
-5.32	-31.01	1.44	0.20	-1.08	-6.30	0.29	3.73	3.24	2.78	1.73	0.95	0.90	24.51	0.55	0.52	0.76
26.69	-10.92	-8.50	0.20	5.40	-2.21	-1.72	6.25	3.18	3.40	1.72	0.95	0.90	24.46	0.55	0.53	0.76
-22.27	-20.85	-19.39	0.20	-4.50	-4.21	-3.92	8.06	0.57	5.27	1.71	0.95	0.90	24.41	0.55	0.53	0.77
-9.15	-17.77	15.67	0.20	-1.84	-3.58	3.16	7.60	0.53	3.14	1.70	0.95	0.90	24.37	0.56	0.53	0.77
14.89	-1.72	24.64	0.20	2.99	-0.35	4.95	11.65	2.16	4.46	1.69	0.96	0.90	24.32	0.56	0.53	0.78
-25.04	-19.67	13.62	0.20	-5.02	-3.94	2.73	11.75	1.61	4.94	1.69	0.96	0.90	24.27	0.57	0.54	0.78
-27.88	-23.57	13.62	0.20	-5.58	-4.71	2.72	7.23	4.79	5.34	1.68	0.97	0.91	24.22	0.58	0.54	0.79
11.20	-0.52	8.63	0.20	2.23	-0.10	1.72	7.00	5.66	6.48	1.69	0.98	0.91	24.17	0.58	0.54	0.79
11.21	7.48	1.66	0.20	2.23	1.49	0.33	2.91	1.89	1.71	1.69	0.99	0.91	24.12	0.59	0.54	0.80
-29.70	-30.47	-2.29	0.20	-5.90	-6.05	-0.45	8.52	5.05	6.06	1.70	1.00	0.92	24.07	0.59	0.54	0.80
-41.51	-57.28	3.76	0.20	-8.22	-11.34	0.74	18.95	11.26	13.59	1.71	1.02	0.93	24.02	0.60	0.54	0.81
-20.33	-16.13	8.79	0.20	-4.02	-3.18	1.74	16.11	1.56	10.20	1.72	1.03	0.94	23.97	0.60	0.55	0.81
24.35	22.32	21.15	0.21	5.17	4.74	4.49	3.49	5.22	3.42	1.95	1.13	0.78	25.44	0.58	0.40	0.70
-12.63	12.26	8.14	0.21	-2.68	2.60	1.73	2.95	4.08	2.44	1.95	1.12	0.79	25.39	0.57	0.41	0.70

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-26.19	8.90	2.82	0.20	-5.16	1.75	0.56	11.10	1.84	2.15	1.74	1.05	0.95	23.93	0.60	0.55	0.81
-25.03	-1.11	-2.13	0.20	-4.92	-0.22	-0.42	12.40	6.10	5.63	1.76	1.06	0.97	23.88	0.61	0.55	0.82
15.04	23.85	3.92	0.20	2.95	4.68	0.77	11.28	2.36	4.45	1.78	1.08	0.98	23.83	0.61	0.55	0.82
17.03	34.75	11.94	0.20	3.33	6.79	2.33	7.47	2.06	5.96	1.81	1.09	1.00	23.78	0.61	0.55	0.82
-13.92	7.67	8.95	0.20	-2.71	1.50	1.75	7.58	5.58	7.14	1.83	1.11	1.02	23.73	0.60	0.56	0.82
-9.82	22.62	8.97	0.19	-1.91	4.40	1.74	8.70	3.44	6.59	1.86	1.12	1.04	23.68	0.60	0.56	0.82
5.24	44.49	18.96	0.19	1.02	8.63	3.68	0.82	3.49	4.49	1.90	1.13	1.06	23.63	0.60	0.56	0.82
14.25	13.38	20.93	0.19	2.76	2.59	4.05	6.63	3.04	8.20	1.93	1.14	1.09	23.58	0.59	0.56	0.82
33.21	-1.63	1.94	0.19	6.41	-0.32	0.37	7.42	5.02	8.70	1.97	1.16	1.11	23.54	0.59	0.57	0.81
37.12	5.37	-8.00	0.19	7.15	1.03	-1.54	8.38	1.65	6.44	2.01	1.16	1.14	23.49	0.58	0.57	0.81
18.06	-5.62	-5.92	0.19	3.47	-1.08	-1.14	11.25	4.30	3.74	2.05	1.17	1.17	23.44	0.57	0.57	0.81
8.06	-15.57	-11.83	0.19	1.54	-2.98	-2.27	15.58	6.62	1.76	2.10	1.18	1.20	23.39	0.56	0.57	0.80
33.03	-17.50	-3.75	0.19	6.31	-3.34	-0.72	14.19	7.29	3.37	2.14	1.19	1.23	23.34	0.55	0.57	0.80
46.92	-5.45	-3.68	0.19	8.94	-1.04	-0.70	8.03	5.62	3.40	2.19	1.19	1.26	23.29	0.54	0.58	0.79
11.86	-11.40	-20.58	0.19	2.25	-2.17	-3.91	4.63	3.73	3.18	2.24	1.20	1.30	23.24	0.53	0.58	0.79
-5.11	-19.33	-0.48	0.19	-0.97	-3.66	-0.09	5.19	2.79	1.16	2.30	1.20	1.33	23.19	0.52	0.58	0.78
17.92	16.68	15.54	0.19	3.39	3.15	2.94	6.88	3.07	2.11	2.35	1.21	1.37	23.14	0.51	0.58	0.77
16.90	10.63	4.55	0.19	3.19	2.00	0.86	5.51	1.40	4.72	2.41	1.21	1.40	23.10	0.50	0.58	0.77
-4.07	-20.34	18.56	0.19	-0.77	-3.82	3.49	4.43	1.51	6.32	2.47	1.21	1.44	23.05	0.49	0.58	0.76
21.94	7.70	34.50	0.19	4.11	1.44	6.47	4.44	1.86	5.99	2.53	1.22	1.48	23.00	0.48	0.58	0.76
30.89	12.66	26.43	0.19	5.78	2.37	4.94	7.26	4.03	3.02	2.59	1.22	1.51	22.95	0.47	0.59	0.75
-17.09	-24.31	9.41	0.19	-3.19	-4.53	1.76	6.80	0.63	2.03	2.65	1.23	1.55	22.90	0.47	0.59	0.75
-17.97	-30.19	4.43	0.19	-3.34	-5.61	0.82	5.75	3.46	3.32	2.71	1.24	1.59	22.85	0.46	0.59	0.74
4.11	-24.07	11.45	0.19	0.76	-4.47	2.12	6.22	5.04	3.62	2.77	1.25	1.63	22.80	0.45	0.59	0.74
-24.80	-32.95	-1.51	0.19	-4.59	-6.10	-0.28	6.47	3.87	6.20	2.83	1.26	1.67	22.75	0.44	0.59	0.74
-37.62	-31.81	-7.44	0.18	-6.94	-5.87	-1.37	6.26	7.60	8.65	2.88	1.27	1.71	22.71	0.44	0.59	0.74
-4.49	1.26	17.59	0.18	-0.83	0.23	3.24	5.94	5.32	6.05	2.94	1.28	1.74	22.66	0.44	0.59	0.74
3.57	19.23	3.59	0.18	0.65	3.53	0.66	1.68	2.92	3.42	2.99	1.29	1.78	22.61	0.43	0.59	0.73
-41.31	3.20	-17.33	0.18	-7.56	0.58	-3.17	3.21	0.47	3.17	3.04	1.30	1.81	22.56	0.43	0.60	0.73
-27.12	13.17	10.74	0.18	-4.95	2.40	1.96	3.71	1.54	3.92	3.08	1.32	1.84	22.51	0.43	0.60	0.73
40.91	30.09	20.73	0.18	7.45	5.48	3.77	4.49	3.87	2.23	3.12	1.33	1.87	22.46	0.43	0.60	0.73
-26.19	8.90	2.82	0.20	-5.16	1.75	0.56	11.10	1.84	2.15	1.74	1.05	0.95	23.93	0.60	0.55	0.81
-25.03	-1.11	-2.13	0.20	-4.92	-0.22	-0.42	12.40	6.10	5.63	1.76	1.06	0.97	23.88	0.61	0.55	0.82

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-17.09	0.04	11.71	0.18	-3.10	0.01	2.13	1.96	3.62	2.61	3.16	1.34	1.89	22.41	0.43	0.60	-17.09
-81.84	-16.91	2.73	0.18	-14.81	-3.06	0.49	8.32	2.61	4.90	3.19	1.36	1.91	22.36	0.43	0.60	-81.84
0.38	10.11	-8.20	0.18	0.07	1.82	-1.48	7.43	1.21	1.51	3.21	1.37	1.92	22.31	0.43	0.60	0.38
36.36	11.07	-11.11	0.18	6.54	1.99	-2.00	4.29	3.21	2.39	3.23	1.38	1.94	22.27	0.43	0.60	36.36
-30.60	-28.88	-11.02	0.18	-5.49	-5.18	-1.98	7.80	4.18	3.86	3.24	1.39	1.95	22.22	0.43	0.60	-30.60
-30.43	-26.76	-7.93	0.18	-5.45	-4.79	-1.42	8.04	2.53	4.73	3.24	1.40	1.95	22.17	0.43	0.60	-30.43
16.65	13.28	-12.84	0.18	2.97	2.37	-2.29	6.60	0.97	3.51	3.24	1.41	1.95	22.12	0.44	0.60	16.65
-4.32	10.24	-15.73	0.18	-0.77	1.82	-2.80	3.71	1.08	1.46	3.23	1.42	1.95	22.07	0.44	0.60	-4.32
-21.22	2.22	-9.63	0.18	-3.77	0.39	-1.71	2.10	3.34	4.46	3.21	1.42	1.94	22.02	0.44	0.60	-21.22
13.85	17.19	-16.52	0.18	2.45	3.04	-2.92	7.86	3.92	4.64	3.19	1.43	1.93	21.97	0.45	0.61	13.85
12.85	15.14	-15.41	0.18	2.27	2.67	-2.72	8.74	3.20	2.25	3.16	1.43	1.92	21.92	0.45	0.61	12.85
-20.08	14.09	-8.31	0.18	-3.53	2.48	-1.46	4.53	1.31	2.26	3.12	1.43	1.90	21.88	0.46	0.61	-20.08
9.99	26.02	-10.22	0.18	1.75	4.57	-1.79	1.48	4.15	1.98	3.08	1.43	1.88	21.83	0.46	0.61	9.99
65.89	25.92	-3.14	0.18	11.53	4.54	-0.55	5.21	6.13	1.39	3.04	1.42	1.86	21.78	0.47	0.61	65.89
34.74	6.86	1.92	0.17	6.06	1.20	0.33	8.40	3.76	4.53	2.99	1.42	1.84	21.73	0.47	0.61	34.74
-13.25	2.85	-1.03	0.17	-2.31	0.50	-0.18	2.70	3.51	1.67	2.94	1.41	1.81	21.68	0.48	0.62	-13.25
8.81	6.84	4.01	0.17	1.53	1.19	0.70	4.31	1.81	4.63	2.89	1.40	1.79	21.63	0.48	0.62	8.81
13.82	-13.14	4.05	0.17	2.39	-2.27	0.70	3.99	1.31	3.14	2.83	1.39	1.76	21.58	0.49	0.62	13.82
-9.14	-32.04	2.09	0.17	-1.58	-5.53	0.36	5.76	2.87	5.49	2.78	1.38	1.74	21.53	0.50	0.63	-9.14
6.92	-23.92	8.12	0.17	1.19	-4.11	1.40	7.00	6.06	4.95	2.72	1.37	1.71	21.48	0.50	0.63	6.92
28.90	-0.86	2.15	0.17	4.96	-0.15	0.37	1.35	1.86	2.86	2.66	1.36	1.69	21.44	0.51	0.63	28.90
-2.10	-0.85	-12.78	0.17	-0.36	-0.15	-2.18	0.90	2.23	1.61	2.61	1.34	1.66	21.39	0.51	0.64	-2.10
-26.99	-2.83	-8.68	0.17	-4.60	-0.48	-1.48	2.83	2.54	2.14	2.55	1.33	1.64	21.34	0.52	0.64	-26.99
14.08	11.16	5.38	0.17	2.39	1.90	0.91	4.93	1.70	1.70	2.50	1.32	1.61	21.29	0.53	0.64	14.08
23.06	-3.85	18.38	0.17	3.91	-0.65	3.12	1.79	4.28	1.18	2.45	1.30	1.59	21.24	0.53	0.65	23.06
-8.92	-13.80	20.35	0.17	-1.51	-2.33	3.44	3.75	1.69	0.26	2.41	1.29	1.57	21.19	0.54	0.65	-8.92
15.12	5.22	14.34	0.17	2.55	0.88	2.42	5.22	1.81	0.21	2.36	1.28	1.55	21.14	0.54	0.66	15.12
19.11	-3.77	18.32	0.17	3.21	-0.63	3.08	2.37	1.00	0.58	2.32	1.26	1.53	21.09	0.54	0.66	19.11
-17.85	-37.68	13.31	0.17	-2.99	-6.31	2.23	2.26	2.38	2.11	2.28	1.25	1.51	21.04	0.55	0.66	-17.85
-19.72	-42.51	13.31	0.17	-3.29	-7.10	2.22	5.63	1.63	4.20	2.24	1.24	1.49	21.00	0.55	0.66	-19.72
-15.60	-22.37	23.29	0.17	-2.60	-3.72	3.88	6.74	2.32	1.87	2.21	1.23	1.47	20.95	0.56	0.67	-15.60
-17.09	0.04	11.71	0.18	-3.10	0.01	2.13	1.96	3.62	2.61	3.16	1.34	1.89	22.41	0.43	0.60	-17.09
-81.84	-16.91	2.73	0.18	-14.81	-3.06	0.49	8.32	2.61	4.90	3.19	1.36	1.91	22.36	0.43	0.60	-81.84

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-20.47	-20.27	17.26	0.17	-3.40	-3.37	2.86	5.55	1.11	2.68	2.18	1.21	1.45	20.90	0.56	0.67	0.87
-38.30	-23.18	11.25	0.17	-6.34	-3.84	1.86	3.15	0.67	0.29	2.15	1.20	1.43	20.85	0.56	0.67	0.87
-24.12	-10.10	21.23	0.17	-3.98	-1.67	3.50	0.85	1.98	1.41	2.12	1.19	1.41	20.80	0.56	0.67	0.87
29.92	-0.07	25.19	0.16	4.92	-0.01	4.14	4.54	1.02	0.08	2.10	1.18	1.39	20.75	0.57	0.67	0.87
1.91	7.93	0.19	0.16	0.31	1.30	0.03	6.65	4.13	0.68	2.07	1.17	1.37	20.70	0.57	0.66	0.87
-26.99	22.87	-1.76	0.16	-4.41	3.74	-0.29	2.81	3.44	1.31	2.05	1.17	1.36	20.65	0.57	0.66	0.87
-9.86	24.79	10.28	0.16	-1.61	4.04	1.68	3.37	2.49	2.18	2.03	1.16	1.34	20.61	0.57	0.66	0.87
-7.78	6.74	-3.68	0.16	-1.26	1.09	-0.60	2.53	1.97	2.49	2.01	1.15	1.32	20.56	0.57	0.66	0.87
11.27	-2.26	-1.62	0.16	1.83	-0.37	-0.26	2.53	2.58	3.19	1.99	1.14	1.30	20.51	0.58	0.65	0.87
14.27	3.74	-6.56	0.16	2.30	0.60	-1.06	1.59	2.07	1.98	1.97	1.14	1.28	20.46	0.58	0.65	0.87
8.28	-1.25	-22.45	0.16	1.33	-0.20	-3.61	3.78	1.26	1.36	1.95	1.13	1.25	20.41	0.58	0.64	0.87
18.28	-12.22	-11.33	0.16	2.93	-1.96	-1.82	4.41	0.95	3.13	1.92	1.12	1.23	20.36	0.58	0.64	0.87
22.25	-5.17	-0.26	0.16	3.56	-0.83	-0.04	7.21	2.03	1.94	1.90	1.11	1.21	20.31	0.59	0.64	0.86
15.23	13.82	-0.20	0.16	2.43	2.20	-0.03	4.34	2.81	2.55	1.88	1.11	1.19	20.26	0.59	0.63	0.86
-3.74	6.79	-2.15	0.16	-0.60	1.08	-0.34	3.20	2.51	2.89	1.86	1.10	1.16	20.21	0.59	0.63	0.86
4.31	3.78	-0.09	0.16	0.68	0.60	-0.01	5.14	1.50	2.00	1.83	1.09	1.14	20.17	0.59	0.62	0.86
34.28	18.74	8.94	0.16	5.42	2.96	1.41	2.40	4.04	0.51	1.81	1.08	1.12	20.12	0.60	0.62	0.86
17.23	3.71	3.96	0.16	2.71	0.58	0.62	5.84	1.00	1.55	1.79	1.07	1.09	20.07	0.60	0.61	0.86
-16.72	-20.25	5.00	0.16	-2.63	-3.18	0.78	5.28	4.48	3.81	1.76	1.06	1.07	20.02	0.60	0.61	0.85
7.35	-12.18	29.98	0.16	1.15	-1.91	4.69	1.07	1.97	3.49	1.74	1.05	1.05	19.97	0.60	0.60	0.85
31.33	9.84	29.91	0.16	4.89	1.53	4.67	4.86	1.67	3.78	1.72	1.04	1.02	19.92	0.60	0.60	0.85
-1.68	7.81	17.86	0.16	-0.26	1.21	2.78	3.84	6.57	2.30	1.69	1.02	1.00	19.87	0.61	0.59	0.85
-24.58	-7.18	11.85	0.16	-3.81	-1.11	1.84	3.39	8.86	2.53	1.67	1.01	0.97	19.82	0.61	0.58	0.84
-5.47	7.83	6.86	0.15	-0.84	1.21	1.06	8.37	8.67	4.68	1.65	1.00	0.95	19.78	0.61	0.58	0.84
3.59	14.79	2.89	0.15	0.55	2.28	0.45	3.11	6.27	8.97	1.62	0.98	0.93	19.73	0.61	0.57	0.83
-7.35	5.76	-9.05	0.15	-1.13	0.88	-1.39	5.53	5.58	5.86	1.60	0.97	0.91	19.68	0.61	0.56	0.83
19.68	9.74	-8.96	0.15	3.01	1.49	-1.37	4.42	3.47	1.64	1.58	0.96	0.88	19.63	0.60	0.56	0.82
23.64	-5.26	-4.88	0.15	3.61	-0.80	-0.74	2.32	5.22	3.94	1.57	0.95	0.86	19.58	0.60	0.55	0.82
-15.32	-9.22	-12.80	0.15	-2.33	-1.40	-1.95	5.45	6.86	4.18	1.55	0.93	0.85	19.53	0.60	0.55	0.81
-2.24	9.79	-3.71	0.15	-0.34	1.48	-0.56	8.30	4.70	4.16	1.54	0.92	0.83	19.48	0.60	0.54	0.81
11.80	4.77	8.33	0.15	1.78	0.72	1.26	3.59	6.40	5.80	1.53	0.92	0.82	19.43	0.60	0.53	0.80
-20.47	-20.27	17.26	0.17	-3.40	-3.37	2.86	5.55	1.11	2.68	2.18	1.21	1.45	20.90	0.56	0.67	0.87
-38.30	-23.18	11.25	0.17	-6.34	-3.84	1.86	3.15	0.67	0.29	2.15	1.20	1.43	20.85	0.56	0.67	0.87

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-20.14	-8.22	0.36	0.15	-3.03	-1.24	0.05	4.33	10.49	4.77	1.52	0.91	0.80	19.38	0.60	0.53	0.80
-39.96	1.81	-0.59	0.15	-5.99	0.27	-0.09	8.03	10.62	1.93	1.51	0.90	0.79	19.34	0.60	0.53	0.80
-20.79	22.77	9.44	0.15	-3.11	3.40	1.41	8.58	10.71	2.28	1.50	0.90	0.79	19.29	0.60	0.52	0.80
-20.65	18.69	1.47	0.15	-3.08	2.79	0.22	11.99	7.76	3.11	1.50	0.90	0.78	19.24	0.60	0.52	0.80
-55.45	-14.31	-15.45	0.15	-8.23	-2.12	-2.29	11.19	3.55	3.33	1.49	0.90	0.78	19.19	0.61	0.52	0.80
-29.23	-23.22	-6.36	0.15	-4.33	-3.44	-0.94	6.97	4.03	3.39	1.49	0.91	0.78	19.14	0.61	0.52	0.80
4.88	-11.14	-3.29	0.15	0.72	-1.64	-0.49	4.43	2.50	1.50	1.49	0.92	0.79	19.09	0.62	0.53	0.81
-28.02	-9.09	-11.21	0.15	-4.12	-1.34	-1.65	4.38	0.45	2.61	1.50	0.94	0.79	19.04	0.63	0.53	0.82
-11.89	-15.04	11.84	0.15	-1.74	-2.20	1.73	2.75	2.22	6.12	1.50	0.95	0.80	18.99	0.64	0.54	0.83
50.09	-27.94	28.81	0.15	7.31	-4.08	4.21	5.53	4.23	6.71	1.51	0.98	0.82	18.95	0.65	0.54	0.85
17.00	-23.83	16.76	0.15	2.47	-3.47	2.44	11.86	4.54	6.35	1.52	1.00	0.83	18.90	0.66	0.55	0.86
-37.90	-17.73	5.77	0.15	-5.50	-2.57	0.84	16.05	4.37	10.37	1.53	1.03	0.85	18.85	0.68	0.56	0.88
8.21	-17.65	8.79	0.14	1.19	-2.55	1.27	10.02	6.30	7.75	1.54	1.07	0.88	18.80	0.69	0.57	0.90
30.19	-7.59	9.80	0.14	4.35	-1.09	1.41	2.65	7.19	1.76	1.55	1.11	0.90	18.75	0.71	0.58	0.92
-6.80	-16.53	-3.16	0.14	-0.98	-2.37	-0.45	5.81	9.26	5.74	1.57	1.15	0.93	18.70	0.73	0.59	0.94
12.24	-12.46	-3.10	0.14	1.75	-1.78	-0.44	14.28	9.76	9.51	1.59	1.20	0.95	18.65	0.75	0.60	0.96
42.18	22.53	-0.04	0.14	6.01	3.21	-0.01	13.32	8.81	7.98	1.61	1.24	0.98	18.60	0.77	0.61	0.98
2.14	16.46	-19.95	0.14	0.30	2.34	-2.83	8.57	6.97	6.27	1.64	1.30	1.02	18.55	0.79	0.62	1.01
-19.77	5.43	-15.83	0.14	-2.80	0.77	-2.24	2.18	7.94	5.69	1.66	1.35	1.05	18.51	0.81	0.63	1.03
22.28	16.39	9.23	0.14	3.14	2.31	1.30	3.28	3.41	4.09	1.69	1.41	1.08	18.46	0.83	0.64	1.05
34.22	16.34	0.26	0.14	4.81	2.30	0.04	8.35	6.58	3.40	1.72	1.46	1.11	18.41	0.85	0.65	1.07
10.18	16.28	-8.67	0.14	1.43	2.28	-1.21	8.75	7.87	1.78	1.76	1.52	1.15	18.36	0.87	0.65	1.09
12.19	-11.72	10.37	0.14	1.70	-1.63	1.45	5.60	4.30	1.36	1.79	1.58	1.18	18.31	0.88	0.66	1.10
22.17	-31.62	19.36	0.14	3.08	-4.39	2.69	5.33	3.05	4.13	1.83	1.64	1.22	18.26	0.89	0.66	1.11
1.18	-22.50	11.35	0.14	0.16	-3.12	1.57	4.56	1.98	3.54	1.88	1.70	1.25	18.21	0.90	0.67	1.12
-32.71	-27.39	4.37	0.14	-4.51	-3.78	0.60	1.40	6.38	1.67	1.92	1.75	1.29	18.16	0.91	0.67	1.13
1.41	-7.31	11.39	0.14	0.19	-1.00	1.57	5.85	3.50	6.34	1.97	1.80	1.32	18.12	0.92	0.67	1.14
38.38	6.70	5.40	0.14	5.26	0.92	0.74	8.56	2.65	7.07	2.02	1.85	1.36	18.07	0.92	0.67	1.14
-8.63	-4.29	-17.52	0.14	-1.18	-0.59	-2.39	4.58	4.37	3.78	2.07	1.90	1.39	18.02	0.92	0.67	1.14
-24.51	-7.26	-14.41	0.14	-3.33	-0.99	-1.96	10.58	3.85	4.35	2.12	1.94	1.42	17.97	0.92	0.67	1.14
0.59	5.76	-5.32	0.14	0.08	0.78	-0.72	14.07	5.59	3.82	2.17	1.98	1.46	17.92	0.91	0.67	1.13
-20.14	-8.22	0.36	0.15	-3.03	-1.24	0.05	4.33	10.49	4.77	1.52	0.91	0.80	19.38	0.60	0.53	0.80
-39.96	1.81	-0.59	0.15	-5.99	0.27	-0.09	8.03	10.62	1.93	1.51	0.90	0.79	19.34	0.60	0.53	0.80

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-20.31	33.69	-10.24	0.14	-2.74	4.55	-1.38	13.05	9.49	7.34	2.22	2.02	1.49	17.87	0.91	0.67	1.13
-38.14	11.61	1.82	0.13	-5.13	1.56	0.25	4.83	6.68	5.55	2.27	2.06	1.52	17.82	0.90	0.67	1.12
-25.96	-9.39	14.84	0.13	-3.48	-1.26	1.99	1.34	5.46	8.87	2.33	2.09	1.55	17.77	0.90	0.67	1.12
10.12	20.60	8.84	0.13	1.35	2.75	1.18	11.63	12.88	16.25	2.38	2.11	1.58	17.72	0.89	0.67	1.11
25.10	24.52	3.87	0.13	3.34	3.26	0.51	10.31	7.55	11.72	2.43	2.13	1.61	17.68	0.88	0.66	1.10
-3.89	25.43	14.88	0.13	-0.51	3.37	1.97	0.66	2.25	4.27	2.48	2.15	1.64	17.63	0.87	0.66	1.09
-5.81	15.36	19.86	0.13	-0.77	2.03	2.62	1.28	5.43	4.00	2.52	2.17	1.67	17.58	0.86	0.66	1.09
-2.74	-21.62	19.83	0.13	-0.36	-2.84	2.61	2.60	8.66	2.62	2.56	2.18	1.69	17.53	0.85	0.66	1.08
-22.64	-8.55	23.79	0.13	-2.97	-1.12	3.12	4.38	7.92	0.98	2.60	2.19	1.72	17.48	0.84	0.66	1.07
-6.53	7.47	33.72	0.13	-0.85	0.97	4.40	6.77	5.37	1.98	2.64	2.20	1.74	17.43	0.83	0.66	1.06
20.50	-6.53	30.64	0.13	2.66	-0.85	3.98	4.30	2.44	1.49	2.67	2.20	1.77	17.38	0.82	0.66	1.06
8.49	3.49	8.61	0.13	1.10	0.45	1.11	2.91	1.86	3.26	2.70	2.20	1.79	17.33	0.82	0.66	1.05
-13.44	3.49	22.60	0.13	-1.73	0.45	2.91	1.27	4.15	3.29	2.72	2.21	1.81	17.29	0.81	0.67	1.05
-3.36	-2.50	34.53	0.13	-0.43	-0.32	4.44	0.61	3.79	2.39	2.74	2.21	1.83	17.24	0.81	0.67	1.05
24.65	5.50	5.50	0.13	3.16	0.70	0.70	3.33	1.88	2.54	2.76	2.21	1.85	17.19	0.80	0.67	1.04
31.59	-8.48	8.52	0.13	4.03	-1.08	1.09	3.65	3.21	2.76	2.77	2.21	1.86	17.14	0.80	0.67	1.04
23.53	-11.43	15.51	0.13	2.99	-1.45	1.97	6.19	2.68	3.65	2.77	2.20	1.88	17.09	0.79	0.68	1.04
-6.45	-22.36	-14.44	0.13	-0.82	-2.83	-1.83	8.72	4.92	4.63	2.78	2.20	1.89	17.04	0.79	0.68	1.04
-43.29	-40.22	-13.34	0.13	-5.46	-5.07	-1.68	7.89	2.54	4.87	2.78	2.20	1.90	16.99	0.79	0.69	1.05
-14.13	-13.10	2.73	0.13	-1.77	-1.64	0.34	8.13	6.91	3.01	2.77	2.19	1.91	16.94	0.79	0.69	1.05
23.91	2.93	-12.20	0.13	2.99	0.37	-1.53	9.66	5.07	4.47	2.76	2.19	1.92	16.89	0.79	0.70	1.06
12.89	-0.07	-21.09	0.12	1.60	-0.01	-2.63	10.86	6.52	8.37	2.75	2.19	1.93	16.85	0.80	0.70	1.06
13.88	12.92	-24.95	0.12	1.72	1.60	-3.09	7.34	5.46	8.14	2.73	2.18	1.94	16.80	0.80	0.71	1.07
29.85	4.89	-26.80	0.12	3.69	0.60	-3.31	3.68	4.12	2.84	2.71	2.18	1.94	16.75	0.80	0.72	1.08
23.79	-5.09	-12.67	0.12	2.93	-0.63	-1.56	4.30	13.20	12.87	2.69	2.17	1.95	16.70	0.81	0.72	1.09
-5.19	15.89	-0.59	0.12	-0.64	1.95	-0.07	15.95	24.23	34.51	2.66	2.17	1.95	16.65	0.81	0.73	1.09
-7.11	29.81	11.43	0.12	-0.87	3.64	1.39	4.80	15.33	25.00	2.64	2.16	1.95	16.60	0.82	0.74	1.10
4.94	24.71	4.45	0.12	0.60	3.00	0.54	12.85	11.47	12.18	2.61	2.16	1.95	16.55	0.83	0.75	1.12
-24.96	15.64	-10.49	0.12	-3.02	1.89	-1.27	4.22	4.65	6.38	2.58	2.15	1.95	16.50	0.83	0.76	1.13
-33.79	10.60	-2.42	0.12	-4.07	1.28	-0.29	3.95	3.47	7.28	2.55	2.15	1.95	16.46	0.84	0.77	1.14
25.28	14.56	-4.35	0.12	3.03	1.75	-0.52	6.85	3.78	6.94	2.52	2.14	1.95	16.41	0.85	0.78	1.15
-20.31	33.69	-10.24	0.14	-2.74	4.55	-1.38	13.05	9.49	7.34	2.22	2.02	1.49	17.87	0.91	0.67	1.13
-38.14	11.61	1.82	0.13	-5.13	1.56	0.25	4.83	6.68	5.55	2.27	2.06	1.52	17.82	0.90	0.67	1.12

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
34.21	13.51	-16.26	0.12	4.09	1.61	-1.94	8.13	2.01	3.85	2.49	2.13	1.95	16.36	0.86	0.79	1.16
-4.80	0.50	-13.16	0.12	-0.57	0.06	-1.57	2.11	0.97	3.87	2.45	2.13	1.95	16.31	0.87	0.80	1.18
26.21	-10.47	0.92	0.12	3.11	-1.24	0.11	2.97	1.79	5.08	2.42	2.12	1.95	16.26	0.88	0.81	1.19
32.15	-6.43	7.95	0.12	3.79	-0.76	0.94	2.25	1.41	2.68	2.39	2.12	1.95	16.21	0.88	0.82	1.20
-22.82	-4.40	-0.02	0.12	-2.68	-0.52	0.00	1.76	4.97	3.47	2.36	2.11	1.96	16.16	0.89	0.83	1.22
-4.71	-18.34	16.99	0.12	-0.55	-2.15	1.99	3.33	3.87	3.08	2.34	2.11	1.96	16.11	0.90	0.84	1.23
19.31	-18.26	28.95	0.12	2.25	-2.13	3.37	5.94	14.49	8.40	2.31	2.11	1.97	16.06	0.91	0.85	1.25
-22.63	-22.17	16.91	0.12	-2.63	-2.57	1.96	25.30	41.49	15.32	2.29	2.10	1.98	16.02	0.92	0.86	1.26
-30.47	-42.03	19.88	0.12	-3.52	-4.85	2.30	16.99	28.70	12.02	2.27	2.10	1.99	15.97	0.93	0.88	1.28
11.62	-37.86	15.86	0.12	1.34	-4.35	1.82	4.49	5.05	9.69	2.25	2.11	2.01	15.92	0.94	0.89	1.29
5.64	-39.69	6.86	0.11	0.65	-4.54	0.79	3.30	8.69	5.15	2.24	2.11	2.03	15.87	0.94	0.90	1.31
-45.23	-51.50	-9.09	0.11	-5.16	-5.87	-1.04	7.86	8.75	4.48	2.23	2.12	2.05	15.82	0.95	0.92	1.32
-29.03	-23.33	-13.00	0.11	-3.29	-2.65	-1.48	11.37	8.25	10.27	2.23	2.13	2.08	15.77	0.96	0.94	1.34
14.05	11.70	3.07	0.11	1.59	1.32	0.35	14.24	2.64	7.80	2.22	2.15	2.12	15.72	0.96	0.95	1.36
-18.88	9.67	-7.87	0.11	-2.12	1.09	-0.89	10.63	4.35	3.05	2.23	2.16	2.16	15.67	0.97	0.97	1.37
-14.76	6.65	3.18	0.11	-1.65	0.74	0.36	1.70	7.56	1.10	2.23	2.19	2.21	15.63	0.98	0.99	1.39
50.22	7.63	26.17	0.11	5.60	0.85	2.92	7.05	2.94	6.17	2.24	2.21	2.26	15.58	0.99	1.01	1.41
33.10	10.61	16.13	0.11	3.67	1.18	1.79	4.39	2.18	6.94	2.26	2.24	2.31	15.53	1.00	1.02	1.43
-16.88	19.56	16.12	0.11	-1.86	2.16	1.78	6.46	3.20	6.80	2.27	2.28	2.37	15.48	1.00	1.04	1.45
2.21	6.52	34.06	0.11	0.24	0.72	3.75	10.36	3.11	7.75	2.29	2.31	2.42	15.43	1.01	1.06	1.46
12.23	1.51	43.95	0.11	1.34	0.17	4.81	13.36	5.21	6.32	2.31	2.35	2.48	15.38	1.02	1.07	1.48
-24.69	7.51	38.83	0.11	-2.69	0.82	4.23	15.42	6.49	7.79	2.34	2.40	2.54	15.33	1.03	1.09	1.50
-2.58	-1.49	28.75	0.11	-0.28	-0.16	3.12	14.59	4.51	12.00	2.36	2.45	2.60	15.28	1.04	1.10	1.51
38.40	5.51	3.73	0.11	4.15	0.59	0.40	16.73	6.53	12.29	2.39	2.50	2.66	15.23	1.04	1.11	1.53
-5.62	0.51	-23.19	0.11	-0.60	0.05	-2.49	10.82	2.99	10.07	2.42	2.55	2.72	15.19	1.05	1.13	1.54
-27.50	-18.44	-11.07	0.11	-2.94	-1.97	-1.18	4.30	5.67	6.62	2.45	2.60	2.78	15.14	1.06	1.13	1.55
15.58	-14.37	0.99	0.11	1.66	-1.53	0.11	6.24	6.23	5.02	2.48	2.66	2.83	15.09	1.07	1.14	1.57
39.52	-9.31	-12.94	0.11	4.19	-0.99	-1.37	4.61	7.73	3.71	2.51	2.72	2.87	15.04	1.08	1.14	1.57
24.44	-8.26	-13.84	0.11	2.58	-0.87	-1.46	4.04	7.69	3.96	2.54	2.77	2.92	14.99	1.09	1.15	1.58
10.43	5.76	-2.76	0.11	1.09	0.60	-0.29	5.66	8.16	4.58	2.58	2.82	2.95	14.94	1.10	1.14	1.58
23.41	14.73	-1.70	0.10	2.45	1.54	-0.18	5.59	5.59	7.36	2.61	2.87	2.98	14.89	1.10	1.14	1.58
34.21	13.51	-16.26	0.12	4.09	1.61	-1.94	8.13	2.01	3.85	2.49	2.13	1.95	16.36	0.86	0.79	1.16
-4.80	0.50	-13.16	0.12	-0.57	0.06	-1.57	2.11	0.97	3.87	2.45	2.13	1.95	16.31	0.87	0.80	1.18

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
0.42	2.70	-12.63	0.10	0.04	0.28	-1.31	7.14	4.21	8.05	2.65	2.92	3.00	14.84	1.10	1.13	1.58
-25.48	-3.28	-5.54	0.10	-2.64	-0.34	-0.57	9.55	5.49	4.23	2.68	2.96	3.01	14.79	1.10	1.12	1.57
12.60	7.72	19.47	0.10	1.30	0.80	2.01	4.79	5.76	2.09	2.72	3.00	3.02	14.75	1.10	1.11	1.57
10.60	2.71	8.47	0.10	1.09	0.28	0.87	3.43	2.89	3.18	2.75	3.03	3.02	14.70	1.10	1.10	1.55
-36.30	-5.27	-22.46	0.10	-3.70	-0.54	-2.29	7.66	1.72	5.75	2.79	3.06	3.01	14.65	1.10	1.08	1.54
-21.13	4.74	-9.35	0.10	-2.14	0.48	-0.95	7.46	3.72	1.73	2.82	3.08	3.00	14.60	1.09	1.06	1.52
10.95	16.71	4.71	0.10	1.11	1.69	0.48	12.01	4.10	4.25	2.86	3.09	2.99	14.55	1.08	1.05	1.50
-12.00	18.65	-16.22	0.10	-1.21	1.87	-1.63	16.63	7.59	9.34	2.90	3.10	2.97	14.50	1.07	1.03	1.48
-33.86	17.59	-12.12	0.10	-3.39	1.76	-1.21	20.39	3.86	12.53	2.94	3.10	2.95	14.45	1.06	1.01	1.46
1.26	16.53	9.93	0.10	0.13	1.64	0.99	15.52	6.65	8.37	2.97	3.10	2.93	14.40	1.04	0.99	1.43
19.27	14.48	7.94	0.10	1.91	1.43	0.79	15.34	1.81	4.32	3.01	3.08	2.91	14.36	1.02	0.97	1.41
-32.65	5.45	0.97	0.10	-3.22	0.54	0.10	17.00	4.54	2.49	3.05	3.06	2.88	14.31	1.00	0.95	1.38
-29.47	-13.52	13.99	0.10	-2.89	-1.33	1.37	23.82	8.84	5.40	3.08	3.03	2.85	14.26	0.98	0.93	1.35
13.62	-21.44	16.97	0.10	1.33	-2.09	1.65	25.82	9.56	12.07	3.11	2.99	2.82	14.21	0.96	0.91	1.32
-27.30	-19.35	-13.99	0.10	-2.65	-1.88	-1.36	23.78	4.99	11.02	3.15	2.95	2.80	14.16	0.94	0.89	1.29
-44.11	-25.25	-12.89	0.10	-4.26	-2.44	-1.24	21.04	3.92	6.72	3.18	2.91	2.77	14.11	0.91	0.87	1.26
3.03	-13.16	10.16	0.10	0.29	-1.26	0.98	17.15	4.61	3.59	3.21	2.86	2.74	14.06	0.89	0.86	1.24
9.06	3.87	-10.79	0.10	0.87	0.37	-1.03	18.97	6.99	1.55	3.23	2.80	2.72	14.01	0.87	0.84	1.21
4.09	-11.10	-16.69	0.10	0.39	-1.05	-1.59	25.73	12.08	7.57	3.26	2.75	2.69	13.96	0.84	0.83	1.18
9.11	-0.07	11.37	0.09	0.86	-0.01	1.07	27.35	14.92	6.89	3.29	2.69	2.67	13.92	0.82	0.81	1.15
8.13	36.87	9.37	0.09	0.76	3.47	0.88	21.72	5.70	0.81	3.32	2.64	2.65	13.87	0.79	0.80	1.13
0.17	27.75	2.40	0.09	0.02	2.59	0.22	8.74	0.77	5.10	3.35	2.58	2.63	13.82	0.77	0.79	1.10
-18.74	7.69	16.41	0.09	-1.74	0.72	1.53	3.59	5.10	3.66	3.38	2.52	2.61	13.77	0.75	0.77	1.07
18.31	16.65	25.37	0.09	1.69	1.54	2.35	7.73	6.46	3.79	3.41	2.47	2.59	13.72	0.72	0.76	1.05
35.26	15.60	23.32	0.09	3.24	1.44	2.15	8.06	5.99	4.98	3.45	2.41	2.57	13.67	0.70	0.75	1.02
-14.73	-7.40	5.31	0.09	-1.35	-0.68	0.49	7.69	5.32	4.16	3.49	2.36	2.55	13.62	0.68	0.73	1.00
-4.64	-10.36	-1.66	0.09	-0.42	-0.94	-0.15	6.93	4.73	9.05	3.53	2.32	2.53	13.57	0.66	0.72	0.97
13.40	-8.31	14.36	0.09	1.21	-0.75	1.30	14.91	2.30	6.60	3.58	2.27	2.51	13.53	0.63	0.70	0.94
24.38	-23.23	4.37	0.09	2.19	-2.09	0.39	12.03	4.38	4.13	3.64	2.23	2.49	13.48	0.61	0.68	0.92
53.27	-21.13	-13.56	0.09	4.77	-1.89	-1.21	7.09	10.52	8.28	3.71	2.20	2.47	13.43	0.59	0.67	0.89
21.18	-2.08	-18.45	0.09	1.88	-0.18	-1.64	7.42	8.01	8.47	3.78	2.17	2.45	13.38	0.58	0.65	0.87
0.42	2.70	-12.63	0.10	0.04	0.28	-1.31	7.14	4.21	8.05	2.65	2.92	3.00	14.84	1.10	1.13	1.58
-25.48	-3.28	-5.54	0.10	-2.64	-0.34	-0.57	9.55	5.49	4.23	2.68	2.96	3.01	14.79	1.10	1.12	1.57

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
11.16	-2.06	-24.32	0.09	0.99	-0.18	-2.15	5.61	3.60	5.98	3.86	2.15	2.44	13.33	0.56	0.63	0.84
26.14	-14.01	-17.19	0.09	2.30	-1.23	-1.51	4.44	3.38	6.26	3.95	2.13	2.42	13.28	0.54	0.61	0.82
14.11	-3.96	-9.09	0.09	1.23	-0.35	-0.80	10.73	2.76	3.53	4.05	2.12	2.40	13.23	0.52	0.59	0.79
38.06	-0.94	-14.00	0.09	3.31	-0.08	-1.22	11.69	3.31	0.63	4.15	2.11	2.39	13.18	0.51	0.58	0.77
20.99	-13.90	-11.90	0.09	1.82	-1.20	-1.03	6.56	4.06	0.21	4.26	2.10	2.37	13.13	0.49	0.56	0.74
1.00	-10.84	-0.83	0.09	0.09	-0.93	-0.07	2.43	2.29	2.50	4.38	2.10	2.36	13.09	0.48	0.54	0.72
15.02	-10.78	-0.78	0.09	1.28	-0.92	-0.07	4.65	3.84	2.07	4.49	2.10	2.34	13.04	0.47	0.52	0.70
-24.91	-22.71	-10.71	0.09	-2.12	-1.93	-0.91	6.21	3.92	2.21	4.61	2.10	2.33	12.99	0.46	0.50	0.68
-26.75	-36.57	-2.64	0.08	-2.26	-3.09	-0.22	4.38	3.76	0.60	4.73	2.11	2.32	12.94	0.45	0.49	0.66
-4.64	-46.39	14.39	0.08	-0.39	-3.90	1.21	6.98	3.58	4.65	4.84	2.12	2.30	12.89	0.44	0.48	0.65
-45.48	-38.21	12.38	0.08	-3.80	-3.19	1.03	7.23	8.92	4.75	4.95	2.13	2.29	12.84	0.43	0.46	0.63
-39.26	-35.05	4.39	0.08	-3.26	-2.91	0.36	2.62	5.26	2.00	5.05	2.14	2.28	12.79	0.42	0.45	0.62
11.85	-34.90	8.41	0.08	0.98	-2.88	0.69	3.13	5.88	1.64	5.14	2.15	2.26	12.74	0.42	0.44	0.61
-6.11	-13.79	8.43	0.08	-0.50	-1.13	0.69	2.91	5.39	1.76	5.22	2.16	2.25	12.70	0.41	0.43	0.60
-53.94	-10.72	0.45	0.08	-4.40	-0.87	0.04	9.68	5.57	6.77	5.29	2.17	2.24	12.65	0.41	0.42	0.59
-43.69	-3.68	13.47	0.08	-3.54	-0.30	1.09	9.90	6.16	9.24	5.34	2.18	2.22	12.60	0.41	0.42	0.58
18.41	24.29	14.46	0.08	1.48	1.96	1.16	24.30	9.60	9.17	5.38	2.18	2.21	12.55	0.41	0.41	0.58
20.39	26.21	-1.52	0.08	1.63	2.10	-0.12	21.99	14.42	10.11	5.39	2.19	2.19	12.50	0.41	0.41	0.57
-33.53	14.14	17.50	0.08	-2.67	1.12	1.39	6.51	3.00	4.25	5.39	2.19	2.18	12.45	0.41	0.40	0.57
-2.41	21.08	29.45	0.08	-0.19	1.67	2.33	2.54	5.47	6.86	5.37	2.20	2.16	12.40	0.41	0.40	0.57
35.58	11.03	9.42	0.08	2.79	0.87	0.74	6.51	6.58	6.17	5.33	2.20	2.14	12.35	0.41	0.40	0.57
-7.42	-14.95	-7.54	0.08	-0.58	-1.17	-0.59	9.28	2.16	5.89	5.28	2.19	2.12	12.30	0.42	0.40	0.58
-5.34	-10.88	-9.46	0.08	-0.41	-0.84	-0.73	7.77	4.27	5.67	5.20	2.19	2.09	12.26	0.42	0.40	0.58
16.69	-1.84	3.59	0.08	1.28	-0.14	0.28	6.70	3.50	2.70	5.12	2.18	2.07	12.21	0.43	0.40	0.59
-6.28	-24.78	0.63	0.08	-0.48	-1.90	0.05	3.74	3.85	6.02	5.01	2.17	2.04	12.16	0.43	0.41	0.59
-4.21	-6.70	-3.32	0.08	-0.32	-0.51	-0.25	3.16	3.31	3.98	4.90	2.16	2.02	12.11	0.44	0.41	0.60
18.82	19.29	8.72	0.08	1.42	1.46	0.66	4.83	1.00	2.92	4.78	2.14	1.99	12.06	0.45	0.42	0.61
23.78	-4.73	-1.25	0.08	1.78	-0.35	-0.09	13.87	3.92	4.31	4.64	2.13	1.96	12.01	0.46	0.42	0.62
5.78	35.23	4.79	0.07	0.43	2.62	0.36	15.22	7.98	5.89	4.51	2.11	1.94	11.96	0.47	0.43	0.64
6.81	45.08	23.77	0.07	0.50	3.34	1.76	8.22	7.41	5.61	4.37	2.10	1.91	11.91	0.48	0.44	0.65
46.75	-2.00	7.76	0.07	3.44	-0.15	0.57	3.35	8.52	5.54	4.23	2.08	1.88	11.87	0.49	0.44	0.66
11.16	-2.06	-24.32	0.09	0.99	-0.18	-2.15	5.61	3.60	5.98	3.86	2.15	2.44	13.33	0.56	0.63	0.84
26.14	-14.01	-17.19	0.09	2.30	-1.23	-1.51	4.44	3.38	6.26	3.95	2.13	2.42	13.28	0.54	0.61	0.82

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
21.67	34.95	-5.20	0.07	1.58	2.55	-0.38	2.55	9.04	3.12	4.09	2.07	1.86	11.82	0.51	0.45	0.68
-24.28	-7.09	0.85	0.07	-1.76	-0.51	0.06	3.41	10.73	4.08	3.96	2.05	1.83	11.77	0.52	0.46	0.69
9.81	-48.97	0.89	0.07	0.71	-3.53	0.06	2.84	9.02	2.53	3.83	2.04	1.81	11.72	0.53	0.47	0.71
9.82	19.11	-6.05	0.07	0.70	1.37	-0.43	4.73	4.48	2.00	3.71	2.03	1.79	11.67	0.55	0.48	0.73
-7.13	-19.88	-11.97	0.07	-0.51	-1.41	-0.85	4.60	5.96	2.75	3.60	2.02	1.77	11.62	0.56	0.49	0.75
4.92	-29.77	-11.88	0.07	0.35	-2.10	-0.84	0.51	8.56	4.17	3.50	2.01	1.76	11.57	0.57	0.50	0.76
-10.01	31.25	-7.79	0.07	-0.70	2.19	-0.55	2.98	5.03	1.04	3.40	2.00	1.75	11.52	0.59	0.51	0.78
-3.93	-8.79	-14.70	0.07	-0.27	-0.61	-1.02	12.41	18.38	3.51	3.32	2.00	1.74	11.47	0.60	0.52	0.80
4.12	-15.72	-17.59	0.07	0.28	-1.08	-1.21	13.20	20.10	11.48	3.25	2.00	1.73	11.43	0.61	0.53	0.81
0.16	17.29	4.48	0.07	0.01	1.18	0.31	5.67	9.29	4.68	3.18	2.00	1.73	11.38	0.63	0.54	0.83
2.21	8.25	14.49	0.07	0.15	0.56	0.99	0.68	5.30	8.44	3.13	2.00	1.73	11.33	0.64	0.55	0.84
-15.71	24.20	-0.49	0.07	-1.06	1.63	-0.03	5.75	6.80	12.11	3.09	2.01	1.73	11.28	0.65	0.56	0.86
17.34	3.16	11.53	0.07	1.16	0.21	0.77	3.67	5.06	8.12	3.05	2.02	1.73	11.23	0.66	0.57	0.87
62.23	-35.77	34.48	0.07	4.14	-2.38	2.29	3.84	6.72	5.03	3.02	2.03	1.74	11.18	0.67	0.58	0.88
-5.83	4.31	22.41	0.07	-0.38	0.28	1.48	1.73	6.20	6.71	2.99	2.04	1.75	11.13	0.68	0.58	0.90
-64.64	-7.67	23.37	0.07	-4.23	-0.50	1.53	2.72	5.02	6.43	2.97	2.05	1.76	11.08	0.69	0.59	0.91
-23.41	-45.55	31.30	0.07	-1.52	-2.96	2.03	5.06	9.31	3.69	2.96	2.07	1.77	11.04	0.70	0.60	0.92
-8.29	-7.43	6.27	0.06	-0.53	-0.48	0.40	4.49	15.97	4.15	2.94	2.09	1.78	10.99	0.71	0.60	0.93
-11.20	-17.37	-8.68	0.06	-0.72	-1.11	-0.56	6.67	15.53	7.77	2.93	2.11	1.79	10.94	0.72	0.61	0.95
-1.12	-10.30	-3.61	0.06	-0.07	-0.65	-0.23	8.02	11.78	6.10	2.92	2.14	1.80	10.89	0.73	0.62	0.96
3.93	46.65	-18.52	0.06	0.25	2.94	-1.17	8.91	9.02	11.36	2.90	2.17	1.81	10.84	0.75	0.62	0.97
5.96	26.51	-21.40	0.06	0.37	1.66	-1.34	2.53	13.00	5.64	2.88	2.19	1.82	10.79	0.76	0.63	0.99
-24.95	11.45	-2.30	0.06	-1.55	0.71	-0.14	9.21	12.78	5.47	2.86	2.23	1.83	10.74	0.78	0.64	1.01
-7.83	30.38	1.74	0.06	-0.48	1.87	0.11	1.88	11.81	7.55	2.84	2.26	1.84	10.69	0.80	0.65	1.03
23.19	-1.66	-15.19	0.06	1.41	-0.10	-0.93	8.10	11.56	8.89	2.81	2.30	1.85	10.64	0.82	0.66	1.05
-16.77	-21.60	-17.08	0.06	-1.01	-1.31	-1.03	7.10	8.47	5.82	2.78	2.33	1.86	10.60	0.84	0.67	1.07
2.32	-16.51	2.00	0.06	0.14	-0.99	0.12	6.19	0.15	2.70	2.75	2.38	1.87	10.55	0.86	0.68	1.10
11.34	-31.41	-5.95	0.06	0.67	-1.87	-0.35	1.37	6.56	2.80	2.72	2.42	1.87	10.50	0.89	0.69	1.13
-38.55	-26.28	-15.86	0.06	-2.27	-1.55	-0.94	6.75	7.53	7.19	2.68	2.47	1.88	10.45	0.92	0.70	1.16
-4.41	-3.20	5.21	0.06	-0.26	-0.19	0.30	0.96	4.29	4.10	2.64	2.52	1.89	10.40	0.95	0.72	1.19
26.60	13.79	8.22	0.06	1.54	0.80	0.48	4.33	2.71	2.78	2.60	2.57	1.90	10.35	0.99	0.73	1.23
21.67	34.95	-5.20	0.07	1.58	2.55	-0.38	2.55	9.04	3.12	4.09	2.07	1.86	11.82	0.51	0.45	0.68
-24.28	-7.09	0.85	0.07	-1.76	-0.51	0.06	3.41	10.73	4.08	3.96	2.05	1.83	11.77	0.52	0.46	0.69

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-2.40	12.75	-8.73	0.06	-0.14	0.73	-0.50	5.60	0.89	3.91	2.56	2.63	1.91	10.30	1.03	0.75	1.27
-2.34	8.72	4.33	0.06	-0.13	0.50	0.25	4.16	2.58	6.03	2.51	2.68	1.92	10.25	1.07	0.77	1.31
24.67	21.67	12.34	0.06	1.39	1.22	0.70	2.91	1.44	9.93	2.46	2.74	1.93	10.21	1.11	0.78	1.36
60.56	21.60	-12.62	0.06	3.39	1.21	-0.71	1.95	4.74	9.20	2.42	2.80	1.95	10.16	1.16	0.80	1.41
38.41	12.55	-15.52	0.06	2.13	0.70	-0.86	1.05	7.29	6.67	2.37	2.85	1.96	10.11	1.20	0.83	1.46
-2.61	2.53	3.55	0.06	-0.14	0.14	0.20	4.53	9.26	5.03	2.33	2.91	1.98	10.06	1.25	0.85	1.51
42.36	-5.45	-0.41	0.05	2.31	-0.30	-0.02	10.23	5.59	6.06	2.29	2.97	2.00	10.01	1.30	0.87	1.56
19.29	-7.41	-17.33	0.05	1.04	-0.40	-0.94	6.73	2.35	2.62	2.25	3.02	2.02	9.96	1.34	0.90	1.62
-46.60	-20.34	-13.22	0.05	-2.49	-1.09	-0.71	4.77	3.83	3.20	2.21	3.08	2.04	9.91	1.39	0.92	1.67
5.53	-24.24	-1.15	0.05	0.29	-1.28	-0.06	4.87	5.39	2.57	2.18	3.12	2.06	9.86	1.43	0.94	1.72
10.55	-10.16	-15.07	0.05	0.55	-0.53	-0.79	3.07	2.81	3.29	2.15	3.17	2.08	9.81	1.48	0.97	1.77
-39.34	-8.11	-27.94	0.05	-2.05	-0.42	-1.45	2.52	0.81	2.64	2.12	3.21	2.11	9.77	1.51	0.99	1.81
-7.19	-15.05	-11.81	0.05	-0.37	-0.77	-0.61	4.82	0.89	5.35	2.09	3.24	2.13	9.72	1.55	1.02	1.85
11.85	-6.99	5.25	0.05	0.60	-0.36	0.27	4.71	2.53	7.93	2.07	3.27	2.16	9.67	1.58	1.04	1.89
-10.10	13.02	18.25	0.05	-0.51	0.66	0.92	1.28	5.56	3.60	2.05	3.29	2.18	9.62	1.61	1.06	1.93
-2.02	15.97	28.20	0.05	-0.10	0.80	1.41	4.90	5.84	3.52	2.03	3.31	2.20	9.57	1.63	1.08	1.96
16.00	5.94	41.11	0.05	0.79	0.29	2.03	6.71	6.82	4.77	2.01	3.31	2.22	9.52	1.65	1.10	1.98
1.02	-11.03	53.96	0.05	0.05	-0.54	2.64	5.16	3.11	3.02	2.00	3.31	2.23	9.47	1.66	1.12	2.00
-30.87	-28.94	52.79	0.05	-1.50	-1.40	2.56	3.56	4.39	4.09	1.98	3.30	2.24	9.42	1.67	1.13	2.01
-6.74	-24.82	50.63	0.05	-0.32	-1.19	2.43	3.28	3.28	4.44	1.97	3.28	2.26	9.38	1.67	1.15	2.02
30.27	-24.70	33.50	0.05	1.44	-1.17	1.59	3.71	2.36	1.46	1.96	3.26	2.26	9.33	1.66	1.16	2.03
-12.72	-21.60	14.45	0.05	-0.60	-1.02	0.68	7.17	2.03	5.05	1.95	3.22	2.27	9.28	1.65	1.17	2.02
-33.57	1.46	13.44	0.05	-1.56	0.07	0.62	7.63	4.17	6.09	1.94	3.18	2.27	9.23	1.64	1.17	2.02
-11.43	22.43	2.45	0.05	-0.53	1.03	0.11	1.72	4.20	4.05	1.93	3.13	2.27	9.18	1.63	1.18	2.01
-47.26	33.33	-12.49	0.05	-2.15	1.52	-0.57	1.74	3.16	3.72	1.91	3.07	2.27	9.13	1.60	1.19	2.00
-44.02	23.23	-12.39	0.05	-1.98	1.05	-0.56	3.74	1.19	1.80	1.90	3.01	2.26	9.08	1.58	1.19	1.98
4.11	16.17	-4.32	0.04	0.18	0.72	-0.19	4.33	3.19	1.54	1.89	2.94	2.25	9.03	1.55	1.19	1.96
-2.84	22.10	0.73	0.04	-0.12	0.97	0.03	1.76	2.91	1.99	1.88	2.87	2.23	8.98	1.53	1.19	1.93
-3.77	20.03	-5.21	0.04	-0.16	0.87	-0.23	2.61	1.66	1.42	1.87	2.79	2.22	8.94	1.49	1.19	1.91
10.27	18.97	5.83	0.04	0.44	0.82	0.25	2.86	1.94	3.34	1.85	2.71	2.20	8.89	1.46	1.19	1.88
31.24	17.91	10.84	0.04	1.33	0.76	0.46	3.09	1.60	5.39	1.84	2.62	2.18	8.84	1.43	1.18	1.85
-2.40	12.75	-8.73	0.06	-0.14	0.73	-0.50	5.60	0.89	3.91	2.56	2.63	1.91	10.30	1.03	0.75	1.27
-2.34	8.72	4.33	0.06	-0.13	0.50	0.25	4.16	2.58	6.03	2.51	2.68	1.92	10.25	1.07	0.77	1.31

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
22.19	5.87	-18.10	0.04	0.93	0.25	-0.76	0.95	4.94	3.98	1.83	2.54	2.15	8.79	1.39	1.18	1.82
-25.75	-7.11	-14.00	0.04	-1.07	-0.30	-0.58	4.39	8.34	3.07	1.81	2.45	2.13	8.74	1.35	1.17	1.79
20.31	-3.08	-10.90	0.04	0.83	-0.13	-0.45	5.15	4.94	4.33	1.80	2.37	2.10	8.69	1.32	1.17	1.76
38.25	11.92	-42.75	0.04	1.55	0.48	-1.73	3.77	1.45	1.45	1.79	2.29	2.07	8.64	1.28	1.16	1.73
-11.75	6.90	-28.56	0.04	-0.47	0.28	-1.14	3.02	0.64	3.43	1.78	2.21	2.04	8.59	1.24	1.15	1.69
30.27	-6.09	-14.43	0.04	1.20	-0.24	-0.57	4.05	1.62	4.70	1.76	2.13	2.01	8.54	1.21	1.14	1.66
37.18	-0.07	-27.31	0.04	1.45	0.00	-1.06	4.83	5.66	2.26	1.75	2.05	1.98	8.50	1.17	1.13	1.63
7.15	6.93	-21.16	0.04	0.28	0.27	-0.81	3.70	7.22	5.48	1.74	1.98	1.95	8.45	1.14	1.12	1.60
22.14	22.89	-9.06	0.04	0.84	0.87	-0.34	1.88	5.03	2.06	1.72	1.91	1.92	8.40	1.11	1.11	1.57
8.13	37.78	11.98	0.04	0.30	1.42	0.45	2.75	12.44	4.31	1.71	1.85	1.88	8.35	1.08	1.10	1.54
0.17	-5.27	12.98	0.04	0.01	-0.20	0.48	5.38	12.15	3.70	1.70	1.79	1.85	8.30	1.05	1.09	1.51
-3.77	-38.17	2.99	0.04	-0.14	-1.39	0.11	3.51	1.80	9.15	1.69	1.73	1.82	8.25	1.03	1.08	1.49
-9.69	-12.06	18.99	0.04	-0.35	-0.43	0.68	0.55	1.99	6.06	1.67	1.68	1.79	8.20	1.00	1.07	1.47
8.36	-3.02	-3.00	0.04	0.30	-0.11	-0.11	3.00	2.89	4.71	1.66	1.63	1.75	8.15	0.98	1.06	1.44
-12.58	-34.93	-33.88	0.04	-0.44	-1.22	-1.19	4.56	4.22	7.90	1.65	1.59	1.72	8.11	0.97	1.05	1.42
-22.45	-29.78	-13.74	0.03	-0.77	-1.03	-0.47	2.27	4.40	4.39	1.64	1.56	1.69	8.06	0.95	1.04	1.41
17.61	-9.69	-5.66	0.03	0.60	-0.33	-0.19	1.43	5.02	3.91	1.62	1.52	1.66	8.01	0.94	1.03	1.39
9.61	-33.59	-14.57	0.03	0.32	-1.13	-0.49	1.55	3.05	2.50	1.61	1.50	1.64	7.96	0.93	1.02	1.38
-19.32	-8.49	-9.48	0.03	-0.64	-0.28	-0.31	1.81	5.09	7.75	1.60	1.47	1.61	7.91	0.92	1.01	1.37
9.75	-0.46	0.58	0.03	0.32	-0.01	0.02	3.55	7.09	6.89	1.58	1.45	1.58	7.86	0.92	1.00	1.36
27.73	-36.37	18.59	0.03	0.89	-1.16	0.59	1.25	3.42	3.32	1.57	1.43	1.56	7.81	0.92	0.99	1.35
-3.27	11.70	14.57	0.03	-0.10	0.37	0.46	0.68	1.34	3.48	1.55	1.42	1.53	7.76	0.92	0.99	1.35
-16.18	-3.31	10.56	0.03	-0.50	-0.10	0.33	0.36	4.86	1.25	1.54	1.41	1.51	7.71	0.92	0.98	1.35
11.89	-36.21	33.52	0.03	0.36	-1.10	1.02	1.26	2.78	3.94	1.52	1.40	1.49	7.67	0.92	0.98	1.35
-3.08	30.81	30.44	0.03	-0.09	0.92	0.91	1.58	2.46	6.21	1.50	1.40	1.48	7.62	0.93	0.98	1.35
-63.89	4.76	21.38	0.03	-1.88	0.14	0.63	5.29	5.60	3.76	1.49	1.40	1.46	7.57	0.94	0.98	1.36
-40.63	-14.21	29.32	0.03	-1.18	-0.41	0.85	7.11	4.26	5.67	1.47	1.40	1.45	7.52	0.96	0.99	1.37
-0.49	33.77	20.26	0.03	-0.01	0.96	0.58	0.76	4.58	1.17	1.45	1.41	1.44	7.47	0.97	1.00	1.39
-21.40	-7.27	15.23	0.03	-0.60	-0.20	0.43	4.14	5.36	3.05	1.43	1.42	1.44	7.42	0.99	1.00	1.41
12.67	1.75	23.20	0.03	0.35	0.05	0.64	3.61	6.39	3.14	1.41	1.43	1.43	7.37	1.01	1.02	1.43
37.63	37.69	27.14	0.03	1.02	1.02	0.73	1.70	4.59	2.77	1.39	1.44	1.43	7.32	1.03	1.03	1.46
22.19	5.87	-18.10	0.04	0.93	0.25	-0.76	0.95	4.94	3.98	1.83	2.54	2.15	8.79	1.39	1.18	1.82
-25.75	-7.11	-14.00	0.04	-1.07	-0.30	-0.58	4.39	8.34	3.07	1.81	2.45	2.13	8.74	1.35	1.17	1.79

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
6.59	-22.33	24.08	0.03	0.17	-0.59	0.64	2.94	4.83	3.05	1.38	1.46	1.44	7.28	1.06	1.04	1.49
19.59	0.73	21.04	0.03	0.51	0.02	0.55	2.36	5.87	4.50	1.36	1.47	1.44	7.23	1.09	1.06	1.52
43.52	40.66	31.97	0.03	1.11	1.04	0.82	1.21	4.45	0.52	1.34	1.49	1.45	7.18	1.11	1.08	1.55
20.44	-2.40	32.88	0.03	0.51	-0.06	0.82	0.95	9.05	3.06	1.32	1.51	1.46	7.13	1.14	1.11	1.59
-10.52	35.55	12.83	0.02	-0.26	0.87	0.31	2.08	5.56	2.57	1.30	1.53	1.47	7.08	1.18	1.13	1.63
8.53	42.40	9.83	0.02	0.20	1.02	0.24	4.14	4.35	0.27	1.28	1.55	1.48	7.03	1.21	1.16	1.67
49.47	-11.64	1.85	0.02	1.16	-0.27	0.04	4.50	3.30	2.02	1.26	1.57	1.50	6.98	1.24	1.19	1.72
9.40	17.36	-16.08	0.02	0.22	0.40	-0.37	1.31	5.09	2.31	1.24	1.59	1.51	6.93	1.28	1.22	1.76
-38.49	9.32	-15.97	0.02	-0.87	0.21	-0.36	1.52	3.91	2.42	1.23	1.61	1.53	6.88	1.31	1.25	1.81
3.64	-11.66	-22.85	0.02	0.08	-0.26	-0.50	4.34	4.21	5.01	1.21	1.63	1.54	6.84	1.35	1.28	1.86
13.65	13.35	-28.71	0.02	0.29	0.29	-0.62	2.32	7.00	0.63	1.19	1.65	1.56	6.79	1.39	1.31	1.91
-20.28	-6.65	-20.57	0.02	-0.43	-0.14	-0.43	2.06	10.64	4.82	1.17	1.66	1.57	6.74	1.42	1.34	1.96
0.81	-7.61	-16.45	0.02	0.02	-0.16	-0.34	1.01	9.90	7.56	1.15	1.68	1.58	6.69	1.46	1.38	2.00
-2.13	16.39	-15.34	0.02	-0.04	0.33	-0.31	2.57	5.11	6.06	1.14	1.69	1.60	6.64	1.49	1.41	2.05
-21.04	-4.62	-13.24	0.02	-0.41	-0.09	-0.26	3.70	6.58	10.54	1.12	1.70	1.60	6.59	1.52	1.43	2.09
17.02	-7.59	0.82	0.02	0.32	-0.14	0.02	0.67	9.42	15.77	1.10	1.72	1.61	6.54	1.56	1.46	2.13
38.96	12.42	13.84	0.02	0.72	0.23	0.26	5.00	5.26	14.65	1.09	1.73	1.61	6.49	1.59	1.48	2.17
-2.06	-10.57	2.85	0.02	-0.04	-0.19	0.05	3.27	6.30	15.04	1.07	1.73	1.61	6.45	1.62	1.50	2.21
-47.90	-22.49	-10.10	0.02	-0.84	-0.39	-0.18	4.90	2.32	5.00	1.06	1.74	1.61	6.40	1.65	1.52	2.24
-11.73	3.56	-2.03	0.02	-0.20	0.06	-0.03	6.82	8.06	3.58	1.05	1.75	1.61	6.35	1.67	1.53	2.27
13.32	3.56	3.01	0.02	0.22	0.06	0.05	7.87	12.53	7.48	1.04	1.76	1.60	6.30	1.70	1.54	2.30
-53.55	-3.43	0.05	0.02	-0.86	-0.05	0.00	7.75	12.56	8.13	1.02	1.77	1.59	6.25	1.73	1.55	2.32
-44.30	6.58	8.08	0.02	-0.69	0.10	0.13	3.98	7.74	8.78	1.02	1.78	1.58	6.20	1.75	1.56	2.34
27.79	6.57	6.09	0.02	0.42	0.10	0.09	3.93	10.24	8.79	1.01	1.79	1.57	6.15	1.77	1.56	2.36
2.78	-9.41	-3.87	0.01	0.04	-0.14	-0.06	9.92	2.06	12.22	1.00	1.80	1.56	6.10	1.80	1.56	2.38
-32.11	-19.34	11.16	0.01	-0.45	-0.27	0.16	20.29	21.58	34.22	1.00	1.81	1.55	6.05	1.82	1.55	2.39
-7.98	-11.27	27.12	0.01	-0.11	-0.15	0.37	55.89	27.05	62.16	0.99	1.82	1.54	6.01	1.84	1.55	2.40
2.09	-5.22	24.06	0.01	0.03	-0.07	0.31	47.64	8.99	39.63	0.99	1.84	1.53	5.96	1.85	1.54	2.41
-15.83	-5.18	15.02	0.01	-0.20	-0.06	0.19	8.17	7.20	3.68	0.99	1.86	1.53	5.91	1.87	1.53	2.42
-34.67	-1.16	-0.96	0.01	-0.42	-0.01	-0.01	1.24	4.61	3.78	1.00	1.88	1.53	5.86	1.88	1.53	2.42
9.43	-4.13	-0.92	0.01	0.11	-0.05	-0.01	2.09	1.94	7.94	1.01	1.90	1.53	5.81	1.89	1.52	2.43
6.59	-22.33	24.08	0.03	0.17	-0.59	0.64	2.94	4.83	3.05	1.38	1.46	1.44	7.28	1.06	1.04	1.49
19.59	0.73	21.04	0.03	0.51	0.02	0.55	2.36	5.87	4.50	1.36	1.47	1.44	7.23	1.09	1.06	1.52

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
39.39	-2.11	-3.86	0.01	0.43	-0.02	-0.04	5.49	1.17	11.66	1.02	1.93	1.55	5.76	1.90	1.52	2.43
-13.61	-1.08	-29.75	0.01	-0.14	-0.01	-0.31	3.19	5.22	6.82	1.04	1.96	1.57	5.71	1.90	1.52	2.43
12.44	-6.06	-22.61	0.01	0.12	-0.06	-0.23	3.06	4.79	6.35	1.06	2.00	1.60	5.66	1.89	1.52	2.42
39.39	3.96	-0.52	0.01	0.37	0.04	0.00	1.19	5.69	2.82	1.08	2.03	1.64	5.62	1.88	1.52	2.41
-14.60	5.96	-1.47	0.01	-0.13	0.05	-0.01	1.66	8.69	3.03	1.12	2.07	1.70	5.57	1.86	1.52	2.40
22.44	-5.03	5.56	0.01	0.19	-0.04	0.05	2.15	5.26	1.05	1.16	2.12	1.76	5.52	1.83	1.52	2.38
42.36	7.98	11.57	0.01	0.34	0.06	0.09	1.09	2.55	1.09	1.20	2.16	1.83	5.47	1.80	1.52	2.35
6.31	15.94	-3.40	0.01	0.05	0.12	-0.03	3.17	4.75	1.27	1.26	2.21	1.92	5.42	1.76	1.52	2.33
13.33	3.92	-10.33	0.01	0.09	0.03	-0.07	2.49	5.87	3.86	1.32	2.26	2.02	5.37	1.71	1.53	2.29
3.35	12.90	-8.25	0.01	0.02	0.08	-0.05	1.07	1.69	3.51	1.39	2.31	2.12	5.32	1.66	1.53	2.26
21.35	21.84	-9.18	0.01	0.13	0.13	-0.06	2.32	2.17	2.54	1.47	2.37	2.24	5.27	1.61	1.52	2.22
30.30	10.79	-10.10	0.01	0.17	0.06	-0.06	3.47	3.24	3.01	1.56	2.42	2.37	5.22	1.55	1.52	2.18
7.28	9.76	-6.02	0.01	0.04	0.05	-0.03	1.18	1.54	4.34	1.65	2.48	2.51	5.18	1.50	1.52	2.13
20.27	6.74	-5.95	0.00	0.09	0.03	-0.03	3.39	2.36	2.18	1.76	2.54	2.65	5.13	1.44	1.51	2.09
-4.71	-11.23	-20.86	0.00	-0.02	-0.04	-0.08	4.43	2.49	5.97	1.87	2.59	2.81	5.08	1.39	1.50	2.05
1.35	-16.16	-13.75	0.00	0.00	-0.06	-0.05	5.79	3.03	5.69	1.98	2.64	2.96	5.03	1.33	1.49	2.00
59.28	-6.11	0.32	0.00	0.18	-0.02	0.00	8.22	6.00	8.45	2.10	2.69	3.12	4.98	1.28	1.48	1.96
13.19	-12.06	-9.61	0.00	0.03	-0.03	-0.02	4.38	1.44	4.75	2.22	2.74	3.27	4.93	1.24	1.47	1.92
-25.73	-19.98	-3.54	0.00	-0.05	-0.04	-0.01	1.55	3.94	2.96	2.34	2.78	3.41	4.88	1.19	1.46	1.89
9.35	-1.92	4.50	0.00	0.01	0.00	0.01	2.17	2.44	4.64	2.45	2.82	3.55	4.83	1.15	1.45	1.85
5.37	9.08	2.53	0.00	0.01	0.01	0.00	5.33	0.70	4.60	2.56	2.85	3.68	4.79	1.11	1.44	1.82
-13.56	-2.92	24.51	0.00	-0.01	0.00	0.01	8.59	0.50	5.62	2.67	2.87	3.80	4.74	1.08	1.42	1.79
39.39	-2.11	-3.86	0.01	0.43	-0.02	-0.04	5.49	1.17	11.66	1.02	1.93	1.55	5.76	1.90	1.52	2.43
-13.61	-1.08	-29.75	0.01	-0.14	-0.01	-0.31	3.19	5.22	6.82	1.04	1.96	1.57	5.71	1.90	1.52	2.43
12.44	-6.06	-22.61	0.01	0.12	-0.06	-0.23	3.06	4.79	6.35	1.06	2.00	1.60	5.66	1.89	1.52	2.42

Microtremors Segment: B3-S2

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
71.63	-154.01	-124.25	0.26	18.59	-39.97	-32.24	1.34	24.05	5.26	3.66	5.45	4.04	30.03	1.49	1.10	1.85
26.44	169.96	87.83	0.26	6.85	44.02	22.75	8.96	17.74	3.79	3.71	5.43	4.08	29.98	1.47	1.10	1.83
21.36	200.22	133.39	0.26	5.52	51.76	34.48	4.76	7.48	5.84	3.75	5.42	4.12	29.93	1.45	1.10	1.82
17.29	121.58	-44.78	0.26	4.46	31.37	-11.55	3.02	20.68	8.38	3.78	5.40	4.16	29.88	1.43	1.10	1.80
-29.67	-86.49	-122.44	0.26	-7.64	-22.27	-31.53	1.16	39.43	6.13	3.80	5.38	4.19	29.83	1.42	1.10	1.79
7.38	-207.90	-2.19	0.26	1.90	-53.43	-0.56	7.90	27.96	3.48	3.81	5.36	4.21	29.79	1.41	1.11	1.79
40.30	-82.31	42.74	0.26	10.34	-21.11	10.96	6.28	10.74	5.21	3.81	5.35	4.23	29.74	1.40	1.11	1.79
-67.64	-21.10	-46.25	0.26	-17.32	-5.40	-11.84	3.38	13.13	1.64	3.79	5.33	4.24	29.69	1.41	1.12	1.80
-67.36	-84.88	-114.92	0.26	-17.21	-21.69	-29.36	6.22	16.74	3.77	3.77	5.31	4.25	29.64	1.41	1.13	1.81
70.65	-44.62	-19.64	0.26	18.02	-11.38	-5.01	3.64	10.67	5.24	3.73	5.31	4.24	29.59	1.42	1.14	1.82
35.45	186.10	170.06	0.25	9.02	47.36	43.28	2.12	13.59	6.60	3.68	5.30	4.23	29.54	1.44	1.15	1.84
-88.44	352.03	106.51	0.25	-22.46	89.41	27.05	2.08	19.05	4.46	3.62	5.30	4.21	29.49	1.46	1.16	1.87
-50.15	124.07	-132.43	0.25	-12.71	31.45	-33.57	5.99	17.65	4.49	3.56	5.31	4.18	29.44	1.49	1.18	1.90
111.74	-190.79	-77.01	0.25	28.27	-48.27	-19.48	2.11	13.13	9.75	3.48	5.33	4.14	29.39	1.53	1.19	1.94
100.33	-163.08	109.93	0.25	25.33	-41.18	27.76	7.73	8.69	1.84	3.40	5.35	4.09	29.35	1.58	1.21	1.98
-83.70	-106.54	-8.27	0.25	-21.09	-26.85	-2.08	2.23	10.53	3.63	3.31	5.38	4.04	29.30	1.63	1.22	2.03
-70.38	19.64	-167.91	0.25	-17.70	4.94	-42.23	5.92	12.95	1.05	3.21	5.42	3.97	29.25	1.69	1.24	2.09
24.73	186.23	-56.45	0.25	6.21	46.74	-14.17	8.15	20.18	5.91	3.12	5.46	3.90	29.20	1.75	1.25	2.15
30.63	-63.02	84.50	0.25	7.67	-15.79	21.17	3.37	19.34	7.65	3.02	5.51	3.83	29.15	1.83	1.27	2.22
53.47	-97.69	81.17	0.25	13.37	-24.42	20.29	8.28	17.25	3.79	2.92	5.57	3.75	29.10	1.91	1.28	2.30
49.27	149.21	48.92	0.25	12.29	37.23	12.20	3.23	21.89	9.11	2.82	5.63	3.66	29.05	2.00	1.30	2.38
34.11	134.64	-30.12	0.25	8.49	33.53	-7.50	3.57	17.36	9.24	2.72	5.70	3.57	29.00	2.09	1.31	2.47
-18.91	-41.55	-141.77	0.25	-4.70	-10.32	-35.23	2.18	11.41	7.27	2.63	5.77	3.47	28.96	2.20	1.32	2.56
-17.82	-262.93	-106.26	0.25	-4.42	-65.21	-26.35	2.40	1.91	6.01	2.54	5.85	3.37	28.91	2.30	1.33	2.66
27.17	20.56	12.93	0.25	6.72	5.09	3.20	2.02	9.95	10.61	2.45	5.92	3.27	28.86	2.42	1.34	2.76
-52.77	288.94	62.79	0.25	-13.03	71.37	15.51	3.63	26.87	4.79	2.37	6.00	3.17	28.81	2.53	1.34	2.86
-14.63	1.36	42.58	0.25	-3.61	0.33	10.50	2.93	19.57	2.59	2.29	6.08	3.07	28.76	2.65	1.34	2.97
97.22	44.27	27.45	0.25	23.92	10.89	6.75	5.57	7.85	3.01	2.22	6.15	2.97	28.71	2.77	1.34	3.07
33.97	128.92	91.22	0.25	8.34	31.65	22.39	5.01	11.25	5.43	2.16	6.22	2.87	28.66	2.88	1.33	3.18
-65.96	-161.02	67.91	0.25	-16.16	-39.45	16.64	1.62	19.19	13.09	2.10	6.28	2.78	28.61	3.00	1.32	3.28
-50.72	-382.93	-123.98	0.24	-12.40	-93.63	-30.31	7.86	9.54	18.23	2.04	6.34	2.69	28.56	3.11	1.32	3.37
47.30	-160.83	-167.39	0.24	11.54	-39.24	-40.84	7.23	9.87	6.52	1.99	6.40	2.60	28.52	3.21	1.31	3.46
23.17	255.98	0.95	0.24	5.64	62.33	0.23	4.76	13.23	8.63	1.95	6.44	2.52	28.47	3.30	1.29	3.55

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-57.75	179.11	90.78	0.24	-14.03	43.52	22.06	1.09	18.56	3.24	1.91	6.48	2.45	28.42	3.39	1.28	3.62
-9.61	-85.07	12.58	0.24	-2.33	-20.63	3.05	4.05	19.33	6.96	1.88	6.50	2.39	28.37	3.46	1.27	3.69
59.30	-121.66	-48.34	0.24	14.35	-29.44	-11.70	3.70	24.24	6.17	1.85	6.52	2.33	28.32	3.53	1.26	3.75
64.07	109.37	86.59	0.24	15.47	26.41	20.91	3.32	20.05	1.34	1.82	6.53	2.27	28.27	3.58	1.25	3.79
0.94	198.75	181.06	0.24	0.23	47.90	43.63	2.41	15.28	6.56	1.80	6.53	2.23	28.22	3.63	1.24	3.83
-60.93	-46.55	-36.23	0.24	-14.65	-11.20	-8.71	11.24	21.04	11.27	1.78	6.53	2.19	28.17	3.66	1.23	3.86
-33.73	-78.30	-233.68	0.24	-8.09	-18.79	-56.08	9.96	9.67	11.49	1.76	6.51	2.16	28.13	3.69	1.22	3.89
53.24	-187.76	-106.99	0.24	12.75	-44.97	-25.63	16.21	6.14	15.64	1.75	6.49	2.13	28.08	3.71	1.22	3.90
42.06	-277.83	149.93	0.24	10.05	-66.40	35.83	8.82	12.46	2.93	1.74	6.46	2.12	28.03	3.72	1.22	3.92
-67.88	70.59	193.25	0.24	-16.19	16.84	46.09	3.17	18.12	3.93	1.72	6.42	2.11	27.98	3.73	1.22	3.92
-91.55	288.88	-27.08	0.24	-21.79	68.75	-6.45	1.88	16.28	2.81	1.71	6.38	2.10	27.93	3.72	1.23	3.92
-13.33	50.20	-119.78	0.24	-3.16	11.92	-28.45	3.78	12.32	13.80	1.70	6.34	2.11	27.88	3.72	1.24	3.92
49.61	-194.51	55.35	0.24	11.76	-46.10	13.12	9.76	8.49	1.55	1.70	6.29	2.12	27.83	3.70	1.25	3.91
-15.45	-30.05	124.00	0.24	-3.65	-7.11	29.33	8.00	22.44	6.69	1.69	6.24	2.13	27.78	3.69	1.26	3.90
-61.28	117.77	-99.05	0.24	-14.46	27.79	-23.37	3.03	15.21	6.28	1.69	6.19	2.15	27.73	3.67	1.27	3.88
37.78	93.35	-280.28	0.24	8.90	21.98	-66.01	1.91	31.71	9.19	1.69	6.14	2.17	27.69	3.64	1.29	3.86
81.55	88.99	-63.58	0.24	19.16	20.91	-14.94	4.84	31.09	3.89	1.68	6.09	2.20	27.64	3.62	1.30	3.85
17.36	-4.18	204.14	0.23	4.07	-0.98	47.87	5.28	1.94	7.15	1.68	6.05	2.23	27.59	3.59	1.32	3.83
-29.61	-66.04	108.52	0.23	-6.93	-15.45	25.39	5.39	22.36	5.70	1.69	6.00	2.26	27.54	3.56	1.34	3.81
-33.47	-104.69	-49.59	0.23	-7.82	-24.45	-11.58	5.51	14.74	10.93	1.69	5.96	2.29	27.49	3.53	1.36	3.78
3.60	0.52	-23.44	0.23	0.84	0.12	-5.46	2.28	28.36	5.84	1.69	5.93	2.33	27.44	3.50	1.37	3.76
92.42	131.26	50.52	0.23	21.49	30.52	11.74	4.63	26.09	8.01	1.70	5.90	2.36	27.39	3.47	1.39	3.74
74.09	-93.82	69.28	0.23	17.19	-21.77	16.07	0.87	18.17	8.65	1.71	5.87	2.40	27.34	3.44	1.41	3.71
-109.83	-160.30	-27.80	0.23	-25.42	-37.11	-6.43	5.30	37.87	8.13	1.72	5.85	2.43	27.29	3.40	1.42	3.69
-111.37	56.91	-159.41	0.23	-25.73	13.15	-36.82	3.98	24.47	6.81	1.73	5.83	2.47	27.25	3.37	1.43	3.66
43.77	69.66	-72.94	0.23	10.09	16.06	-16.81	2.44	9.16	3.87	1.75	5.82	2.50	27.20	3.33	1.43	3.63
19.66	118.28	185.84	0.23	4.52	27.21	42.74	7.22	30.56	8.54	1.76	5.81	2.54	27.15	3.30	1.44	3.60
-1.37	165.72	166.14	0.23	-0.31	38.03	38.13	4.56	28.99	2.21	1.78	5.82	2.57	27.10	3.26	1.44	3.57
49.54	-23.57	-147.89	0.23	11.35	-5.40	-33.87	3.93	13.35	6.93	1.80	5.82	2.60	27.05	3.23	1.44	3.54
47.36	-108.30	-206.18	0.23	10.82	-24.75	-47.11	4.88	13.72	7.92	1.82	5.83	2.62	27.00	3.20	1.44	3.51
49.17	31.85	95.05	0.23	11.21	7.26	21.67	0.37	28.76	4.62	1.85	5.85	2.65	26.95	3.17	1.43	3.48
-31.85	64.66	228.41	0.23	-7.25	14.71	51.96	3.28	20.07	9.76	1.87	5.87	2.67	26.90	3.15	1.43	3.45
-89.60	-144.18	-75.89	0.23	-20.34	-32.73	-17.23	4.62	22.54	15.25	1.89	5.90	2.69	26.86	3.12	1.42	3.43

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
9.57	-165.56	-319.09	0.23	2.17	-37.50	-72.27	4.09	9.74	17.17	1.91	5.94	2.70	26.81	3.11	1.41	3.41
71.42	-5.21	-76.29	0.23	16.14	-1.18	-17.24	2.14	15.79	12.38	1.93	5.98	2.71	26.76	3.10	1.40	3.40
-1.71	36.73	220.43	0.23	-0.39	8.28	49.71	1.94	15.67	10.62	1.95	6.03	2.72	26.71	3.09	1.40	3.39
-73.55	87.48	189.61	0.23	-16.55	19.68	42.66	5.23	21.50	9.73	1.97	6.08	2.73	26.66	3.09	1.39	3.39
-12.37	114.08	-31.70	0.22	-2.78	25.61	-7.12	8.18	20.53	13.18	1.98	6.14	2.74	26.61	3.10	1.38	3.39
30.61	26.80	-166.29	0.22	6.86	6.00	-37.25	6.07	21.77	7.33	2.00	6.21	2.74	26.56	3.11	1.37	3.40
-23.40	-197.86	-5.94	0.22	-5.23	-44.22	-1.33	4.24	25.63	13.26	2.01	6.28	2.74	26.51	3.13	1.37	3.41
-36.27	-165.13	201.67	0.22	-8.09	-36.82	44.97	3.39	20.45	7.17	2.01	6.35	2.75	26.46	3.15	1.36	3.43
-53.08	201.80	41.19	0.22	-11.81	44.90	9.17	6.75	9.03	11.16	2.02	6.43	2.75	26.42	3.19	1.36	3.46
-31.90	223.95	-223.44	0.22	-7.08	49.72	-49.60	2.05	13.96	4.02	2.02	6.51	2.75	26.37	3.23	1.36	3.50
40.10	5.49	-90.80	0.22	8.88	1.22	-20.11	2.97	4.85	4.52	2.01	6.60	2.75	26.32	3.28	1.37	3.55
6.01	-147.22	164.06	0.22	1.33	-32.54	36.26	4.41	9.97	4.85	2.00	6.68	2.75	26.27	3.34	1.37	3.61
-34.92	-135.65	121.49	0.22	-7.70	-29.91	26.79	5.83	18.57	12.05	1.99	6.77	2.76	26.22	3.40	1.38	3.67
10.14	31.56	-80.58	0.22	2.23	6.94	-17.73	6.06	18.84	4.88	1.98	6.86	2.76	26.17	3.47	1.40	3.74
34.07	95.31	-129.16	0.22	7.48	20.92	-28.35	7.02	13.70	2.77	1.96	6.95	2.77	26.12	3.55	1.41	3.82
58.89	-12.86	11.09	0.22	12.90	-2.82	2.43	7.70	18.42	20.98	1.94	7.04	2.78	26.07	3.63	1.43	3.90
89.60	-164.50	24.02	0.22	19.58	-35.94	5.25	6.17	14.88	7.33	1.92	7.12	2.79	26.03	3.72	1.45	3.99
-7.55	5.82	-38.94	0.22	-1.65	1.27	-8.49	7.43	3.45	2.75	1.89	7.20	2.80	25.98	3.81	1.48	4.08
-89.35	177.46	37.07	0.22	-19.43	38.60	8.06	5.13	15.28	3.87	1.87	7.27	2.82	25.93	3.89	1.51	4.18
-30.10	130.84	33.94	0.22	-6.53	28.39	7.36	5.30	14.30	6.77	1.84	7.34	2.84	25.88	3.98	1.54	4.27
-14.00	42.49	-15.09	0.22	-3.03	9.20	-3.27	8.71	21.32	11.92	1.82	7.40	2.87	25.83	4.07	1.58	4.37
5.03	-131.33	70.80	0.22	1.09	-28.37	15.29	9.29	12.54	15.08	1.79	7.45	2.89	25.78	4.16	1.61	4.46
73.88	-68.93	101.46	0.22	15.92	-14.85	21.86	6.68	17.20	12.93	1.77	7.49	2.92	25.73	4.24	1.65	4.55
50.64	-19.75	-14.71	0.22	10.89	-4.25	-3.16	5.86	12.61	7.87	1.75	7.52	2.95	25.68	4.31	1.69	4.63
-18.41	52.19	-82.51	0.21	-3.95	11.20	-17.70	4.28	9.21	5.89	1.73	7.55	2.98	25.63	4.37	1.73	4.70
-25.32	154.78	-22.29	0.21	-5.42	33.12	-4.77	2.80	17.39	8.24	1.71	7.56	3.02	25.59	4.42	1.77	4.76
-19.22	-115.30	-41.16	0.21	-4.10	-24.62	-8.79	5.99	9.37	2.70	1.69	7.55	3.05	25.54	4.46	1.80	4.81
-36.10	-108.85	-75.92	0.21	-7.69	-23.19	-16.17	3.10	23.35	5.10	1.68	7.54	3.08	25.49	4.48	1.83	4.84
16.95	187.00	61.12	0.21	3.60	39.74	12.99	0.27	17.78	3.77	1.68	7.51	3.12	25.44	4.48	1.86	4.85
75.78	219.18	102.80	0.21	16.06	46.47	21.79	3.05	10.67	8.30	1.67	7.48	3.15	25.39	4.47	1.89	4.85
55.52	-125.01	33.53	0.21	11.74	-26.44	7.09	6.52	2.88	11.49	1.67	7.43	3.18	25.34	4.45	1.91	4.84
-5.57	-288.18	4.46	0.21	-1.17	-60.81	0.94	11.56	5.92	11.35	1.67	7.37	3.21	25.29	4.41	1.92	4.81
-31.48	125.15	-99.34	0.21	-6.63	26.34	-20.91	11.60	14.13	9.71	1.68	7.30	3.24	25.24	4.35	1.93	4.76

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
44.50	123.65	-90.96	0.21	9.34	25.97	-19.10	2.06	14.15	15.21	1.69	7.23	3.27	25.20	4.28	1.93	4.70
60.30	-158.28	69.10	0.21	12.63	-33.16	14.48	11.14	10.60	12.41	1.70	7.15	3.29	25.15	4.20	1.93	4.62
-38.74	14.01	61.84	0.21	-8.10	2.93	12.92	12.30	17.91	12.75	1.72	7.06	3.31	25.10	4.11	1.92	4.54
-84.48	131.72	-52.17	0.21	-17.61	27.46	-10.88	3.82	5.25	13.38	1.74	6.97	3.32	25.05	4.01	1.91	4.45
-54.19	-22.50	-10.04	0.21	-11.27	-4.68	-2.09	6.16	13.07	8.70	1.76	6.87	3.33	25.00	3.91	1.89	4.34
16.89	-205.04	98.79	0.21	3.51	-42.55	20.50	1.94	8.64	20.84	1.78	6.78	3.34	24.95	3.80	1.87	4.24
62.74	-38.55	33.53	0.21	12.99	-7.98	6.94	3.55	6.81	14.95	1.81	6.67	3.34	24.90	3.69	1.85	4.13
-30.31	184.16	-126.28	0.21	-6.26	38.03	-26.08	8.93	13.12	2.57	1.83	6.57	3.34	24.85	3.58	1.82	4.02
-50.14	-2.20	-143.73	0.21	-10.33	-0.45	-29.61	6.42	6.90	7.02	1.86	6.47	3.34	24.80	3.48	1.80	3.91
109.75	-174.85	39.48	0.21	22.55	-35.93	8.11	4.96	2.17	12.58	1.89	6.37	3.34	24.76	3.37	1.77	3.81
123.29	-156.18	122.17	0.21	25.27	-32.02	25.04	10.43	8.75	12.14	1.92	6.27	3.34	24.71	3.27	1.74	3.70
-19.91	71.99	31.86	0.20	-4.07	14.72	6.52	17.67	18.61	8.61	1.95	6.17	3.33	24.66	3.17	1.71	3.60
-112.64	225.40	1.80	0.20	-22.98	45.98	0.37	21.53	26.71	10.29	1.98	6.08	3.32	24.61	3.08	1.68	3.51
-67.26	11.92	-93.01	0.20	-13.69	2.43	-18.93	12.09	2.70	7.93	2.00	5.99	3.32	24.56	2.99	1.66	3.42
56.77	-175.75	-5.80	0.20	11.52	-35.68	-1.18	2.33	23.68	19.50	2.03	5.90	3.31	24.51	2.90	1.63	3.33
64.53	-243.90	188.84	0.20	13.07	-49.39	38.24	5.15	11.19	19.23	2.06	5.81	3.31	24.46	2.82	1.61	3.25
-15.56	-36.34	-54.43	0.20	-3.14	-7.34	-10.99	15.19	4.83	34.31	2.09	5.73	3.31	24.41	2.75	1.59	3.17
-15.49	201.34	-219.87	0.20	-3.12	40.57	-44.30	22.08	17.84	13.41	2.11	5.65	3.31	24.37	2.67	1.57	3.10
-25.39	35.87	-28.37	0.20	-5.10	7.21	-5.70	22.08	20.74	35.15	2.14	5.57	3.32	24.32	2.60	1.55	3.03
-129.08	-54.10	143.41	0.20	-25.88	-10.85	28.75	9.62	20.61	38.23	2.17	5.49	3.33	24.27	2.54	1.54	2.97
-48.71	-59.86	155.82	0.20	-9.74	-11.97	31.16	17.75	35.89	41.63	2.19	5.42	3.34	24.22	2.47	1.52	2.90
91.22	13.23	-67.36	0.20	18.20	2.64	-13.44	13.79	9.26	38.99	2.22	5.35	3.36	24.17	2.41	1.52	2.85
26.99	176.86	-165.88	0.20	5.37	35.19	-33.01	20.98	52.38	40.58	2.25	5.28	3.39	24.12	2.35	1.51	2.79
41.86	79.34	58.34	0.20	8.31	15.75	11.58	18.40	25.06	13.02	2.28	5.22	3.42	24.07	2.29	1.50	2.74
62.66	3.18	109.01	0.20	12.41	0.63	21.58	13.44	31.79	34.45	2.31	5.16	3.46	24.02	2.23	1.50	2.69
-34.39	-120.58	-144.91	0.20	-6.79	-23.81	-28.62	14.24	2.00	22.26	2.34	5.10	3.51	23.97	2.18	1.50	2.64
-35.24	-187.96	-197.22	0.20	-6.94	-37.03	-38.85	14.00	23.52	42.62	2.38	5.05	3.57	23.93	2.12	1.50	2.60
44.75	61.30	116.95	0.20	8.79	12.04	22.98	14.87	7.98	22.24	2.42	5.00	3.63	23.88	2.07	1.50	2.55
66.54	94.99	240.25	0.20	13.04	18.62	47.09	9.62	30.43	15.32	2.47	4.96	3.71	23.83	2.01	1.50	2.51
-30.52	23.75	-69.09	0.20	-5.97	4.64	-13.51	6.36	32.15	7.88	2.52	4.92	3.79	23.78	1.95	1.51	2.47
-66.32	95.51	-239.47	0.20	-12.93	18.63	-46.70	9.68	25.25	13.28	2.58	4.89	3.89	23.73	1.90	1.51	2.42
-16.15	-28.62	-37.90	0.19	-3.14	-5.57	-7.37	1.90	29.78	11.55	2.64	4.87	3.99	23.68	1.84	1.51	2.39
18.86	-302.95	145.89	0.19	3.66	-58.77	28.30	2.26	37.12	16.09	2.71	4.85	4.11	23.63	1.79	1.52	2.35

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
28.77	-111.12	105.39	0.19	5.57	-21.50	20.39	4.59	25.17	10.40	2.78	4.85	4.24	23.58	1.74	1.53	2.32
-47.18	375.36	-17.78	0.19	-9.11	72.44	-3.43	14.84	24.16	23.19	2.86	4.86	4.39	23.54	1.70	1.53	2.29
-46.98	157.29	-68.60	0.19	-9.04	30.28	-13.20	21.92	32.17	5.73	2.95	4.88	4.54	23.49	1.66	1.54	2.26
40.04	-316.39	30.49	0.19	7.69	-60.75	5.85	25.92	7.02	29.36	3.04	4.91	4.71	23.44	1.62	1.55	2.24
45.88	-201.34	91.25	0.19	8.79	-38.56	17.47	19.90	26.19	21.01	3.13	4.96	4.89	23.39	1.58	1.56	2.22
-30.14	192.68	-76.77	0.19	-5.76	36.80	-14.66	9.01	17.35	3.42	3.23	5.02	5.07	23.34	1.55	1.57	2.21
-131.81	300.69	-93.42	0.19	-25.11	57.28	-17.80	4.70	23.86	8.71	3.34	5.09	5.27	23.29	1.53	1.58	2.20
-94.35	-122.66	32.71	0.19	-17.93	-23.31	6.21	10.32	6.96	9.42	3.45	5.18	5.48	23.24	1.50	1.59	2.19
105.64	-328.75	-4.34	0.19	20.02	-62.30	-0.82	8.70	18.62	6.05	3.56	5.29	5.69	23.19	1.49	1.60	2.18
169.10	-28.03	-32.26	0.19	31.96	-5.30	-6.10	3.50	25.95	6.82	3.67	5.41	5.91	23.14	1.47	1.61	2.18
-7.21	146.73	-45.10	0.19	-1.36	27.66	-8.50	6.56	31.49	21.04	3.78	5.54	6.13	23.10	1.46	1.62	2.18
-63.06	185.07	64.87	0.19	-11.86	34.79	12.20	3.89	31.61	17.99	3.89	5.68	6.35	23.05	1.46	1.63	2.19
15.04	71.56	179.39	0.19	2.82	13.42	33.63	5.48	27.87	4.98	4.00	5.83	6.57	23.00	1.46	1.64	2.20
-53.87	-126.33	-19.93	0.19	-10.07	-23.62	-3.73	5.08	28.24	3.22	4.10	6.00	6.78	22.95	1.46	1.65	2.21
-47.66	-77.92	-55.77	0.19	-8.89	-14.53	-10.40	3.68	23.79	2.34	4.20	6.17	6.98	22.90	1.47	1.66	2.22
118.21	72.10	31.29	0.19	21.99	13.41	5.82	6.09	8.53	5.06	4.29	6.35	7.17	22.85	1.48	1.67	2.23
103.78	80.79	-31.71	0.19	19.25	14.99	-5.88	3.22	18.72	8.30	4.37	6.54	7.34	22.80	1.50	1.68	2.25
-11.40	-40.28	123.12	0.19	-2.11	-7.45	22.78	3.84	22.56	7.63	4.45	6.72	7.50	22.75	1.51	1.69	2.27
-19.33	-116.97	81.71	0.18	-3.57	-21.58	15.08	2.44	18.83	9.09	4.51	6.91	7.64	22.71	1.53	1.69	2.28
-48.18	-48.63	-235.97	0.18	-8.87	-8.95	-43.42	5.04	5.22	8.83	4.57	7.10	7.76	22.66	1.56	1.70	2.30
-55.97	103.26	-36.42	0.18	-10.27	18.95	-6.68	7.18	7.94	5.49	4.61	7.29	7.85	22.61	1.58	1.70	2.32
-9.82	129.80	336.98	0.18	-1.80	23.75	61.67	3.48	12.49	9.39	4.65	7.47	7.91	22.56	1.61	1.70	2.34
-2.79	69.40	168.97	0.18	-0.51	12.67	30.84	3.73	15.50	11.28	4.67	7.64	7.95	22.51	1.64	1.70	2.36
4.22	19.22	-290.78	0.18	0.77	3.50	-52.92	3.66	15.26	4.81	4.68	7.80	7.96	22.46	1.67	1.70	2.38
-13.75	-160.49	-348.49	0.18	-2.50	-29.13	-63.25	6.28	4.66	4.97	4.68	7.95	7.94	22.41	1.70	1.70	2.40
1.28	-89.99	139.94	0.18	0.23	-16.29	25.33	2.74	2.40	3.13	4.67	8.09	7.89	22.36	1.73	1.69	2.42
60.17	92.01	370.92	0.18	10.86	16.61	66.95	6.06	16.50	5.24	4.64	8.22	7.82	22.31	1.77	1.68	2.44
62.93	-79.01	29.12	0.18	11.33	-14.22	5.24	7.32	20.47	7.31	4.61	8.33	7.71	22.27	1.81	1.67	2.46
3.81	-32.78	-275.38	0.18	0.68	-5.88	-49.43	5.12	16.61	5.02	4.56	8.42	7.59	22.22	1.85	1.66	2.49
-1.19	167.95	-215.39	0.18	-0.21	30.06	-38.55	1.87	13.67	5.15	4.50	8.50	7.44	22.17	1.89	1.65	2.51
40.74	-1.38	58.93	0.18	7.27	-0.25	10.52	6.80	11.73	19.43	4.43	8.57	7.27	22.12	1.93	1.64	2.53
-57.22	-225.92	174.47	0.18	-10.18	-40.21	31.06	1.69	4.77	11.94	4.36	8.62	7.09	22.07	1.98	1.63	2.56
-104.88	-81.30	35.06	0.18	-18.62	-14.43	6.22	1.84	9.97	3.60	4.28	8.65	6.89	22.02	2.02	1.61	2.58

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
20.30	218.43	-108.79	0.18	3.59	38.66	-19.26	2.26	16.15	5.67	4.19	8.66	6.68	21.97	2.07	1.59	2.61
56.15	36.92	-52.46	0.18	9.91	6.52	-9.26	3.00	11.89	6.81	4.09	8.65	6.46	21.92	2.11	1.58	2.64
-6.94	-213.73	161.33	0.18	-1.22	-37.62	28.39	3.50	16.31	7.76	3.99	8.63	6.23	21.88	2.16	1.56	2.67
3.08	49.61	87.84	0.18	0.54	8.71	15.42	3.09	19.27	10.65	3.89	8.59	6.00	21.83	2.21	1.54	2.70
17.05	233.04	-151.03	0.18	2.98	40.78	-26.43	4.41	7.74	14.12	3.78	8.54	5.77	21.78	2.26	1.53	2.73
-80.81	50.48	-35.65	0.17	-14.10	8.81	-6.22	1.99	5.80	14.25	3.66	8.47	5.54	21.73	2.31	1.51	2.76
-47.55	-162.30	107.21	0.17	-8.27	-28.24	18.65	5.05	8.77	12.99	3.55	8.38	5.32	21.68	2.36	1.50	2.80
105.35	-171.62	23.95	0.17	18.28	-29.78	4.16	2.46	2.72	8.91	3.43	8.29	5.10	21.63	2.42	1.49	2.84
45.06	-9.26	-43.00	0.17	7.79	-1.60	-7.44	4.06	3.95	5.75	3.31	8.18	4.89	21.58	2.47	1.48	2.88
-44.94	93.58	-104.70	0.17	-7.75	16.14	-18.06	1.88	9.32	5.29	3.19	8.06	4.69	21.53	2.53	1.47	2.92
49.07	-39.53	-129.22	0.17	8.44	-6.80	-22.23	0.65	3.68	14.67	3.07	7.93	4.50	21.48	2.58	1.46	2.97
75.82	-208.03	41.96	0.17	13.00	-35.68	7.20	3.00	6.58	20.34	2.96	7.80	4.32	21.44	2.63	1.46	3.01
-47.23	-51.50	189.50	0.17	-8.08	-8.81	32.40	1.72	6.55	7.00	2.85	7.65	4.15	21.39	2.69	1.46	3.06
-64.99	158.29	27.07	0.17	-11.08	26.99	4.62	4.68	7.88	3.94	2.74	7.49	4.00	21.34	2.74	1.46	3.10
15.12	144.69	-161.65	0.17	2.57	24.60	-27.48	4.74	11.55	5.74	2.63	7.33	3.86	21.29	2.78	1.47	3.15
-9.88	137.13	2.68	0.17	-1.68	23.24	0.45	3.15	6.38	2.15	2.53	7.16	3.73	21.24	2.83	1.48	3.19
-52.75	14.82	231.21	0.17	-8.91	2.51	39.07	4.00	6.37	1.64	2.43	6.99	3.62	21.19	2.88	1.49	3.24
3.36	-249.70	13.73	0.17	0.57	-42.07	2.31	2.43	11.65	4.26	2.34	6.82	3.52	21.14	2.92	1.51	3.28
7.35	-110.97	-204.88	0.17	1.23	-18.64	-34.42	2.00	12.28	11.04	2.25	6.65	3.43	21.09	2.96	1.53	3.33
-15.62	272.71	84.36	0.17	-2.62	45.68	14.13	1.49	12.01	7.56	2.16	6.47	3.36	21.04	2.99	1.55	3.37
45.33	195.77	222.75	0.17	7.57	32.69	37.20	0.50	10.52	5.51	2.08	6.30	3.30	21.00	3.03	1.58	3.42
25.19	-78.46	-47.59	0.17	4.19	-13.06	-7.92	1.64	10.05	7.28	2.01	6.13	3.24	20.95	3.06	1.62	3.46
-39.77	-78.15	-287.91	0.17	-6.60	-12.97	-47.79	2.21	19.16	6.41	1.93	5.96	3.20	20.90	3.08	1.66	3.50
-4.67	-20.95	-210.91	0.17	-0.77	-3.47	-34.91	1.40	13.57	0.84	1.87	5.80	3.17	20.85	3.10	1.70	3.53
111.13	-43.81	213.10	0.17	18.34	-7.23	35.16	2.52	8.69	6.96	1.81	5.63	3.15	20.80	3.11	1.74	3.57
91.73	-51.62	229.22	0.16	15.09	-8.49	37.71	1.02	4.75	10.93	1.75	5.48	3.14	20.75	3.12	1.79	3.60
-151.14	-2.51	-229.78	0.16	-24.79	-0.41	-37.68	2.40	1.69	12.11	1.70	5.32	3.13	20.70	3.13	1.84	3.63
-142.55	46.41	-218.87	0.16	-23.31	7.59	-35.79	1.78	1.45	7.75	1.65	5.17	3.12	20.65	3.13	1.89	3.65
88.57	34.25	101.37	0.16	14.44	5.58	16.52	3.20	3.27	7.27	1.61	5.03	3.13	20.61	3.13	1.94	3.68
90.22	-25.76	284.61	0.16	14.66	-4.19	46.25	2.70	9.10	3.12	1.57	4.89	3.13	20.56	3.12	2.00	3.71
-7.93	-3.70	96.85	0.16	-1.29	-0.60	15.69	1.27	8.70	4.37	1.53	4.76	3.14	20.51	3.12	2.06	3.74
-32.84	160.99	-259.82	0.16	-5.30	26.00	-41.96	0.56	5.70	7.84	1.49	4.64	3.16	20.46	3.12	2.12	3.77
-75.62	83.50	6.69	0.16	-12.17	13.44	1.08	2.20	7.96	7.60	1.45	4.52	3.17	20.41	3.11	2.18	3.80

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-101.25	-173.32	160.37	0.16	-16.25	-27.82	25.74	2.49	12.10	3.76	1.42	4.41	3.18	20.36	3.11	2.24	3.83
-20.00	-175.62	-98.75	0.16	-3.20	-28.10	-15.80	3.19	13.63	1.32	1.39	4.31	3.19	20.31	3.10	2.30	3.86
55.94	-10.24	-47.45	0.16	8.92	-1.63	-7.57	1.16	13.09	11.29	1.36	4.21	3.19	20.26	3.10	2.35	3.89
34.77	182.42	-106.14	0.16	5.53	29.00	-16.88	2.47	6.15	4.79	1.33	4.12	3.20	20.21	3.10	2.41	3.93
-32.22	41.97	-76.76	0.16	-5.11	6.65	-12.17	2.66	3.36	2.34	1.30	4.03	3.20	20.17	3.10	2.46	3.96
27.79	-299.51	188.02	0.16	4.39	-47.32	29.71	1.13	3.09	4.43	1.27	3.95	3.20	20.12	3.11	2.52	4.00
63.62	-119.67	73.50	0.16	10.02	-18.85	11.58	1.09	10.46	1.45	1.24	3.88	3.19	20.07	3.12	2.57	4.04
-69.36	196.19	-96.44	0.16	-10.89	30.80	-15.14	2.47	9.88	3.89	1.22	3.81	3.18	20.02	3.13	2.61	4.08
-5.20	157.48	-117.01	0.16	-0.81	24.65	-18.31	3.98	9.26	10.09	1.19	3.75	3.17	19.97	3.15	2.66	4.12
39.74	-72.69	-74.62	0.16	6.20	-11.34	-11.64	2.01	12.71	5.96	1.17	3.69	3.15	19.92	3.17	2.70	4.16
-117.09	-214.11	170.20	0.16	-18.21	-33.29	26.47	1.24	10.25	2.18	1.14	3.64	3.13	19.87	3.19	2.74	4.21
-83.68	-93.49	184.50	0.16	-12.97	-14.49	28.60	3.81	5.54	1.76	1.12	3.60	3.10	19.82	3.22	2.78	4.25
66.37	40.63	-48.77	0.15	10.25	6.28	-7.54	0.52	10.83	4.69	1.09	3.55	3.07	19.78	3.25	2.81	4.30
77.09	213.12	40.25	0.15	11.87	32.82	6.20	4.30	1.09	5.49	1.07	3.52	3.04	19.73	3.29	2.84	4.35
-24.00	171.35	129.92	0.15	-3.68	26.30	19.94	3.11	8.10	1.05	1.05	3.48	3.00	19.68	3.33	2.86	4.39
-82.78	-168.65	7.65	0.15	-12.67	-25.80	1.17	1.77	2.11	2.04	1.02	3.45	2.96	19.63	3.37	2.89	4.44
-68.46	-132.04	24.59	0.15	-10.44	-20.14	3.75	2.00	6.90	6.69	1.00	3.43	2.92	19.58	3.41	2.90	4.48
19.65	39.15	11.52	0.15	2.99	5.95	1.75	3.20	8.39	5.42	0.98	3.40	2.87	19.53	3.46	2.92	4.52
103.41	96.88	-96.31	0.15	15.67	14.68	-14.59	2.43	7.55	4.51	0.96	3.38	2.83	19.48	3.50	2.93	4.57
57.10	82.53	-151.81	0.15	8.62	12.46	-22.92	1.82	4.02	3.43	0.95	3.36	2.78	19.43	3.55	2.94	4.61
-34.94	-50.54	-67.36	0.15	-5.26	-7.61	-10.14	2.62	3.21	0.70	0.93	3.34	2.74	19.38	3.60	2.95	4.65
-34.78	22.52	66.65	0.15	-5.22	3.38	10.00	1.64	5.23	1.86	0.91	3.33	2.69	19.34	3.64	2.95	4.69
107.08	-26.46	33.45	0.15	16.01	-3.96	5.00	1.75	9.72	2.59	0.90	3.31	2.64	19.29	3.69	2.94	4.72
109.66	-115.18	64.26	0.15	16.34	-17.16	9.58	1.21	10.69	1.51	0.88	3.29	2.60	19.24	3.73	2.94	4.74
-54.45	67.92	-17.82	0.15	-8.09	10.09	-2.65	2.01	7.51	4.90	0.87	3.28	2.55	19.19	3.76	2.93	4.76
-4.32	71.65	-136.51	0.15	-0.64	10.60	-20.20	0.50	3.07	3.75	0.86	3.26	2.51	19.14	3.79	2.91	4.78
21.66	-24.45	114.54	0.15	3.19	-3.61	16.89	1.96	3.72	0.37	0.85	3.25	2.46	19.09	3.81	2.89	4.78
-109.16	-64.26	90.14	0.15	-16.05	-9.45	13.25	1.32	5.91	2.09	0.84	3.23	2.42	19.04	3.83	2.86	4.78
-69.79	-48.03	-128.78	0.15	-10.22	-7.04	-18.87	2.20	7.75	0.90	0.84	3.22	2.37	18.99	3.84	2.83	4.77
68.23	33.00	11.46	0.15	9.96	4.82	1.67	2.71	3.16	5.61	0.83	3.20	2.33	18.95	3.85	2.80	4.76
103.89	151.63	83.28	0.15	15.12	22.06	12.12	3.72	5.72	6.01	0.83	3.18	2.28	18.90	3.85	2.76	4.74
23.64	148.04	-75.73	0.15	3.43	21.47	-10.98	4.60	7.20	2.56	0.82	3.17	2.24	18.85	3.84	2.72	4.71
-50.29	-191.87	-176.22	0.14	-7.27	-27.73	-25.46	3.89	2.01	5.63	0.82	3.15	2.19	18.80	3.83	2.67	4.67

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-77.03	-149.19	25.09	0.14	-11.09	-21.48	3.61	5.38	7.65	5.87	0.82	3.13	2.15	18.75	3.81	2.62	4.63
-52.76	210.69	225.59	0.14	-7.57	30.23	32.37	3.90	6.48	2.30	0.82	3.11	2.10	18.70	3.79	2.57	4.58
42.28	58.16	-87.68	0.14	6.05	8.32	-12.54	6.49	3.20	3.14	0.82	3.08	2.06	18.65	3.76	2.51	4.52
93.01	-158.64	-215.06	0.14	13.25	-22.61	-30.65	6.29	8.40	0.88	0.82	3.06	2.01	18.60	3.72	2.45	4.46
50.74	-139.04	144.09	0.14	7.20	-19.74	20.46	4.27	7.65	0.74	0.82	3.03	1.97	18.55	3.68	2.39	4.39
-14.33	-27.70	174.45	0.14	-2.03	-3.92	24.69	2.79	8.01	1.82	0.83	3.01	1.93	18.51	3.64	2.33	4.32
-48.19	82.20	4.10	0.14	-6.80	11.59	0.58	5.75	2.89	2.49	0.83	2.98	1.88	18.46	3.59	2.27	4.25
-16.05	57.92	-206.49	0.14	-2.26	8.14	-29.01	7.34	10.58	0.91	0.83	2.95	1.84	18.41	3.54	2.20	4.17
31.92	6.79	-217.63	0.14	4.47	0.95	-30.47	5.97	13.65	4.71	0.84	2.92	1.79	18.36	3.49	2.14	4.09
-46.04	-138.94	260.29	0.14	-6.42	-19.38	36.31	6.38	0.11	6.51	0.84	2.89	1.75	18.31	3.44	2.08	4.01
-66.80	-122.41	279.22	0.14	-9.29	-17.01	38.81	6.42	8.14	0.59	0.85	2.86	1.71	18.26	3.38	2.02	3.93
72.20	185.47	-62.21	0.14	10.00	25.69	-8.62	6.04	0.97	1.82	0.85	2.83	1.67	18.21	3.32	1.95	3.85
36.99	240.62	38.84	0.14	5.10	33.21	5.36	1.97	4.33	2.23	0.86	2.80	1.63	18.16	3.26	1.89	3.76
-68.94	-32.79	132.50	0.14	-9.48	-4.51	18.22	4.14	2.09	3.49	0.87	2.77	1.59	18.12	3.19	1.83	3.68
-23.74	-218.29	-70.62	0.14	-3.25	-29.91	-9.68	3.82	4.89	2.43	0.88	2.73	1.55	18.07	3.12	1.77	3.58
53.21	-29.79	-267.94	0.14	7.26	-4.07	-36.57	2.61	5.82	5.30	0.89	2.70	1.52	18.02	3.04	1.71	3.49
62.99	134.01	-215.96	0.14	8.57	18.23	-29.37	1.38	9.74	4.64	0.90	2.67	1.48	17.97	2.96	1.65	3.39
-34.06	-99.06	48.38	0.14	-4.62	-13.42	6.56	3.47	4.81	3.87	0.91	2.63	1.45	17.92	2.88	1.59	3.29
-80.82	-185.48	198.89	0.14	-10.91	-25.04	26.85	11.17	17.01	11.45	0.93	2.60	1.42	17.87	2.80	1.53	3.19
40.27	31.83	181.14	0.13	5.42	4.28	24.36	7.63	9.37	5.51	0.95	2.57	1.39	17.82	2.71	1.47	3.09
131.94	133.51	28.72	0.13	17.68	17.89	3.85	0.11	11.58	2.93	0.97	2.54	1.37	17.77	2.63	1.41	2.98
-21.28	15.21	-167.00	0.13	-2.84	2.03	-22.29	1.39	13.61	1.29	0.99	2.51	1.34	17.72	2.54	1.36	2.88
-147.93	-137.54	-94.47	0.13	-19.67	-18.29	-12.56	0.89	4.31	2.47	1.01	2.49	1.32	17.68	2.45	1.30	2.78
10.36	-92.07	29.67	0.13	1.37	-12.20	3.93	1.21	5.83	2.60	1.04	2.47	1.30	17.63	2.37	1.25	2.67
72.20	96.93	-28.33	0.13	9.53	12.79	-3.74	3.44	2.30	3.32	1.07	2.44	1.28	17.58	2.28	1.20	2.58
-3.92	152.43	-32.20	0.13	-0.52	20.04	-4.23	2.01	4.12	1.50	1.10	2.43	1.27	17.53	2.20	1.15	2.48
-41.82	-37.79	55.76	0.13	-5.48	-4.95	7.30	1.04	6.98	1.98	1.14	2.41	1.25	17.48	2.12	1.10	2.39
-101.52	-91.53	90.47	0.13	-13.25	-11.94	11.81	2.72	12.02	3.87	1.17	2.39	1.24	17.43	2.04	1.06	2.30
-11.29	143.37	70.15	0.13	-1.47	18.64	9.12	4.55	14.37	2.42	1.21	2.38	1.23	17.38	1.97	1.02	2.22
125.50	172.74	-93.79	0.13	16.25	22.37	-12.15	5.35	4.13	1.77	1.25	2.37	1.22	17.33	1.90	0.98	2.14
49.16	-42.52	-208.18	0.13	6.34	-5.48	-26.86	3.35	15.52	6.49	1.28	2.37	1.22	17.29	1.84	0.95	2.07
-44.84	-175.08	94.05	0.13	-5.76	-22.50	12.09	3.53	1.33	6.53	1.32	2.36	1.21	17.24	1.79	0.92	2.01
-35.67	-4.71	139.59	0.13	-4.57	-0.60	17.87	5.75	10.00	6.83	1.36	2.36	1.21	17.19	1.74	0.89	1.95

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-7.57	220.86	-178.32	0.13	-0.97	28.16	-22.74	6.67	13.10	5.28	1.40	2.36	1.20	17.14	1.69	0.86	1.90
80.29	-25.53	-99.76	0.13	10.20	-3.24	-12.67	2.11	9.41	4.59	1.43	2.37	1.20	17.09	1.66	0.84	1.86
66.01	-221.03	158.13	0.13	8.35	-27.96	20.00	0.46	6.23	2.07	1.46	2.38	1.21	17.04	1.63	0.82	1.82
-21.07	5.40	236.35	0.13	-2.66	0.68	29.78	1.63	5.62	2.19	1.49	2.39	1.21	16.99	1.60	0.81	1.80
38.90	101.19	-41.04	0.13	4.88	12.70	-5.15	2.19	15.21	3.33	1.52	2.40	1.21	16.94	1.58	0.80	1.77
31.77	10.97	-293.37	0.13	3.97	1.37	-36.67	5.55	12.50	3.88	1.54	2.42	1.22	16.89	1.57	0.79	1.76
-51.18	-64.92	-78.61	0.12	-6.37	-8.08	-9.79	9.40	18.87	5.56	1.56	2.44	1.22	16.85	1.56	0.78	1.75
-74.92	-111.56	116.32	0.12	-9.29	-13.83	14.42	6.98	18.47	1.72	1.58	2.46	1.23	16.80	1.56	0.78	1.75
-80.60	-105.12	49.99	0.12	-9.95	-12.98	6.17	6.53	49.86	3.39	1.59	2.48	1.24	16.75	1.56	0.78	1.75
-38.35	100.90	9.88	0.12	-4.72	12.41	1.22	4.14	44.99	6.79	1.59	2.51	1.25	16.70	1.57	0.78	1.76
39.66	258.18	65.73	0.12	4.86	31.63	8.05	15.61	24.20	15.56	1.60	2.54	1.26	16.65	1.59	0.79	1.77
5.58	19.63	44.52	0.12	0.68	2.39	5.43	12.73	48.63	17.53	1.60	2.57	1.27	16.60	1.61	0.80	1.79
-61.30	-100.21	45.34	0.12	-7.45	-12.18	5.51	8.01	99.46	18.77	1.59	2.61	1.28	16.55	1.63	0.80	1.82
57.72	61.87	-131.48	0.12	6.98	7.49	-15.91	10.77	61.02	12.95	1.59	2.65	1.29	16.50	1.67	0.82	1.86
62.49	133.49	-194.82	0.12	7.53	16.08	-23.48	6.59	19.60	5.10	1.58	2.69	1.31	16.46	1.71	0.83	1.90
-63.50	0.22	267.04	0.12	-7.62	0.03	32.05	6.78	57.16	4.30	1.57	2.75	1.32	16.41	1.75	0.84	1.94
-18.32	-252.27	180.15	0.12	-2.19	-30.15	21.53	11.54	49.46	3.59	1.56	2.81	1.33	16.36	1.80	0.86	2.00
51.62	-143.48	-255.69	0.12	6.14	-17.07	-30.43	7.56	34.30	5.73	1.54	2.88	1.35	16.31	1.86	0.87	2.06
40.44	139.54	-56.06	0.12	4.79	16.54	-6.64	3.57	11.18	3.04	1.53	2.96	1.37	16.26	1.93	0.89	2.13
-25.57	37.19	165.73	0.12	-3.02	4.39	19.56	1.37	18.17	2.08	1.52	3.05	1.38	16.21	2.00	0.91	2.20
-13.49	-60.76	48.30	0.12	-1.58	-7.14	5.68	0.94	16.91	2.08	1.51	3.16	1.40	16.16	2.09	0.93	2.28
86.38	51.26	-53.68	0.12	10.11	6.00	-6.28	2.95	12.15	4.99	1.51	3.28	1.42	16.11	2.17	0.94	2.37
107.00	104.95	-92.38	0.12	12.47	12.23	-10.76	4.47	14.00	7.38	1.50	3.42	1.45	16.06	2.27	0.96	2.47
-17.17	50.64	-6.18	0.12	-1.99	5.87	-0.72	1.18	18.52	4.90	1.51	3.57	1.47	16.02	2.37	0.98	2.57
-173.78	-89.28	132.57	0.12	-20.07	-10.31	15.31	0.31	17.77	2.47	1.51	3.75	1.50	15.97	2.48	0.99	2.67
-81.26	-116.86	17.28	0.12	-9.34	-13.44	1.99	2.68	9.53	3.69	1.52	3.95	1.53	15.92	2.60	1.00	2.79
108.70	104.17	-118.51	0.11	12.45	11.93	-13.57	1.79	9.39	6.94	1.53	4.17	1.56	15.87	2.72	1.02	2.90
63.36	226.51	-137.99	0.11	7.22	25.82	-15.73	3.47	8.03	7.55	1.55	4.41	1.59	15.82	2.84	1.02	3.02
-71.61	1.06	-41.63	0.11	-8.13	0.12	-4.72	5.03	12.55	7.03	1.58	4.68	1.63	15.77	2.97	1.03	3.14
13.52	-218.51	282.90	0.11	1.53	-24.69	31.97	2.28	6.55	7.87	1.61	4.97	1.67	15.72	3.09	1.04	3.26
159.18	-96.87	169.00	0.11	17.91	-10.90	19.01	1.18	7.88	4.59	1.64	5.28	1.71	15.67	3.22	1.04	3.38
56.76	137.06	-203.93	0.11	6.36	15.35	-22.84	1.85	11.38	3.13	1.68	5.61	1.76	15.63	3.34	1.05	3.50
-10.33	112.56	-94.33	0.11	-1.15	12.55	-10.52	2.68	4.48	2.08	1.72	5.95	1.80	15.58	3.47	1.05	3.62

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
6.69	-92.48	-104.92	0.11	0.74	-10.27	-11.65	1.82	12.67	5.14	1.76	6.30	1.85	15.53	3.59	1.05	3.74
-90.14	-188.91	-71.56	0.11	-9.96	-20.87	-7.91	0.65	13.43	1.41	1.80	6.66	1.90	15.48	3.70	1.05	3.85
-87.77	-67.39	148.29	0.11	-9.65	-7.41	16.31	3.26	2.60	3.65	1.84	7.03	1.95	15.43	3.81	1.06	3.96
-41.50	159.43	-31.93	0.11	-4.54	17.46	-3.50	3.80	3.82	2.17	1.89	7.39	1.99	15.38	3.92	1.06	4.06
-0.41	202.70	84.97	0.11	-0.04	22.09	9.26	1.10	4.61	5.96	1.93	7.74	2.04	15.33	4.02	1.06	4.16
100.40	69.16	234.33	0.11	10.89	7.50	25.42	3.30	10.21	6.01	1.97	8.09	2.08	15.28	4.11	1.06	4.25
43.12	-43.89	-220.69	0.11	4.66	-4.74	-23.83	1.48	10.18	0.69	2.00	8.41	2.12	15.23	4.20	1.06	4.34
-36.88	-123.55	-272.70	0.11	-3.96	-13.28	-29.31	3.40	4.41	4.40	2.03	8.71	2.16	15.19	4.29	1.07	4.42
-34.73	-134.03	49.76	0.11	-3.72	-14.34	5.32	5.95	2.59	3.79	2.06	8.99	2.20	15.14	4.37	1.07	4.50
-68.51	-2.75	88.49	0.11	-7.30	-0.29	9.42	7.26	0.74	4.90	2.08	9.23	2.23	15.09	4.45	1.08	4.58
-42.28	133.99	14.29	0.11	-4.48	14.20	1.51	2.53	1.64	2.70	2.09	9.43	2.26	15.04	4.52	1.08	4.65
56.70	93.53	-55.62	0.11	5.98	9.87	-5.87	2.59	4.04	3.40	2.09	9.59	2.28	14.99	4.58	1.09	4.71
136.33	-17.62	52.39	0.11	14.31	-1.85	5.50	4.10	8.61	0.32	2.09	9.70	2.30	14.94	4.65	1.10	4.77
42.98	-124.33	128.04	0.10	4.49	-12.99	13.38	3.95	9.98	5.26	2.08	9.77	2.31	14.89	4.70	1.11	4.83
-64.97	-57.96	51.68	0.10	-6.76	-6.03	5.38	1.68	9.79	4.17	2.06	9.78	2.31	14.84	4.75	1.12	4.88
-26.78	178.80	-51.31	0.10	-2.77	18.51	-5.31	6.83	14.09	4.55	2.03	9.74	2.31	14.79	4.79	1.13	4.92
-17.68	-13.53	-193.81	0.10	-1.82	-1.39	-19.96	7.64	10.25	2.85	2.00	9.66	2.30	14.75	4.83	1.15	4.96
8.35	-383.73	21.54	0.10	0.86	-39.33	2.21	1.29	4.29	5.38	1.96	9.52	2.28	14.70	4.85	1.16	4.99
-19.62	-130.69	142.22	0.10	-2.00	-13.33	14.51	5.21	3.62	5.29	1.92	9.35	2.26	14.65	4.87	1.18	5.01
-56.46	406.76	-28.01	0.10	-5.73	41.29	-2.84	5.71	1.36	5.28	1.87	9.13	2.24	14.60	4.88	1.20	5.03
32.60	386.17	171.71	0.10	3.29	39.00	17.34	8.05	5.71	0.35	1.82	8.87	2.21	14.55	4.88	1.22	5.03
1.54	-140.32	73.23	0.10	0.15	-14.10	7.36	9.78	7.54	2.92	1.76	8.59	2.18	14.50	4.87	1.24	5.02
-17.42	-256.52	-186.54	0.10	-1.74	-25.65	-18.65	7.86	3.58	6.11	1.71	8.27	2.15	14.45	4.84	1.26	5.01
81.47	132.73	-7.15	0.10	8.11	13.21	-0.71	1.46	2.28	4.68	1.65	7.94	2.11	14.40	4.81	1.28	4.97
55.20	-6.52	-91.94	0.10	5.46	-0.65	-9.10	3.49	1.26	6.81	1.60	7.58	2.07	14.36	4.75	1.30	4.93
-55.79	-128.25	33.18	0.10	-5.50	-12.63	3.27	3.65	3.19	8.41	1.54	7.22	2.03	14.31	4.68	1.32	4.86
-124.42	251.51	182.75	0.10	-12.19	24.65	17.91	2.30	3.05	6.07	1.49	6.85	1.99	14.26	4.59	1.33	4.78
-44.07	-63.87	-173.26	0.10	-4.30	-6.23	-16.89	3.04	12.40	6.70	1.45	6.48	1.95	14.21	4.48	1.35	4.68
97.83	-152.43	-104.70	0.10	9.49	-14.79	-10.16	2.34	13.22	1.94	1.40	6.11	1.91	14.16	4.35	1.36	4.56
54.54	222.43	93.33	0.10	5.26	21.46	9.01	7.07	14.90	18.00	1.37	5.75	1.87	14.11	4.21	1.37	4.42
-4.55	-69.87	172.81	0.10	-0.44	-6.71	16.59	22.48	23.10	31.87	1.34	5.40	1.83	14.06	4.05	1.37	4.27
40.38	-50.63	38.39	0.10	3.86	-4.84	3.67	13.62	5.91	10.89	1.31	5.07	1.79	14.01	3.87	1.37	4.11
28.25	46.38	-230.22	0.10	2.68	4.41	-21.87	5.67	7.55	5.98	1.29	4.76	1.76	13.96	3.69	1.36	3.93

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
12.18	-362.98	-11.73	0.09	1.15	-34.30	-1.11	6.73	11.76	1.00	1.28	4.48	1.73	13.92	3.50	1.35	3.75
-34.76	-115.02	51.20	0.09	-3.27	-10.81	4.81	5.60	3.46	5.99	1.27	4.21	1.70	13.87	3.31	1.34	3.57
-77.53	442.33	90.92	0.09	-7.25	41.36	8.50	10.33	11.29	3.07	1.27	3.97	1.68	13.82	3.11	1.32	3.38
11.61	58.33	96.55	0.09	1.08	5.42	8.98	13.15	17.97	4.71	1.28	3.75	1.66	13.77	2.92	1.29	3.20
78.44	-361.06	-162.32	0.09	7.26	-33.40	-15.01	7.37	17.33	2.61	1.30	3.55	1.64	13.72	2.74	1.27	3.02
-14.68	107.45	7.00	0.09	-1.35	9.89	0.64	5.83	10.63	1.28	1.32	3.37	1.63	13.67	2.56	1.24	2.85
-74.49	312.61	132.73	0.09	-6.82	28.60	12.14	11.19	3.01	6.89	1.34	3.22	1.63	13.62	2.40	1.21	2.69
21.63	-35.94	72.32	0.09	1.97	-3.27	6.58	7.58	9.09	11.20	1.37	3.09	1.63	13.57	2.25	1.19	2.55
-8.39	-45.78	21.14	0.09	-0.76	-4.14	1.91	5.35	6.05	9.92	1.41	2.97	1.63	13.53	2.12	1.16	2.41
-40.28	-31.62	-114.67	0.09	-3.63	-2.85	-10.32	1.47	3.74	4.34	1.45	2.88	1.64	13.48	1.99	1.14	2.29
60.69	-141.27	-87.26	0.09	5.43	-12.64	-7.81	4.91	9.03	5.54	1.49	2.80	1.66	13.43	1.88	1.11	2.19
70.43	119.78	1.91	0.09	6.27	10.66	0.17	8.74	7.85	5.38	1.53	2.74	1.68	13.38	1.79	1.09	2.10
15.27	158.22	13.89	0.09	1.35	14.00	1.23	11.87	23.86	6.27	1.58	2.70	1.70	13.33	1.71	1.08	2.02
-31.69	-161.77	-26.08	0.09	-2.79	-14.24	-2.30	3.13	18.46	10.67	1.63	2.67	1.74	13.28	1.63	1.06	1.95
48.29	-120.20	83.81	0.09	4.23	-10.52	7.33	16.63	18.84	14.09	1.69	2.65	1.77	13.23	1.57	1.05	1.89
91.02	-30.90	131.38	0.09	7.92	-2.69	11.43	13.47	0.96	8.12	1.74	2.64	1.82	13.18	1.52	1.04	1.84
-6.15	-102.62	-21.83	0.09	-0.53	-8.88	-1.89	18.88	18.98	7.53	1.80	2.64	1.86	13.13	1.47	1.04	1.80
-9.11	150.29	-97.59	0.09	-0.78	12.92	-8.39	27.25	39.26	4.59	1.86	2.66	1.91	13.09	1.43	1.03	1.76
-23.03	238.51	-173.04	0.09	-1.97	20.39	-14.80	21.03	36.00	7.98	1.92	2.68	1.96	13.04	1.40	1.02	1.73
-91.80	-113.74	8.29	0.09	-7.80	-9.67	0.71	15.31	16.22	7.95	1.98	2.70	2.02	12.99	1.37	1.02	1.70
-58.49	-82.35	202.88	0.08	-4.94	-6.96	17.14	4.06	16.44	11.12	2.04	2.74	2.08	12.94	1.34	1.02	1.68
19.60	126.57	-23.48	0.08	1.65	10.63	-1.97	7.66	14.07	11.87	2.11	2.78	2.13	12.89	1.32	1.01	1.66
29.51	47.22	-41.34	0.08	2.46	3.94	-3.45	8.41	10.99	7.40	2.17	2.84	2.19	12.84	1.31	1.01	1.65
41.38	4.12	177.39	0.08	3.43	0.34	14.72	5.25	11.04	2.13	2.24	2.89	2.25	12.79	1.29	1.00	1.64
38.23	-58.77	66.90	0.08	3.15	-4.85	5.52	9.88	19.42	6.30	2.30	2.96	2.30	12.74	1.28	1.00	1.63
11.14	-24.60	-198.83	0.08	0.91	-2.02	-16.30	11.32	11.16	1.37	2.37	3.03	2.36	12.70	1.28	1.00	1.62
56.01	63.32	-191.04	0.08	4.56	5.16	-15.57	6.85	10.09	2.22	2.44	3.10	2.41	12.65	1.27	0.99	1.61
-31.03	-173.45	26.29	0.08	-2.51	-14.05	2.13	2.40	3.06	3.54	2.50	3.19	2.46	12.60	1.27	0.98	1.61
-112.73	-229.64	86.08	0.08	-9.08	-18.49	6.93	4.29	8.79	5.16	2.57	3.27	2.51	12.55	1.27	0.98	1.60
27.45	158.51	-7.08	0.08	2.20	12.68	-0.57	4.19	17.79	4.26	2.64	3.36	2.55	12.50	1.27	0.97	1.60
75.25	371.45	2.94	0.08	5.98	29.53	0.23	2.20	12.36	4.95	2.71	3.46	2.59	12.45	1.27	0.96	1.59
-2.89	24.65	2.93	0.08	-0.23	1.95	0.23	3.24	6.53	3.98	2.79	3.56	2.63	12.40	1.28	0.94	1.59
-68.74	-327.74	-103.86	0.08	-5.40	-25.73	-8.15	6.47	10.84	1.83	2.86	3.66	2.66	12.35	1.28	0.93	1.58

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-33.52	-55.97	5.34	0.08	-2.61	-4.37	0.42	4.05	8.10	3.51	2.93	3.76	2.68	12.30	1.29	0.92	1.58
87.38	268.61	134.07	0.08	6.77	20.82	10.39	4.52	10.88	2.21	3.00	3.87	2.70	12.26	1.29	0.90	1.57
74.06	113.84	-68.06	0.08	5.70	8.77	-5.24	1.15	11.61	0.44	3.07	3.98	2.72	12.21	1.30	0.89	1.57
-79.92	-108.17	-150.61	0.08	-6.11	-8.27	-11.52	1.82	9.30	4.06	3.14	4.09	2.73	12.16	1.30	0.87	1.57
-124.50	-16.92	11.67	0.08	-9.46	-1.29	0.89	3.21	2.76	6.21	3.20	4.21	2.74	12.11	1.31	0.86	1.57
5.75	137.84	110.43	0.08	0.43	10.41	8.34	4.90	3.87	4.38	3.27	4.32	2.75	12.06	1.32	0.84	1.57
24.70	14.54	105.01	0.08	1.85	1.09	7.88	3.75	3.46	2.62	3.33	4.43	2.75	12.01	1.33	0.83	1.57
4.65	-126.24	23.75	0.07	0.35	-9.40	1.77	4.52	5.36	4.22	3.38	4.53	2.75	11.96	1.34	0.81	1.57
37.57	-107.77	-30.23	0.07	2.78	-7.97	-2.24	6.84	5.60	2.47	3.44	4.64	2.74	11.91	1.35	0.80	1.57
-32.43	-31.49	-72.02	0.07	-2.38	-2.31	-5.29	7.48	10.65	5.35	3.48	4.73	2.73	11.87	1.36	0.78	1.57
0.64	63.45	-73.72	0.07	0.05	4.63	-5.38	2.77	10.32	3.89	3.52	4.83	2.72	11.82	1.37	0.77	1.57
24.60	13.30	39.36	0.07	1.78	0.96	2.85	8.32	4.66	7.11	3.55	4.91	2.70	11.77	1.38	0.76	1.58
-111.21	-50.62	36.21	0.07	-8.01	-3.64	2.61	6.89	6.40	4.27	3.58	4.99	2.68	11.72	1.39	0.75	1.58
-73.83	52.37	-42.77	0.07	-5.28	3.74	-3.06	5.71	10.85	2.53	3.60	5.05	2.66	11.67	1.41	0.74	1.59
126.07	61.15	74.17	0.07	8.95	4.34	5.27	3.47	11.20	1.02	3.60	5.11	2.63	11.62	1.42	0.73	1.59
129.57	-111.75	99.83	0.07	9.13	-7.88	7.04	8.17	6.76	1.19	3.60	5.16	2.60	11.57	1.43	0.72	1.60
-19.64	-68.39	62.51	0.07	-1.38	-4.79	4.38	9.50	7.88	7.54	3.59	5.19	2.56	11.52	1.45	0.71	1.61
-8.58	135.48	131.12	0.07	-0.60	9.42	9.11	11.48	14.83	14.10	3.57	5.21	2.53	11.47	1.46	0.71	1.62
17.41	-16.75	-114.91	0.07	1.20	-1.16	-7.93	11.42	9.68	4.34	3.53	5.22	2.48	11.43	1.48	0.70	1.64
-7.60	-152.41	-218.23	0.07	-0.52	-10.44	-14.95	8.25	5.43	3.83	3.49	5.21	2.44	11.38	1.49	0.70	1.65
-20.53	106.68	37.14	0.07	-1.40	7.25	2.53	6.09	4.78	4.33	3.44	5.19	2.40	11.33	1.51	0.70	1.66
-103.28	203.06	143.78	0.07	-6.97	13.71	9.71	3.38	2.53	3.15	3.38	5.15	2.35	11.28	1.53	0.70	1.68
-13.03	-10.33	153.19	0.07	-0.87	-0.69	10.26	3.30	5.76	2.67	3.31	5.10	2.30	11.23	1.54	0.69	1.69
135.73	-137.03	-152.81	0.07	9.03	-9.11	-10.16	4.07	6.56	5.33	3.23	5.04	2.24	11.18	1.56	0.69	1.71
46.37	-64.62	-172.15	0.07	3.06	-4.27	-11.36	6.89	3.43	4.84	3.15	4.96	2.19	11.13	1.57	0.69	1.72
-35.64	-48.39	239.72	0.07	-2.33	-3.17	15.70	7.74	4.73	0.89	3.07	4.88	2.13	11.08	1.59	0.70	1.74
-20.52	-62.17	7.22	0.07	-1.33	-4.04	0.47	6.31	8.05	4.79	2.98	4.79	2.08	11.04	1.60	0.70	1.75
-48.37	53.85	-192.40	0.06	-3.12	3.47	-12.41	4.97	7.32	3.71	2.90	4.69	2.03	10.99	1.62	0.70	1.76
36.66	88.57	3.98	0.06	2.35	5.67	0.25	6.79	0.86	3.01	2.81	4.58	1.98	10.94	1.63	0.70	1.78
106.38	-23.56	46.89	0.06	6.76	-1.50	2.98	5.88	5.91	1.44	2.73	4.47	1.93	10.89	1.64	0.71	1.79
-27.77	-198.12	61.67	0.06	-1.75	-12.48	3.89	3.58	7.98	1.43	2.64	4.36	1.88	10.84	1.65	0.71	1.80
-35.63	-8.70	-72.30	0.06	-2.23	-0.54	-4.52	4.77	10.81	2.02	2.57	4.24	1.83	10.79	1.65	0.71	1.80
18.41	275.77	-73.01	0.06	1.14	17.10	-4.53	5.11	6.03	4.98	2.49	4.13	1.79	10.74	1.65	0.72	1.80

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-3.61	-47.69	175.79	0.06	-0.22	-2.93	10.81	3.23	3.04	3.84	2.43	4.01	1.75	10.69	1.65	0.72	1.80
-4.59	-179.23	176.09	0.06	-0.28	-10.93	10.74	1.26	7.97	5.39	2.37	3.90	1.72	10.64	1.65	0.73	1.80
-56.45	51.03	-104.05	0.06	-3.42	3.09	-6.29	1.00	6.53	3.04	2.32	3.79	1.69	10.60	1.63	0.73	1.79
-85.16	101.73	-272.29	0.06	-5.11	6.10	-16.34	0.64	5.32	1.82	2.28	3.68	1.66	10.55	1.62	0.73	1.77
27.96	43.44	79.10	0.06	1.66	2.58	4.71	3.42	10.90	2.50	2.24	3.58	1.64	10.50	1.60	0.73	1.76
134.65	-112.42	265.42	0.06	7.94	-6.63	15.66	5.39	11.26	2.53	2.22	3.49	1.62	10.45	1.57	0.73	1.73
-33.55	-77.04	-67.98	0.06	-1.96	-4.51	-3.98	2.68	5.18	3.01	2.20	3.40	1.61	10.40	1.55	0.73	1.71
-104.26	-61.76	-16.80	0.06	-6.05	-3.58	-0.97	8.97	4.47	3.26	2.19	3.31	1.60	10.35	1.52	0.73	1.68
106.74	-88.45	71.09	0.06	6.14	-5.09	4.09	7.58	5.82	1.48	2.18	3.24	1.59	10.30	1.49	0.73	1.65
100.33	42.64	-101.84	0.06	5.72	2.43	-5.81	2.38	3.78	1.47	2.18	3.17	1.58	10.25	1.45	0.73	1.63
25.09	-42.35	-32.57	0.06	1.42	-2.39	-1.84	4.34	5.30	1.67	2.18	3.10	1.58	10.21	1.42	0.72	1.60
30.98	-34.20	-49.40	0.06	1.74	-1.92	-2.77	7.97	7.54	3.01	2.19	3.04	1.57	10.16	1.39	0.72	1.57
-91.89	145.58	-86.12	0.06	-5.10	8.08	-4.78	6.58	3.95	1.61	2.19	2.99	1.57	10.11	1.36	0.71	1.54
-118.46	138.02	40.97	0.06	-6.52	7.59	2.25	1.88	3.74	2.54	2.20	2.94	1.56	10.06	1.33	0.71	1.51
34.72	-10.24	185.52	0.05	1.89	-0.56	10.11	2.10	2.47	3.40	2.21	2.89	1.56	10.01	1.31	0.71	1.49
10.64	-21.17	256.64	0.05	0.57	-1.14	13.86	0.92	7.06	2.21	2.22	2.85	1.56	9.96	1.28	0.70	1.46
-153.07	132.61	-30.81	0.05	-8.19	7.09	-1.65	3.60	3.13	2.10	2.23	2.81	1.55	9.91	1.26	0.70	1.44
10.23	9.32	-264.22	0.05	0.54	0.49	-14.00	3.53	4.18	2.12	2.23	2.78	1.55	9.86	1.25	0.69	1.43
201.81	-118.46	-112.46	0.05	10.60	-6.22	-5.90	8.05	6.92	1.67	2.23	2.74	1.54	9.81	1.23	0.69	1.41
10.39	8.77	116.54	0.05	0.54	0.46	6.06	6.14	5.13	2.01	2.23	2.71	1.53	9.77	1.22	0.69	1.40
-72.47	85.58	172.96	0.05	-3.73	4.41	8.91	2.04	1.14	2.55	2.22	2.68	1.51	9.72	1.21	0.68	1.39
-5.31	-19.55	21.57	0.05	-0.27	-1.00	1.10	4.50	4.61	1.42	2.21	2.66	1.50	9.67	1.20	0.68	1.38
-16.26	-185.14	-91.29	0.05	-0.82	-9.35	-4.61	2.25	4.93	0.85	2.19	2.63	1.48	9.62	1.20	0.68	1.38
91.60	5.23	-57.99	0.05	4.58	0.26	-2.90	5.27	3.30	1.89	2.17	2.60	1.47	9.57	1.20	0.67	1.38
94.24	164.89	69.00	0.05	4.66	8.16	3.42	2.76	2.04	2.39	2.15	2.58	1.44	9.52	1.20	0.67	1.38
-40.86	-21.40	-3.13	0.05	-2.00	-1.05	-0.15	2.67	2.24	1.52	2.12	2.56	1.42	9.47	1.20	0.67	1.38
-6.76	-51.25	-162.80	0.05	-0.33	-2.49	-7.90	5.63	1.63	3.76	2.10	2.54	1.40	9.42	1.21	0.67	1.38
38.18	2.85	3.53	0.05	1.83	0.14	0.17	5.93	0.42	1.69	2.06	2.51	1.37	9.38	1.22	0.67	1.39
-5.87	-30.09	73.38	0.05	-0.28	-1.43	3.49	1.33	3.11	1.65	2.03	2.49	1.35	9.33	1.23	0.66	1.39
-66.72	54.86	-66.63	0.05	-3.14	2.58	-3.13	7.57	4.66	0.31	2.00	2.47	1.32	9.28	1.23	0.66	1.40
-54.47	112.53	-7.48	0.05	-2.53	5.23	-0.35	8.69	7.52	3.51	1.97	2.45	1.29	9.23	1.25	0.66	1.41
59.53	-24.65	123.29	0.05	2.74	-1.13	5.67	8.28	12.96	3.70	1.93	2.42	1.27	9.18	1.26	0.66	1.42
47.32	5.39	85.87	0.05	2.15	0.25	3.91	4.83	3.68	1.73	1.90	2.40	1.24	9.13	1.27	0.65	1.42

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-26.71	110.16	-111.07	0.05	-1.20	4.96	-5.00	1.75	4.19	2.02	1.86	2.38	1.21	9.08	1.28	0.65	1.43
-18.61	-35.99	-196.45	0.04	-0.83	-1.60	-8.74	2.48	3.73	1.61	1.83	2.35	1.18	9.03	1.28	0.65	1.44
13.40	-138.64	-39.97	0.04	0.59	-6.10	-1.76	5.60	4.38	1.82	1.80	2.33	1.16	8.98	1.29	0.64	1.44
64.26	-50.26	75.96	0.04	2.80	-2.19	3.30	4.83	2.36	2.29	1.78	2.30	1.13	8.94	1.30	0.64	1.44
23.09	104.64	87.63	0.04	0.99	4.50	3.77	5.25	6.79	3.39	1.75	2.27	1.11	8.89	1.30	0.63	1.44
-123.70	27.37	6.45	0.04	-5.26	1.16	0.27	6.84	3.94	1.37	1.73	2.25	1.08	8.84	1.30	0.62	1.44
-122.20	-129.42	-135.29	0.04	-5.13	-5.44	-5.68	6.68	2.62	1.12	1.71	2.22	1.06	8.79	1.29	0.62	1.43
86.88	-21.12	-11.99	0.04	3.61	-0.88	-0.50	6.10	7.50	1.42	1.70	2.18	1.03	8.74	1.29	0.61	1.42
144.42	41.84	174.69	0.04	5.92	1.72	7.16	6.74	7.32	1.33	1.68	2.15	1.01	8.69	1.28	0.60	1.41
-33.79	60.64	67.21	0.04	-1.37	2.46	2.72	8.84	3.35	0.72	1.67	2.12	0.99	8.64	1.27	0.59	1.40
-88.54	-7.47	-63.79	0.04	-3.54	-0.30	-2.55	6.92	10.04	2.28	1.66	2.08	0.97	8.59	1.25	0.58	1.38
5.64	-206.04	-40.58	0.04	0.22	-8.14	-1.60	6.25	2.90	2.60	1.65	2.05	0.95	8.54	1.24	0.58	1.36
55.52	-9.60	63.38	0.04	2.17	-0.37	2.47	8.91	7.29	2.51	1.65	2.01	0.94	8.50	1.22	0.57	1.34
-8.57	226.97	151.95	0.04	-0.33	8.74	5.85	7.81	8.66	4.92	1.65	1.98	0.92	8.45	1.20	0.56	1.32
-131.28	-18.45	28.59	0.04	-4.99	-0.70	1.09	5.62	8.68	4.12	1.65	1.94	0.90	8.40	1.18	0.55	1.30
-29.95	-73.26	-225.02	0.04	-1.12	-2.75	-8.44	6.08	8.43	3.48	1.65	1.91	0.89	8.35	1.15	0.54	1.27
114.89	190.50	-138.28	0.04	4.25	7.05	-5.12	6.42	2.07	8.37	1.66	1.88	0.88	8.30	1.13	0.53	1.25
18.63	116.89	225.55	0.04	0.68	4.27	8.23	6.51	2.53	5.44	1.67	1.85	0.86	8.25	1.11	0.52	1.22
-23.35	-102.14	156.78	0.04	-0.84	-3.68	5.64	2.79	3.80	0.71	1.68	1.82	0.85	8.20	1.09	0.51	1.20
-28.24	-131.67	-202.13	0.04	-1.00	-4.67	-7.18	5.01	5.11	2.14	1.69	1.80	0.84	8.15	1.06	0.50	1.18
-67.04	-164.08	-167.38	0.04	-2.35	-5.74	-5.86	1.16	2.16	2.72	1.70	1.77	0.84	8.11	1.04	0.49	1.15
22.06	-86.57	92.77	0.03	0.76	-2.99	3.20	6.98	5.15	3.76	1.72	1.76	0.83	8.06	1.02	0.48	1.13
92.84	175.25	137.32	0.03	3.16	5.96	4.67	3.82	10.68	2.98	1.73	1.74	0.82	8.01	1.00	0.47	1.11
-6.33	134.64	-37.88	0.03	-0.21	4.51	-1.27	0.66	5.14	2.68	1.75	1.73	0.82	7.96	0.99	0.47	1.09
-58.19	-125.38	-45.71	0.03	-1.92	-4.14	-1.51	1.77	3.81	1.72	1.77	1.72	0.81	7.91	0.97	0.46	1.07
48.84	-14.10	120.14	0.03	1.59	-0.46	3.90	0.62	7.64	3.91	1.79	1.72	0.81	7.86	0.96	0.45	1.06
42.66	114.70	52.80	0.03	1.37	3.67	1.69	0.46	2.91	6.27	1.82	1.72	0.81	7.81	0.95	0.45	1.05
-18.38	-78.37	-12.28	0.03	-0.58	-2.47	-0.39	1.99	4.73	4.35	1.84	1.72	0.81	7.76	0.94	0.44	1.03
-34.26	-108.99	13.72	0.03	-1.06	-3.38	0.43	3.29	5.94	2.33	1.87	1.73	0.81	7.71	0.93	0.44	1.02
-44.10	155.92	-35.23	0.03	-1.35	4.76	-1.07	1.39	4.42	6.13	1.89	1.74	0.82	7.67	0.92	0.43	1.02
25.95	177.25	34.77	0.03	0.78	5.32	1.04	1.09	6.18	3.93	1.92	1.76	0.82	7.62	0.92	0.43	1.01
-0.10	-130.85	34.63	0.03	0.00	-3.86	1.02	3.53	4.15	3.70	1.94	1.77	0.83	7.57	0.91	0.43	1.01
-47.00	-68.44	-40.36	0.03	-1.36	-1.98	-1.17	5.14	0.41	1.32	1.97	1.79	0.84	7.52	0.91	0.42	1.00

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
8.09	124.45	-43.19	0.03	0.23	3.55	-1.23	3.90	1.21	2.40	1.99	1.81	0.85	7.47	0.91	0.42	1.00
-9.90	-4.79	-68.96	0.03	-0.28	-0.13	-1.93	1.47	4.55	3.05	2.01	1.83	0.86	7.42	0.91	0.43	1.01
-1.86	-81.62	-0.81	0.03	-0.05	-2.24	-0.02	3.78	7.30	3.41	2.03	1.85	0.87	7.37	0.91	0.43	1.01
68.01	-171.11	4.18	0.03	1.84	-4.62	0.11	3.01	4.78	1.91	2.05	1.87	0.89	7.32	0.92	0.43	1.01
69.74	-60.64	-47.73	0.03	1.85	-1.61	-1.26	3.18	5.16	3.69	2.06	1.90	0.90	7.28	0.92	0.44	1.02
6.60	161.16	53.26	0.03	0.17	4.19	1.38	3.31	2.48	4.09	2.07	1.92	0.92	7.23	0.93	0.44	1.03
-92.22	9.82	56.05	0.03	-2.35	0.25	1.43	3.10	4.28	4.33	2.07	1.94	0.94	7.18	0.93	0.45	1.04
-102.82	25.75	23.89	0.03	-2.57	0.64	0.60	2.46	5.64	1.42	2.08	1.95	0.96	7.13	0.94	0.46	1.05
23.35	56.58	71.70	0.02	0.57	1.39	1.76	2.13	2.19	2.21	2.07	1.97	0.98	7.08	0.95	0.47	1.06
108.09	-157.21	-28.38	0.02	2.59	-3.77	-0.68	1.75	1.83	5.77	2.06	1.99	1.00	7.03	0.96	0.48	1.08
58.76	-66.76	-124.08	0.02	1.38	-1.57	-2.92	2.22	4.55	0.41	2.05	2.00	1.02	6.98	0.98	0.50	1.10
-41.26	106.16	19.14	0.02	-0.95	2.44	0.44	4.49	7.23	4.38	2.03	2.01	1.04	6.93	0.99	0.51	1.11
-17.14	86.78	143.81	0.02	-0.39	1.95	3.24	7.07	3.42	4.70	2.01	2.02	1.06	6.88	1.01	0.53	1.14
33.84	-40.31	7.51	0.02	0.74	-0.89	0.17	4.56	6.17	3.91	1.98	2.02	1.09	6.84	1.02	0.55	1.16
-29.16	-133.96	-80.34	0.02	-0.63	-2.88	-1.73	0.89	7.44	3.99	1.94	2.02	1.11	6.79	1.04	0.57	1.19
-23.05	-24.64	1.82	0.02	-0.48	-0.52	0.04	2.38	3.31	6.56	1.91	2.02	1.13	6.74	1.06	0.59	1.21
-33.93	135.14	-37.11	0.02	-0.70	2.77	-0.76	2.48	5.39	3.79	1.86	2.02	1.15	6.69	1.08	0.62	1.25
37.07	177.52	-107.82	0.02	0.74	3.55	-2.16	0.85	5.85	2.43	1.82	2.01	1.17	6.64	1.10	0.64	1.28
93.82	-20.80	-60.48	0.02	1.83	-0.41	-1.18	2.91	3.01	1.44	1.77	2.00	1.19	6.59	1.13	0.67	1.31
-89.18	-241.27	44.56	0.02	-1.69	-4.58	0.85	2.64	7.13	3.75	1.73	1.99	1.20	6.54	1.15	0.70	1.35
-35.92	-227.33	132.21	0.02	-0.66	-4.21	2.45	4.94	7.23	1.20	1.68	1.98	1.22	6.49	1.18	0.73	1.39
26.10	-13.84	85.77	0.02	0.47	-0.25	1.54	3.37	2.32	2.69	1.63	1.97	1.23	6.45	1.21	0.76	1.43
-57.82	315.56	-56.28	0.02	-1.01	5.52	-0.98	4.01	2.82	2.92	1.58	1.95	1.24	6.40	1.24	0.79	1.47
5.29	159.61	-68.03	0.02	0.09	2.71	-1.16	5.26	2.59	1.88	1.53	1.93	1.26	6.35	1.27	0.82	1.51
25.24	-264.18	109.89	0.02	0.42	-4.36	1.81	1.06	2.43	3.64	1.48	1.92	1.27	6.30	1.30	0.86	1.55
57.08	-129.39	65.54	0.02	0.91	-2.07	1.05	3.07	2.30	6.08	1.43	1.90	1.27	6.25	1.33	0.89	1.60
-2.02	171.53	-154.28	0.02	-0.03	2.66	-2.39	3.49	2.73	1.83	1.39	1.88	1.28	6.20	1.35	0.92	1.64
-68.87	196.79	-51.87	0.02	-1.03	2.95	-0.78	1.86	5.23	4.32	1.35	1.86	1.29	6.15	1.38	0.95	1.68
88.10	14.37	121.00	0.01	1.28	0.21	1.75	2.49	14.20	2.97	1.31	1.84	1.29	6.10	1.41	0.98	1.72
73.78	-130.40	67.62	0.01	1.03	-1.83	0.95	4.98	26.12	6.61	1.28	1.83	1.29	6.05	1.43	1.01	1.75
-142.07	-46.04	-40.43	0.01	-1.92	-0.62	-0.55	3.12	20.95	13.21	1.25	1.81	1.29	6.01	1.45	1.04	1.78
-116.55	77.90	-100.15	0.01	-1.52	1.01	-1.30	3.12	7.96	7.45	1.22	1.80	1.29	5.96	1.47	1.06	1.81
107.48	78.59	-91.76	0.01	1.34	0.98	-1.15	6.48	3.79	5.59	1.20	1.78	1.30	5.91	1.48	1.08	1.83

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
119.04	-106.36	21.38	0.01	1.43	-1.28	0.26	6.43	10.55	7.56	1.18	1.77	1.30	5.86	1.50	1.09	1.86
-12.17	-138.86	118.11	0.01	-0.14	-1.60	1.36	3.68	9.55	7.50	1.17	1.76	1.30	5.81	1.51	1.11	1.87
-15.11	79.26	-2.12	0.01	-0.17	0.87	-0.02	1.76	2.48	6.57	1.16	1.76	1.30	5.76	1.52	1.12	1.89
-31.01	24.05	-125.87	0.01	-0.33	0.25	-1.32	4.18	2.88	3.72	1.15	1.75	1.30	5.71	1.53	1.13	1.90
-37.86	-176.64	16.36	0.01	-0.38	-1.77	0.16	2.70	2.79	2.85	1.14	1.75	1.30	5.66	1.54	1.14	1.91
50.12	-123.03	220.88	0.01	0.48	-1.17	2.10	4.02	0.34	1.43	1.14	1.76	1.30	5.62	1.54	1.14	1.92
8.01	70.08	138.17	0.01	0.07	0.63	1.24	2.63	8.59	0.40	1.14	1.76	1.30	5.57	1.55	1.14	1.93
-9.98	157.63	-126.86	0.01	-0.08	1.34	-1.08	1.08	2.74	2.96	1.14	1.77	1.30	5.52	1.56	1.15	1.93
64.92	31.25	-159.28	0.01	0.52	0.25	-1.27	1.54	3.68	3.42	1.14	1.78	1.31	5.47	1.56	1.15	1.94
-6.19	-104.60	0.04	0.01	-0.05	-0.78	0.00	0.98	1.87	4.84	1.14	1.80	1.31	5.42	1.57	1.15	1.95
-18.13	-53.28	42.96	0.01	-0.13	-0.37	0.30	2.86	3.63	4.50	1.15	1.82	1.32	5.37	1.58	1.15	1.95
-20.05	17.79	-16.10	0.01	-0.13	0.12	-0.10	4.87	2.42	4.05	1.16	1.84	1.33	5.32	1.59	1.15	1.96
-82.83	18.72	-10.04	0.01	-0.50	0.11	-0.06	5.25	3.92	3.17	1.16	1.86	1.34	5.27	1.60	1.15	1.98
-26.61	83.52	3.97	0.01	-0.15	0.46	0.02	2.75	2.69	1.96	1.17	1.89	1.35	5.22	1.62	1.16	1.99
-8.53	68.22	-29.97	0.01	-0.04	0.34	-0.15	2.35	2.45	2.92	1.18	1.93	1.37	5.18	1.64	1.16	2.01
48.40	-80.75	-4.90	0.00	0.22	-0.36	-0.02	2.92	1.23	5.46	1.18	1.96	1.38	5.13	1.66	1.17	2.03
96.12	-79.43	49.01	0.00	0.38	-0.32	0.20	1.56	1.78	4.45	1.19	2.00	1.40	5.08	1.68	1.17	2.05
-24.02	-10.24	46.82	0.00	-0.08	-0.04	0.16	3.65	3.18	4.92	1.20	2.04	1.42	5.03	1.70	1.18	2.07
-46.87	-29.16	-13.24	0.00	-0.14	-0.09	-0.04	3.19	0.67	2.61	1.21	2.08	1.44	4.98	1.73	1.19	2.10
11.21	8.88	-29.15	0.00	0.03	0.02	-0.07	1.04	5.02	2.18	1.21	2.12	1.46	4.93	1.75	1.20	2.12
47.10	82.70	59.79	0.00	0.09	0.17	0.12	1.41	4.31	1.59	1.22	2.16	1.48	4.88	1.77	1.21	2.15
57.90	-69.32	78.51	0.00	0.09	-0.10	0.12	2.04	5.16	5.04	1.23	2.20	1.50	4.83	1.79	1.22	2.17

Microtremors Segment: B3-S2

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
42.75	60.68	-30.92	0.26	11.09	15.75	-8.02	5.86	7.60	19.64	5.81	6.37	6.61	30.03	1.10	1.14	1.58
-54.23	86.38	-185.49	0.26	-14.05	22.37	-48.04	0.23	9.43	13.87	5.77	6.28	6.70	29.98	1.09	1.16	1.59
8.86	42.12	-78.95	0.26	2.29	10.89	-20.41	4.13	7.29	4.50	5.72	6.18	6.80	29.93	1.08	1.19	1.61
-21.12	21.98	236.73	0.26	-5.45	5.67	61.08	8.75	6.41	4.22	5.68	6.08	6.91	29.88	1.07	1.22	1.62
-63.95	-45.98	237.78	0.26	-16.47	-11.84	61.23	10.75	14.94	15.57	5.62	5.98	7.02	29.83	1.06	1.25	1.64
17.14	-53.79	-94.50	0.26	4.41	-13.82	-24.29	3.38	3.49	19.91	5.57	5.89	7.13	29.79	1.06	1.28	1.66
-1.89	44.23	-218.88	0.26	-0.48	11.34	-56.14	5.93	11.78	10.09	5.51	5.79	7.24	29.74	1.05	1.31	1.68
-18.85	53.02	66.43	0.26	-4.82	13.57	17.01	6.88	10.30	4.54	5.45	5.69	7.35	29.69	1.04	1.35	1.71
51.09	19.87	167.96	0.26	13.05	5.08	42.91	2.34	2.74	16.87	5.38	5.58	7.46	29.64	1.04	1.39	1.73
25.93	41.74	-190.99	0.26	6.61	10.64	-48.70	10.57	3.88	33.42	5.32	5.48	7.56	29.59	1.03	1.42	1.76
-7.11	2.64	-300.00	0.25	-1.81	0.67	-76.35	12.05	9.49	33.12	5.26	5.38	7.65	29.54	1.02	1.46	1.78
-15.06	-32.31	106.39	0.25	-3.83	-8.21	27.02	6.60	5.24	11.34	5.19	5.27	7.74	29.49	1.02	1.49	1.80
-61.91	25.70	333.51	0.25	-15.69	6.51	84.55	5.56	5.51	16.08	5.13	5.17	7.81	29.44	1.01	1.52	1.83
14.18	18.60	91.66	0.25	3.59	4.71	23.19	7.09	7.03	4.97	5.07	5.06	7.88	29.39	1.00	1.55	1.84
72.01	-28.39	-231.06	0.25	18.18	-7.17	-58.34	9.63	10.86	15.30	5.02	4.94	7.92	29.35	0.99	1.58	1.86
-39.06	-33.27	-293.01	0.25	-9.84	-8.38	-73.84	8.62	9.06	31.52	4.97	4.83	7.95	29.30	0.97	1.60	1.87
-23.93	-44.12	64.46	0.25	-6.02	-11.10	16.21	12.66	8.47	38.92	4.92	4.71	7.96	29.25	0.96	1.62	1.88
51.01	-5.03	242.84	0.25	12.80	-1.26	60.95	9.47	4.29	14.65	4.87	4.59	7.95	29.20	0.94	1.63	1.89
11.88	78.81	-78.49	0.25	2.98	19.74	-19.66	13.18	2.78	8.39	4.82	4.47	7.92	29.15	0.93	1.64	1.89
29.80	127.39	-135.06	0.25	7.45	31.85	-33.76	14.74	10.00	12.51	4.78	4.36	7.87	29.10	0.91	1.65	1.88
0.73	62.00	151.91	0.25	0.18	15.47	37.90	18.84	3.91	32.89	4.74	4.24	7.80	29.05	0.89	1.65	1.88
-78.11	-113.90	244.12	0.25	-19.45	-28.36	60.79	12.67	10.10	18.24	4.69	4.12	7.72	29.00	0.88	1.65	1.87
9.03	-129.42	-46.27	0.25	2.24	-32.16	-11.50	11.31	4.38	19.75	4.65	4.01	7.63	28.96	0.86	1.64	1.85
31.94	37.76	-271.64	0.25	7.92	9.36	-67.37	14.39	10.73	9.32	4.61	3.90	7.53	28.91	0.85	1.63	1.84
-37.05	75.52	-88.91	0.25	-9.17	18.69	-22.01	19.06	6.67	33.60	4.57	3.79	7.42	28.86	0.83	1.63	1.83
-11.95	16.33	75.12	0.25	-2.95	4.03	18.56	16.90	7.00	27.82	4.52	3.69	7.31	28.81	0.82	1.62	1.81
-25.88	3.28	24.92	0.25	-6.38	0.81	6.14	10.45	8.45	6.67	4.48	3.59	7.19	28.76	0.80	1.61	1.79
11.15	-58.62	-123.87	0.25	2.74	-14.42	-30.47	11.94	10.85	21.31	4.44	3.50	7.07	28.71	0.79	1.59	1.78
29.07	-64.38	-67.49	0.25	7.14	-15.80	-16.57	10.18	8.43	2.86	4.39	3.41	6.96	28.66	0.78	1.59	1.77
-45.90	46.65	126.40	0.25	-11.25	11.43	30.97	8.89	13.35	8.80	4.34	3.33	6.85	28.61	0.77	1.58	1.75
-39.73	50.45	175.80	0.24	-9.71	12.33	42.98	6.39	12.93	5.69	4.29	3.26	6.75	28.56	0.76	1.57	1.75
-42.56	-30.60	-34.49	0.24	-10.39	-7.47	-8.41	4.88	7.91	6.17	4.24	3.19	6.65	28.52	0.75	1.57	1.74
8.50	-80.39	-456.50	0.24	2.07	-19.57	-111.16	7.25	8.98	9.19	4.19	3.13	6.57	28.47	0.75	1.57	1.74

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
18.16	58.83	466.80	0.24	4.40	14.27	113.20	13.74	4.61	35.56	4.09	3.03	6.44	28.37	0.742	1.576	1.742
-36.80	117.47	58.74	0.24	-8.91	28.43	14.22	14.05	0.34	44.19	4.04	2.99	6.40	28.32	0.741	1.583	1.748
-7.71	89.04	-175.02	0.24	-1.86	21.50	-42.27	11.06	3.66	19.29	4.00	2.96	6.37	28.27	0.741	1.593	1.757
66.17	-39.07	-42.58	0.24	15.95	-9.41	-10.26	9.52	4.12	7.86	3.96	2.93	6.35	28.22	0.741	1.605	1.768
-29.91	-106.78	92.32	0.24	-7.19	-25.68	22.20	11.55	7.80	9.47	3.92	2.91	6.34	28.17	0.741	1.618	1.780
-110.62	-56.46	198.74	0.24	-26.55	-13.55	47.70	13.95	5.39	6.55	3.89	2.89	6.35	28.13	0.741	1.632	1.792
16.56	-24.31	-14.62	0.24	3.97	-5.82	-3.50	20.09	10.76	24.63	3.87	2.87	6.37	28.08	0.741	1.645	1.804
99.33	-16.23	-269.05	0.24	23.74	-3.88	-64.30	14.53	17.08	1.15	3.85	2.86	6.39	28.03	0.741	1.658	1.816
9.11	-24.16	-173.16	0.24	2.17	-5.76	-41.30	9.96	13.32	23.61	3.85	2.85	6.42	27.98	0.740	1.670	1.826
-56.79	5.87	192.80	0.24	-13.52	1.40	45.89	7.91	7.82	11.78	3.84	2.84	6.45	27.93	0.739	1.679	1.835
24.27	46.76	229.96	0.24	5.76	11.10	54.62	13.26	9.53	32.68	3.85	2.84	6.49	27.88	0.737	1.687	1.841
11.20	18.62	-98.30	0.24	2.65	4.41	-23.30	12.16	8.83	27.44	3.86	2.83	6.52	27.83	0.735	1.692	1.844
5.16	-31.36	-176.75	0.24	1.22	-7.42	-41.80	1.64	8.75	9.42	3.87	2.83	6.56	27.78	0.731	1.693	1.844
91.97	-59.19	144.32	0.24	21.70	-13.97	34.06	10.44	23.86	17.02	3.90	2.83	6.59	27.73	0.728	1.691	1.841
-23.17	-16.05	276.48	0.24	-5.46	-3.78	65.11	11.01	11.22	19.74	3.92	2.84	6.62	27.69	0.723	1.687	1.835
-94.94	40.90	-82.91	0.24	-22.31	9.61	-19.48	13.28	11.51	6.86	3.96	2.84	6.64	27.64	0.718	1.679	1.826
35.18	59.69	-335.07	0.23	8.25	14.00	-78.57	19.93	15.38	28.18	3.99	2.85	6.66	27.59	0.713	1.669	1.815
56.00	31.50	-36.32	0.23	13.10	7.37	-8.50	23.88	14.47	23.31	4.03	2.85	6.67	27.54	0.707	1.656	1.801
-37.04	-8.56	332.09	0.23	-8.65	-2.00	77.54	20.91	7.31	33.13	4.07	2.86	6.68	27.49	0.702	1.642	1.786
-7.95	67.32	75.28	0.23	-1.85	15.69	17.54	23.13	13.41	38.72	4.11	2.86	6.68	27.44	0.697	1.627	1.770
75.91	44.09	-162.55	0.23	17.65	10.25	-37.79	23.27	9.96	24.76	4.14	2.87	6.68	27.39	0.693	1.612	1.754
-5.23	-105.80	40.70	0.23	-1.21	-24.55	9.44	9.90	7.59	4.66	4.18	2.88	6.67	27.34	0.689	1.596	1.738
-78.07	-69.45	120.38	0.23	-18.07	-16.08	27.87	2.55	16.68	18.92	4.21	2.89	6.66	27.29	0.686	1.579	1.722
-9.89	11.65	64.01	0.23	-2.29	2.69	14.79	6.05	20.28	2.44	4.25	2.90	6.64	27.25	0.683	1.563	1.706
59.01	35.55	-238.64	0.23	13.60	8.19	-55.01	18.34	6.77	26.27	4.28	2.92	6.62	27.20	0.682	1.547	1.691
22.84	44.38	-262.63	0.23	5.25	10.21	-60.40	23.38	13.93	19.05	4.31	2.93	6.60	27.15	0.681	1.532	1.677
-82.04	21.24	255.39	0.23	-18.83	4.88	58.61	20.33	15.37	24.45	4.33	2.96	6.58	27.10	0.682	1.518	1.664
-51.78	7.18	259.36	0.23	-11.86	1.64	59.39	12.53	16.33	6.96	4.36	2.98	6.56	27.05	0.684	1.505	1.653
25.28	-39.76	-78.01	0.23	5.78	-9.09	-17.82	5.42	9.56	20.75	4.38	3.01	6.54	27.00	0.686	1.493	1.643
-2.77	-1.69	-111.62	0.23	-0.63	-0.39	-25.45	6.17	7.81	11.84	4.40	3.03	6.53	26.95	0.690	1.483	1.635
-12.74	52.20	4.59	0.23	-2.90	11.88	1.04	3.93	11.84	7.78	4.42	3.07	6.52	26.90	0.694	1.474	1.629
31.22	18.05	102.38	0.23	7.09	4.10	23.24	7.07	14.32	5.57	4.44	3.11	6.52	26.86	0.699	1.467	1.625
26.11	19.97	48.08	0.23	5.91	4.52	10.89	9.86	12.70	20.66	4.47	3.15	6.52	26.81	0.705	1.460	1.621

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
23.01	8.90	-112.79	0.23	5.20	2.01	-25.49	7.86	5.47	10.41	4.49	3.19	6.53	26.76	0.711	1.455	1.619
82.79	4.86	-221.12	0.23	18.67	1.10	-49.86	8.16	13.01	17.27	4.51	3.24	6.55	26.71	0.718	1.450	1.618
8.61	24.80	22.28	0.23	1.94	5.58	5.01	11.23	1.27	17.16	4.54	3.30	6.57	26.66	0.726	1.446	1.618
-85.24	108.52	293.65	0.22	-19.14	24.36	65.93	11.84	5.29	20.91	4.57	3.36	6.59	26.61	0.734	1.442	1.618
-22.03	110.07	30.01	0.22	-4.93	24.66	6.72	14.77	10.56	18.62	4.60	3.42	6.62	26.56	0.743	1.439	1.619
25.96	-97.96	-201.65	0.22	5.80	-21.89	-45.07	13.43	6.07	30.94	4.64	3.49	6.65	26.51	0.752	1.436	1.621
-25.04	-118.54	-70.10	0.22	-5.58	-26.43	-15.63	7.92	5.33	22.46	4.67	3.55	6.69	26.46	0.761	1.433	1.622
-56.88	-0.31	71.90	0.22	-12.66	-0.07	16.00	3.34	13.95	4.10	4.70	3.62	6.73	26.42	0.771	1.430	1.625
31.17	19.64	30.69	0.22	6.92	4.36	6.81	1.74	5.40	12.70	4.74	3.70	6.77	26.37	0.780	1.428	1.627
32.04	29.53	-127.11	0.22	7.10	6.54	-28.15	3.67	5.01	16.69	4.77	3.77	6.81	26.32	0.789	1.426	1.630
-64.89	-15.50	-80.69	0.22	-14.34	-3.43	-17.83	4.86	10.22	23.92	4.81	3.84	6.85	26.27	0.798	1.424	1.632
-18.73	-84.31	60.35	0.22	-4.13	-18.59	13.31	5.78	5.67	17.74	4.84	3.91	6.88	26.22	0.807	1.422	1.635
29.25	-97.96	92.05	0.22	6.44	-21.55	20.25	6.05	15.28	13.92	4.87	3.97	6.92	26.17	0.816	1.419	1.637
22.15	29.17	18.83	0.22	4.86	6.40	4.13	9.98	9.86	4.72	4.90	4.04	6.94	26.12	0.824	1.417	1.639
53.99	156.79	-107.99	0.22	11.82	34.34	-23.65	12.10	6.28	6.29	4.92	4.10	6.97	26.07	0.832	1.415	1.642
25.83	63.34	-36.69	0.22	5.64	13.84	-8.02	8.44	9.84	16.26	4.94	4.15	6.98	26.03	0.841	1.414	1.645
-35.15	-54.69	131.12	0.22	-7.66	-11.92	28.58	8.80	9.06	26.46	4.95	4.20	6.99	25.98	0.849	1.413	1.648
-34.02	-42.50	105.65	0.22	-7.40	-9.24	22.98	11.02	9.05	28.32	4.95	4.24	6.99	25.93	0.857	1.412	1.652
6.04	30.51	-215.13	0.22	1.31	6.62	-46.68	13.95	16.55	16.25	4.94	4.27	6.99	25.88	0.865	1.413	1.657
43.94	66.31	-240.21	0.22	9.51	14.36	-52.01	14.42	3.67	14.20	4.93	4.30	6.97	25.83	0.873	1.415	1.662
-25.10	19.13	232.81	0.22	-5.42	4.13	50.29	14.47	6.72	25.20	4.90	4.32	6.95	25.78	0.881	1.418	1.669
-119.81	-37.84	201.94	0.22	-25.82	-8.16	43.52	11.54	14.00	14.73	4.87	4.33	6.93	25.73	0.888	1.422	1.677
-54.47	-63.65	-107.25	0.22	-11.71	-13.68	-23.06	5.79	11.73	1.85	4.83	4.33	6.90	25.68	0.896	1.428	1.686
32.58	-59.41	-154.72	0.21	6.99	-12.74	-33.19	5.94	3.37	14.67	4.78	4.32	6.86	25.63	0.904	1.435	1.696
35.44	-4.29	-100.21	0.21	7.58	-0.92	-21.44	1.46	11.74	19.14	4.72	4.30	6.82	25.59	0.911	1.444	1.708
53.26	63.58	123.75	0.21	11.37	13.57	26.42	1.96	23.90	15.04	4.66	4.28	6.78	25.54	0.919	1.455	1.721
23.11	17.41	138.23	0.21	4.92	3.71	29.44	10.32	19.61	11.74	4.59	4.25	6.74	25.49	0.926	1.467	1.735
-36.87	-61.51	-19.01	0.21	-7.83	-13.07	-4.04	6.23	6.09	18.45	4.52	4.22	6.69	25.44	0.934	1.481	1.751
13.18	-0.40	-126.71	0.21	2.79	-0.08	-26.86	1.96	7.36	17.72	4.44	4.18	6.64	25.39	0.941	1.497	1.769
34.08	51.49	-77.30	0.21	7.21	10.89	-16.35	1.70	1.01	8.14	4.35	4.13	6.60	25.34	0.949	1.515	1.788
-31.92	53.27	234.39	0.21	-6.74	11.24	49.46	0.57	4.10	6.74	4.27	4.08	6.55	25.29	0.957	1.535	1.809
-19.82	27.10	145.63	0.21	-4.17	5.70	30.66	7.92	5.32	28.55	4.18	4.03	6.51	25.24	0.965	1.557	1.831
40.14	-108.75	-218.22	0.21	8.43	-22.84	-45.83	6.97	12.95	33.61	4.09	3.98	6.47	25.20	0.973	1.579	1.855

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
42.97	-124.29	-161.46	0.21	9.00	-26.04	-33.83	1.81	13.35	7.34	4.01	3.93	6.43	25.15	0.981	1.604	1.880
-14.09	29.89	45.78	0.21	-2.94	6.25	9.57	7.63	9.06	8.17	3.93	3.88	6.39	25.10	0.989	1.629	1.906
-43.98	133.56	99.49	0.21	-9.17	27.85	20.74	8.84	3.61	29.63	3.85	3.83	6.36	25.05	0.997	1.655	1.932
-7.87	97.08	58.18	0.21	-1.64	20.19	12.10	4.44	14.17	26.91	3.77	3.79	6.34	25.00	1.005	1.682	1.959
20.10	-59.00	-98.74	0.21	4.17	-12.24	-20.49	9.28	18.35	18.70	3.70	3.75	6.31	24.95	1.014	1.708	1.987
-13.91	-123.65	-41.45	0.21	-2.88	-25.59	-8.58	11.02	30.77	27.60	3.63	3.71	6.29	24.90	1.023	1.735	2.014
-24.84	-15.38	211.21	0.21	-5.13	-3.18	43.61	12.42	36.85	27.30	3.56	3.67	6.28	24.85	1.032	1.762	2.042
55.10	108.43	15.76	0.21	11.35	22.34	3.25	2.61	24.95	13.00	3.50	3.65	6.26	24.80	1.041	1.788	2.069
52.88	90.02	-209.85	0.21	10.87	18.50	-43.12	5.19	16.55	16.25	3.44	3.62	6.25	24.76	1.052	1.814	2.097
-10.21	-77.02	38.50	0.21	-2.09	-15.79	7.89	9.29	21.11	25.84	3.39	3.61	6.24	24.71	1.064	1.840	2.125
44.72	-118.63	171.08	0.20	9.15	-24.26	34.99	9.18	22.59	16.29	3.34	3.60	6.23	24.66	1.077	1.865	2.153
97.44	-0.40	-10.24	0.20	19.88	-0.08	-2.09	11.90	25.27	37.65	3.30	3.59	6.23	24.61	1.091	1.889	2.182
16.20	58.47	-103.01	0.20	3.30	11.90	-20.96	11.17	29.30	29.80	3.25	3.60	6.22	24.56	1.106	1.914	2.210
-58.71	32.28	-4.79	0.20	-11.92	6.55	-0.97	6.77	18.22	10.94	3.21	3.61	6.22	24.51	1.123	1.938	2.240
-43.51	-34.73	73.07	0.20	-8.81	-7.03	14.80	13.91	22.28	11.45	3.17	3.62	6.23	24.46	1.141	1.962	2.270
-51.32	-57.55	75.78	0.20	-10.37	-11.62	15.31	10.89	28.80	19.19	3.14	3.65	6.24	24.41	1.162	1.988	2.302
12.75	15.53	-47.28	0.20	2.57	3.13	-9.53	17.06	49.58	25.06	3.10	3.67	6.25	24.37	1.185	2.014	2.336
98.53	81.32	-184.81	0.20	19.80	16.35	-37.15	32.50	63.49	16.15	3.07	3.71	6.26	24.32	1.210	2.041	2.373
-4.67	-9.83	-25.38	0.20	-0.94	-1.97	-5.09	37.01	14.78	12.49	3.03	3.76	6.28	24.27	1.239	2.070	2.412
-50.56	-84.65	220.23	0.20	-10.11	-16.93	44.05	46.60	71.91	46.04	3.00	3.81	6.30	24.22	1.271	2.100	2.454
28.48	45.42	150.49	0.20	5.68	9.06	30.02	52.74	43.38	115.44	2.97	3.88	6.32	24.17	1.306	2.130	2.499
3.42	26.27	-161.49	0.20	0.68	5.23	-32.14	17.09	18.68	87.51	2.94	3.95	6.35	24.12	1.344	2.162	2.546
-42.51	-101.59	-105.95	0.20	-8.44	-20.17	-21.03	26.48	20.75	73.99	2.91	4.04	6.39	24.07	1.386	2.194	2.595
33.51	-21.35	263.74	0.20	6.63	-4.23	52.22	42.57	16.24	103.47	2.89	4.13	6.43	24.02	1.430	2.226	2.646
24.39	25.63	134.94	0.20	4.82	5.06	26.65	30.05	17.56	71.15	2.87	4.25	6.49	23.97	1.477	2.257	2.697
-53.56	16.54	-203.93	0.20	-10.55	3.26	-40.17	19.50	36.52	11.90	2.86	4.37	6.55	23.93	1.526	2.286	2.748
40.47	66.36	-162.19	0.20	7.95	13.04	-31.87	9.64	25.50	5.89	2.86	4.51	6.62	23.88	1.574	2.312	2.797
37.31	29.16	20.10	0.20	7.31	5.72	3.94	5.58	13.35	18.43	2.87	4.66	6.71	23.83	1.623	2.335	2.843
-79.61	-22.86	146.77	0.20	-15.56	-4.47	28.69	7.29	18.15	17.02	2.89	4.83	6.81	23.78	1.669	2.353	2.885
-42.37	11.15	151.17	0.20	-8.26	2.17	29.48	8.66	30.34	16.55	2.93	5.01	6.92	23.73	1.713	2.366	2.921
35.64	-2.88	-63.01	0.19	6.93	-0.56	-12.25	15.93	7.67	22.49	2.97	5.21	7.05	23.68	1.753	2.372	2.949
46.48	-38.80	-207.46	0.19	9.02	-7.53	-40.25	24.90	17.97	66.11	3.04	5.43	7.20	23.63	1.788	2.372	2.970
-52.52	33.20	9.94	0.19	-10.16	6.42	1.92	10.28	14.68	49.44	3.11	5.66	7.36	23.58	1.816	2.364	2.981

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-80.25	76.97	132.65	0.19	-15.49	14.86	25.60	7.81	13.29	14.68	3.21	5.90	7.54	23.54	1.838	2.349	2.983
23.86	-27.14	-77.46	0.19	4.59	-5.22	-14.91	7.21	25.12	18.34	3.32	6.16	7.73	23.49	1.853	2.328	2.975
46.72	-102.89	-185.93	0.19	8.97	-19.75	-35.70	17.62	27.99	32.49	3.45	6.42	7.95	23.44	1.860	2.301	2.958
32.55	-30.63	11.43	0.19	6.23	-5.87	2.19	17.91	16.60	38.46	3.61	6.70	8.18	23.39	1.859	2.269	2.934
-29.45	53.32	220.96	0.19	-5.63	10.18	42.20	3.33	2.63	27.06	3.77	6.99	8.44	23.34	1.851	2.235	2.902
-91.22	94.01	18.49	0.19	-17.38	17.91	3.52	13.98	24.77	44.91	3.96	7.27	8.71	23.29	1.837	2.200	2.867
-22.99	35.74	-178.19	0.19	-4.37	6.79	-33.86	10.20	25.64	32.12	4.16	7.56	9.01	23.24	1.818	2.165	2.827
45.96	-65.21	-4.82	0.19	8.71	-12.36	-0.91	7.04	15.12	16.36	4.37	7.84	9.32	23.19	1.794	2.132	2.786
55.76	11.89	84.02	0.19	10.54	2.25	15.88	1.62	9.19	10.15	4.59	8.12	9.64	23.14	1.767	2.100	2.744
58.53	48.75	67.72	0.19	11.03	9.19	12.76	3.60	7.26	16.05	4.82	8.38	9.98	23.10	1.738	2.070	2.703
-0.59	-1.35	-30.35	0.19	-0.11	-0.25	-5.71	4.16	6.55	15.89	5.05	8.63	10.32	23.05	1.708	2.042	2.662
-60.47	4.63	-158.97	0.19	-11.34	0.87	-29.81	9.87	15.73	15.05	5.29	8.87	10.67	23.00	1.677	2.018	2.624
-16.32	-52.28	13.32	0.19	-3.05	-9.78	2.49	11.65	8.54	26.17	5.51	9.08	11.01	22.95	1.647	1.997	2.588
-17.26	-21.15	211.87	0.19	-3.22	-3.94	39.51	9.62	4.76	6.83	5.74	9.28	11.35	22.90	1.617	1.978	2.555
-48.13	8.87	86.28	0.19	-8.95	1.65	16.05	5.48	8.46	7.79	5.95	9.45	11.68	22.85	1.588	1.963	2.525
8.95	-81.99	-170.55	0.19	1.66	-15.21	-31.64	7.88	5.05	25.47	6.15	9.59	12.00	22.80	1.560	1.952	2.498
27.87	1.16	-242.72	0.19	5.16	0.21	-44.90	13.94	10.86	36.95	6.33	9.70	12.30	22.75	1.533	1.943	2.475
-14.16	142.86	-9.21	0.18	-2.61	26.36	-1.70	11.03	7.45	2.70	6.49	9.79	12.58	22.71	1.507	1.938	2.456
-59.01	54.45	213.38	0.18	-10.86	10.02	39.26	5.49	4.99	15.03	6.63	9.83	12.84	22.66	1.483	1.937	2.440
1.10	-88.49	62.83	0.18	0.20	-16.24	11.53	5.48	17.45	7.33	6.74	9.85	13.08	22.61	1.461	1.939	2.428
44.01	-34.25	-100.09	0.18	8.05	-6.27	-18.32	5.47	12.20	9.12	6.83	9.84	13.28	22.56	1.440	1.944	2.419
0.92	50.71	-49.79	0.18	0.17	9.25	-9.09	8.51	8.59	6.95	6.89	9.79	13.44	22.51	1.421	1.951	2.414
20.87	35.52	20.27	0.18	3.80	6.46	3.69	11.57	8.00	17.70	6.91	9.71	13.56	22.46	1.404	1.961	2.412
-34.10	53.33	118.00	0.18	-6.19	9.68	21.42	4.48	6.17	23.50	6.91	9.60	13.64	22.41	1.390	1.973	2.414
-22.99	10.19	-34.17	0.18	-4.16	1.85	-6.18	12.35	6.01	19.51	6.88	9.47	13.67	22.36	1.377	1.987	2.418
46.96	-78.68	-222.65	0.18	8.48	-14.20	-40.19	16.54	10.54	3.41	6.82	9.32	13.65	22.31	1.367	2.003	2.425
-0.14	-11.51	7.78	0.18	-0.02	-2.07	1.40	6.66	11.14	19.65	6.73	9.14	13.60	22.27	1.358	2.020	2.434
-8.12	43.42	258.26	0.18	-1.46	7.79	46.36	8.28	9.92	18.81	6.62	8.94	13.50	22.22	1.351	2.039	2.446
-34.04	-49.58	138.46	0.18	-6.09	-8.88	24.78	6.77	4.68	5.83	6.49	8.73	13.36	22.17	1.346	2.059	2.460
-12.95	-75.34	-226.36	0.18	-2.31	-13.45	-40.41	3.85	1.77	1.66	6.34	8.51	13.19	22.12	1.342	2.080	2.476
14.05	2.79	-232.44	0.18	2.50	0.50	-41.37	2.57	3.60	0.29	6.17	8.27	12.98	22.07	1.339	2.102	2.493
0.02	-0.22	134.76	0.18	0.00	-0.04	23.92	10.56	7.92	9.61	6.00	8.02	12.74	22.02	1.338	2.125	2.511
49.92	-44.14	170.15	0.18	8.84	-7.81	30.12	10.78	10.05	13.77	5.81	7.77	12.48	21.97	1.337	2.148	2.530

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
35.74	19.90	-68.05	0.18	6.31	3.51	-12.01	6.15	14.42	16.40	5.62	7.51	12.19	21.92	1.337	2.170	2.549
28.61	92.66	-94.72	0.18	5.04	16.31	-16.67	5.11	7.61	8.51	5.42	7.25	11.88	21.88	1.338	2.192	2.568
-2.44	30.41	96.28	0.18	-0.43	5.34	16.90	9.74	5.35	5.66	5.22	7.00	11.54	21.83	1.340	2.211	2.585
-30.38	-109.45	157.77	0.18	-5.32	-19.15	27.61	4.82	9.80	11.37	5.03	6.74	11.20	21.78	1.342	2.228	2.601
41.59	-39.16	-22.50	0.17	7.26	-6.83	-3.93	5.32	10.61	25.71	4.83	6.49	10.84	21.73	1.343	2.242	2.614
7.49	174.56	-138.17	0.17	1.30	30.37	-24.04	3.80	9.48	16.67	4.65	6.25	10.47	21.68	1.345	2.252	2.623
-43.44	62.07	-6.88	0.17	-7.54	10.77	-1.19	2.05	7.75	2.98	4.48	6.02	10.11	21.63	1.345	2.258	2.628
-4.35	-130.80	149.84	0.17	-0.75	-22.63	25.92	6.13	8.23	12.36	4.31	5.79	9.74	21.58	1.343	2.260	2.629
9.64	-70.41	91.35	0.17	1.66	-12.14	15.76	4.73	9.73	16.74	4.16	5.57	9.39	21.53	1.340	2.257	2.625
39.54	47.63	-117.59	0.17	6.80	8.19	-20.23	2.14	8.79	12.30	4.02	5.36	9.04	21.48	1.335	2.249	2.615
75.31	155.21	-85.18	0.17	12.92	26.62	-14.61	5.41	4.20	7.89	3.89	5.17	8.70	21.44	1.327	2.236	2.600
-10.83	47.79	151.68	0.17	-1.85	8.17	25.94	7.25	0.39	12.16	3.78	4.98	8.38	21.39	1.317	2.217	2.579
-98.61	-189.93	177.03	0.17	-16.81	-32.38	30.18	4.93	8.41	4.44	3.68	4.80	8.06	21.34	1.305	2.194	2.553
-46.32	-149.26	-32.26	0.17	-7.87	-25.37	-5.49	6.47	3.05	14.17	3.58	4.63	7.76	21.29	1.292	2.167	2.523
36.69	55.92	-280.64	0.17	6.22	9.48	-47.57	2.20	1.86	14.00	3.50	4.47	7.47	21.24	1.278	2.136	2.489
108.40	148.50	-52.97	0.17	18.32	25.10	-8.95	5.52	4.72	12.17	3.42	4.33	7.20	21.19	1.263	2.102	2.452
95.99	14.16	195.75	0.17	16.17	2.39	32.98	2.54	5.32	1.13	3.36	4.19	6.94	21.14	1.248	2.066	2.413
-72.07	-114.65	-14.61	0.17	-12.11	-19.26	-2.45	1.50	5.71	7.00	3.30	4.06	6.69	21.09	1.232	2.029	2.373
-87.75	-6.42	5.41	0.17	-14.70	-1.07	0.91	3.42	3.59	8.62	3.24	3.95	6.46	21.04	1.216	1.991	2.333
74.28	30.53	-29.54	0.17	12.40	5.10	-4.93	1.56	6.84	18.37	3.20	3.84	6.24	21.00	1.201	1.954	2.294
57.01	-44.46	-14.45	0.17	9.49	-7.40	-2.41	3.22	12.38	14.20	3.15	3.74	6.04	20.95	1.187	1.918	2.256
-40.03	-18.34	172.23	0.17	-6.64	-3.04	28.59	6.05	11.26	3.80	3.11	3.65	5.86	20.90	1.175	1.885	2.221
6.03	-12.29	-39.04	0.17	1.00	-2.03	-6.46	5.26	8.60	7.10	3.07	3.57	5.69	20.85	1.163	1.855	2.189
57.90	1.72	-150.65	0.17	9.55	0.28	-24.86	2.56	6.17	6.88	3.03	3.49	5.53	20.80	1.154	1.828	2.162
27.73	49.61	-37.28	0.16	4.56	8.16	-6.13	3.96	6.52	2.75	2.99	3.42	5.39	20.75	1.146	1.805	2.139
-14.31	-33.43	146.51	0.16	-2.35	-5.48	24.03	2.65	4.72	14.83	2.94	3.36	5.26	20.70	1.141	1.787	2.120
-36.21	-93.19	190.83	0.16	-5.92	-15.24	31.20	1.79	5.70	16.08	2.90	3.30	5.14	20.65	1.138	1.772	2.106
-50.04	20.95	-123.31	0.16	-8.16	3.41	-20.10	5.39	4.93	17.10	2.86	3.25	5.03	20.61	1.138	1.762	2.098
-34.87	86.72	-238.58	0.16	-5.67	14.09	-38.77	1.92	2.86	16.81	2.81	3.20	4.93	20.56	1.140	1.756	2.094
7.18	-29.40	71.76	0.16	1.16	-4.76	11.62	1.95	4.23	6.55	2.76	3.16	4.84	20.51	1.145	1.755	2.095
-9.82	-75.20	264.09	0.16	-1.59	-12.15	42.65	1.50	3.23	9.38	2.71	3.11	4.76	20.46	1.151	1.758	2.101
-68.67	63.81	-62.32	0.16	-11.06	10.27	-10.03	2.08	1.76	12.25	2.65	3.07	4.68	20.41	1.160	1.766	2.113
34.40	107.46	-258.68	0.16	5.52	17.25	-41.52	2.34	2.42	5.16	2.60	3.04	4.62	20.36	1.170	1.778	2.129

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
127.07	28.18	10.82	0.16	20.33	4.51	1.73	1.84	2.16	14.05	2.54	3.00	4.56	20.31	1.182	1.795	2.149
-44.10	-56.78	210.38	0.16	-7.03	-9.06	33.56	8.56	8.05	12.42	2.48	2.96	4.50	20.26	1.196	1.817	2.175
-99.81	-83.51	85.79	0.16	-15.87	-13.28	13.64	6.05	12.00	6.30	2.42	2.93	4.46	20.21	1.211	1.842	2.205
1.38	31.59	-205.97	0.16	0.22	5.01	-32.65	1.87	7.75	7.27	2.36	2.89	4.41	20.17	1.228	1.872	2.239
-1.62	31.45	-149.26	0.16	-0.26	4.97	-23.58	4.25	6.23	6.46	2.29	2.86	4.37	20.12	1.245	1.906	2.277
6.37	-85.45	113.82	0.16	1.00	-13.46	17.93	6.81	5.51	6.11	2.23	2.82	4.34	20.07	1.265	1.943	2.318
-35.58	-35.22	75.44	0.16	-5.59	-5.53	11.84	4.14	6.49	9.70	2.17	2.79	4.30	20.02	1.285	1.983	2.363
-52.40	35.77	-92.53	0.16	-8.20	5.60	-14.48	0.81	5.32	13.29	2.11	2.75	4.27	19.97	1.306	2.026	2.410
41.61	79.53	-205.93	0.16	6.49	12.41	-32.12	1.02	2.27	5.93	2.05	2.72	4.24	19.92	1.328	2.071	2.460
25.48	81.20	-16.48	0.16	3.96	12.63	-2.56	4.12	4.82	11.63	1.99	2.69	4.21	19.87	1.350	2.118	2.512
-29.52	-43.89	283.99	0.16	-4.58	-6.80	44.02	3.13	2.93	9.21	1.93	2.65	4.19	19.82	1.372	2.167	2.565
-72.32	-63.68	93.23	0.15	-11.17	-9.84	14.40	1.14	4.13	10.82	1.88	2.62	4.16	19.78	1.394	2.218	2.620
-67.04	56.32	-254.44	0.15	-10.32	8.67	-39.18	3.45	5.81	8.75	1.82	2.58	4.14	19.73	1.415	2.270	2.675
84.92	97.01	-177.57	0.15	13.04	14.89	-27.26	8.90	6.95	21.22	1.77	2.55	4.12	19.68	1.437	2.323	2.731
148.45	-17.17	114.56	0.15	22.71	-2.63	17.53	7.41	8.63	13.14	1.72	2.51	4.10	19.63	1.458	2.377	2.788
26.10	-122.90	113.10	0.15	3.98	-18.74	17.25	2.91	6.24	9.22	1.68	2.48	4.08	19.58	1.479	2.430	2.845
-83.79	21.30	-90.94	0.15	-12.74	3.24	-13.82	4.95	6.20	17.60	1.64	2.45	4.06	19.53	1.498	2.483	2.900
13.35	196.85	-55.64	0.15	2.02	29.82	-8.43	4.13	4.12	14.76	1.60	2.42	4.04	19.48	1.517	2.534	2.954
83.15	66.31	93.29	0.15	12.56	10.01	14.09	2.22	5.73	7.63	1.56	2.39	4.02	19.43	1.535	2.583	3.005
-82.85	-166.50	112.87	0.15	-12.47	-25.06	16.99	0.76	7.12	6.57	1.52	2.36	4.01	19.38	1.551	2.630	3.053
-96.50	-138.90	45.56	0.15	-14.47	-20.83	6.83	0.81	4.80	4.07	1.49	2.34	3.99	19.34	1.565	2.673	3.098
16.66	71.23	-41.45	0.15	2.49	10.65	-6.20	1.12	5.27	14.58	1.47	2.31	3.98	19.29	1.577	2.713	3.138
54.52	77.92	-87.19	0.15	8.12	11.61	-12.99	1.44	5.96	9.04	1.44	2.29	3.96	19.24	1.587	2.749	3.174
39.32	-143.96	-46.92	0.15	5.84	-21.38	-6.97	4.27	3.50	5.87	1.42	2.27	3.95	19.19	1.594	2.782	3.206
-50.66	-200.28	108.96	0.15	-7.50	-29.64	16.13	1.17	4.25	10.46	1.40	2.24	3.94	19.14	1.600	2.811	3.235
-14.53	19.08	79.58	0.15	-2.14	2.81	11.74	2.59	7.50	13.66	1.39	2.22	3.93	19.09	1.604	2.838	3.260
69.36	165.70	-98.38	0.15	10.20	24.36	-14.46	3.06	10.52	9.03	1.37	2.21	3.93	19.04	1.607	2.861	3.281
43.13	48.26	42.74	0.15	6.32	7.07	6.26	0.67	7.51	5.88	1.36	2.19	3.92	18.99	1.608	2.881	3.299
-29.90	-78.69	169.31	0.15	-4.37	-11.49	24.72	0.51	5.66	7.12	1.35	2.17	3.92	18.95	1.607	2.897	3.313
-105.63	-17.51	1.97	0.15	-15.37	-2.55	0.29	1.74	9.09	2.31	1.34	2.16	3.91	18.90	1.606	2.910	3.324
-33.36	120.28	-115.80	0.15	-4.84	17.44	-16.79	3.01	4.55	6.30	1.34	2.15	3.91	18.85	1.603	2.920	3.331
82.54	74.87	-65.44	0.14	11.93	10.82	-9.46	3.45	6.28	2.92	1.33	2.14	3.91	18.80	1.600	2.927	3.336
23.33	-122.04	50.59	0.14	3.36	-17.57	7.29	4.94	1.32	13.54	1.33	2.13	3.90	18.75	1.597	2.932	3.339

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-52.62	-75.66	63.36	0.14	-7.55	-10.86	9.09	5.70	2.14	11.27	1.33	2.12	3.90	18.70	1.593	2.935	3.340
4.47	153.18	5.23	0.14	0.64	21.90	0.75	2.55	2.78	5.73	1.33	2.11	3.91	18.65	1.590	2.938	3.341
-6.52	147.56	9.20	0.14	-0.93	21.03	1.31	0.32	7.01	3.98	1.33	2.11	3.91	18.60	1.588	2.940	3.342
-37.44	-61.62	34.11	0.14	-5.32	-8.75	4.84	3.45	8.35	2.14	1.33	2.11	3.91	18.55	1.587	2.944	3.345
18.60	-164.18	70.90	0.14	2.63	-23.23	10.03	1.83	6.42	5.37	1.33	2.11	3.91	18.51	1.588	2.949	3.349
-41.36	-49.76	41.68	0.14	-5.83	-7.02	5.88	3.87	5.42	9.30	1.32	2.10	3.91	18.46	1.591	2.956	3.356
-76.13	95.14	-131.14	0.14	-10.70	13.37	-18.43	6.70	12.46	13.16	1.32	2.10	3.91	18.41	1.596	2.964	3.366
48.92	96.74	-157.56	0.14	6.85	13.54	-22.06	2.05	8.10	11.92	1.31	2.11	3.91	18.36	1.603	2.974	3.379
95.63	-28.40	94.56	0.14	13.34	-3.96	13.19	2.86	1.59	3.52	1.31	2.11	3.91	18.31	1.613	2.986	3.394
4.43	-120.12	101.17	0.14	0.62	-16.70	14.06	0.90	4.84	2.57	1.30	2.11	3.90	18.26	1.624	2.999	3.410
-49.48	3.11	-104.82	0.14	-6.85	0.43	-14.52	3.62	5.55	3.38	1.29	2.12	3.89	18.21	1.639	3.012	3.429
-9.37	168.75	26.34	0.14	-1.29	23.29	3.63	1.43	2.63	1.25	1.28	2.12	3.88	18.16	1.656	3.027	3.450
2.64	92.22	147.99	0.14	0.36	12.68	20.35	2.87	6.88	4.78	1.27	2.13	3.87	18.12	1.675	3.042	3.473
-50.26	-89.80	38.61	0.14	-6.89	-12.30	5.29	4.24	9.60	3.50	1.26	2.14	3.85	18.07	1.697	3.058	3.497
-54.06	-105.42	12.51	0.14	-7.38	-14.39	1.71	2.44	13.49	2.79	1.25	2.15	3.83	18.02	1.721	3.074	3.523
51.94	-30.16	-97.32	0.14	7.06	-4.10	-13.24	0.64	12.51	8.66	1.23	2.16	3.81	17.97	1.747	3.089	3.549
110.62	-35.04	-197.73	0.14	14.99	-4.75	-26.79	2.32	7.64	7.47	1.22	2.16	3.78	17.92	1.776	3.104	3.576
-1.61	-22.93	54.56	0.14	-0.22	-3.10	7.37	16.85	22.63	8.46	1.20	2.17	3.75	17.87	1.805	3.118	3.603
-47.51	11.08	224.00	0.13	-6.39	1.49	30.13	16.79	7.79	10.47	1.19	2.18	3.71	17.82	1.836	3.129	3.628
20.54	3.04	-13.42	0.13	2.75	0.41	-1.80	4.28	12.66	8.81	1.17	2.19	3.67	17.77	1.867	3.136	3.650
-35.43	-39.89	-126.14	0.13	-4.73	-5.33	-16.84	2.75	4.88	3.12	1.16	2.19	3.63	17.72	1.899	3.139	3.668
-34.30	-37.75	50.01	0.13	-4.56	-5.02	6.65	2.87	5.45	1.34	1.14	2.20	3.58	17.68	1.930	3.135	3.682
39.69	30.26	117.68	0.13	5.26	4.01	15.59	2.17	9.90	3.85	1.13	2.21	3.53	17.63	1.960	3.125	3.688
-19.35	6.18	-37.49	0.13	-2.55	0.82	-4.95	4.11	11.59	4.10	1.12	2.22	3.47	17.58	1.989	3.106	3.688
-17.28	24.11	-155.10	0.13	-2.27	3.17	-20.40	4.18	9.58	2.94	1.11	2.23	3.41	17.53	2.015	3.079	3.680
60.63	51.94	-18.75	0.13	7.94	6.80	-2.46	7.89	10.76	3.84	1.10	2.25	3.35	17.48	2.039	3.044	3.664
6.49	-56.06	50.19	0.13	0.85	-7.32	6.55	7.89	5.45	5.25	1.10	2.26	3.29	17.43	2.061	3.000	3.640
-83.36	-13.93	-9.89	0.13	-10.84	-1.81	-1.29	3.69	3.11	7.82	1.10	2.28	3.23	17.38	2.079	2.948	3.607
-28.14	82.92	100.92	0.13	-3.64	10.74	13.07	2.91	8.69	2.60	1.10	2.29	3.16	17.33	2.093	2.888	3.567
51.81	45.66	28.66	0.13	6.68	5.89	3.70	7.24	13.34	4.17	1.10	2.31	3.10	17.29	2.104	2.820	3.518
-5.28	-29.39	-102.19	0.13	-0.68	-3.78	-13.13	8.91	4.03	5.37	1.11	2.33	3.03	17.24	2.111	2.745	3.463
-67.14	-93.15	62.89	0.13	-8.59	-11.92	8.05	5.09	25.84	0.26	1.11	2.36	2.97	17.19	2.114	2.664	3.401
-5.00	-33.91	21.72	0.13	-0.64	-4.32	2.77	1.18	17.36	5.69	1.13	2.38	2.91	17.14	2.114	2.578	3.334

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
80.85	81.99	-131.06	0.13	10.27	10.41	-16.64	5.39	17.55	5.43	1.14	2.41	2.84	17.09	2.111	2.488	3.263
41.60	139.53	-21.76	0.13	5.26	17.65	-2.75	7.29	11.48	10.39	1.16	2.45	2.78	17.04	2.105	2.395	3.188
-22.44	62.11	65.16	0.13	-2.83	7.83	8.21	8.70	4.85	5.07	1.19	2.48	2.73	16.99	2.096	2.300	3.112
8.59	-99.82	3.02	0.13	1.08	-12.53	0.38	2.86	4.41	5.48	1.21	2.53	2.67	16.94	2.086	2.205	3.035
-35.36	-96.44	-77.83	0.13	-4.42	-12.05	-9.73	9.45	19.41	3.52	1.24	2.57	2.62	16.89	2.074	2.111	2.959
-52.19	26.69	-3.66	0.12	-6.50	3.32	-0.46	11.56	8.49	3.19	1.27	2.62	2.57	16.85	2.060	2.019	2.884
67.78	99.43	87.17	0.12	8.40	12.33	10.81	4.44	9.81	5.24	1.30	2.67	2.52	16.80	2.047	1.929	2.813
62.51	34.15	-59.89	0.12	7.72	4.22	-7.40	2.74	3.53	8.68	1.34	2.72	2.47	16.75	2.033	1.843	2.744
-28.56	-53.82	-117.53	0.12	-3.51	-6.62	-14.46	3.02	17.03	5.82	1.38	2.78	2.42	16.70	2.019	1.761	2.679
-36.43	-18.69	47.61	0.12	-4.46	-2.29	5.83	2.77	34.01	4.29	1.41	2.84	2.38	16.65	2.005	1.683	2.617
33.57	9.32	52.41	0.12	4.10	1.14	6.39	10.93	31.79	2.38	1.45	2.90	2.34	16.60	1.991	1.609	2.560
50.40	20.25	-20.65	0.12	6.12	2.46	-2.51	7.09	44.07	10.17	1.50	2.96	2.30	16.55	1.978	1.539	2.507
-90.52	33.13	21.35	0.12	-10.95	4.01	2.58	10.12	35.55	4.19	1.54	3.02	2.27	16.50	1.966	1.474	2.458
-122.10	-15.92	35.24	0.12	-14.71	-1.92	4.25	9.55	17.12	9.93	1.58	3.09	2.23	16.46	1.956	1.413	2.413
16.11	-37.82	-10.81	0.12	1.93	-4.54	-1.30	4.15	30.84	12.73	1.62	3.16	2.20	16.41	1.947	1.357	2.373
22.03	16.21	-58.67	0.12	2.63	1.94	-7.01	10.75	39.09	7.44	1.66	3.23	2.17	16.36	1.940	1.305	2.338
-29.95	20.13	-17.52	0.12	-3.56	2.39	-2.08	4.89	25.24	4.60	1.71	3.30	2.14	16.31	1.935	1.257	2.307
56.99	-45.83	26.47	0.12	6.75	-5.43	3.14	1.99	24.35	5.40	1.75	3.38	2.12	16.26	1.933	1.212	2.281
52.77	-31.69	-5.58	0.12	6.23	-3.74	-0.66	5.11	29.15	3.22	1.79	3.46	2.09	16.21	1.933	1.171	2.260
-51.24	-3.63	13.41	0.12	-6.02	-0.43	1.58	6.69	18.36	2.93	1.83	3.54	2.07	16.16	1.936	1.134	2.244
-0.14	-34.56	41.30	0.12	-0.02	-4.04	4.83	3.15	23.27	4.17	1.86	3.62	2.05	16.11	1.943	1.101	2.233
32.79	-47.41	22.17	0.12	3.82	-5.52	2.58	7.81	21.64	3.60	1.90	3.71	2.03	16.06	1.953	1.071	2.227
-42.19	-42.24	-27.81	0.12	-4.89	-4.90	-3.23	5.44	8.71	8.18	1.93	3.80	2.02	16.02	1.967	1.043	2.226
-27.05	-0.17	-33.69	0.12	-3.12	-0.02	-3.89	3.83	19.01	5.62	1.97	3.91	2.01	15.97	1.984	1.019	2.231
73.85	31.76	-0.62	0.12	8.49	3.65	-0.07	2.89	19.62	2.19	2.00	4.01	1.99	15.92	2.006	0.997	2.240
66.57	51.58	10.36	0.11	7.62	5.91	1.19	5.76	4.63	2.68	2.03	4.13	1.99	15.87	2.033	0.978	2.256
-69.43	74.32	74.19	0.11	-7.91	8.47	8.46	3.90	15.99	3.43	2.06	4.25	1.98	15.82	2.064	0.962	2.278
-58.18	3.15	33.97	0.11	-6.60	0.36	3.86	2.46	21.54	4.74	2.09	4.39	1.98	15.77	2.101	0.948	2.305
34.87	0.14	-54.98	0.11	3.94	0.02	-6.21	2.96	13.71	4.16	2.11	4.53	1.98	15.72	2.144	0.936	2.339
-23.16	38.05	82.96	0.11	-2.61	4.28	9.33	4.14	7.75	0.91	2.14	4.68	1.98	15.67	2.191	0.927	2.379
-36.04	-68.90	115.56	0.11	-4.04	-7.72	12.94	1.18	10.98	2.62	2.16	4.85	1.98	15.63	2.244	0.919	2.424
15.00	-70.63	-75.52	0.11	1.67	-7.88	-8.42	5.99	7.55	1.65	2.18	5.02	1.99	15.58	2.301	0.912	2.475
34.90	68.36	-115.14	0.11	3.87	7.59	-12.78	6.79	3.29	4.63	2.20	5.20	2.00	15.53	2.363	0.908	2.531

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
72.68	77.06	-58.79	0.11	8.03	8.51	-6.50	4.78	9.40	3.75	2.22	5.38	2.01	15.48	2.428	0.905	2.591
36.46	-55.00	16.30	0.11	4.01	-6.05	1.79	5.56	6.98	2.15	2.23	5.57	2.02	15.43	2.497	0.903	2.655
-45.53	-85.73	119.03	0.11	-4.99	-9.39	13.03	3.60	2.30	8.06	2.25	5.77	2.03	15.38	2.569	0.902	2.722
-81.28	60.31	55.68	0.11	-8.86	6.57	6.07	0.51	1.14	6.78	2.26	5.96	2.04	15.33	2.643	0.902	2.792
-10.10	134.91	-56.32	0.11	-1.10	14.64	-6.11	4.32	12.11	2.61	2.27	6.16	2.04	15.28	2.718	0.903	2.864
62.80	52.52	-47.12	0.11	6.78	5.67	-5.09	2.11	10.14	6.63	2.27	6.35	2.05	15.23	2.794	0.904	2.937
-48.24	-77.44	8.96	0.11	-5.19	-8.32	0.96	4.94	11.36	5.99	2.28	6.53	2.06	15.19	2.871	0.906	3.011
-62.02	-44.21	37.87	0.11	-6.64	-4.73	4.05	2.98	15.18	5.37	2.28	6.71	2.07	15.14	2.947	0.908	3.084
73.96	98.67	-39.13	0.11	7.88	10.51	-4.17	4.70	14.35	6.30	2.27	6.87	2.07	15.09	3.022	0.911	3.156
76.65	22.42	-110.83	0.11	8.13	2.38	-11.75	5.58	9.64	4.61	2.27	7.03	2.07	15.04	3.095	0.914	3.227
3.49	-117.41	33.33	0.11	0.37	-12.39	3.52	1.45	6.80	2.54	2.26	7.16	2.07	14.99	3.164	0.917	3.294
-62.40	-78.03	173.91	0.11	-6.55	-8.19	18.26	3.15	3.40	3.32	2.25	7.27	2.07	14.94	3.230	0.919	3.358
6.71	21.08	38.48	0.10	0.70	2.20	4.02	2.68	9.79	3.00	2.24	7.36	2.06	14.89	3.290	0.922	3.417
57.58	19.98	-120.35	0.10	5.99	2.08	-12.52	1.85	13.59	1.46	2.22	7.43	2.05	14.84	3.345	0.925	3.471
-75.39	-75.92	-88.93	0.10	-7.80	-7.86	-9.20	3.20	5.02	5.04	2.20	7.47	2.04	14.79	3.394	0.928	3.519
-86.06	-108.56	48.15	0.10	-8.86	-11.18	4.96	7.70	2.48	0.90	2.18	7.48	2.03	14.75	3.436	0.931	3.560
-15.86	-47.25	79.89	0.10	-1.63	-4.84	8.19	4.69	6.61	5.39	2.15	7.47	2.01	14.70	3.471	0.934	3.595
66.04	95.64	-90.09	0.10	6.74	9.76	-9.19	3.10	7.51	0.96	2.12	7.43	1.99	14.65	3.498	0.937	3.622
82.73	125.19	-59.79	0.10	8.40	12.71	-6.07	2.27	7.33	3.48	2.09	7.36	1.97	14.60	3.517	0.939	3.641
-57.32	-86.90	105.12	0.10	-5.79	-8.78	10.62	1.52	3.62	1.91	2.06	7.27	1.94	14.55	3.528	0.942	3.652
-76.05	-133.47	31.85	0.10	-7.64	-13.41	3.20	4.67	4.35	4.14	2.03	7.16	1.92	14.50	3.530	0.945	3.654
-12.88	68.65	-20.18	0.10	-1.29	6.87	-2.02	6.05	3.62	5.30	1.99	7.02	1.89	14.45	3.524	0.949	3.649
52.04	150.20	18.83	0.10	5.18	14.94	1.87	9.57	4.65	3.04	1.96	6.86	1.86	14.40	3.509	0.953	3.636
88.76	0.89	3.78	0.10	8.79	0.09	0.37	11.61	6.03	10.48	1.92	6.69	1.84	14.36	3.485	0.957	3.614
-18.39	-116.89	-26.18	0.10	-1.81	-11.51	-2.58	8.96	10.66	12.56	1.88	6.51	1.81	14.31	3.454	0.961	3.585
-63.23	-21.62	-34.05	0.10	-6.20	-2.12	-3.34	2.95	4.38	8.99	1.85	6.31	1.78	14.26	3.414	0.966	3.548
62.77	51.31	-37.91	0.10	6.12	5.00	-3.70	2.83	10.04	3.24	1.81	6.10	1.76	14.21	3.367	0.971	3.504
54.53	13.17	-0.83	0.10	5.29	1.28	-0.08	5.28	10.46	3.86	1.78	5.89	1.74	14.16	3.312	0.976	3.453
-97.38	-30.81	118.93	0.10	-9.40	-2.97	11.48	5.95	12.06	7.28	1.74	5.67	1.71	14.11	3.251	0.982	3.396
-51.09	-35.69	71.55	0.10	-4.90	-3.43	6.87	3.42	10.70	11.56	1.71	5.45	1.69	14.06	3.184	0.988	3.334
-5.97	24.33	-67.46	0.10	-0.57	2.32	-6.44	9.98	4.17	19.25	1.68	5.24	1.67	14.01	3.112	0.994	3.267
-81.80	76.11	-8.31	0.10	-7.77	7.23	-0.79	8.71	15.26	9.39	1.66	5.03	1.66	13.96	3.036	1.000	3.197
16.33	75.80	42.62	0.09	1.54	7.16	4.03	3.83	14.04	8.10	1.63	4.83	1.64	13.92	2.957	1.007	3.124

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
75.14	-30.31	-25.41	0.09	7.06	-2.85	-2.39	4.19	8.27	3.28	1.61	4.64	1.63	13.87	2.875	1.013	75.14
-34.94	-50.16	-34.30	0.09	-3.27	-4.69	-3.21	6.83	1.49	8.11	1.59	4.45	1.62	13.82	2.793	1.019	-34.94
-9.85	121.69	15.74	0.09	-0.92	11.32	1.46	8.82	4.45	0.53	1.58	4.28	1.62	13.77	2.709	1.026	-9.85
65.04	84.26	8.69	0.09	6.02	7.79	0.80	5.99	10.85	8.36	1.57	4.12	1.62	13.72	2.627	1.032	65.04
-33.03	-55.81	5.66	0.09	-3.04	-5.13	0.52	2.26	7.98	0.99	1.56	3.97	1.62	13.67	2.545	1.037	-33.03
-81.80	-16.67	100.45	0.09	-7.48	-1.53	9.19	0.84	12.51	3.58	1.55	3.83	1.62	13.62	2.464	1.042	-81.80
13.34	1.35	24.20	0.09	1.21	0.12	2.20	5.44	9.38	6.94	1.55	3.70	1.63	13.57	2.384	1.047	13.34
32.24	-18.63	-239.37	0.09	2.92	-1.69	-21.66	4.06	4.20	10.42	1.56	3.59	1.64	13.53	2.307	1.051	32.24
-33.76	-26.55	-97.70	0.09	-3.04	-2.39	-8.79	2.97	9.41	3.64	1.56	3.49	1.65	13.48	2.231	1.054	-33.76
-75.54	-14.48	283.93	0.09	-6.76	-1.30	25.41	12.32	9.71	6.02	1.57	3.40	1.66	13.43	2.158	1.057	-75.54
-20.35	26.48	106.15	0.09	-1.81	2.36	9.45	3.45	6.19	4.21	1.59	3.31	1.68	13.38	2.089	1.060	-20.35
51.59	69.28	-315.43	0.09	4.57	6.13	-27.92	8.55	5.59	8.99	1.60	3.24	1.70	13.33	2.023	1.063	51.59
6.47	91.94	-191.42	0.09	0.57	8.09	-16.84	20.22	8.74	18.31	1.62	3.18	1.73	13.28	1.961	1.067	6.47
-57.43	-31.19	238.49	0.09	-5.02	-2.73	20.87	12.86	22.13	19.05	1.64	3.13	1.76	13.23	1.903	1.070	-57.43
-40.23	-123.90	252.50	0.09	-3.50	-10.78	21.97	9.89	24.62	16.19	1.67	3.09	1.79	13.18	1.849	1.074	-40.23
19.81	-38.58	-104.79	0.09	1.71	-3.34	-9.06	15.67	27.13	8.82	1.70	3.05	1.83	13.13	1.798	1.078	19.81
44.68	81.32	-267.05	0.09	3.84	6.99	-22.97	14.00	26.49	22.43	1.72	3.02	1.87	13.09	1.752	1.083	44.68
16.55	29.09	-78.35	0.09	1.42	2.49	-6.70	9.13	10.52	17.09	1.75	3.00	1.91	13.04	1.709	1.088	16.55
-9.46	-154.67	217.37	0.09	-0.80	-13.15	18.48	7.98	24.07	4.78	1.79	2.98	1.95	12.99	1.670	1.093	-9.46
2.55	-34.31	185.56	0.08	0.22	-2.90	15.68	12.91	38.78	17.89	1.82	2.98	2.00	12.94	1.634	1.099	2.55
14.52	140.47	-154.50	0.08	1.22	11.80	-12.98	8.95	28.34	15.65	1.86	2.97	2.05	12.89	1.601	1.105	14.52
-3.51	35.11	-184.82	0.08	-0.29	2.93	-15.43	1.69	26.06	7.59	1.89	2.98	2.10	12.84	1.573	1.111	-3.51
-39.42	-66.84	105.34	0.08	-3.27	-5.55	8.74	11.25	18.46	6.54	1.93	2.99	2.16	12.79	1.548	1.117	-39.42
-66.21	-105.51	169.78	0.08	-5.46	-8.70	14.01	8.50	11.40	6.30	1.97	3.01	2.21	12.74	1.527	1.123	-66.21
3.91	8.67	-78.40	0.08	0.32	0.71	-6.43	6.26	2.66	6.71	2.01	3.03	2.27	12.70	1.510	1.130	3.91
58.79	119.41	-171.90	0.08	4.79	9.73	-14.01	5.06	5.01	3.33	2.05	3.07	2.33	12.65	1.497	1.137	58.79
10.65	-1.84	38.37	0.08	0.86	-0.15	3.11	4.50	9.19	2.55	2.09	3.11	2.39	12.60	1.488	1.144	10.65
13.60	-58.73	126.04	0.08	1.09	-4.73	10.15	6.37	14.53	3.30	2.13	3.16	2.45	12.55	1.482	1.150	13.60
-0.43	2.37	2.78	0.08	-0.03	0.19	0.22	5.40	10.74	5.43	2.17	3.21	2.51	12.50	1.479	1.156	-0.43
-42.34	60.23	-61.10	0.08	-3.37	4.79	-4.86	5.78	4.33	7.98	2.22	3.28	2.57	12.45	1.478	1.161	-42.34
-5.25	40.02	-4.97	0.08	-0.41	3.16	-0.39	4.88	6.57	10.47	2.26	3.35	2.64	12.40	1.480	1.166	-5.25
12.74	-81.91	60.92	0.08	1.00	-6.43	4.78	3.22	2.30	6.39	2.31	3.43	2.70	12.35	1.484	1.169	12.74
-25.24	-57.64	68.66	0.08	-1.97	-4.50	5.36	4.05	1.37	9.00	2.36	3.52	2.77	12.30	1.491	1.172	-25.24

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-34.12	95.27	-46.39	0.08	-2.64	7.38	-3.59	1.55	7.95	7.18	2.41	3.62	2.83	12.26	1.500	1.175	1.906
8.93	116.83	-142.01	0.08	0.69	9.00	-10.93	4.93	8.36	3.15	2.46	3.72	2.90	12.21	1.512	1.176	1.915
42.82	11.56	102.07	0.08	3.28	0.88	7.81	6.01	12.26	10.11	2.51	3.83	2.96	12.16	1.525	1.178	1.926
4.73	-13.45	233.40	0.08	0.36	-1.02	17.74	3.38	11.76	6.34	2.57	3.95	3.02	12.11	1.539	1.179	1.939
-39.20	55.45	-81.91	0.08	-2.96	4.19	-6.18	2.01	4.68	3.35	2.62	4.07	3.09	12.06	1.556	1.179	1.952
28.82	42.24	-215.31	0.08	2.16	3.17	-16.15	4.20	3.82	6.88	2.67	4.20	3.15	12.01	1.573	1.180	1.967
57.64	-16.82	-22.84	0.07	4.29	-1.25	-1.70	3.55	4.91	7.92	2.72	4.33	3.21	11.96	1.592	1.180	1.981
-71.33	-90.62	144.92	0.07	-5.28	-6.71	10.72	7.32	8.45	7.36	2.77	4.46	3.27	11.91	1.610	1.180	1.996
-100.99	-54.34	71.48	0.07	-7.42	-3.99	5.25	8.31	13.97	7.68	2.81	4.58	3.32	11.87	1.628	1.180	2.011
18.18	130.49	-139.38	0.07	1.33	9.53	-10.17	1.79	9.01	10.10	2.86	4.70	3.37	11.82	1.646	1.179	2.025
42.06	128.96	-99.90	0.07	3.05	9.35	-7.24	1.87	6.19	15.18	2.90	4.82	3.41	11.77	1.664	1.179	2.039
41.89	-59.20	84.13	0.07	3.02	-4.26	6.06	1.90	4.57	13.30	2.93	4.93	3.45	11.72	1.682	1.178	2.054
20.77	-156.78	98.76	0.07	1.48	-11.21	7.06	2.94	6.22	9.75	2.96	5.03	3.49	11.67	1.699	1.178	2.068
-79.12	-34.41	-23.39	0.07	-5.62	-2.44	-1.66	6.17	7.95	7.27	2.98	5.12	3.52	11.62	1.716	1.179	2.082
16.01	81.48	-137.07	0.07	1.13	5.74	-9.66	8.45	1.50	5.61	3.00	5.19	3.54	11.57	1.733	1.180	2.097
95.78	60.19	-75.64	0.07	6.70	4.21	-5.29	7.42	7.09	11.31	3.00	5.25	3.55	11.52	1.749	1.182	2.111
-5.40	21.01	113.29	0.07	-0.38	1.46	7.87	4.49	13.12	18.26	3.00	5.30	3.56	11.47	1.765	1.185	2.126
-3.38	-69.91	99.86	0.07	-0.23	-4.82	6.89	2.31	8.75	7.36	2.99	5.32	3.56	11.43	1.780	1.188	2.140
-0.38	-17.74	-114.11	0.07	-0.03	-1.22	-7.82	3.28	6.99	2.82	2.97	5.33	3.55	11.38	1.793	1.193	2.154
26.57	61.16	-121.64	0.07	1.81	4.16	-8.27	2.71	7.67	5.27	2.95	5.32	3.53	11.33	1.805	1.199	2.167
76.36	-9.96	101.40	0.07	5.15	-0.67	6.84	4.36	2.27	8.07	2.91	5.29	3.51	11.28	1.816	1.205	2.180
-18.75	18.01	95.01	0.07	-1.26	1.21	6.37	3.48	4.46	6.31	2.87	5.25	3.49	11.23	1.826	1.213	2.192
-74.57	1.95	-116.95	0.07	-4.96	0.13	-7.78	2.58	5.94	1.84	2.83	5.18	3.45	11.18	1.833	1.222	2.203
-71.28	-66.93	-65.58	0.07	-4.70	-4.42	-4.33	2.92	1.79	1.54	2.77	5.10	3.42	11.13	1.839	1.233	2.214
-48.04	-103.60	99.35	0.07	-3.15	-6.79	6.51	2.68	6.39	3.27	2.71	5.00	3.38	11.08	1.843	1.246	2.225
13.03	-80.24	37.08	0.07	0.85	-5.22	2.41	3.93	5.89	2.10	2.65	4.90	3.34	11.04	1.846	1.260	2.235
14.98	102.70	-63.87	0.06	0.97	6.62	-4.12	5.97	6.09	4.38	2.59	4.78	3.30	10.99	1.848	1.277	2.246
8.93	135.21	-50.64	0.06	0.57	8.65	-3.24	4.82	4.99	0.97	2.52	4.65	3.26	10.94	1.848	1.296	2.257
60.79	24.87	1.46	0.06	3.86	1.58	0.09	2.90	4.50	4.04	2.45	4.52	3.22	10.89	1.847	1.317	2.268
30.60	-95.00	82.29	0.06	1.93	-5.99	5.18	4.68	7.96	2.63	2.38	4.38	3.19	10.84	1.844	1.341	2.280
-67.32	-132.56	62.00	0.06	-4.21	-8.28	3.88	5.80	13.52	3.24	2.31	4.24	3.15	10.79	1.839	1.367	2.291
-5.18	54.59	-66.99	0.06	-0.32	3.38	-4.15	4.02	2.98	1.42	2.24	4.10	3.12	10.74	1.832	1.395	2.303
61.71	138.19	-77.69	0.06	3.79	8.50	-4.78	3.34	5.15	2.17	2.17	3.96	3.09	10.69	1.823	1.424	2.314

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-1.42	30.83	-5.53	0.06	-0.09	1.88	-0.34	3.57	7.45	3.07	2.11	3.82	3.06	10.64	1.813	1.455	2.324
-50.31	-101.04	54.38	0.06	-3.04	-6.11	3.29	5.10	7.43	4.01	2.05	3.69	3.04	10.60	1.801	1.486	2.335
-39.13	-60.73	18.23	0.06	-2.35	-3.64	1.09	6.39	3.56	5.59	1.99	3.56	3.02	10.55	1.788	1.517	2.345
46.85	104.17	-104.60	0.06	2.79	6.20	-6.22	4.96	0.84	6.28	1.94	3.44	3.00	10.50	1.775	1.549	2.355
90.57	53.84	-56.27	0.06	5.34	3.18	-3.32	10.98	2.58	4.89	1.89	3.33	2.99	10.45	1.761	1.579	2.365
3.38	-27.23	78.68	0.06	0.20	-1.59	4.60	2.73	3.88	3.04	1.85	3.23	2.97	10.40	1.746	1.607	2.373
-108.41	-54.08	109.31	0.06	-6.29	-3.14	6.34	4.18	1.29	4.04	1.81	3.13	2.95	10.35	1.731	1.633	2.380
-71.05	-41.90	21.05	0.06	-4.09	-2.41	1.21	4.13	4.66	3.88	1.77	3.05	2.94	10.30	1.717	1.656	2.385
71.95	39.09	-74.84	0.06	4.10	2.23	-4.27	2.19	4.21	1.73	1.74	2.97	2.92	10.25	1.703	1.675	2.388
87.63	13.97	-28.64	0.06	4.95	0.79	-1.62	1.85	5.65	1.84	1.72	2.90	2.90	10.21	1.688	1.689	2.388
-38.47	-2.07	17.39	0.06	-2.15	-0.12	0.97	0.31	2.54	2.32	1.69	2.83	2.87	10.16	1.674	1.697	2.384
-77.24	-27.02	11.33	0.06	-4.29	-1.50	0.63	1.72	1.90	2.58	1.67	2.78	2.85	10.11	1.659	1.700	2.375
58.80	-22.93	12.28	0.06	3.23	-1.26	0.68	1.38	4.85	4.18	1.66	2.72	2.81	10.06	1.643	1.697	2.362
95.49	31.04	30.20	0.05	5.20	1.69	1.65	2.46	5.49	5.21	1.64	2.68	2.77	10.01	1.628	1.687	2.344
-23.66	-49.94	38.06	0.05	-1.28	-2.70	2.06	5.69	0.75	9.59	1.63	2.63	2.73	9.96	1.613	1.671	2.322
-90.43	-77.70	-15.98	0.05	-4.84	-4.16	-0.86	4.58	3.51	6.01	1.62	2.59	2.68	9.91	1.597	1.650	2.296
-32.19	27.39	-17.92	0.05	-1.71	1.45	-0.95	4.60	4.41	3.02	1.62	2.56	2.62	9.86	1.582	1.623	2.266
34.81	145.03	-11.86	0.05	1.83	7.61	-0.62	3.21	6.89	6.62	1.61	2.52	2.56	9.81	1.566	1.593	2.233
-15.23	56.61	9.15	0.05	-0.79	2.94	0.48	3.43	3.47	8.04	1.60	2.49	2.50	9.77	1.549	1.558	2.197
-25.15	-85.34	47.04	0.05	-1.30	-4.40	2.42	6.45	3.80	4.88	1.60	2.45	2.43	9.72	1.532	1.519	2.157
-38.03	26.76	-51.95	0.05	-1.94	1.36	-2.65	6.45	7.16	7.78	1.60	2.42	2.36	9.67	1.514	1.478	2.116
-31.89	61.57	-81.68	0.05	-1.61	3.11	-4.13	3.60	8.29	2.97	1.60	2.38	2.29	9.62	1.495	1.435	2.072
72.03	-0.57	56.37	0.05	3.60	-0.03	2.82	4.90	3.31	2.37	1.59	2.35	2.22	9.57	1.475	1.391	2.027
-6.10	-76.43	115.02	0.05	-0.30	-3.78	5.69	2.41	4.77	2.89	1.59	2.32	2.14	9.52	1.454	1.346	1.981
-114.86	-136.02	-6.20	0.05	-5.63	-6.66	-0.30	2.61	6.73	6.32	1.59	2.28	2.07	9.47	1.433	1.301	1.936
-22.58	21.20	-75.03	0.05	-1.10	1.03	-3.64	5.33	3.93	4.54	1.59	2.25	2.00	9.42	1.412	1.258	1.891
140.18	110.92	66.98	0.05	6.73	5.32	3.22	4.39	5.91	1.08	1.59	2.21	1.93	9.38	1.390	1.216	1.847
71.76	27.63	111.62	0.05	3.41	1.31	5.30	2.13	1.69	2.67	1.59	2.18	1.87	9.33	1.369	1.177	1.805
-128.13	-23.39	-6.59	0.05	-6.02	-1.10	-0.31	6.10	6.05	5.87	1.59	2.14	1.81	9.28	1.348	1.141	1.766
9.11	1.64	-27.52	0.05	0.42	0.08	-1.28	5.33	3.56	7.65	1.59	2.10	1.76	9.23	1.327	1.108	1.729
159.77	-25.33	-24.42	0.05	7.35	-1.17	-1.12	3.23	3.13	4.64	1.58	2.07	1.71	9.18	1.307	1.080	1.696
11.43	-58.17	-14.34	0.05	0.52	-2.65	-0.65	6.10	3.25	3.11	1.58	2.03	1.67	9.13	1.288	1.055	1.665
-102.39	104.72	84.52	0.05	-4.61	4.71	3.80	5.63	5.65	0.98	1.58	2.00	1.63	9.08	1.269	1.035	1.637

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-75.04	60.37	48.25	0.04	-3.34	2.69	2.15	2.66	11.92	1.97	1.57	1.96	1.60	9.03	1.250	1.019	1.613
-20.85	-99.56	-99.65	0.04	-0.92	-4.38	-4.38	4.96	11.80	3.29	1.57	1.93	1.58	8.98	1.232	1.007	1.592
29.14	59.50	-92.26	0.04	1.27	2.59	-4.01	5.02	10.30	4.32	1.56	1.90	1.56	8.94	1.216	0.999	1.574
8.06	50.27	53.81	0.04	0.35	2.16	2.31	0.25	8.99	0.14	1.56	1.87	1.55	8.89	1.200	0.995	1.559
-106.74	-124.60	98.51	0.04	-4.54	-5.30	4.19	2.49	6.08	1.92	1.55	1.84	1.54	8.84	1.187	0.994	1.548
-68.39	-43.27	-18.66	0.04	-2.87	-1.82	-0.78	3.72	5.45	1.09	1.55	1.82	1.54	8.79	1.175	0.997	1.541
87.57	86.63	-49.52	0.04	3.63	3.59	-2.06	0.92	7.66	0.45	1.54	1.79	1.54	8.74	1.165	1.002	1.536
68.26	76.28	-6.41	0.04	2.80	3.13	-0.26	1.38	5.31	2.27	1.53	1.77	1.55	8.69	1.157	1.009	1.535
-45.78	10.10	-45.31	0.04	-1.85	0.41	-1.83	2.13	1.91	6.02	1.53	1.76	1.56	8.64	1.151	1.018	1.536
-64.56	-25.89	-26.16	0.04	-2.58	-1.04	-1.05	4.53	1.17	9.06	1.52	1.75	1.56	8.59	1.147	1.027	1.540
59.45	-13.82	51.78	0.04	2.35	-0.55	2.05	4.30	1.23	6.56	1.52	1.74	1.58	8.54	1.145	1.038	1.545
159.01	37.12	3.67	0.04	6.20	1.45	0.14	3.09	5.85	5.24	1.51	1.73	1.59	8.50	1.144	1.049	1.552
51.59	82.86	-74.19	0.04	1.99	3.19	-2.86	3.22	9.01	6.48	1.51	1.73	1.60	8.45	1.145	1.059	1.560
-82.35	42.59	-34.97	0.04	-3.13	1.62	-1.33	2.39	8.51	6.76	1.51	1.73	1.61	8.40	1.148	1.068	1.568
-48.09	-164.18	-17.86	0.04	-1.80	-6.16	-0.67	2.55	8.18	6.46	1.51	1.73	1.62	8.35	1.153	1.076	1.577
0.01	-214.43	-40.74	0.04	0.00	-7.93	-1.51	6.03	3.46	4.36	1.50	1.74	1.63	8.30	1.159	1.083	1.586
-40.91	78.83	22.29	0.04	-1.49	2.88	0.81	5.77	2.18	5.04	1.50	1.75	1.64	8.25	1.167	1.088	1.596
-42.74	100.45	45.16	0.04	-1.54	3.62	1.63	5.60	5.80	2.56	1.50	1.77	1.64	8.20	1.178	1.091	1.606
-5.65	-100.56	-50.83	0.04	-0.20	-3.57	-1.80	3.59	11.27	2.19	1.50	1.79	1.64	8.15	1.190	1.092	1.616
9.35	-31.31	-40.65	0.04	0.33	-1.10	-1.42	1.79	9.29	2.94	1.50	1.81	1.64	8.11	1.205	1.092	1.626
22.28	29.68	74.29	0.03	0.77	1.02	2.56	4.37	2.55	6.15	1.50	1.83	1.64	8.06	1.221	1.091	1.637
2.23	-27.34	20.10	0.03	0.08	-0.93	0.68	3.83	3.19	6.73	1.50	1.86	1.63	8.01	1.239	1.088	1.649
-43.68	-19.26	-2.94	0.03	-1.46	-0.65	-0.10	2.99	3.27	8.28	1.50	1.89	1.63	7.96	1.258	1.083	1.661
-8.58	60.64	69.93	0.03	-0.28	2.00	2.31	2.27	5.11	5.24	1.50	1.92	1.62	7.91	1.279	1.079	1.673
93.25	65.38	-48.12	0.03	3.03	2.12	-1.56	3.38	6.04	2.24	1.50	1.94	1.61	7.86	1.300	1.074	1.686
35.00	-75.62	-53.91	0.03	1.12	-2.42	-1.73	2.11	6.27	3.65	1.49	1.97	1.60	7.81	1.321	1.068	1.699
-128.82	-132.21	31.14	0.03	-4.06	-4.16	0.98	4.21	4.29	1.05	1.49	2.00	1.58	7.76	1.343	1.063	1.713
-31.49	-58.84	17.04	0.03	-0.98	-1.82	0.53	0.96	2.28	4.17	1.48	2.03	1.57	7.71	1.366	1.059	1.729
133.30	11.24	80.84	0.03	4.07	0.34	2.47	6.02	0.51	7.26	1.48	2.06	1.56	7.67	1.389	1.056	1.745
-5.95	24.16	-52.22	0.03	-0.18	0.72	-1.57	6.35	2.36	2.67	1.47	2.08	1.55	7.62	1.413	1.054	1.762
-89.76	29.04	-80.95	0.03	-2.65	0.86	-2.39	5.37	2.16	8.33	1.47	2.11	1.54	7.57	1.436	1.053	1.781
7.40	19.93	109.99	0.03	0.21	0.58	3.19	5.13	1.55	9.06	1.46	2.13	1.54	7.52	1.460	1.054	1.801
27.33	-84.95	40.69	0.03	0.78	-2.42	1.16	5.02	7.38	4.36	1.45	2.15	1.53	7.47	1.484	1.057	1.822

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
48.18	-1.79	20.57	0.03	1.35	-0.05	0.58	6.93	10.59	4.34	1.44	2.17	1.53	7.42	1.506	1.061	1.843
3.08	192.81	-39.40	0.03	0.08	5.30	-1.08	7.17	7.61	6.10	1.43	2.18	1.53	7.37	1.527	1.068	1.863
-66.79	23.37	-111.10	0.03	-1.80	0.63	-3.00	2.94	5.30	8.93	1.42	2.19	1.53	7.32	1.546	1.076	1.884
-5.65	-153.39	53.02	0.03	-0.15	-4.06	1.41	4.73	3.71	6.61	1.41	2.20	1.53	7.28	1.563	1.086	1.903
29.31	-12.07	68.78	0.03	0.76	-0.31	1.79	4.71	7.39	3.58	1.40	2.21	1.54	7.23	1.577	1.097	1.921
-28.70	78.78	12.61	0.03	-0.73	2.01	0.32	7.69	10.80	4.67	1.39	2.21	1.55	7.18	1.588	1.110	1.938
-60.52	18.58	-80.25	0.03	-1.51	0.46	-2.01	5.01	5.90	4.02	1.38	2.21	1.56	7.13	1.596	1.125	1.952
30.54	-31.41	-84.92	0.02	0.75	-0.77	-2.08	2.60	2.97	1.99	1.38	2.21	1.57	7.08	1.600	1.140	1.965
68.35	-21.32	82.08	0.02	1.64	-0.51	1.97	4.11	4.62	2.11	1.37	2.20	1.59	7.03	1.601	1.155	1.974
-35.72	-22.24	-2.08	0.02	-0.84	-0.52	-0.05	3.21	5.97	2.17	1.37	2.19	1.60	6.98	1.599	1.171	1.982
-119.41	2.78	-93.89	0.02	-2.75	0.06	-2.16	1.44	4.26	2.02	1.37	2.18	1.62	6.93	1.593	1.186	1.986
-40.09	64.63	18.27	0.02	-0.90	1.45	0.41	4.28	8.19	6.58	1.37	2.17	1.64	6.88	1.584	1.200	1.987
132.73	7.48	55.12	0.02	2.92	0.16	1.21	4.74	9.53	4.45	1.37	2.16	1.66	6.84	1.572	1.212	1.985
55.35	-18.52	10.99	0.02	1.19	-0.40	0.24	3.40	6.12	1.32	1.38	2.14	1.68	6.79	1.556	1.223	1.980
-65.63	71.36	-33.97	0.02	-1.38	1.50	-0.71	0.93	9.90	2.82	1.38	2.12	1.70	6.74	1.538	1.232	1.971
2.50	15.18	-0.90	0.02	0.05	0.31	-0.02	2.48	4.43	6.59	1.39	2.11	1.72	6.69	1.517	1.240	1.959
-17.47	-125.62	51.00	0.02	-0.35	-2.51	1.02	5.97	4.46	6.71	1.40	2.09	1.74	6.64	1.493	1.245	1.944
3.56	-43.29	-32.04	0.02	0.07	-0.84	-0.62	6.94	5.03	2.14	1.41	2.07	1.76	6.59	1.469	1.248	1.927
66.42	136.51	-73.82	0.02	1.26	2.59	-1.40	7.87	5.01	1.03	1.42	2.05	1.78	6.54	1.444	1.249	1.909
16.25	34.15	6.31	0.02	0.30	0.63	0.12	4.47	1.58	1.27	1.44	2.04	1.79	6.49	1.419	1.248	1.889
-24.73	-195.54	15.27	0.02	-0.45	-3.52	0.27	3.28	3.41	3.67	1.45	2.02	1.81	6.45	1.394	1.245	1.869
-47.58	-165.82	47.14	0.02	-0.83	-2.90	0.83	3.56	3.84	4.11	1.47	2.01	1.82	6.40	1.370	1.240	1.848
47.42	113.27	29.99	0.02	0.81	1.93	0.51	1.83	1.94	2.00	1.48	2.00	1.83	6.35	1.348	1.234	1.827
83.16	249.53	-120.83	0.02	1.37	4.12	-1.99	3.89	3.67	1.34	1.50	1.99	1.84	6.30	1.327	1.225	1.806
-118.77	63.89	-31.52	0.02	-1.90	1.02	-0.50	5.49	4.43	2.43	1.52	1.99	1.85	6.25	1.307	1.215	1.785
-98.34	-118.02	101.34	0.02	-1.52	-1.83	1.57	2.90	3.39	2.45	1.54	1.98	1.85	6.20	1.290	1.204	1.765
96.67	-139.51	21.09	0.02	1.45	-2.09	0.32	0.61	4.41	4.74	1.55	1.98	1.85	6.15	1.275	1.192	1.745
12.45	-43.16	-0.95	0.01	0.18	-0.63	-0.01	5.12	6.49	12.44	1.57	1.98	1.85	6.10	1.262	1.179	1.727
-114.35	107.70	8.04	0.01	-1.60	1.51	0.11	6.37	16.12	11.67	1.58	1.98	1.85	6.05	1.251	1.165	1.710
-28.06	105.26	0.02	0.01	-0.38	1.42	0.00	2.71	2.02	10.86	1.60	1.99	1.84	6.01	1.242	1.151	1.694
48.90	-63.84	56.91	0.01	0.64	-0.83	0.74	4.67	5.11	10.95	1.61	1.99	1.83	5.96	1.236	1.137	1.680
-2.19	-209.31	51.69	0.01	-0.03	-2.62	0.65	3.75	2.02	6.84	1.62	2.00	1.82	5.91	1.232	1.124	1.668
-72.04	-64.77	-87.24	0.01	-0.86	-0.78	-1.05	4.54	1.99	4.53	1.63	2.01	1.81	5.86	1.231	1.110	1.657

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-50.79	213.92	-61.94	0.01	-0.58	2.46	-0.71	3.83	1.46	3.09	1.64	2.02	1.80	5.81	1.231	1.096	1.648
63.18	127.23	114.95	0.01	0.70	1.40	1.26	2.64	3.97	3.31	1.65	2.03	1.78	5.76	1.233	1.083	1.641
53.95	-119.80	48.62	0.01	0.57	-1.26	0.51	4.69	4.43	4.26	1.65	2.04	1.77	5.71	1.236	1.071	1.635
-77.00	-73.43	-44.39	0.01	-0.77	-0.73	-0.44	5.60	0.39	3.84	1.65	2.05	1.75	5.66	1.239	1.058	1.630
-63.72	106.49	-32.23	0.01	-0.61	1.01	-0.31	4.36	2.42	3.29	1.66	2.06	1.73	5.62	1.243	1.046	1.625
17.38	44.18	-85.00	0.01	0.16	0.40	-0.76	5.10	1.89	4.55	1.66	2.07	1.71	5.57	1.248	1.035	1.622
99.14	-90.74	2.17	0.01	0.84	-0.77	0.02	4.73	1.84	3.34	1.65	2.07	1.70	5.52	1.253	1.026	1.619
108.73	5.41	55.05	0.01	0.87	0.04	0.44	0.49	4.31	2.75	1.65	2.08	1.68	5.47	1.257	1.017	1.617
-35.42	85.22	-49.96	0.01	-0.27	0.64	-0.37	3.53	4.79	5.01	1.65	2.08	1.66	5.42	1.261	1.010	1.616
-52.24	36.96	10.12	0.01	-0.37	0.26	0.07	3.27	4.89	7.30	1.64	2.08	1.65	5.37	1.265	1.005	1.615
45.77	-76.97	86.93	0.01	0.30	-0.50	0.57	2.36	3.95	5.47	1.64	2.07	1.64	5.32	1.268	1.001	1.615
25.63	-153.52	32.69	0.01	0.15	-0.92	0.20	1.73	4.96	5.23	1.63	2.07	1.63	5.27	1.269	1.000	1.616
-70.28	-17.19	-48.28	0.01	-0.39	-0.09	-0.27	2.11	4.13	6.04	1.62	2.06	1.62	5.22	1.270	1.000	1.617
-33.07	125.58	-75.04	0.01	-0.17	0.63	-0.38	1.05	5.17	6.45	1.61	2.05	1.62	5.18	1.269	1.003	1.618
56.88	87.14	34.05	0.00	0.26	0.39	0.15	1.02	10.57	3.72	1.60	2.03	1.62	5.13	1.267	1.008	1.619
-46.14	-66.92	63.85	0.00	-0.18	-0.27	0.26	1.01	6.57	2.15	1.60	2.02	1.62	5.08	1.262	1.015	1.620
-61.92	-85.63	-20.24	0.00	-0.22	-0.30	-0.07	5.93	5.95	1.90	1.59	2.00	1.63	5.03	1.256	1.024	1.621
83.04	46.44	-2.19	0.00	0.25	0.14	-0.01	9.22	3.49	5.31	1.58	1.97	1.64	4.98	1.249	1.035	1.622
38.80	-8.65	34.74	0.00	0.10	-0.02	0.09	2.84	6.79	3.89	1.57	1.95	1.65	4.93	1.240	1.048	1.623
-66.15	-79.48	28.61	0.00	-0.13	-0.16	0.06	1.44	4.83	1.92	1.56	1.92	1.66	4.88	1.230	1.062	1.625
2.98	5.65	21.51	0.00	0.00	0.01	0.03	3.03	3.32	1.32	1.56	1.90	1.68	4.83	1.219	1.079	1.628
65.84	-10.35	-37.46	0.00	0.07	-0.01	-0.04	5.18	3.73	2.16	1.55	1.87	1.70	4.79	1.208	1.097	1.631
-18.25	-96.15	-70.24	0.00	-0.01	-0.05	-0.04	3.15	4.73	4.26	1.54	1.84	1.72	4.74	1.196	1.116	1.636

Microtremors Segment: B3-S3

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-108.54	-59.77	-32.66	0.26	-28.17	-15.51	-8.48	7.06	9.77	14.03	3.36	6.37	3.92	30.03	1.89	1.17	2.22
52.57	3.33	-69.44	0.26	13.61	0.86	-17.99	15.22	14.82	14.71	3.37	6.32	3.97	29.98	1.88	1.18	2.21
173.11	-9.66	-40.21	0.26	44.75	-2.50	-10.39	9.62	9.73	12.72	3.37	6.26	4.02	29.93	1.85	1.19	2.20
-7.23	-16.62	180.52	0.26	-1.86	-4.29	46.57	16.14	9.15	8.39	3.38	6.19	4.08	29.88	1.83	1.21	2.19
-212.79	-26.53	21.13	0.26	-54.79	-6.83	5.44	20.87	7.81	6.51	3.39	6.13	4.14	29.83	1.81	1.22	2.18
-85.19	-25.44	-132.64	0.26	-21.89	-6.54	-34.09	6.92	18.46	3.71	3.39	6.06	4.20	29.79	1.79	1.24	2.17
157.66	44.52	53.53	0.26	40.44	11.42	13.73	19.93	14.80	11.23	3.40	5.99	4.26	29.74	1.76	1.25	2.16
77.18	44.33	121.19	0.26	19.76	11.35	31.03	9.34	7.72	12.10	3.40	5.91	4.32	29.69	1.74	1.27	2.15
-98.78	-32.70	15.93	0.26	-25.24	-8.35	4.07	10.36	9.74	9.83	3.41	5.84	4.39	29.64	1.71	1.29	2.14
-67.45	8.35	-177.73	0.26	-17.20	2.13	-45.32	16.69	19.16	7.38	3.42	5.77	4.45	29.59	1.69	1.30	2.13
24.64	60.20	-111.14	0.25	6.27	15.32	-28.29	0.47	18.84	1.23	3.43	5.69	4.50	29.54	1.66	1.31	2.12
92.40	-6.91	134.82	0.25	23.47	-1.76	34.25	13.15	8.40	11.22	3.44	5.62	4.56	29.49	1.64	1.33	2.11
-13.76	-55.79	68.43	0.25	-3.49	-14.14	17.35	9.15	2.09	15.67	3.45	5.54	4.60	29.44	1.61	1.34	2.09
-92.55	-24.64	-57.58	0.25	-23.42	-6.23	-14.57	7.14	20.73	2.06	3.46	5.47	4.64	29.39	1.58	1.34	2.08
65.50	26.35	-44.37	0.25	16.54	6.65	-11.20	7.20	26.75	10.83	3.47	5.40	4.68	29.35	1.56	1.35	2.06
57.25	22.25	-19.23	0.25	14.43	5.61	-4.84	1.25	17.82	8.73	3.48	5.32	4.70	29.30	1.53	1.35	2.04
-28.81	-47.71	19.79	0.25	-7.25	-12.00	4.98	5.30	12.14	6.14	3.49	5.25	4.71	29.25	1.50	1.35	2.02
-56.64	-32.55	14.73	0.25	-14.22	-8.17	3.70	10.88	10.59	12.88	3.51	5.18	4.72	29.20	1.48	1.34	2.00
-91.35	91.32	-51.19	0.25	-22.88	22.88	-12.82	1.46	33.46	14.87	3.53	5.11	4.71	29.15	1.45	1.33	1.97
55.72	91.95	-10.05	0.25	13.93	22.99	-2.51	1.06	25.70	18.56	3.55	5.05	4.69	29.10	1.42	1.32	1.94
120.36	-22.20	28.93	0.25	30.03	-5.54	7.22	9.11	1.81	15.90	3.57	4.98	4.67	29.05	1.40	1.31	1.91
-28.83	-17.13	-29.06	0.25	-7.18	-4.26	-7.24	6.07	14.27	1.28	3.60	4.92	4.64	29.00	1.37	1.29	1.88
-75.62	47.81	-7.97	0.25	-18.79	11.88	-1.98	12.01	18.27	11.85	3.62	4.87	4.60	28.96	1.34	1.27	1.85
74.38	37.63	-22.90	0.25	18.45	9.33	-5.68	19.88	15.10	9.68	3.65	4.81	4.55	28.91	1.32	1.25	1.81
118.99	-24.41	-49.74	0.25	29.45	-6.04	-12.31	9.42	15.24	4.77	3.68	4.77	4.50	28.86	1.29	1.22	1.78
-84.09	-54.26	1.37	0.25	-20.77	-13.40	0.34	16.13	12.91	7.29	3.71	4.72	4.44	28.81	1.27	1.20	1.75
-149.62	-22.11	20.34	0.25	-36.88	-5.45	5.01	16.31	9.99	12.01	3.74	4.68	4.38	28.76	1.25	1.17	1.71
-35.25	-31.01	4.30	0.25	-8.67	-7.63	1.06	8.11	4.22	14.43	3.77	4.65	4.32	28.71	1.23	1.14	1.68
56.70	-35.88	-42.61	0.25	13.92	-8.81	-10.46	6.35	13.74	13.75	3.80	4.63	4.26	28.66	1.22	1.12	1.65
51.48	24.13	27.44	0.25	12.61	5.91	6.72	9.60	14.19	18.74	3.83	4.61	4.19	28.61	1.21	1.10	1.63
-0.63	48.98	115.17	0.24	-0.15	11.98	28.16	12.09	10.92	7.54	3.85	4.60	4.13	28.56	1.20	1.07	1.61
49.27	18.84	-8.04	0.24	12.02	4.60	-1.96	9.77	6.15	6.83	3.87	4.60	4.07	28.52	1.19	1.05	1.59
26.12	-9.19	-96.81	0.24	6.36	-2.24	-23.57	8.92	15.26	5.46	3.89	4.61	4.01	28.47	1.19	1.03	1.57

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-16.90	-13.15	-3.60	0.24	-4.11	-3.20	-0.87	11.21	8.01	8.37	3.90	4.63	3.96	28.42	1.19	1.02	1.56
39.05	-28.08	83.25	0.24	9.47	-6.81	20.19	8.15	2.99	4.97	3.91	4.65	3.92	28.37	1.19	1.00	1.55
3.96	-33.96	20.06	0.24	0.96	-8.22	4.85	5.59	10.15	7.27	3.92	4.68	3.87	28.32	1.20	0.99	1.55
-91.87	26.05	-83.80	0.24	-22.19	6.29	-20.24	2.15	14.74	7.42	3.92	4.72	3.84	28.27	1.20	0.98	1.55
-79.53	60.87	-65.49	0.24	-19.17	14.67	-15.78	5.22	14.05	4.87	3.91	4.76	3.81	28.22	1.22	0.97	1.56
-10.35	-15.23	64.53	0.24	-2.49	-3.66	15.52	7.65	1.97	4.54	3.90	4.81	3.78	28.17	1.23	0.97	1.57
-58.22	-72.06	141.13	0.24	-13.97	-17.29	33.87	7.54	2.68	18.10	3.89	4.86	3.76	28.13	1.25	0.97	1.58
-27.05	-10.90	-44.05	0.24	-6.48	-2.61	-10.55	20.63	5.92	25.57	3.87	4.91	3.75	28.08	1.27	0.97	1.60
98.80	45.02	-201.55	0.24	23.61	10.76	-48.17	11.42	8.07	6.23	3.85	4.96	3.74	28.03	1.29	0.97	1.61
47.50	18.89	-13.10	0.24	11.33	4.50	-3.12	9.92	1.98	6.53	3.82	5.01	3.73	27.98	1.31	0.98	1.63
-32.53	-48.06	117.70	0.24	-7.74	-11.44	28.01	6.54	6.42	7.79	3.80	5.06	3.72	27.93	1.33	0.98	1.65
-46.37	-57.85	-10.50	0.24	-11.01	-13.74	-2.49	7.31	21.74	7.12	3.77	5.11	3.72	27.88	1.35	0.99	1.68
26.66	31.19	-83.30	0.24	6.32	7.39	-19.74	13.10	12.17	11.46	3.74	5.15	3.73	27.83	1.38	1.00	1.70
72.46	70.98	-10.09	0.24	17.14	16.79	-2.39	20.62	8.59	7.32	3.71	5.18	3.73	27.78	1.40	1.00	1.72
-12.66	-19.13	61.82	0.24	-2.99	-4.51	14.59	23.89	15.19	4.06	3.69	5.21	3.74	27.73	1.41	1.01	1.74
21.32	-50.00	47.61	0.24	5.02	-11.77	11.21	19.35	11.74	4.26	3.66	5.23	3.74	27.69	1.43	1.02	1.76
28.21	36.03	-6.46	0.24	6.63	8.47	-1.52	12.49	6.15	12.01	3.64	5.24	3.75	27.64	1.44	1.03	1.77
-73.70	38.87	-39.35	0.23	-17.28	9.11	-9.23	4.61	8.98	12.11	3.62	5.24	3.76	27.59	1.45	1.04	1.78
-27.50	-7.20	-39.18	0.23	-6.44	-1.69	-9.17	1.62	18.60	7.94	3.60	5.23	3.77	27.54	1.45	1.05	1.79
23.50	24.76	33.84	0.23	5.49	5.78	7.90	7.25	16.18	7.17	3.59	5.21	3.77	27.49	1.45	1.05	1.79
27.40	39.62	55.68	0.23	6.38	9.23	12.97	7.49	18.90	13.17	3.57	5.18	3.77	27.44	1.45	1.06	1.79
36.27	4.52	-65.29	0.23	8.43	1.05	-15.18	5.14	30.51	5.31	3.57	5.14	3.78	27.39	1.44	1.06	1.79
-46.72	-4.48	-70.00	0.23	-10.84	-1.04	-16.24	11.98	22.33	9.01	3.57	5.09	3.77	27.34	1.43	1.06	1.78
-35.56	11.49	69.01	0.23	-8.23	2.66	15.98	8.11	24.83	5.02	3.57	5.03	3.77	27.29	1.41	1.06	1.76
54.40	-2.53	45.80	0.23	12.57	-0.58	10.58	7.74	32.66	8.49	3.57	4.96	3.77	27.25	1.39	1.06	1.75
30.23	-33.47	-115.05	0.23	6.97	-7.71	-26.52	4.41	25.57	9.76	3.58	4.89	3.76	27.20	1.37	1.05	1.72
-14.81	-51.30	-79.64	0.23	-3.41	-11.80	-18.32	4.80	26.25	1.62	3.59	4.82	3.76	27.15	1.34	1.05	1.70
-50.68	-54.10	124.28	0.23	-11.63	-12.42	28.52	2.60	15.31	15.93	3.60	4.74	3.75	27.10	1.32	1.04	1.68
-14.55	-14.97	76.89	0.23	-3.33	-3.43	17.61	1.85	9.85	12.34	3.62	4.66	3.74	27.05	1.29	1.03	1.65
54.36	41.97	-94.06	0.23	12.42	9.59	-21.49	6.29	19.35	0.96	3.63	4.59	3.72	27.00	1.26	1.02	1.63
29.19	54.77	-34.79	0.23	6.66	12.49	-7.93	3.78	12.21	4.44	3.65	4.52	3.71	26.95	1.24	1.02	1.60
-36.80	-6.33	54.19	0.23	-8.37	-1.44	12.33	5.20	14.17	11.29	3.67	4.45	3.69	26.90	1.21	1.00	1.58
-51.62	-32.26	53.99	0.23	-11.72	-7.32	12.25	7.76	13.77	7.00	3.69	4.40	3.67	26.86	1.19	0.99	1.55

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
44.39	36.72	68.75	0.23	10.05	8.32	15.57	0.49	8.89	14.44	3.71	4.35	3.65	26.81	1.17	0.98	1.53
87.12	34.57	-28.31	0.23	19.69	7.81	-6.40	4.46	11.18	10.01	3.73	4.31	3.63	26.76	1.16	0.97	1.51
-8.05	-20.46	-127.99	0.23	-1.81	-4.61	-28.86	10.67	14.98	13.37	3.75	4.28	3.61	26.71	1.14	0.96	1.49
-62.91	11.55	40.21	0.23	-14.15	2.60	9.05	10.61	8.87	14.48	3.76	4.27	3.58	26.66	1.14	0.95	1.48
18.18	9.50	141.85	0.22	4.08	2.13	31.85	7.58	18.30	6.97	3.77	4.27	3.56	26.61	1.13	0.94	1.47
44.05	-45.44	-52.31	0.22	9.87	-10.18	-11.72	14.87	25.08	22.62	3.78	4.29	3.54	26.56	1.13	0.94	1.47
-61.92	1.64	-101.99	0.22	-13.84	0.37	-22.79	9.78	23.99	31.03	3.78	4.32	3.52	26.51	1.14	0.93	1.47
-40.72	48.54	79.07	0.22	-9.08	10.82	17.63	6.07	11.71	22.85	3.79	4.37	3.50	26.46	1.15	0.92	1.48
7.34	-46.47	104.72	0.22	1.63	-10.34	23.30	4.47	9.89	12.52	3.78	4.43	3.48	26.42	1.17	0.92	1.49
-20.63	-76.24	-64.35	0.22	-4.58	-16.92	-14.29	1.45	12.35	8.57	3.77	4.51	3.46	26.37	1.19	0.92	1.51
-4.59	66.78	-107.99	0.22	-1.02	14.79	-23.92	8.43	17.41	12.05	3.76	4.59	3.44	26.32	1.22	0.92	1.53
5.41	60.52	5.23	0.22	1.19	13.37	1.16	9.32	14.08	3.49	3.74	4.70	3.43	26.27	1.26	0.92	1.56
31.33	-74.46	10.21	0.22	6.91	-16.42	2.25	3.51	16.52	4.42	3.71	4.81	3.42	26.22	1.29	0.92	1.59
-1.73	-7.31	-15.76	0.22	-0.38	-1.61	-3.47	3.36	18.36	1.68	3.68	4.92	3.40	26.17	1.34	0.93	1.63
-41.65	55.59	21.24	0.22	-9.14	12.20	4.66	1.40	10.79	2.04	3.64	5.04	3.40	26.12	1.38	0.93	1.67
-4.56	-20.49	-16.75	0.22	-1.00	-4.49	-3.67	2.88	19.33	1.76	3.60	5.17	3.39	26.07	1.44	0.94	1.72
33.38	-3.45	-41.62	0.22	7.29	-0.75	-9.09	1.24	13.36	4.59	3.55	5.30	3.40	26.03	1.49	0.96	1.77
21.26	16.52	34.41	0.22	4.63	3.60	7.50	1.41	6.39	8.35	3.50	5.42	3.40	25.98	1.55	0.97	1.83
-89.61	-33.45	51.25	0.22	-19.49	-7.28	11.15	4.25	6.50	7.47	3.44	5.55	3.41	25.93	1.61	0.99	1.90
-54.32	-25.34	-47.74	0.22	-11.79	-5.50	-10.36	1.23	11.10	8.80	3.37	5.67	3.42	25.88	1.68	1.01	1.96
81.62	54.59	-40.55	0.22	17.67	11.82	-8.78	4.21	8.62	17.66	3.31	5.78	3.44	25.83	1.75	1.04	2.03
35.38	67.34	47.45	0.22	7.64	14.55	10.25	2.36	19.72	20.07	3.24	5.88	3.46	25.78	1.81	1.07	2.11
4.30	-27.75	-11.61	0.22	0.93	-5.98	-2.50	5.25	15.40	12.70	3.17	5.98	3.49	25.73	1.88	1.10	2.18
42.20	-47.60	2.43	0.22	9.07	-10.23	0.52	7.80	8.76	4.31	3.11	6.06	3.51	25.68	1.95	1.13	2.26
4.10	1.48	63.31	0.21	0.88	0.32	13.58	2.61	12.22	10.49	3.04	6.13	3.55	25.63	2.02	1.17	2.33
-41.83	2.47	-41.72	0.21	-8.95	0.53	-8.93	10.33	14.75	12.35	2.97	6.19	3.58	25.59	2.09	1.21	2.41
46.16	-28.49	-13.59	0.21	9.86	-6.08	-2.90	3.40	7.14	14.45	2.90	6.24	3.62	25.54	2.15	1.25	2.49
120.82	-51.33	113.22	0.21	25.73	-10.93	24.12	9.60	9.65	5.11	2.84	6.27	3.66	25.49	2.21	1.29	2.56
-31.37	4.75	31.95	0.21	-6.67	1.01	6.79	4.32	10.05	4.66	2.77	6.28	3.71	25.44	2.27	1.34	2.63
-102.10	54.63	-107.89	0.21	-21.65	11.58	-22.87	5.76	1.08	13.20	2.71	6.29	3.75	25.39	2.32	1.38	2.70
-9.88	43.42	-25.61	0.21	-2.09	9.18	-5.42	4.84	3.85	13.94	2.65	6.28	3.79	25.34	2.37	1.43	2.77
-31.80	-16.64	87.28	0.21	-6.71	-3.51	18.42	7.28	3.54	4.62	2.59	6.26	3.83	25.29	2.41	1.48	2.83
-35.67	-89.43	6.11	0.21	-7.51	-18.83	1.29	4.06	10.30	6.62	2.54	6.23	3.86	25.24	2.45	1.52	2.89

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
19.36	7.73	-61.76	0.21	4.06	1.62	-12.97	6.23	8.63	12.60	2.49	6.19	3.90	25.20	2.49	1.56	2.94
24.26	110.48	-34.56	0.21	5.08	23.15	-7.24	2.85	6.25	10.45	2.44	6.15	3.93	25.15	2.51	1.61	2.98
11.19	31.19	27.47	0.21	2.34	6.52	5.74	7.72	12.12	8.87	2.40	6.09	3.95	25.10	2.54	1.65	3.03
-19.80	-60.76	1.43	0.21	-4.13	-12.67	0.30	6.22	10.45	12.15	2.36	6.03	3.97	25.05	2.56	1.68	3.06
-28.71	-81.48	-37.48	0.21	-5.97	-16.95	-7.80	11.67	6.12	8.97	2.32	5.96	3.99	25.00	2.57	1.72	3.10
18.31	-43.23	51.50	0.21	3.80	-8.97	10.69	12.15	11.74	4.54	2.28	5.89	4.00	24.95	2.59	1.75	3.13
59.15	17.81	36.34	0.21	12.24	3.69	7.52	11.22	9.15	5.80	2.24	5.82	4.00	24.90	2.60	1.79	3.15
10.01	61.65	-20.68	0.21	2.07	12.73	-4.27	7.21	12.02	23.15	2.20	5.74	4.01	24.85	2.60	1.82	3.17
-39.94	21.47	-8.60	0.21	-8.23	4.42	-1.77	8.91	20.65	26.65	2.17	5.65	4.00	24.80	2.60	1.84	3.19
-17.83	-56.46	-40.49	0.21	-3.66	-11.60	-8.32	5.23	25.08	14.05	2.14	5.57	3.99	24.76	2.60	1.87	3.20
-19.76	-28.30	-19.35	0.21	-4.05	-5.80	-3.97	4.86	11.60	11.53	2.11	5.48	3.97	24.71	2.60	1.89	3.21
-7.71	-6.24	46.61	0.20	-1.58	-1.28	9.53	6.39	16.26	10.26	2.08	5.39	3.96	24.66	2.59	1.90	3.22
17.27	-7.22	15.50	0.20	3.52	-1.47	3.16	7.38	8.33	8.08	2.05	5.30	3.94	24.61	2.58	1.92	3.22
12.20	51.69	-54.41	0.20	2.48	10.52	-11.07	8.31	2.92	5.49	2.03	5.22	3.91	24.56	2.57	1.93	3.21
-10.80	40.50	-27.23	0.20	-2.19	8.22	-5.53	13.31	11.77	15.54	2.01	5.13	3.89	24.51	2.55	1.94	3.20
-46.69	-34.52	45.75	0.20	-9.46	-6.99	9.26	4.95	13.06	18.29	1.99	5.04	3.87	24.46	2.53	1.94	3.19
9.38	-17.42	34.60	0.20	1.89	-3.52	6.99	2.15	11.52	7.75	1.98	4.95	3.85	24.41	2.50	1.94	3.16
39.28	66.47	-15.42	0.20	7.91	13.39	-3.11	16.67	12.00	6.95	1.97	4.86	3.83	24.37	2.46	1.94	3.14
-77.65	12.31	-31.32	0.20	-15.61	2.47	-6.29	18.45	7.45	12.71	1.97	4.77	3.82	24.32	2.42	1.94	3.10
-55.39	-89.55	-19.20	0.20	-11.11	-17.95	-3.85	7.21	8.39	17.95	1.97	4.68	3.81	24.27	2.38	1.93	3.07
84.55	-12.35	41.77	0.20	16.91	-2.47	8.35	12.25	13.91	18.32	1.97	4.60	3.80	24.22	2.33	1.93	3.02
50.27	35.60	58.58	0.20	10.03	7.10	11.69	11.37	12.34	10.74	1.98	4.52	3.79	24.17	2.28	1.91	2.97
-9.81	2.52	-26.47	0.20	-1.95	0.50	-5.27	6.10	1.88	5.75	2.00	4.44	3.79	24.12	2.22	1.90	2.92
-1.79	34.44	-62.27	0.20	-0.36	6.84	-12.36	5.39	4.76	18.76	2.02	4.37	3.79	24.07	2.16	1.88	2.86
-48.70	-4.63	8.85	0.20	-9.64	-0.92	1.75	13.50	35.71	32.32	2.05	4.30	3.80	24.02	2.10	1.86	2.80
-46.51	-38.55	82.68	0.20	-9.19	-7.61	16.33	18.45	26.96	37.16	2.08	4.24	3.82	23.97	2.04	1.83	2.74
3.57	8.50	44.44	0.20	0.70	1.68	8.75	8.51	3.01	24.00	2.12	4.19	3.83	23.93	1.98	1.81	2.68
27.50	24.43	-79.48	0.20	5.40	4.80	-15.62	10.06	1.62	14.87	2.16	4.14	3.86	23.88	1.92	1.79	2.62
37.37	25.32	-92.12	0.20	7.32	4.96	-18.06	10.17	2.75	23.58	2.20	4.10	3.89	23.83	1.86	1.76	2.56
2.29	-5.72	53.97	0.20	0.45	-1.12	10.55	18.64	12.66	5.98	2.25	4.06	3.92	23.78	1.80	1.74	2.51
-3.72	-13.69	123.63	0.20	-0.72	-2.67	24.11	7.65	8.64	11.00	2.30	4.04	3.96	23.73	1.75	1.72	2.45
-7.70	29.27	16.37	0.19	-1.50	5.69	3.18	6.52	11.55	7.33	2.36	4.02	4.00	23.68	1.70	1.69	2.40
-39.61	21.16	-33.59	0.19	-7.68	4.11	-6.52	12.32	12.98	10.69	2.42	4.00	4.04	23.63	1.66	1.67	2.35

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
6.45	-11.86	32.43	0.19	1.25	-2.30	6.28	23.88	29.81	17.45	2.48	4.00	4.09	23.58	1.61	1.65	2.31
4.43	-45.75	53.27	0.19	0.85	-8.83	10.28	13.38	24.85	17.11	2.54	4.00	4.14	23.54	1.58	1.63	2.27
-32.52	-21.63	-1.82	0.19	-6.26	-4.16	-0.35	8.57	14.56	17.19	2.60	4.01	4.20	23.49	1.54	1.61	2.23
44.45	66.28	-49.70	0.19	8.53	12.73	-9.54	9.05	15.62	18.94	2.67	4.02	4.26	23.44	1.51	1.60	2.19
66.22	26.09	-42.50	0.19	12.68	5.00	-8.14	8.85	15.60	7.12	2.74	4.04	4.32	23.39	1.48	1.58	2.16
-17.88	-95.78	-15.37	0.19	-3.41	-18.29	-2.94	7.77	2.03	4.99	2.80	4.06	4.39	23.34	1.45	1.56	2.13
-77.69	-67.46	14.65	0.19	-14.80	-12.85	2.79	7.51	4.52	10.51	2.87	4.09	4.45	23.29	1.42	1.55	2.11
-39.46	62.54	-3.36	0.19	-7.50	11.88	-0.64	14.04	7.56	14.47	2.94	4.12	4.53	23.24	1.40	1.54	2.08
33.55	43.32	-40.26	0.19	6.36	8.21	-7.63	8.51	6.64	3.50	3.00	4.15	4.60	23.19	1.38	1.53	2.06
8.46	-62.64	27.78	0.19	1.60	-11.84	5.25	2.46	8.79	2.76	3.07	4.18	4.68	23.14	1.36	1.52	2.04
-8.55	-20.48	68.60	0.19	-1.61	-3.86	12.93	4.11	2.58	10.50	3.14	4.22	4.76	23.10	1.34	1.52	2.03
-15.50	18.52	-44.43	0.19	-2.91	3.48	-8.35	6.57	4.86	19.68	3.20	4.25	4.84	23.05	1.33	1.51	2.01
-53.37	-30.47	-173.98	0.19	-10.01	-5.71	-32.62	7.79	9.19	11.12	3.27	4.28	4.92	23.00	1.31	1.51	2.00
-11.24	25.54	-87.44	0.19	-2.10	4.78	-16.35	4.38	12.44	3.25	3.33	4.31	5.00	22.95	1.29	1.50	1.98
33.71	95.29	169.41	0.19	6.29	17.77	31.60	16.03	7.20	19.11	3.40	4.34	5.08	22.90	1.28	1.50	1.97
42.55	-25.86	175.73	0.19	7.91	-4.81	32.69	23.08	4.15	10.02	3.46	4.37	5.16	22.85	1.26	1.49	1.95
9.44	-97.62	-44.52	0.19	1.75	-18.11	-8.26	20.22	11.79	22.33	3.52	4.40	5.23	22.80	1.25	1.49	1.94
-45.49	61.45	-104.20	0.19	-8.42	11.37	-19.28	6.67	3.89	28.85	3.58	4.43	5.30	22.75	1.24	1.48	1.93
14.57	79.16	-46.88	0.18	2.69	14.61	-8.65	6.00	9.13	25.60	3.64	4.45	5.37	22.71	1.22	1.48	1.92
63.41	-83.84	4.22	0.18	11.67	-15.43	0.78	4.80	14.81	16.21	3.69	4.47	5.43	22.66	1.21	1.47	1.90
4.26	-54.57	25.17	0.18	0.78	-10.01	4.62	6.41	15.44	10.47	3.74	4.49	5.48	22.61	1.20	1.46	1.89
-21.71	85.37	-25.81	0.18	-3.97	15.62	-4.72	3.92	5.46	14.58	3.79	4.50	5.53	22.56	1.19	1.46	1.88
17.30	80.03	-52.64	0.18	3.16	14.61	-9.61	8.46	8.15	8.60	3.83	4.52	5.57	22.51	1.18	1.45	1.87
58.14	-40.06	10.46	0.18	10.58	-7.29	1.90	11.12	5.41	2.57	3.87	4.52	5.60	22.46	1.17	1.45	1.86
-2.97	-84.82	78.30	0.18	-0.54	-15.39	14.21	2.41	5.23	8.29	3.90	4.53	5.62	22.41	1.16	1.44	1.85
-110.75	-24.60	10.14	0.18	-20.05	-4.45	1.83	7.05	5.90	2.88	3.93	4.53	5.63	22.36	1.15	1.43	1.84
-62.41	9.42	-127.61	0.18	-11.26	1.70	-23.03	4.80	6.13	6.54	3.96	4.52	5.64	22.31	1.14	1.42	1.83
49.61	29.34	-41.26	0.18	8.93	5.28	-7.43	6.06	3.99	7.03	3.98	4.51	5.63	22.27	1.13	1.42	1.81
55.40	13.25	107.63	0.18	9.94	2.38	19.32	9.87	6.74	6.17	3.99	4.49	5.62	22.22	1.13	1.41	1.80
4.27	-23.74	19.39	0.18	0.76	-4.25	3.47	5.99	3.31	14.36	4.00	4.47	5.60	22.17	1.12	1.40	1.79
-32.68	31.24	-55.52	0.18	-5.83	5.58	-9.91	3.71	10.47	22.01	4.00	4.45	5.57	22.12	1.11	1.39	1.78
11.36	60.05	40.52	0.18	2.02	10.69	7.21	3.53	8.65	20.20	4.00	4.42	5.53	22.07	1.10	1.38	1.77
81.17	-10.06	74.31	0.18	14.41	-1.79	13.19	7.83	3.55	17.31	3.99	4.38	5.49	22.02	1.10	1.38	1.76

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
36.93	-48.95	4.16	0.18	6.54	-8.66	0.74	5.67	6.00	13.93	3.98	4.34	5.45	21.97	1.09	1.37	1.75
-46.06	15.11	-32.76	0.18	-8.13	2.67	-5.78	7.93	6.45	8.53	3.96	4.30	5.41	21.92	1.08	1.36	1.74
-9.95	32.01	-22.64	0.18	-1.75	5.63	-3.98	3.32	7.38	4.15	3.94	4.25	5.36	21.88	1.08	1.36	1.74
61.94	-40.98	-6.56	0.18	10.87	-7.19	-1.15	2.20	5.83	7.91	3.92	4.19	5.31	21.83	1.07	1.36	1.73
8.79	-12.87	42.38	0.18	1.54	-2.25	7.42	6.53	0.71	8.70	3.89	4.13	5.26	21.78	1.06	1.35	1.72
-77.08	11.12	20.27	0.17	-13.45	1.94	3.54	9.76	6.97	13.76	3.85	4.07	5.22	21.73	1.06	1.35	1.72
-20.89	-23.86	-107.54	0.17	-3.63	-4.15	-18.71	8.29	3.90	17.30	3.82	4.00	5.17	21.68	1.05	1.36	1.71
80.99	12.16	-52.20	0.17	14.05	2.11	-9.06	7.59	15.65	27.02	3.78	3.93	5.12	21.63	1.04	1.36	1.71
31.75	19.09	122.67	0.17	5.49	3.30	21.22	22.04	14.32	22.81	3.73	3.85	5.08	21.58	1.03	1.36	1.71
-46.22	2.04	75.29	0.17	-7.97	0.35	12.99	8.65	10.87	23.77	3.69	3.78	5.04	21.53	1.02	1.37	1.71
8.85	5.02	-72.70	0.17	1.52	0.86	-12.50	7.30	18.00	19.28	3.64	3.71	5.00	21.48	1.02	1.37	1.71
21.78	17.97	-60.42	0.17	3.73	3.08	-10.36	5.51	13.70	16.13	3.59	3.63	4.97	21.44	1.01	1.38	1.71
-40.19	14.89	28.66	0.17	-6.87	2.55	4.90	8.47	3.57	15.02	3.54	3.56	4.94	21.39	1.00	1.39	1.72
-2.11	-42.06	29.56	0.17	-0.36	-7.17	5.04	7.01	7.82	2.47	3.49	3.49	4.91	21.34	1.00	1.41	1.73
37.81	-6.97	-2.48	0.17	6.43	-1.18	-0.42	4.87	3.03	2.55	3.44	3.42	4.89	21.29	0.99	1.42	1.73
-48.18	53.93	-12.43	0.17	-8.17	9.14	-2.11	6.51	10.85	6.46	3.39	3.35	4.87	21.24	0.99	1.44	1.74
-69.94	9.80	-34.32	0.17	-11.82	1.66	-5.80	7.99	6.45	17.87	3.34	3.28	4.86	21.19	0.98	1.46	1.76
36.12	-42.14	-17.20	0.17	6.09	-7.10	-2.90	9.06	8.71	13.68	3.28	3.22	4.85	21.14	0.98	1.48	1.77
28.98	-75.91	33.78	0.17	4.87	-12.75	5.67	7.66	5.92	6.76	3.23	3.16	4.83	21.09	0.98	1.50	1.79
-43.00	-7.75	27.67	0.17	-7.20	-1.30	4.63	4.20	13.19	9.99	3.18	3.11	4.83	21.04	0.98	1.52	1.80
-4.91	103.05	-22.32	0.17	-0.82	17.21	-3.73	7.41	5.02	7.72	3.13	3.06	4.82	21.00	0.98	1.54	1.82
-9.88	58.72	-15.23	0.17	-1.65	9.78	-2.54	8.33	7.69	7.88	3.08	3.02	4.81	20.95	0.98	1.56	1.84
-43.78	-51.30	23.77	0.17	-7.27	-8.52	3.95	9.88	9.55	5.85	3.04	2.98	4.81	20.90	0.98	1.58	1.86
-2.69	-71.07	-18.23	0.17	-0.45	-11.76	-3.02	1.59	9.93	8.82	2.99	2.94	4.81	20.85	0.98	1.61	1.88
2.30	14.04	-39.10	0.17	0.38	2.32	-6.45	3.22	7.02	6.47	2.95	2.91	4.81	20.80	0.99	1.63	1.90
-9.69	17.97	51.89	0.16	-1.59	2.96	8.54	0.82	8.31	15.97	2.92	2.89	4.81	20.75	0.99	1.65	1.92
16.30	-38.99	62.68	0.16	2.67	-6.39	10.28	8.13	10.28	19.62	2.88	2.87	4.82	20.70	1.00	1.67	1.95
11.23	30.02	-50.33	0.16	1.84	4.91	-8.23	7.53	3.62	11.75	2.85	2.86	4.83	20.65	1.00	1.69	1.97
-10.77	26.90	-42.13	0.16	-1.76	4.38	-6.87	5.29	5.46	6.80	2.83	2.85	4.84	20.61	1.01	1.71	1.99
19.21	-52.06	48.87	0.16	3.12	-8.46	7.94	3.79	6.80	14.84	2.81	2.85	4.86	20.56	1.01	1.73	2.01
38.09	-0.96	13.76	0.16	6.17	-0.16	2.23	7.55	7.75	17.88	2.79	2.85	4.87	20.51	1.02	1.75	2.02
-5.98	27.98	-13.22	0.16	-0.97	4.52	-2.14	9.86	7.74	12.43	2.77	2.85	4.88	20.46	1.03	1.76	2.04
-31.91	-42.00	4.81	0.16	-5.14	-6.76	0.77	8.06	6.57	3.30	2.76	2.86	4.89	20.41	1.04	1.77	2.05

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-27.80	-41.84	-22.14	0.16	-4.46	-6.71	-3.55	9.12	9.70	10.65	2.75	2.87	4.90	20.36	1.04	1.78	2.07
38.17	3.24	20.88	0.16	6.11	0.52	3.34	10.93	5.54	8.74	2.74	2.89	4.91	20.31	1.05	1.79	2.08
53.98	-35.70	55.74	0.16	8.61	-5.69	8.89	7.84	10.48	4.03	2.74	2.90	4.91	20.26	1.06	1.79	2.08
-76.98	-19.60	-12.33	0.16	-12.24	-3.12	-1.96	7.29	7.36	2.60	2.74	2.92	4.92	20.21	1.07	1.80	2.09
-69.69	73.29	-82.13	0.16	-11.05	11.62	-13.02	6.44	11.39	4.19	2.74	2.94	4.92	20.17	1.07	1.80	2.09
38.37	21.09	-19.91	0.16	6.06	3.33	-3.14	4.67	12.82	3.84	2.74	2.96	4.92	20.12	1.08	1.79	2.10
-2.71	-90.77	109.93	0.16	-0.43	-14.30	17.31	2.73	7.25	9.19	2.74	2.99	4.92	20.07	1.09	1.79	2.10
-10.69	-37.52	58.61	0.16	-1.68	-5.89	9.20	0.51	5.93	12.10	2.75	3.01	4.91	20.02	1.10	1.79	2.10
34.26	104.34	-86.32	0.16	5.36	16.33	-13.51	3.07	4.23	7.70	2.75	3.03	4.89	19.97	1.10	1.78	2.09
-10.79	107.91	-67.00	0.16	-1.68	16.83	-10.45	6.75	4.33	2.69	2.75	3.05	4.87	19.92	1.11	1.77	2.09
-23.73	-28.26	37.08	0.16	-3.69	-4.39	5.77	7.13	10.38	3.28	2.75	3.07	4.85	19.87	1.12	1.76	2.09
-12.66	-78.05	57.90	0.16	-1.96	-12.10	8.97	8.52	8.40	8.49	2.74	3.09	4.81	19.82	1.13	1.75	2.08
-9.62	-9.88	3.80	0.15	-1.49	-1.53	0.59	8.86	8.94	7.83	2.74	3.10	4.77	19.78	1.13	1.74	2.08
42.31	36.06	-105.98	0.15	6.52	5.55	-16.32	1.78	15.08	5.95	2.73	3.12	4.73	19.73	1.14	1.73	2.07
26.17	25.93	-129.50	0.15	4.02	3.98	-19.88	8.78	5.06	6.68	2.72	3.12	4.68	19.68	1.15	1.72	2.07
-33.82	6.85	30.72	0.15	-5.18	1.05	4.70	13.20	5.32	9.35	2.71	3.13	4.63	19.63	1.15	1.71	2.06
-49.66	-43.08	129.42	0.15	-7.57	-6.57	19.74	9.22	3.06	5.43	2.70	3.13	4.57	19.58	1.16	1.69	2.05
-10.55	-60.88	66.04	0.15	-1.60	-9.25	10.04	3.78	7.95	6.03	2.69	3.13	4.51	19.53	1.16	1.68	2.04
63.34	36.17	-63.95	0.15	9.60	5.48	-9.69	5.48	4.27	1.33	2.68	3.13	4.45	19.48	1.17	1.66	2.03
30.15	60.97	-95.61	0.15	4.55	9.21	-14.44	2.21	4.15	8.73	2.66	3.13	4.39	19.43	1.18	1.65	2.02
-30.86	12.81	38.52	0.15	-4.64	1.93	5.80	1.58	1.37	9.00	2.65	3.13	4.32	19.38	1.18	1.63	2.02
-15.77	-5.21	74.31	0.15	-2.37	-0.78	11.15	0.57	1.63	6.83	2.63	3.12	4.25	19.34	1.19	1.62	2.01
-5.73	-38.13	17.14	0.15	-0.86	-5.70	2.56	2.25	3.96	8.64	2.61	3.11	4.18	19.29	1.19	1.60	1.99
12.25	8.92	18.09	0.15	1.83	1.33	2.69	1.94	6.50	8.15	2.60	3.10	4.11	19.24	1.19	1.58	1.98
17.19	37.82	-2.93	0.15	2.55	5.62	-0.43	1.64	4.27	5.28	2.58	3.09	4.04	19.19	1.20	1.57	1.97
-24.80	-22.22	-15.87	0.15	-3.67	-3.29	-2.35	5.68	7.65	10.18	2.56	3.08	3.96	19.14	1.20	1.55	1.96
-28.70	-8.16	1.17	0.15	-4.23	-1.20	0.17	4.42	5.75	13.16	2.54	3.07	3.89	19.09	1.20	1.53	1.95
54.24	8.83	0.18	0.15	7.97	1.30	0.03	2.19	10.28	11.17	2.53	3.05	3.82	19.04	1.21	1.51	1.93
66.99	-45.10	9.18	0.15	9.81	-6.61	1.35	1.26	9.95	9.47	2.51	3.04	3.74	18.99	1.21	1.49	1.92
-13.12	-89.84	0.18	0.15	-1.92	-13.12	0.03	6.39	3.50	8.43	2.50	3.02	3.67	18.95	1.21	1.47	1.90
-3.10	-11.64	-64.68	0.15	-0.45	-1.69	-9.41	7.35	17.43	9.04	2.48	3.01	3.60	18.90	1.21	1.45	1.89
19.86	109.16	-74.38	0.15	2.88	15.83	-10.79	6.06	13.28	8.90	2.47	3.00	3.53	18.85	1.21	1.43	1.88
-31.12	18.90	34.72	0.14	-4.50	2.73	5.02	5.21	6.36	4.36	2.46	2.98	3.47	18.80	1.21	1.41	1.86

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-30.00	-89.97	71.52	0.14	-4.32	-12.96	10.30	7.23	10.05	7.75	2.44	2.97	3.40	18.75	1.21	1.39	1.85
3.04	-5.78	-6.59	0.14	0.44	-0.83	-0.95	6.34	9.46	7.19	2.43	2.95	3.33	18.70	1.22	1.37	1.83
-9.95	42.14	-49.47	0.14	-1.42	6.03	-7.07	8.24	7.17	3.10	2.41	2.93	3.27	18.65	1.22	1.36	1.82
8.05	-1.95	-22.30	0.14	1.15	-0.28	-3.18	5.82	7.19	1.06	2.39	2.92	3.21	18.60	1.22	1.34	1.81
12.00	3.05	23.71	0.14	1.70	0.43	3.37	7.68	8.78	2.51	2.37	2.90	3.15	18.55	1.22	1.33	1.80
-49.93	32.97	9.66	0.14	-7.06	4.67	1.37	4.00	4.72	5.76	2.35	2.88	3.10	18.51	1.22	1.32	1.80
-2.83	-19.07	-6.33	0.14	-0.40	-2.69	-0.89	5.51	7.03	9.55	2.33	2.85	3.05	18.46	1.23	1.31	1.79
57.06	-45.94	14.67	0.14	8.02	-6.45	2.06	6.42	0.58	7.31	2.31	2.83	3.00	18.41	1.23	1.30	1.79
-0.06	31.08	-23.30	0.14	-0.01	4.35	-3.26	7.73	6.59	11.76	2.28	2.81	2.96	18.36	1.23	1.30	1.79
-8.05	26.96	-26.18	0.14	-1.12	3.76	-3.65	9.04	5.17	6.78	2.25	2.79	2.93	18.31	1.24	1.30	1.79
-14.01	-53.99	35.82	0.14	-1.95	-7.50	4.98	2.39	5.85	2.73	2.23	2.77	2.89	18.26	1.24	1.30	1.80
-26.94	-39.81	19.72	0.14	-3.73	-5.51	2.73	0.80	6.76	3.02	2.20	2.74	2.87	18.21	1.25	1.30	1.80
37.04	33.20	-16.27	0.14	5.11	4.58	-2.24	4.15	7.10	8.49	2.17	2.72	2.84	18.16	1.25	1.31	1.81
33.89	23.08	-10.20	0.14	4.66	3.17	-1.40	14.91	0.70	11.16	2.14	2.70	2.82	18.12	1.26	1.32	1.83
-47.09	-17.93	-26.11	0.14	-6.45	-2.46	-3.58	9.20	7.39	5.63	2.11	2.69	2.81	18.07	1.27	1.33	1.84
-65.87	16.06	20.92	0.14	-8.99	2.19	2.86	2.62	7.54	6.38	2.08	2.67	2.80	18.02	1.28	1.34	1.86
-17.71	-7.96	78.74	0.14	-2.41	-1.08	10.71	9.17	1.44	5.17	2.05	2.66	2.79	17.97	1.29	1.36	1.88
28.26	-26.89	-46.31	0.14	3.83	-3.64	-6.28	9.20	8.68	5.16	2.03	2.64	2.79	17.92	1.30	1.38	1.90
10.18	40.07	-70.06	0.14	1.37	5.41	-9.46	12.09	24.32	15.18	2.00	2.63	2.79	17.87	1.32	1.39	1.92
-39.77	-1.01	86.92	0.13	-5.35	-0.14	11.69	4.45	17.02	16.60	1.98	2.63	2.79	17.82	1.33	1.41	1.93
-5.68	-15.98	66.63	0.13	-0.76	-2.14	8.93	3.92	9.62	16.15	1.96	2.62	2.79	17.77	1.34	1.42	1.95
56.21	66.91	5.50	0.13	7.50	8.93	0.73	4.08	8.30	8.33	1.94	2.62	2.79	17.72	1.35	1.44	1.97
45.00	40.69	7.49	0.13	5.99	5.41	1.00	6.35	11.27	4.10	1.93	2.62	2.79	17.68	1.36	1.45	1.98
-9.07	-18.36	-10.49	0.13	-1.20	-2.43	-1.39	7.26	8.52	2.66	1.92	2.63	2.80	17.63	1.36	1.45	1.99
-42.98	15.64	58.43	0.13	-5.67	2.06	7.71	0.90	7.09	5.82	1.92	2.63	2.80	17.58	1.37	1.46	2.00
-19.86	33.53	25.28	0.13	-2.61	4.41	3.32	3.15	7.94	12.86	1.92	2.64	2.80	17.53	1.37	1.46	2.00
-8.81	-44.45	-121.51	0.13	-1.15	-5.82	-15.92	6.12	3.79	16.22	1.93	2.65	2.80	17.48	1.38	1.45	2.00
23.16	-29.31	-48.15	0.13	3.02	-3.83	-6.28	8.28	13.64	14.16	1.93	2.66	2.80	17.43	1.38	1.45	2.00
44.02	71.60	121.72	0.13	5.72	9.31	15.82	12.22	12.50	5.03	1.95	2.68	2.80	17.38	1.38	1.44	1.99
-21.03	9.43	69.35	0.13	-2.72	1.22	8.98	13.84	3.15	6.05	1.96	2.69	2.80	17.33	1.37	1.43	1.98
-25.95	-72.45	-112.55	0.13	-3.35	-9.35	-14.52	12.63	11.40	1.87	1.98	2.70	2.79	17.29	1.36	1.41	1.96
1.10	-29.26	-81.14	0.13	0.14	-3.76	-10.43	18.22	26.26	10.03	2.00	2.72	2.79	17.24	1.36	1.39	1.95
-5.90	9.78	141.75	0.13	-0.75	1.25	18.14	14.79	15.88	2.99	2.03	2.73	2.79	17.19	1.35	1.38	1.93

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-9.87	-2.24	93.29	0.13	-1.26	-0.29	11.90	1.96	9.66	1.60	2.05	2.75	2.78	17.14	1.34	1.36	-9.87
-6.84	-32.18	-149.58	0.13	-0.87	-4.09	-19.00	7.15	11.64	5.74	2.08	2.76	2.78	17.09	1.32	1.33	-6.84
-33.77	-35.05	-100.06	0.13	-4.27	-4.43	-12.66	13.69	21.72	3.07	2.12	2.78	2.78	17.04	1.31	1.31	-33.77
-45.62	-42.90	91.97	0.13	-5.75	-5.41	11.59	8.66	17.85	5.73	2.15	2.80	2.78	16.99	1.30	1.29	-45.62
39.39	-3.81	74.66	0.13	4.94	-0.48	9.37	3.20	19.04	2.14	2.18	2.81	2.78	16.94	1.29	1.27	39.39
21.26	61.07	-19.44	0.13	2.66	7.63	-2.43	5.07	23.00	2.20	2.22	2.84	2.79	16.89	1.28	1.26	21.26
-15.75	10.92	-6.37	0.12	-1.96	1.36	-0.79	3.96	3.00	2.79	2.25	2.86	2.80	16.85	1.27	1.24	-15.75
28.22	-25.06	-53.24	0.12	3.50	-3.11	-6.60	4.49	18.38	7.08	2.29	2.89	2.80	16.80	1.26	1.23	28.22
-15.81	11.96	-99.91	0.12	-1.95	1.48	-12.34	6.17	9.72	5.61	2.32	2.92	2.82	16.75	1.26	1.21	-15.81
-35.72	-12.04	84.14	0.12	-4.39	-1.48	10.35	9.55	12.62	4.16	2.36	2.95	2.83	16.70	1.25	1.20	-35.72
-20.61	-34.95	129.72	0.12	-2.52	-4.28	15.89	12.02	21.26	8.70	2.39	2.98	2.84	16.65	1.25	1.19	-20.61
4.42	28.05	-76.37	0.12	0.54	3.42	-9.32	22.15	31.92	9.28	2.42	3.02	2.86	16.60	1.25	1.18	4.42
13.38	61.87	-88.02	0.12	1.63	7.52	-10.69	5.98	25.86	10.31	2.46	3.07	2.87	16.55	1.25	1.17	13.38
-15.63	-35.19	83.01	0.12	-1.89	-4.26	10.04	6.95	15.68	4.72	2.49	3.12	2.89	16.50	1.25	1.16	-15.63
29.34	-106.91	123.61	0.12	3.54	-12.88	14.89	5.79	17.88	7.00	2.53	3.18	2.90	16.46	1.26	1.15	29.34
7.26	29.24	-56.51	0.12	0.87	3.51	-6.78	3.09	29.25	7.80	2.56	3.24	2.91	16.41	1.26	1.14	7.26
-69.62	125.92	-151.08	0.12	-8.32	15.05	-18.05	1.29	33.51	8.51	2.60	3.31	2.93	16.36	1.27	1.13	-69.62
-10.46	9.64	6.23	0.12	-1.25	1.15	0.74	3.26	25.15	10.64	2.63	3.39	2.93	16.31	1.29	1.11	-10.46
51.45	-35.31	138.95	0.12	6.10	-4.18	16.47	6.48	24.72	8.24	2.67	3.47	2.94	16.26	1.30	1.10	51.45
-0.66	-4.24	56.58	0.12	-0.08	-0.50	6.68	2.27	7.46	7.37	2.71	3.56	2.94	16.21	1.32	1.09	-0.66
-9.64	-11.21	-155.21	0.12	-1.13	-1.32	-18.24	9.12	3.60	3.73	2.74	3.66	2.94	16.16	1.33	1.07	-9.64
55.26	50.70	-115.65	0.12	6.47	5.93	-13.53	3.28	13.85	3.81	2.77	3.76	2.93	16.11	1.35	1.06	55.26
39.06	71.45	161.28	0.12	4.55	8.32	18.79	1.66	23.92	5.75	2.81	3.87	2.92	16.06	1.38	1.04	39.06
-14.99	-2.69	130.71	0.12	-1.74	-0.31	15.16	4.81	17.07	6.13	2.84	3.98	2.90	16.02	1.40	1.02	-14.99
7.02	-35.62	-168.20	0.12	0.81	-4.11	-19.43	9.93	16.20	5.04	2.87	4.10	2.88	15.97	1.43	1.00	7.02
31.93	-57.44	-145.56	0.12	3.67	-6.61	-16.74	6.38	9.99	4.44	2.90	4.22	2.85	15.92	1.45	0.98	31.93
-20.10	-61.21	171.41	0.11	-2.30	-7.01	19.63	1.89	5.87	3.11	2.93	4.35	2.83	15.87	1.48	0.96	-20.10
-27.01	17.87	152.78	0.11	-3.08	2.04	17.42	6.51	12.42	6.01	2.96	4.48	2.79	15.82	1.51	0.94	-27.01
9.02	52.73	-159.20	0.11	1.02	5.98	-18.07	6.92	10.33	5.07	2.98	4.62	2.76	15.77	1.55	0.93	9.02
-70.86	-3.38	-165.53	0.11	-8.01	-0.38	-18.70	5.48	1.40	2.35	3.00	4.76	2.72	15.72	1.58	0.91	-70.86
-79.56	-38.30	139.54	0.11	-8.95	-4.31	15.70	8.87	4.79	1.98	3.02	4.90	2.69	15.67	1.62	0.89	-79.56
33.52	-14.20	142.99	0.11	3.75	-1.59	16.02	0.81	10.47	3.57	3.03	5.04	2.65	15.63	1.66	0.87	33.52
20.41	43.73	-143.99	0.11	2.28	4.88	-16.05	2.30	5.91	2.53	3.04	5.18	2.61	15.58	1.70	0.86	20.41

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-24.59	23.59	-138.41	0.11	-2.73	2.62	-15.36	5.46	13.47	5.18	3.04	5.32	2.57	15.53	1.75	0.85	1.94
17.42	-74.31	33.82	0.11	1.92	-8.21	3.74	2.06	11.14	7.58	3.04	5.46	2.54	15.48	1.80	0.84	1.98
18.34	-95.98	88.59	0.11	2.02	-10.56	9.75	3.18	8.49	9.65	3.03	5.59	2.51	15.43	1.84	0.83	2.02
-26.65	-66.65	72.29	0.11	-2.92	-7.30	7.92	4.97	15.87	10.73	3.02	5.72	2.48	15.38	1.90	0.82	2.07
-26.55	14.45	-27.79	0.11	-2.89	1.57	-3.03	4.76	11.86	4.52	3.00	5.84	2.45	15.33	1.95	0.82	2.11
38.43	110.19	-91.53	0.11	4.17	11.96	-9.93	5.04	9.63	5.95	2.98	5.95	2.42	15.28	2.00	0.81	2.16
46.25	39.89	-26.28	0.11	4.99	4.31	-2.84	3.28	5.03	7.54	2.95	6.06	2.40	15.23	2.05	0.82	2.21
-44.76	-78.04	57.68	0.11	-4.81	-8.39	6.20	5.72	11.98	3.23	2.92	6.15	2.38	15.19	2.11	0.82	2.26
-20.63	-56.78	26.53	0.11	-2.21	-6.08	2.84	6.33	13.07	1.18	2.88	6.23	2.37	15.14	2.16	0.82	2.31
24.35	14.30	-27.45	0.11	2.59	1.52	-2.92	4.02	9.06	3.96	2.84	6.30	2.35	15.09	2.22	0.83	2.37
-43.61	33.20	-11.36	0.11	-4.62	3.52	-1.20	10.60	1.59	3.98	2.79	6.35	2.34	15.04	2.27	0.84	2.42
-10.51	26.08	10.66	0.11	-1.11	2.75	1.12	7.81	3.78	4.01	2.75	6.39	2.33	14.99	2.32	0.85	2.47
42.42	-2.97	63.53	0.11	4.45	-0.31	6.67	6.98	6.55	3.42	2.70	6.41	2.32	14.94	2.38	0.86	2.53
-2.67	-17.93	45.33	0.10	-0.28	-1.87	4.74	10.50	9.43	2.35	2.65	6.41	2.31	14.89	2.42	0.87	2.58
-18.63	56.98	-119.51	0.10	-1.94	5.93	-12.43	7.00	4.66	4.54	2.59	6.40	2.31	14.84	2.47	0.89	2.62
47.31	31.80	-156.94	0.10	4.90	3.29	-16.24	1.41	5.30	4.33	2.54	6.37	2.30	14.79	2.51	0.90	2.67
56.09	-78.11	56.28	0.10	5.78	-8.05	5.80	6.61	0.77	4.22	2.48	6.32	2.29	14.75	2.54	0.92	2.71
-50.92	-12.94	168.85	0.10	-5.22	-1.33	17.31	11.10	8.63	1.41	2.43	6.26	2.28	14.70	2.57	0.94	2.74
-62.70	59.97	1.53	0.10	-6.40	6.12	0.16	7.11	2.66	0.90	2.38	6.18	2.26	14.65	2.59	0.95	2.76
10.40	32.77	-62.34	0.10	1.06	3.33	-6.33	8.90	8.41	4.43	2.33	6.08	2.25	14.60	2.61	0.97	2.78
36.30	-1.29	79.65	0.10	3.67	-0.13	8.04	9.79	5.74	4.81	2.29	5.98	2.24	14.55	2.61	0.98	2.79
15.19	-1.29	54.40	0.10	1.53	-0.13	5.47	4.41	1.01	2.99	2.24	5.86	2.22	14.50	2.61	0.99	2.79
-20.81	48.61	-96.50	0.10	-2.08	4.86	-9.65	5.78	1.75	2.80	2.20	5.74	2.20	14.45	2.60	1.00	2.79
-15.74	9.48	-53.19	0.10	-1.57	0.94	-5.29	0.99	3.30	2.62	2.17	5.60	2.18	14.40	2.59	1.01	2.78
-19.67	-6.53	79.78	0.10	-1.95	-0.65	7.90	10.57	3.35	6.92	2.13	5.46	2.16	14.36	2.56	1.01	2.75
8.34	78.32	41.55	0.10	0.82	7.71	4.09	8.88	1.14	5.06	2.10	5.31	2.14	14.31	2.53	1.02	2.72
50.22	9.14	-69.38	0.10	4.92	0.90	-6.80	4.19	0.99	4.19	2.08	5.16	2.12	14.26	2.48	1.02	2.68
7.10	-98.69	-43.13	0.10	0.69	-9.62	-4.21	1.78	3.29	6.22	2.06	5.01	2.09	14.21	2.43	1.02	2.64
-35.85	-2.49	68.83	0.10	-3.48	-0.24	6.68	15.87	5.98	7.42	2.04	4.85	2.07	14.16	2.38	1.01	2.58
-16.75	33.44	108.49	0.10	-1.62	3.23	10.47	23.76	11.94	16.78	2.03	4.70	2.04	14.11	2.31	1.01	2.52
25.23	-84.46	55.18	0.10	2.42	-8.11	5.30	10.61	7.46	2.93	2.02	4.54	2.02	14.06	2.24	1.00	2.46
-9.81	-33.23	-54.80	0.10	-0.94	-3.17	-5.23	11.93	11.00	4.97	2.02	4.39	1.99	14.01	2.17	0.98	2.38
-33.73	67.69	-127.42	0.10	-3.20	6.43	-12.11	11.23	12.57	11.42	2.03	4.24	1.96	13.96	2.09	0.97	2.31

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
35.26	19.51	14.82	0.09	3.33	1.84	1.40	5.86	9.11	3.62	2.04	4.10	1.94	13.92	2.01	0.95	2.23
5.17	-47.44	95.62	0.09	0.49	-4.46	8.99	8.41	6.10	2.61	2.05	3.96	1.91	13.87	1.93	0.93	2.15
-40.76	-73.20	-29.50	0.09	-3.81	-6.84	-2.76	8.80	8.50	4.95	2.07	3.83	1.89	13.82	1.85	0.91	2.07
25.26	-9.04	34.51	0.09	2.35	-0.84	3.21	8.71	8.16	2.30	2.09	3.70	1.87	13.77	1.77	0.89	1.98
34.14	61.85	127.20	0.09	3.16	5.72	11.77	9.86	3.50	3.82	2.11	3.58	1.84	13.72	1.69	0.87	1.90
-2.93	36.65	56.84	0.09	-0.27	3.37	5.23	11.53	4.07	9.94	2.14	3.46	1.82	13.67	1.61	0.85	1.82
-23.88	-15.40	-8.24	0.09	-2.19	-1.41	-0.75	6.79	1.94	6.52	2.18	3.34	1.80	13.62	1.53	0.83	1.74
-41.76	-25.32	-127.95	0.09	-3.80	-2.30	-11.64	7.78	6.26	1.42	2.21	3.23	1.78	13.57	1.46	0.81	1.67
4.31	10.70	-136.40	0.09	0.39	0.97	-12.34	4.21	10.91	4.20	2.25	3.13	1.77	13.53	1.39	0.78	1.59
52.19	-45.24	-1.11	0.09	4.70	-4.07	-0.10	8.15	15.20	5.27	2.30	3.03	1.75	13.48	1.32	0.76	1.52
-24.87	-101.95	77.75	0.09	-2.23	-9.12	6.96	0.52	1.08	8.01	2.34	2.93	1.74	13.43	1.25	0.74	1.46
-85.65	13.23	138.34	0.09	-7.62	1.18	12.31	12.70	8.14	5.23	2.39	2.84	1.73	13.38	1.19	0.72	1.39
-12.46	109.98	41.99	0.09	-1.10	9.73	3.72	20.57	16.78	12.20	2.44	2.76	1.72	13.33	1.13	0.71	1.33
10.53	59.63	-131.82	0.09	0.93	5.25	-11.60	14.70	17.59	20.26	2.49	2.68	1.72	13.28	1.08	0.69	1.28
20.47	-47.40	-35.46	0.09	1.79	-4.15	-3.10	10.92	24.81	16.40	2.54	2.61	1.71	13.23	1.03	0.67	1.23
24.37	-37.23	89.44	0.09	2.12	-3.24	7.78	9.61	13.28	4.35	2.60	2.54	1.72	13.18	0.98	0.66	1.18
-56.57	70.69	-28.66	0.09	-4.89	6.12	-2.48	7.99	14.58	9.03	2.65	2.48	1.72	13.13	0.94	0.65	1.14
-0.46	61.42	-99.39	0.09	-0.04	5.28	-8.55	7.60	28.31	10.86	2.71	2.43	1.73	13.09	0.90	0.64	1.10
77.38	-33.64	41.74	0.09	6.62	-2.88	3.57	15.66	27.90	10.34	2.76	2.39	1.74	13.04	0.87	0.63	1.07
14.19	-72.43	181.31	0.09	1.21	-6.16	15.41	5.03	14.91	11.46	2.82	2.36	1.76	12.99	0.84	0.62	1.04
-21.80	-33.22	48.87	0.08	-1.84	-2.81	4.13	12.83	13.31	4.54	2.87	2.33	1.77	12.94	0.81	0.62	1.02
-6.75	-22.12	-195.82	0.08	-0.57	-1.86	-16.45	10.38	2.55	3.90	2.93	2.31	1.80	12.89	0.79	0.61	1.00
4.25	-8.06	-83.25	0.08	0.35	-0.67	-6.95	10.05	1.37	4.68	2.98	2.30	1.82	12.84	0.77	0.61	0.99
-14.74	82.78	139.66	0.08	-1.22	6.87	11.59	2.23	9.91	3.39	3.03	2.30	1.85	12.79	0.76	0.61	0.98
-3.71	31.55	36.32	0.08	-0.31	2.60	3.00	13.56	14.98	7.40	3.08	2.32	1.88	12.74	0.75	0.61	0.97
42.21	-74.37	-101.54	0.08	3.46	-6.10	-8.33	9.95	4.90	6.66	3.13	2.34	1.92	12.70	0.75	0.61	0.97
16.09	-29.17	-48.22	0.08	1.31	-2.38	-3.93	9.04	1.34	6.62	3.18	2.37	1.96	12.65	0.75	0.62	0.97
-21.91	47.79	52.79	0.08	-1.77	3.87	4.28	6.90	7.48	5.80	3.22	2.41	2.00	12.60	0.75	0.62	0.97
-15.84	93.50	51.60	0.08	-1.28	7.53	4.15	4.51	6.09	3.91	3.27	2.47	2.04	12.55	0.75	0.62	0.98
-34.74	30.25	-25.44	0.08	-2.78	2.42	-2.04	10.04	7.48	5.81	3.31	2.53	2.08	12.50	0.76	0.63	0.99
-3.67	-21.77	16.59	0.08	-0.29	-1.73	1.32	8.46	9.17	6.93	3.35	2.60	2.13	12.45	0.78	0.64	1.00
64.20	0.26	45.48	0.08	5.07	0.02	3.59	2.51	1.72	5.71	3.38	2.68	2.18	12.40	0.79	0.64	1.02
1.06	-77.59	-18.55	0.08	0.08	-6.09	-1.46	4.66	6.14	5.19	3.42	2.76	2.22	12.35	0.81	0.65	1.04

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-56.83	-57.32	19.46	0.08	-4.43	-4.47	1.52	6.96	7.54	3.85	3.45	2.86	2.27	12.30	0.83	0.66	1.06
-12.70	42.70	-10.54	0.08	-0.98	3.31	-0.82	5.41	5.96	0.65	3.48	2.95	2.32	12.26	0.85	0.67	1.08
15.29	16.58	-85.33	0.08	1.18	1.28	-6.57	3.27	3.40	2.97	3.50	3.06	2.37	12.21	0.87	0.68	1.10
11.23	-28.40	50.75	0.08	0.86	-2.17	3.88	3.96	7.67	5.62	3.52	3.16	2.42	12.16	0.90	0.69	1.13
1.20	-48.25	94.48	0.08	0.09	-3.67	7.18	5.18	10.32	4.98	3.54	3.27	2.47	12.11	0.92	0.70	1.15
4.18	8.82	-87.52	0.08	0.32	0.67	-6.61	3.27	1.76	1.98	3.56	3.37	2.51	12.06	0.95	0.71	1.18
-17.80	47.70	-104.12	0.08	-1.33	3.58	-7.81	9.84	3.91	1.70	3.58	3.48	2.55	12.01	0.97	0.71	1.21
-33.70	-36.33	34.04	0.07	-2.51	-2.71	2.54	3.32	9.10	5.20	3.59	3.58	2.59	11.96	1.00	0.72	1.23
-1.64	-87.08	8.97	0.07	-0.12	-6.44	0.66	1.49	5.63	5.59	3.59	3.67	2.63	11.91	1.02	0.73	1.26
14.33	-25.86	-2.03	0.07	1.05	-1.90	-0.15	10.60	4.37	7.92	3.60	3.76	2.66	11.87	1.05	0.74	1.28
-7.69	58.07	107.77	0.07	-0.56	4.24	7.87	12.29	6.18	3.88	3.60	3.84	2.69	11.82	1.07	0.75	1.30
-23.63	-2.05	5.56	0.07	-1.71	-0.15	0.40	8.23	11.06	6.85	3.60	3.92	2.71	11.77	1.09	0.75	1.32
15.38	-67.91	-120.19	0.07	1.11	-4.89	-8.65	1.13	7.18	3.13	3.59	3.98	2.73	11.72	1.11	0.76	1.34
11.32	-7.76	9.05	0.07	0.81	-0.55	0.65	3.34	1.46	5.36	3.58	4.03	2.75	11.67	1.13	0.77	1.36
-12.68	5.24	71.90	0.07	-0.90	0.37	5.11	10.07	6.25	7.15	3.56	4.06	2.75	11.62	1.14	0.77	1.38
28.28	42.14	-39.15	0.07	1.99	2.97	-2.76	8.53	6.22	4.55	3.54	4.09	2.75	11.57	1.15	0.78	1.39
25.17	94.86	-72.91	0.07	1.76	6.64	-5.10	6.27	10.70	6.56	3.52	4.10	2.75	11.52	1.17	0.78	1.40
-25.84	33.60	56.14	0.07	-1.80	2.34	3.90	6.37	10.43	11.73	3.49	4.10	2.74	11.47	1.17	0.78	1.41
-16.76	-34.40	63.92	0.07	-1.16	-2.37	4.41	11.88	5.94	3.09	3.46	4.08	2.72	11.43	1.18	0.79	1.42
30.21	-39.26	-104.98	0.07	2.07	-2.69	-7.19	9.81	6.49	1.41	3.42	4.05	2.70	11.38	1.18	0.79	1.42
-7.84	9.79	-52.65	0.07	-0.53	0.67	-3.58	3.19	3.92	1.14	3.38	4.01	2.67	11.33	1.19	0.79	1.42
-55.72	100.57	99.27	0.07	-3.76	6.79	6.70	8.26	11.42	2.42	3.34	3.95	2.63	11.28	1.19	0.79	1.42
-10.60	115.13	44.00	0.07	-0.71	7.71	2.95	6.82	10.59	1.12	3.29	3.89	2.59	11.23	1.18	0.79	1.42
22.37	-65.97	-66.93	0.07	1.49	-4.39	-4.45	2.24	3.27	1.62	3.24	3.82	2.55	11.18	1.18	0.79	1.42
25.27	-172.50	-78.62	0.07	1.67	-11.39	-5.19	1.69	3.57	1.44	3.18	3.74	2.51	11.13	1.17	0.79	1.41
-3.78	-38.08	-6.44	0.07	-0.25	-2.49	-0.42	4.79	6.04	1.48	3.13	3.65	2.46	11.08	1.17	0.79	1.41
-31.71	54.88	44.50	0.07	-2.06	3.57	2.89	2.16	2.54	3.15	3.07	3.56	2.41	11.04	1.16	0.78	1.40
-23.61	44.67	50.33	0.06	-1.52	2.88	3.25	5.26	3.45	3.04	3.02	3.47	2.36	10.99	1.15	0.78	1.39
-34.50	13.55	11.22	0.06	-2.21	0.87	0.72	3.52	0.53	1.79	2.96	3.38	2.31	10.94	1.14	0.78	1.38
4.56	35.45	-47.69	0.06	0.29	2.25	-3.03	2.78	5.81	3.73	2.91	3.28	2.26	10.89	1.13	0.78	1.37
55.43	65.24	30.37	0.06	3.49	4.11	1.91	3.93	9.02	4.95	2.85	3.19	2.20	10.84	1.12	0.77	1.36
4.31	-19.85	118.09	0.06	0.27	-1.24	7.38	5.52	9.99	2.17	2.80	3.10	2.16	10.79	1.11	0.77	1.35
-33.64	12.16	10.84	0.06	-2.09	0.75	0.67	5.18	1.51	2.28	2.75	3.02	2.11	10.74	1.10	0.77	1.34

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-24.53	83.96	-91.98	0.06	-1.51	5.16	-5.66	5.67	8.71	1.40	2.70	2.94	2.06	10.69	1.09	0.76	1.33
-16.45	-54.11	-20.74	0.06	-1.00	-3.30	-1.26	8.31	6.94	1.14	2.66	2.86	2.02	10.64	1.08	0.76	1.32
4.56	-124.76	86.15	0.06	0.28	-7.55	5.21	7.73	0.22	3.25	2.62	2.80	1.98	10.60	1.07	0.76	1.31
-16.42	-34.44	82.83	0.06	-0.99	-2.07	4.97	1.30	1.11	1.51	2.58	2.74	1.94	10.55	1.06	0.75	1.30
-35.32	19.58	-2.32	0.06	-2.10	1.17	-0.14	3.91	1.48	2.62	2.55	2.68	1.91	10.50	1.05	0.75	1.29
-13.23	16.51	-66.17	0.06	-0.78	0.97	-3.90	2.09	0.32	2.56	2.52	2.64	1.88	10.45	1.05	0.75	1.29
19.75	23.42	-30.96	0.06	1.16	1.37	-1.81	2.75	2.49	1.69	2.49	2.60	1.84	10.40	1.04	0.74	1.28
48.61	17.33	84.95	0.06	2.82	1.01	4.93	3.38	5.90	4.30	2.46	2.56	1.81	10.35	1.04	0.74	1.27
-9.47	-20.66	87.62	0.06	-0.54	-1.19	5.04	1.96	4.66	2.82	2.44	2.53	1.79	10.30	1.04	0.73	1.27
-29.40	-9.61	-60.42	0.06	-1.68	-0.55	-3.44	4.32	2.94	1.27	2.42	2.51	1.76	10.25	1.04	0.73	1.26
53.54	-5.58	-71.14	0.06	3.03	-0.32	-4.02	2.58	4.66	0.67	2.40	2.48	1.73	10.21	1.03	0.72	1.26
39.35	-38.50	91.83	0.06	2.20	-2.16	5.14	0.73	1.78	2.05	2.38	2.46	1.70	10.16	1.03	0.71	1.26
8.25	39.49	90.48	0.06	0.46	2.19	5.02	4.91	0.45	3.42	2.36	2.45	1.67	10.11	1.04	0.71	1.25
40.15	53.30	-98.49	0.06	2.21	2.93	-5.42	7.08	6.21	3.84	2.35	2.43	1.64	10.06	1.04	0.70	1.25
-20.90	-54.70	-93.09	0.05	-1.14	-2.98	-5.07	8.00	13.67	1.32	2.33	2.41	1.61	10.01	1.04	0.69	1.25
-79.70	-2.59	95.92	0.05	-4.30	-0.14	5.18	9.07	4.84	4.42	2.31	2.40	1.58	9.96	1.04	0.69	1.25
-22.50	-5.58	112.52	0.05	-1.20	-0.30	6.02	3.79	3.76	3.82	2.29	2.38	1.55	9.91	1.04	0.68	1.24
30.47	-129.31	-64.56	0.05	1.62	-6.85	-3.42	7.85	2.44	1.49	2.27	2.36	1.52	9.86	1.04	0.67	1.24
26.35	-22.01	-145.12	0.05	1.38	-1.16	-7.62	1.58	4.07	1.99	2.24	2.34	1.49	9.81	1.04	0.66	1.24
-28.65	141.74	-1.81	0.05	-1.49	7.37	-0.09	6.62	6.31	0.88	2.22	2.32	1.45	9.77	1.05	0.65	1.23
-39.52	55.34	77.05	0.05	-2.04	2.85	3.97	5.18	3.44	1.11	2.19	2.30	1.41	9.72	1.05	0.65	1.23
4.55	-109.55	-33.02	0.05	0.23	-5.59	-1.68	2.96	2.52	2.07	2.16	2.27	1.38	9.67	1.05	0.64	1.23
-36.39	-57.22	-76.79	0.05	-1.84	-2.89	-3.88	9.16	2.69	1.58	2.13	2.24	1.34	9.62	1.05	0.63	1.22
-24.28	137.61	25.33	0.05	-1.21	6.88	1.27	7.31	2.11	1.91	2.10	2.21	1.31	9.57	1.05	0.62	1.22
72.62	147.04	92.11	0.05	3.59	7.28	4.56	3.48	1.37	3.79	2.07	2.17	1.27	9.52	1.05	0.61	1.22
58.35	-78.11	0.94	0.05	2.86	-3.83	0.05	1.52	4.48	1.02	2.04	2.14	1.24	9.47	1.05	0.61	1.21
-11.75	-174.61	-76.89	0.05	-0.57	-8.47	-3.73	3.81	2.19	3.44	2.00	2.10	1.20	9.42	1.05	0.60	1.21
-25.68	-3.25	-6.70	0.05	-1.23	-0.16	-0.32	6.51	1.60	3.68	1.97	2.06	1.17	9.38	1.04	0.59	1.20
11.34	128.49	62.20	0.05	0.54	6.10	2.95	6.86	5.71	4.09	1.94	2.02	1.14	9.33	1.04	0.59	1.20
40.23	92.04	38.01	0.05	1.89	4.33	1.79	4.37	2.98	4.37	1.91	1.98	1.11	9.28	1.04	0.58	1.19
10.12	-31.09	-9.03	0.05	0.47	-1.45	-0.42	2.60	3.75	4.32	1.88	1.94	1.09	9.23	1.03	0.58	1.18
-22.86	-77.87	-51.89	0.05	-1.05	-3.58	-2.39	3.68	4.09	1.34	1.86	1.90	1.06	9.18	1.03	0.57	1.17
-20.78	29.22	-71.63	0.05	-0.95	1.33	-3.26	3.31	4.60	0.70	1.83	1.87	1.04	9.13	1.02	0.57	1.17

Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
-19.70	43.07	14.50	0.05	-0.89	1.94	0.65	3.69	2.95	1.43	1.81	1.83	1.02	9.08	1.01	0.56	1.16
-6.65	-47.93	106.28	0.04	-0.30	-2.13	4.73	3.95	0.95	2.78	1.79	1.80	1.00	9.03	1.00	0.56	1.15
26.30	-7.82	-2.91	0.04	1.16	-0.34	-0.13	6.00	0.68	0.72	1.78	1.76	0.99	8.98	0.99	0.55	1.14
13.21	59.07	-130.63	0.04	0.57	2.57	-5.68	3.00	3.77	1.45	1.76	1.73	0.97	8.94	0.98	0.55	1.12
-15.79	19.91	-51.25	0.04	-0.68	0.86	-2.20	1.15	6.22	0.71	1.75	1.70	0.96	8.89	0.97	0.55	1.11
2.23	-31.07	82.71	0.04	0.09	-1.32	3.52	1.99	6.04	0.61	1.75	1.67	0.95	8.84	0.96	0.54	1.10
-15.75	-39.94	118.32	0.04	-0.66	-1.68	4.97	3.39	3.29	1.04	1.74	1.65	0.94	8.79	0.95	0.54	1.09
-23.67	-49.76	-5.89	0.04	-0.98	-2.07	-0.24	3.15	3.67	3.02	1.74	1.63	0.94	8.74	0.93	0.54	1.08
27.31	-39.59	-107.65	0.04	1.12	-1.62	-4.41	3.66	4.79	4.82	1.74	1.60	0.93	8.69	0.92	0.53	1.06
20.21	50.39	12.56	0.04	0.82	2.04	0.51	2.29	4.49	2.96	1.75	1.58	0.93	8.64	0.91	0.53	1.05
-8.82	53.17	92.37	0.04	-0.35	2.13	3.69	5.28	0.81	2.76	1.75	1.57	0.92	8.59	0.90	0.53	1.04
4.18	-71.80	-2.80	0.04	0.17	-2.84	-0.11	5.61	4.16	2.44	1.75	1.55	0.92	8.54	0.88	0.52	1.03
-9.81	-26.60	-123.53	0.04	-0.38	-1.04	-4.82	2.68	1.56	1.99	1.76	1.54	0.92	8.50	0.87	0.52	1.02
-40.72	147.15	-57.15	0.04	-1.57	5.67	-2.20	2.79	4.15	2.24	1.77	1.52	0.92	8.45	0.86	0.52	1.00
-36.57	117.61	143.69	0.04	-1.39	4.47	5.46	1.27	1.49	2.25	1.77	1.51	0.91	8.40	0.85	0.52	0.99
-0.50	-80.47	52.32	0.04	-0.02	-3.02	1.96	4.84	5.00	0.82	1.78	1.50	0.91	8.35	0.84	0.51	0.99
15.47	-161.99	-117.54	0.04	0.57	-5.99	-4.35	2.74	3.73	3.14	1.78	1.48	0.91	8.30	0.83	0.51	0.98
2.42	-57.55	36.64	0.04	0.09	-2.10	1.34	3.49	2.34	3.51	1.79	1.47	0.91	8.25	0.82	0.51	0.97
16.38	36.49	111.36	0.04	0.59	1.31	4.01	4.88	3.81	2.44	1.79	1.46	0.91	8.20	0.82	0.51	0.96
13.31	0.41	-104.64	0.04	0.47	0.01	-3.71	2.39	3.97	0.86	1.79	1.45	0.91	8.15	0.81	0.51	0.96
-28.66	-20.56	-174.06	0.04	-1.00	-0.72	-6.09	1.50	2.72	3.47	1.78	1.44	0.91	8.11	0.81	0.51	0.95
-7.60	21.44	24.26	0.03	-0.26	0.74	0.84	0.21	0.89	3.52	1.78	1.43	0.91	8.06	0.80	0.51	0.95
40.33	14.36	144.93	0.03	1.37	0.49	4.93	0.78	0.76	2.21	1.77	1.42	0.91	8.01	0.80	0.51	0.95
13.22	30.27	75.51	0.03	0.44	1.01	2.53	2.59	1.31	3.71	1.76	1.41	0.90	7.96	0.80	0.51	0.95
-13.79	35.13	-64.50	0.03	-0.45	1.16	-2.13	2.02	0.98	4.47	1.75	1.40	0.90	7.91	0.80	0.52	0.95
2.23	-44.85	-119.11	0.03	0.07	-1.46	-3.87	1.62	2.77	1.00	1.73	1.39	0.90	7.86	0.80	0.52	0.95
4.21	-10.75	5.13	0.03	0.13	-0.34	0.16	4.06	4.83	5.01	1.72	1.38	0.90	7.81	0.80	0.52	0.96
10.18	14.24	134.87	0.03	0.32	0.45	4.25	2.24	1.17	2.40	1.70	1.37	0.90	7.76	0.81	0.53	0.96
17.11	-41.71	62.49	0.03	0.53	-1.29	1.94	1.42	1.35	1.70	1.67	1.36	0.89	7.71	0.81	0.53	0.97
6.06	40.29	-98.42	0.03	0.18	1.23	-3.00	0.34	3.15	1.73	1.65	1.35	0.89	7.67	0.82	0.54	0.98
-19.92	63.08	-42.13	0.03	-0.60	1.89	-1.26	0.54	2.66	3.52	1.63	1.34	0.89	7.62	0.83	0.55	0.99
-60.76	-55.94	83.81	0.03	-1.79	-1.65	2.47	0.81	4.90	5.63	1.60	1.33	0.89	7.57	0.83	0.55	1.00
-6.63	-177.48	15.62	0.03	-0.19	-5.15	0.45	1.14	3.41	1.76	1.57	1.33	0.88	7.52	0.84	0.56	1.01

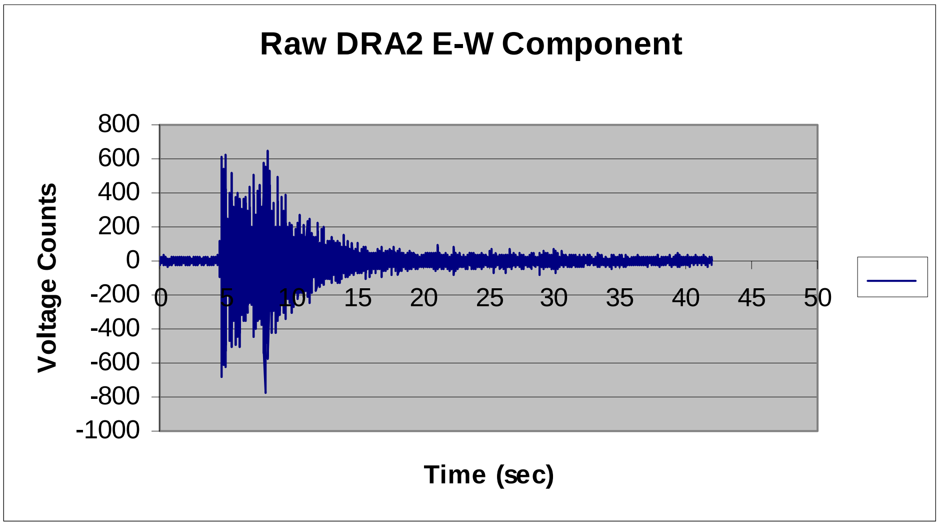
Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
45.28	-91.94	-59.27	0.03	1.29	-2.62	-1.69	1.60	1.93	3.34	1.55	1.32	0.88	7.47	0.85	0.57	1.03
-27.76	156.93	-30.08	0.03	-0.78	4.39	-0.84	3.43	3.67	3.02	1.52	1.31	0.88	7.42	0.86	0.58	1.04
-31.65	81.44	52.89	0.03	-0.87	2.24	1.45	4.70	2.36	0.85	1.49	1.30	0.88	7.37	0.88	0.59	1.06
10.39	-27.67	58.69	0.03	0.28	-0.75	1.58	4.65	4.44	0.70	1.46	1.30	0.88	7.32	0.89	0.60	1.07
15.33	63.26	3.58	0.03	0.41	1.68	0.09	2.37	4.38	1.78	1.43	1.29	0.88	7.28	0.90	0.62	1.09
31.23	27.07	30.52	0.03	0.81	0.70	0.79	1.43	3.28	2.12	1.40	1.28	0.88	7.23	0.91	0.63	1.11
-3.83	-4.98	-20.48	0.03	-0.10	-0.13	-0.52	1.93	0.93	0.99	1.37	1.27	0.89	7.18	0.93	0.65	1.13
-43.74	-35.90	-25.37	0.03	-1.09	-0.90	-0.63	1.76	2.67	3.72	1.34	1.26	0.89	7.13	0.94	0.66	1.15
-17.62	-31.77	75.54	0.02	-0.43	-0.78	1.85	2.82	2.28	2.37	1.31	1.25	0.89	7.08	0.96	0.68	1.17
22.36	-23.66	-27.54	0.02	0.54	-0.57	-0.66	1.62	5.11	1.06	1.28	1.24	0.90	7.03	0.97	0.70	1.20
9.29	-126.37	-69.33	0.02	0.22	-2.97	-1.63	0.41	6.25	1.58	1.26	1.23	0.91	6.98	0.98	0.72	1.22
-32.67	-15.09	58.71	0.02	-0.75	-0.35	1.35	1.37	4.17	4.93	1.23	1.22	0.91	6.93	0.99	0.74	1.24
-33.54	85.77	14.58	0.02	-0.75	1.93	0.33	5.61	0.73	6.37	1.20	1.21	0.92	6.88	1.01	0.76	1.26
-32.42	13.56	-96.24	0.02	-0.71	0.30	-2.12	6.32	3.99	5.68	1.17	1.20	0.93	6.84	1.02	0.79	1.29
-53.25	-17.43	-22.99	0.02	-1.14	-0.37	-0.49	2.61	2.80	2.04	1.15	1.18	0.93	6.79	1.03	0.81	1.31
-17.11	-26.35	94.89	0.02	-0.36	-0.55	1.99	2.38	7.02	3.34	1.12	1.17	0.94	6.74	1.05	0.84	1.34
81.75	73.55	15.68	0.02	1.68	1.51	0.32	3.11	4.47	1.44	1.10	1.16	0.95	6.69	1.06	0.87	1.37
68.44	31.34	-75.19	0.02	1.37	0.63	-1.50	1.61	2.57	3.17	1.07	1.15	0.96	6.64	1.07	0.89	1.40
-54.59	-112.50	-47.92	0.02	-1.06	-2.19	-0.93	4.17	8.02	1.64	1.05	1.14	0.96	6.59	1.09	0.92	1.42
-55.38	28.66	-51.71	0.02	-1.05	0.54	-0.98	2.85	8.44	2.83	1.02	1.13	0.97	6.54	1.10	0.95	1.45
19.69	130.34	64.29	0.02	0.36	2.41	1.19	1.40	6.49	2.69	1.00	1.12	0.98	6.49	1.12	0.98	1.48
14.62	16.04	184.80	0.02	0.26	0.29	3.33	0.94	4.62	2.20	0.98	1.11	0.99	6.45	1.13	1.00	1.51
-4.41	-82.83	24.40	0.02	-0.08	-1.45	0.43	2.73	4.02	2.76	0.96	1.11	0.99	6.40	1.15	1.03	1.54
8.57	-81.50	-99.44	0.02	0.15	-1.39	-1.69	2.42	2.97	1.86	0.95	1.10	1.00	6.35	1.16	1.05	1.57
-8.43	-1.34	16.75	0.02	-0.14	-0.02	0.28	5.23	3.84	5.53	0.93	1.10	1.00	6.30	1.18	1.08	1.60
-41.34	16.62	12.70	0.02	-0.66	0.27	0.20	6.21	2.00	7.49	0.92	1.10	1.01	6.25	1.20	1.10	1.62
-2.26	-19.37	-150.01	0.02	-0.03	-0.30	-2.33	0.49	5.32	1.05	0.91	1.10	1.01	6.20	1.22	1.11	1.65
69.60	22.62	-35.62	0.02	1.04	0.34	-0.53	4.48	3.49	3.15	0.89	1.11	1.01	6.15	1.24	1.13	1.67
58.34	74.42	201.07	0.01	0.85	1.08	2.92	1.77	12.01	7.94	0.89	1.11	1.01	6.10	1.25	1.14	1.70
-32.72	26.21	74.53	0.01	-0.46	0.37	1.04	7.71	21.58	15.88	0.88	1.12	1.02	6.05	1.27	1.15	1.72
-50.56	-21.80	-170.26	0.01	-0.68	-0.29	-2.30	6.61	12.60	8.12	0.88	1.13	1.02	6.01	1.29	1.16	1.74
25.49	11.22	-63.78	0.01	0.33	0.15	-0.83	5.17	6.65	7.80	0.88	1.15	1.02	5.96	1.31	1.17	1.76
27.38	1.19	150.07	0.01	0.34	0.01	1.88	2.68	2.73	8.46	0.88	1.16	1.02	5.91	1.33	1.17	1.77

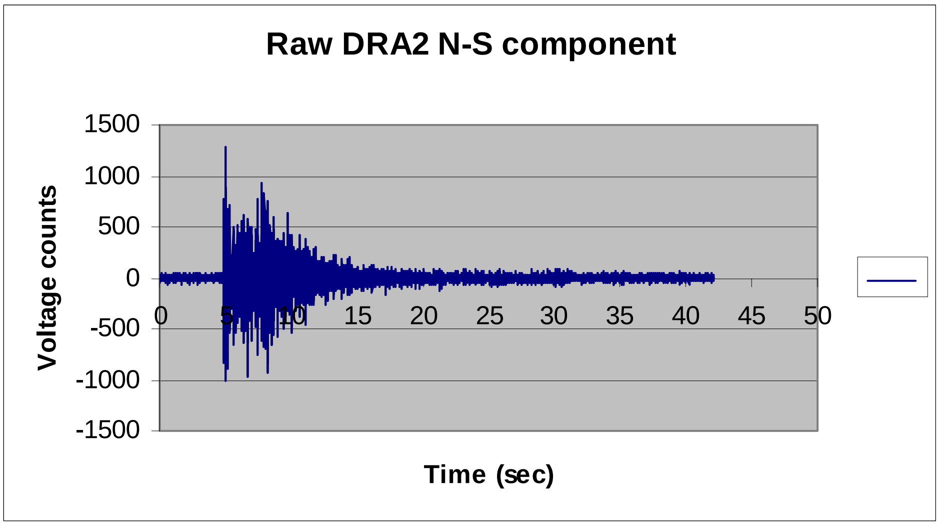
Raw Data			Tapering Function	Tapered Data			FFT Data			Parzen Filtered Data			Frequency Hz	Simple Ratio Spectrum		Mean SQRT Spectrum
Z	E	N		Z	E	N	Z	E	N	Z	E	N		E/Z	N/Z	
9.30	-23.77	36.71	0.01	0.11	-0.29	0.44	3.57	7.23	9.80	0.88	1.18	1.03	5.86	1.35	1.17	1.78
24.22	-18.69	-105.14	0.01	0.28	-0.21	-1.21	2.16	4.57	6.60	0.88	1.21	1.03	5.81	1.37	1.17	1.80
-14.80	-27.60	-17.88	0.01	-0.16	-0.30	-0.20	1.49	2.79	5.05	0.89	1.23	1.04	5.76	1.38	1.16	1.81
-18.74	16.42	34.11	0.01	-0.20	0.17	0.36	2.69	3.33	6.84	0.90	1.26	1.04	5.71	1.40	1.16	1.82
3.28	37.30	34.98	0.01	0.03	0.37	0.35	7.41	3.89	8.46	0.91	1.29	1.05	5.66	1.42	1.16	1.83
-29.67	27.17	35.86	0.01	-0.28	0.26	0.34	4.34	1.54	5.02	0.92	1.32	1.06	5.62	1.43	1.15	1.84
-27.56	46.02	18.76	0.01	-0.25	0.41	0.17	0.23	2.48	2.14	0.93	1.35	1.07	5.57	1.45	1.15	1.85
1.48	13.89	24.69	0.01	0.01	0.12	0.21	0.46	1.06	1.30	0.95	1.39	1.09	5.52	1.47	1.15	1.87
6.46	-53.03	5.65	0.01	0.05	-0.42	0.05	1.20	1.81	3.31	0.96	1.43	1.10	5.47	1.49	1.15	1.88
17.41	-93.74	-17.32	0.01	0.13	-0.70	-0.13	2.31	4.82	5.56	0.98	1.47	1.12	5.42	1.50	1.15	1.89
27.31	-0.56	-58.15	0.01	0.19	0.00	-0.41	3.68	3.81	2.74	0.99	1.51	1.15	5.37	1.52	1.16	1.91
12.22	77.29	-26.96	0.01	0.08	0.50	-0.18	3.00	1.66	1.21	1.01	1.55	1.17	5.32	1.53	1.16	1.92
-43.72	-30.81	75.96	0.01	-0.26	-0.18	0.46	4.08	2.44	1.92	1.03	1.59	1.20	5.27	1.55	1.17	1.94
-83.47	-66.62	-16.15	0.01	-0.46	-0.37	-0.09	2.42	2.40	2.16	1.04	1.63	1.24	5.22	1.56	1.18	1.96
-7.29	1.51	-106.89	0.01	-0.04	0.01	-0.53	1.92	2.25	1.85	1.06	1.68	1.27	5.18	1.58	1.20	1.98
78.56	-8.48	47.25	0.00	0.35	-0.04	0.21	2.69	2.98	2.20	1.08	1.72	1.31	5.13	1.59	1.21	2.00
28.34	-23.42	129.91	0.00	0.11	-0.09	0.52	3.06	0.85	2.89	1.10	1.77	1.35	5.08	1.61	1.23	2.02
-46.63	43.53	-22.29	0.00	-0.16	0.15	-0.08	3.84	4.01	5.42	1.12	1.81	1.40	5.03	1.62	1.25	2.05
-18.51	72.30	-137.95	0.00	-0.06	0.22	-0.41	6.12	4.52	2.92	1.13	1.85	1.44	4.98	1.63	1.27	2.07
24.47	-14.82	-63.53	0.00	0.06	-0.04	-0.16	2.35	2.11	2.04	1.15	1.89	1.49	4.93	1.64	1.30	2.09
6.41	-54.69	56.50	0.00	0.01	-0.11	0.11	1.96	0.32	2.14	1.17	1.92	1.54	4.88	1.65	1.32	2.11
-16.58	56.31	93.21	0.00	-0.02	0.08	0.14	1.25	0.51	2.49	1.18	1.95	1.59	4.83	1.66	1.34	2.13
-36.48	90.01	-1.95	0.00	-0.04	0.09	0.00	0.53	0.47	2.63	1.19	1.98	1.64	4.79	1.66	1.37	2.15
-20.37	-53.07	-130.67	0.00	-0.01	-0.03	-0.07	1.63	1.83	5.66	1.21	2.00	1.68	4.74	1.66	1.39	2.17

Appendix G: Seismic Records Manipulation and Scaling

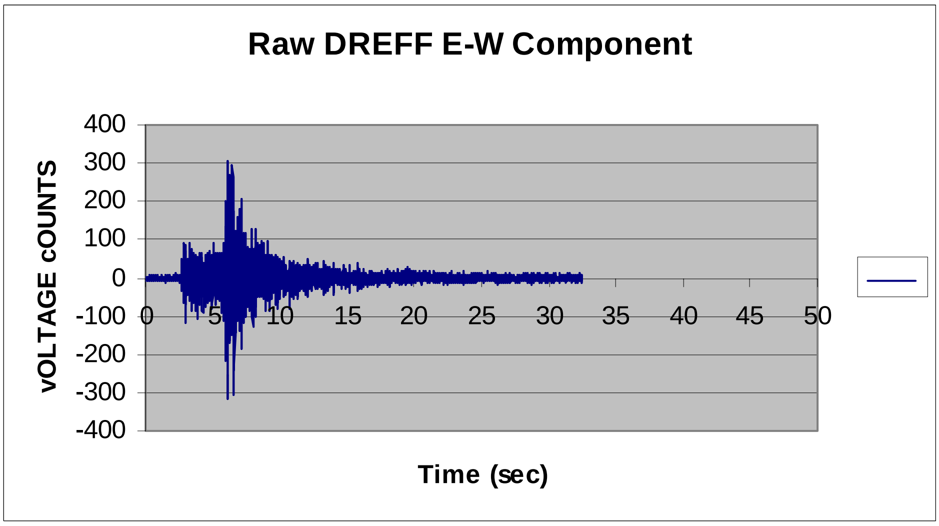
The accelerometer that was used to record the earthquake at the East-west seismic array produced amplitudes in terms of voltage counts that needed to be converted to (g) amplitude. The following are the plots of the raw voltage counts of the east-west and north-south components of the seismic array stations:

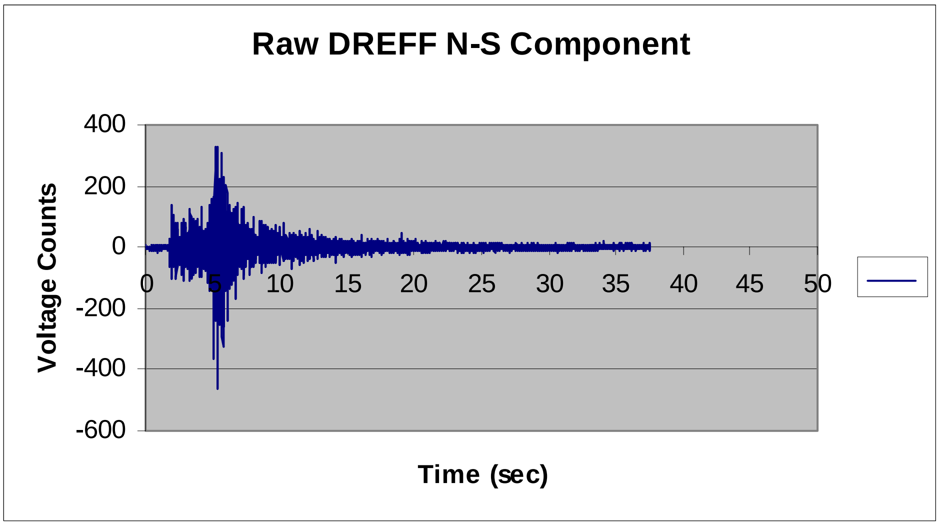
1. Station DRA2



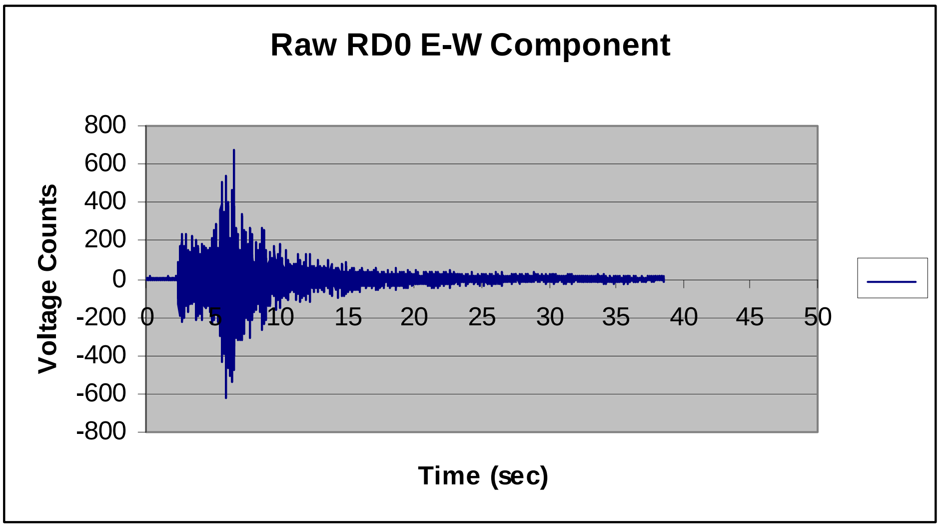


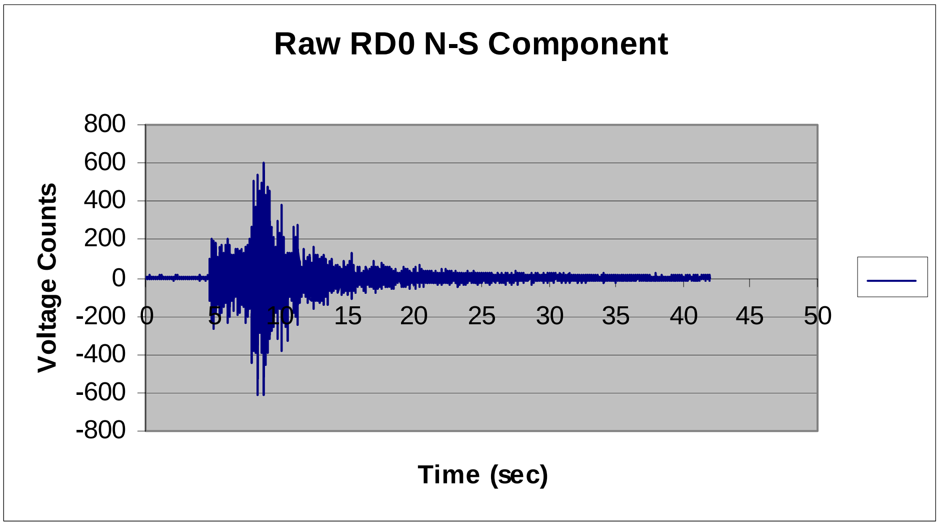
2. Station DREFF



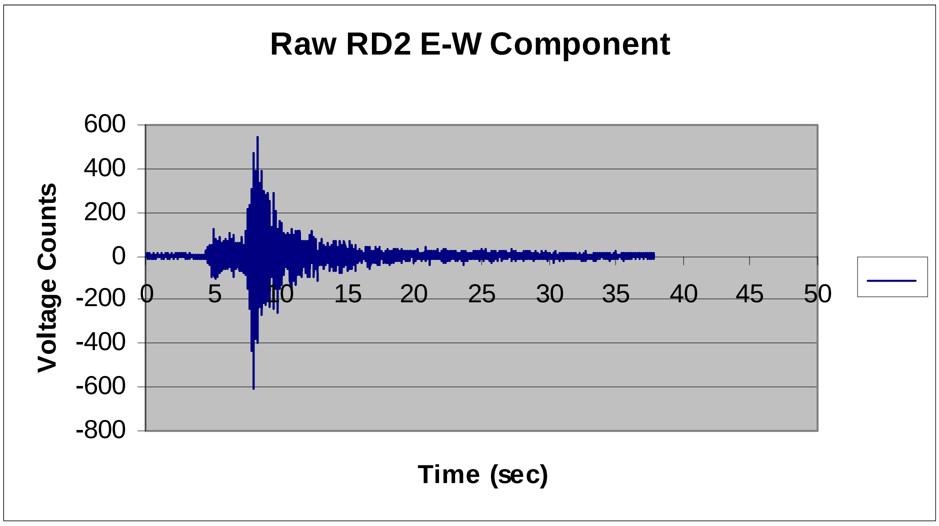


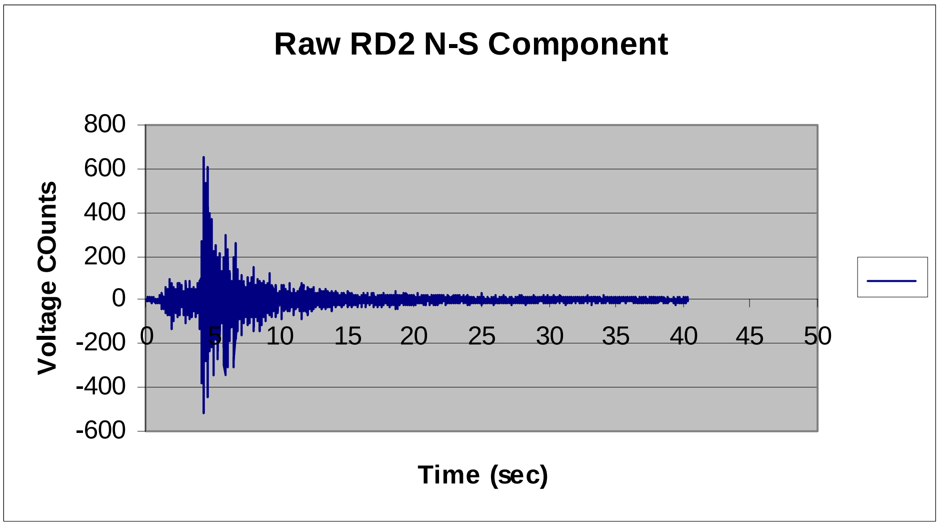
3. Station RD0



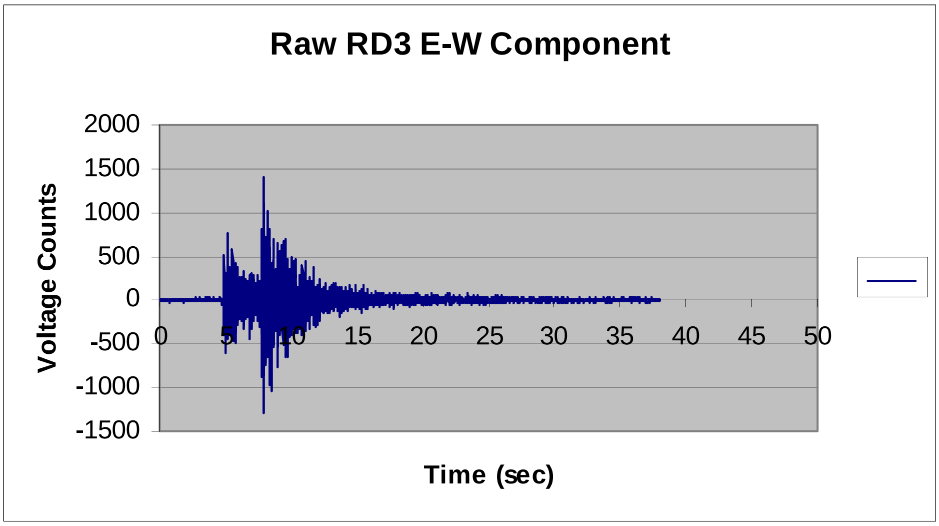


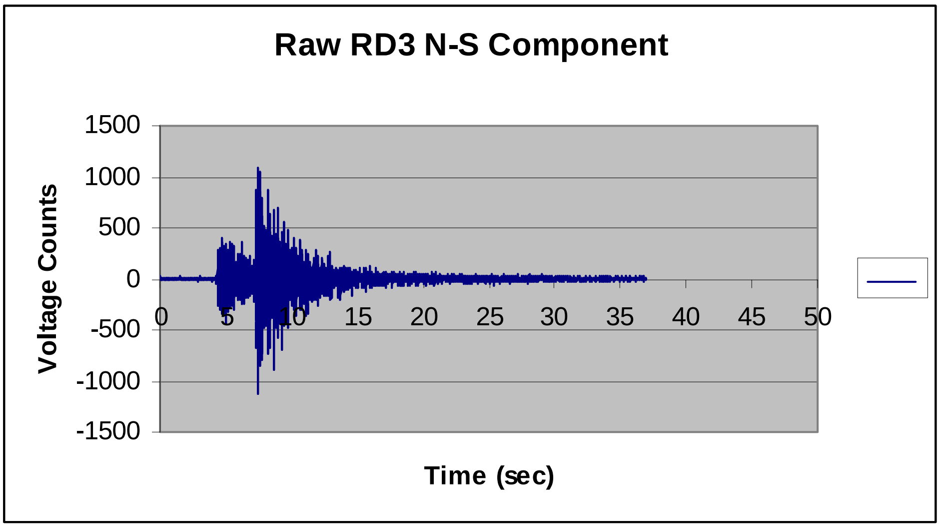
4. Station RD2





5. Station RD3



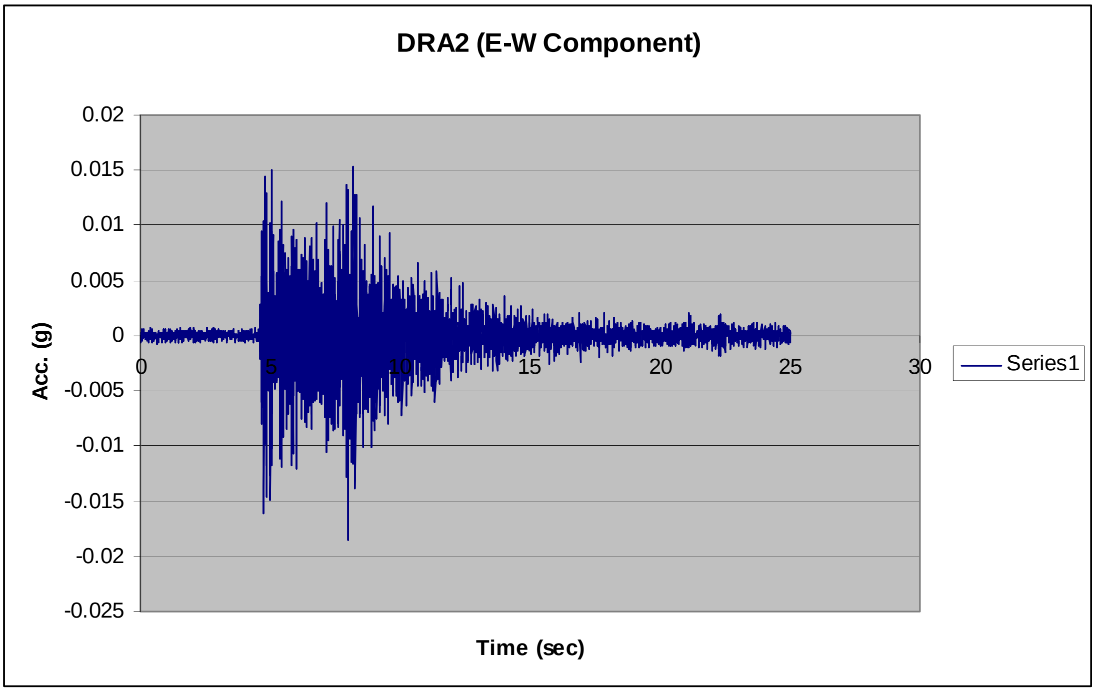


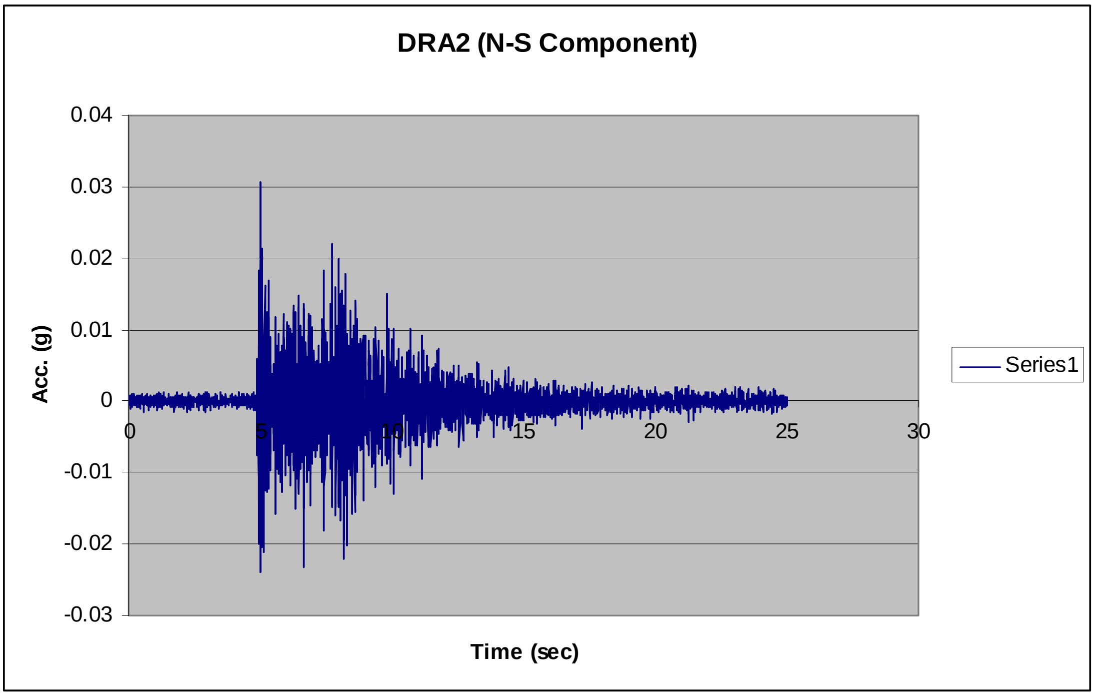
To convert the voltage counts accelerograms to (g) accelerograms the amplitudes must be divided by a constant that is specified by the manufacturer of the recording system. The conversion constant for the systems that were used is given by:

1 voltage count = 419430 g

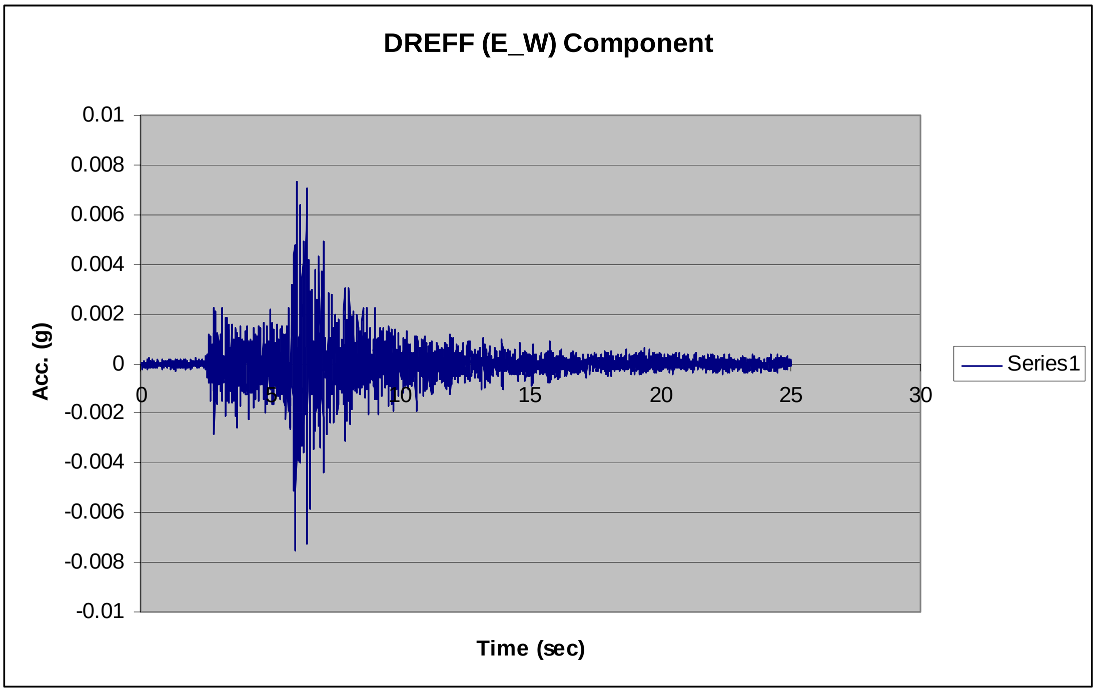
However, the amplitudes of the converted accelerograms turned out to be too small to be recognized by the dynamic site response analysis software, and the amplitude had to be scaled up. The rule of thumb has been not to scale by a factor larger than 2. Recent studies have shown that as far as the shape of the elastic acceleration spectrum is concerned, the permissible factor may be significantly larger than 2 [30]. This argument is more acceptable when the accelerograms are scaled for the same site where they were recorded. The smallest factor that made the amplitudes recognizable by the dynamic analysis software was a factor of 10. The converted and *scaled* accelerograms are presented next:

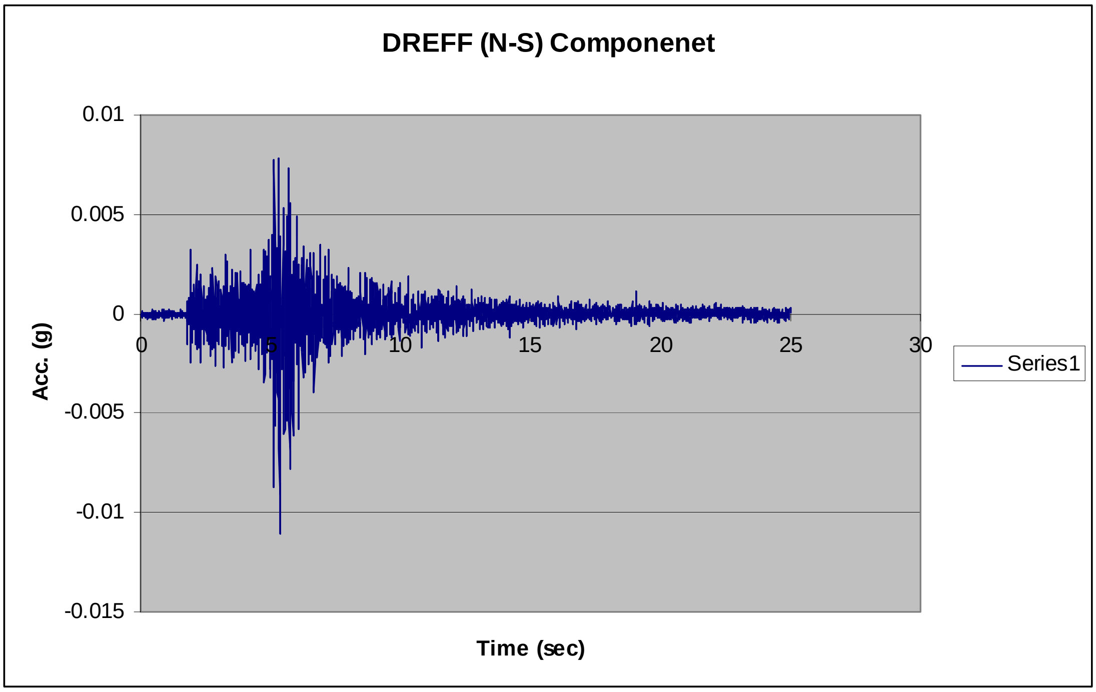
1. Station DR2



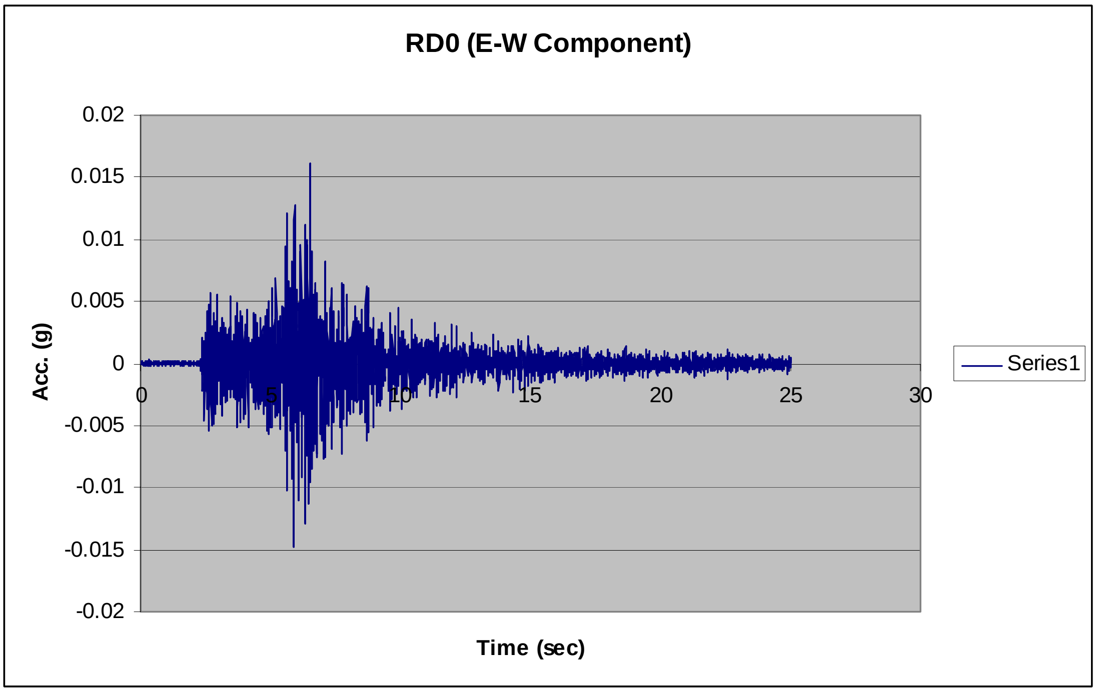


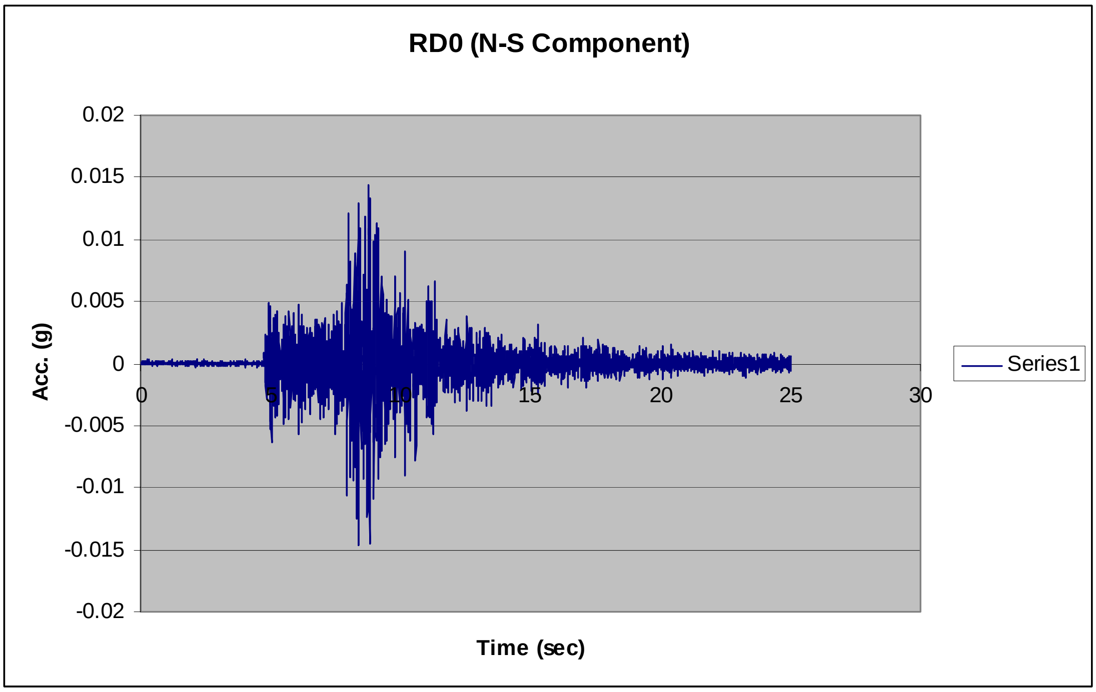
2. Station: DREFF



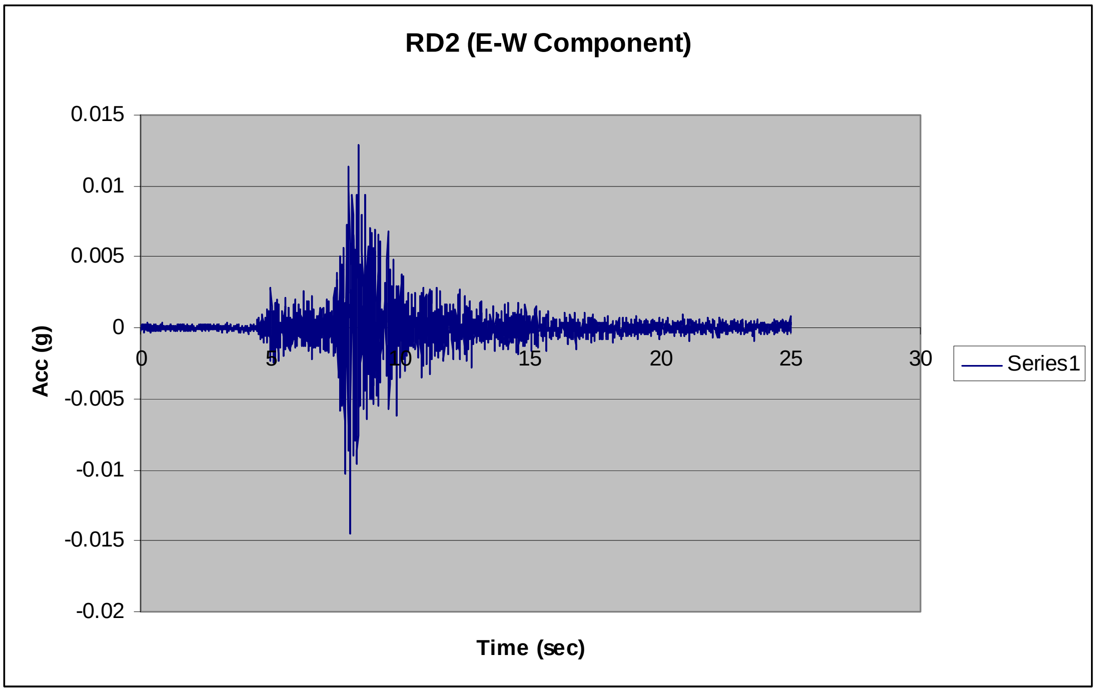


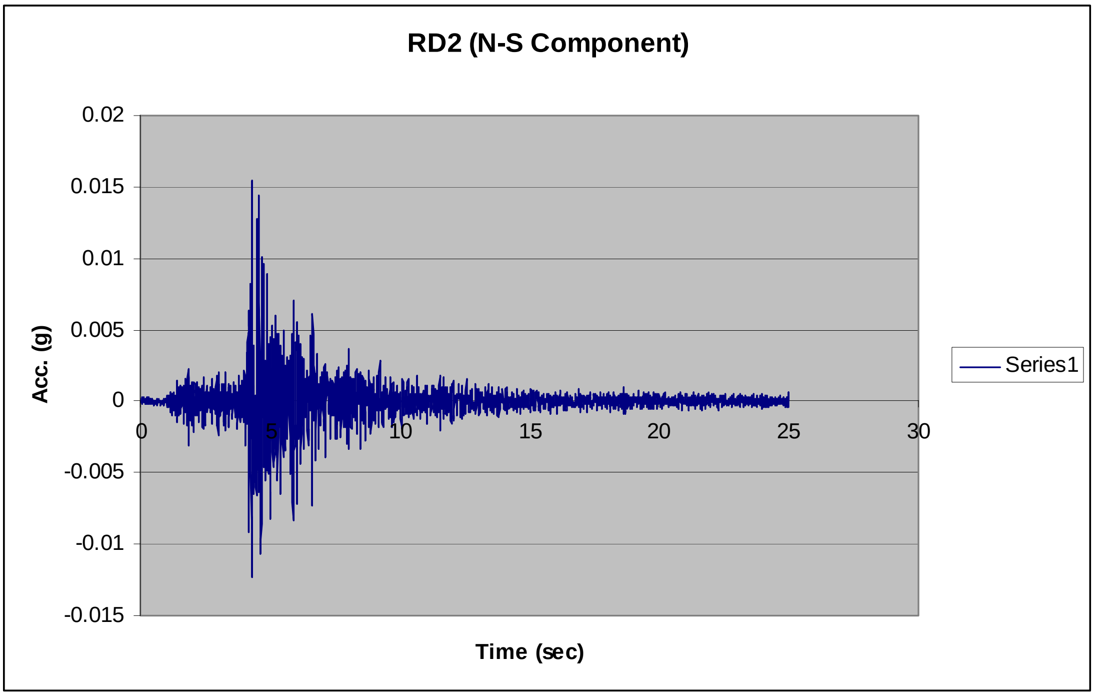
3. Station: RD0



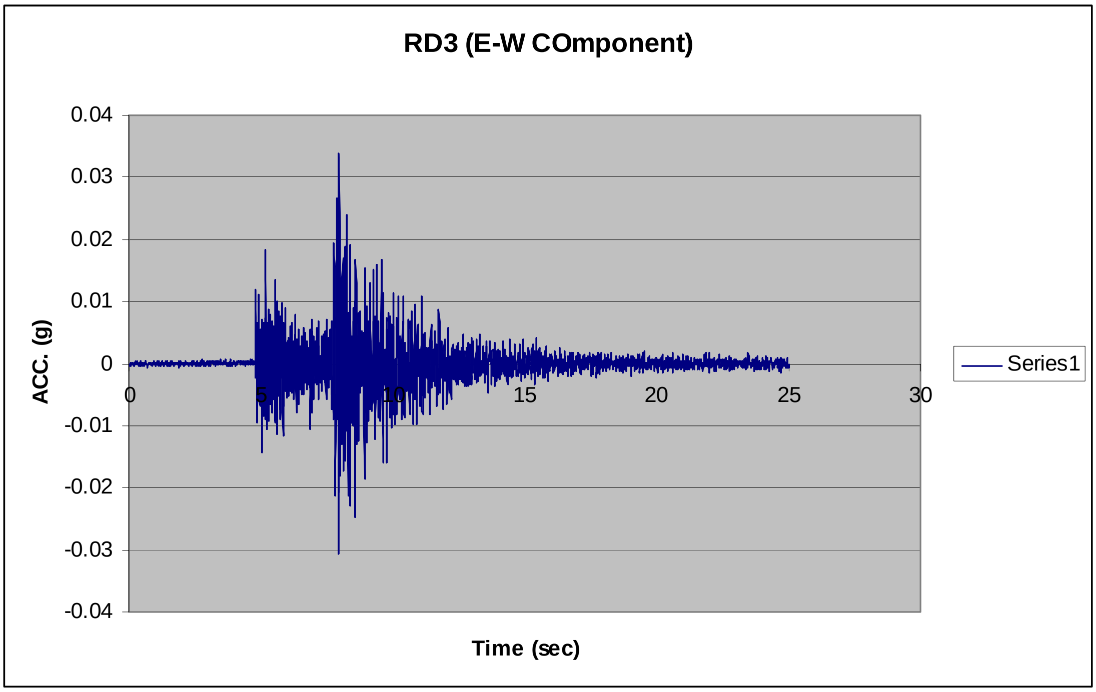


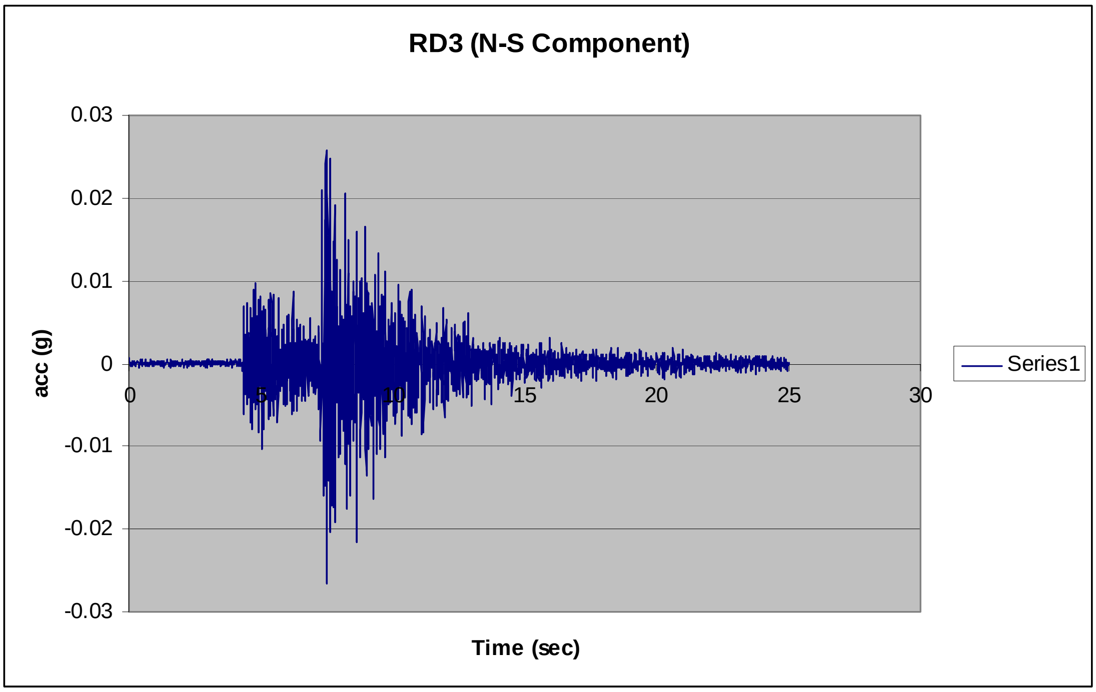
4. Station: RD2





5. Station: RD3:

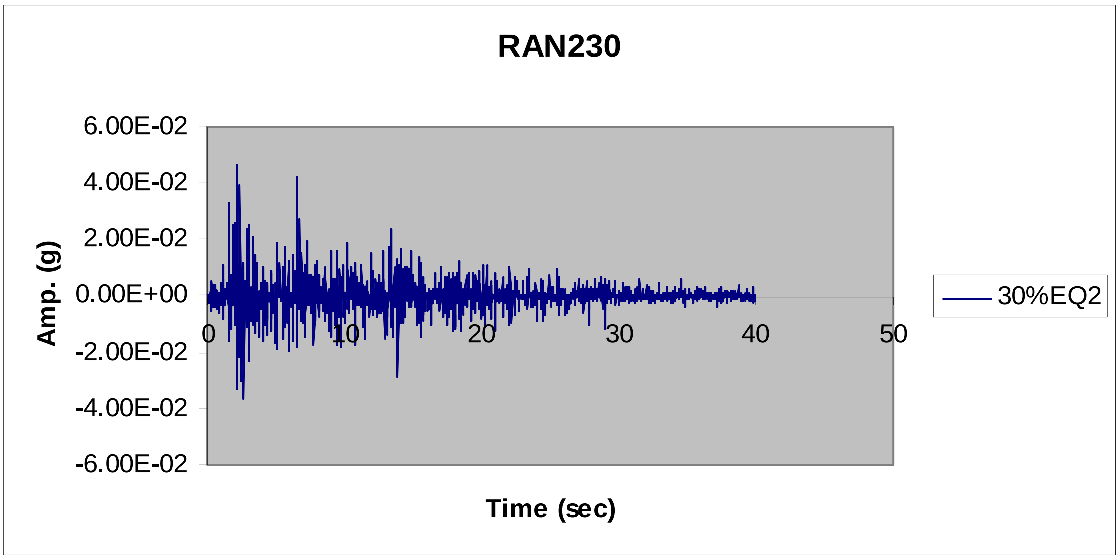




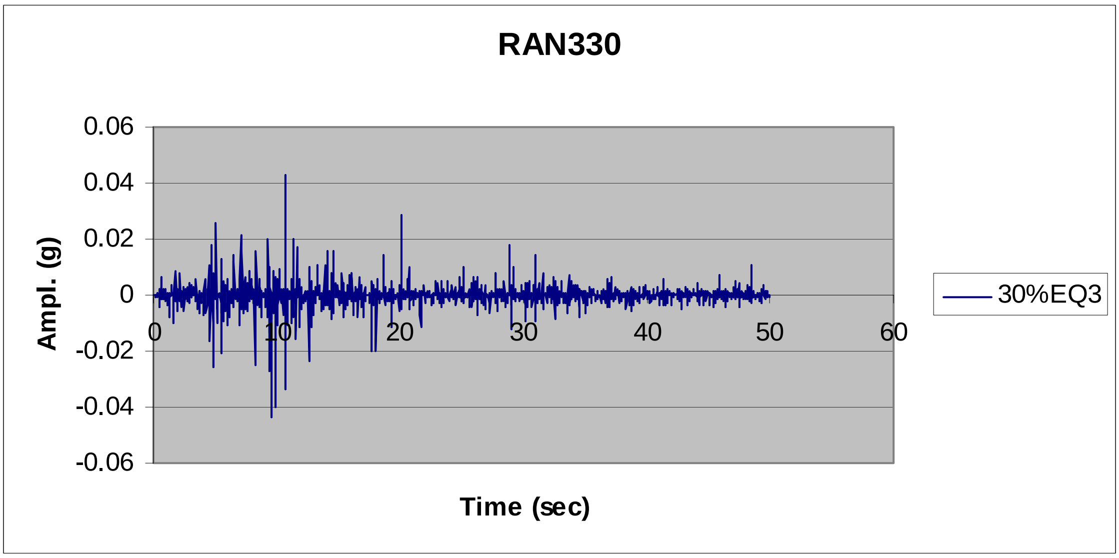
Appendix H: Dynamic Site Response Analysis Data

1. Analysis Input Earthquakes

1.1 RAN230 Earthquake

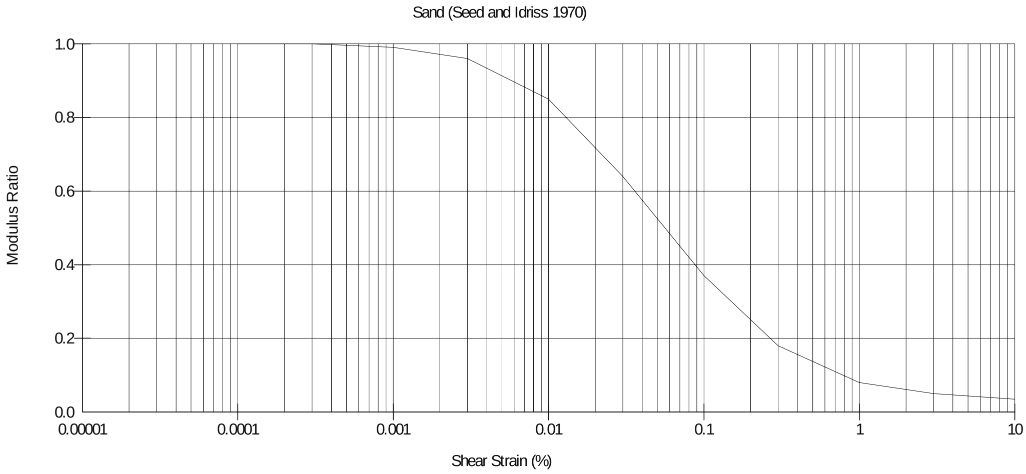


1.2 RAN330 Earthquake

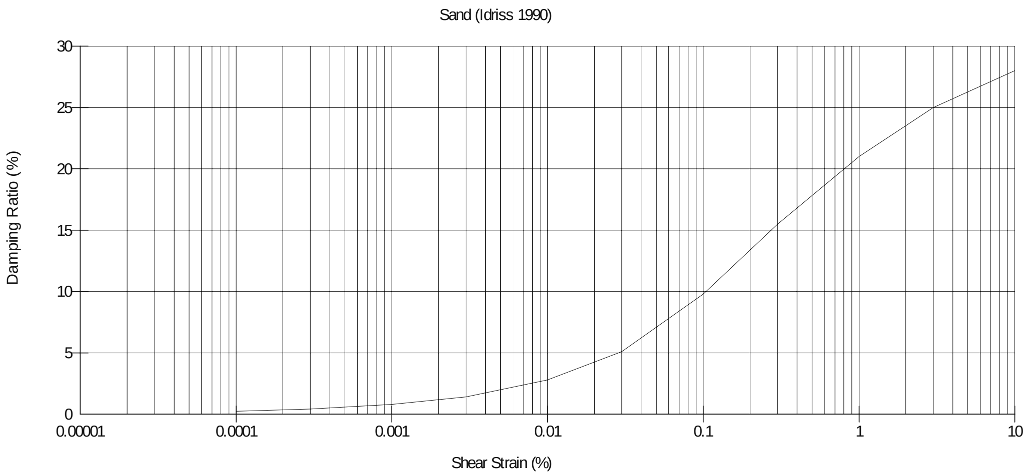


2. Shear Moduli and Damping Curves

a). Shear Moduli curve (from ProShake)



b). Damping curve (from ProShake)



3. Al-Durrah Site Input Soil Profiles

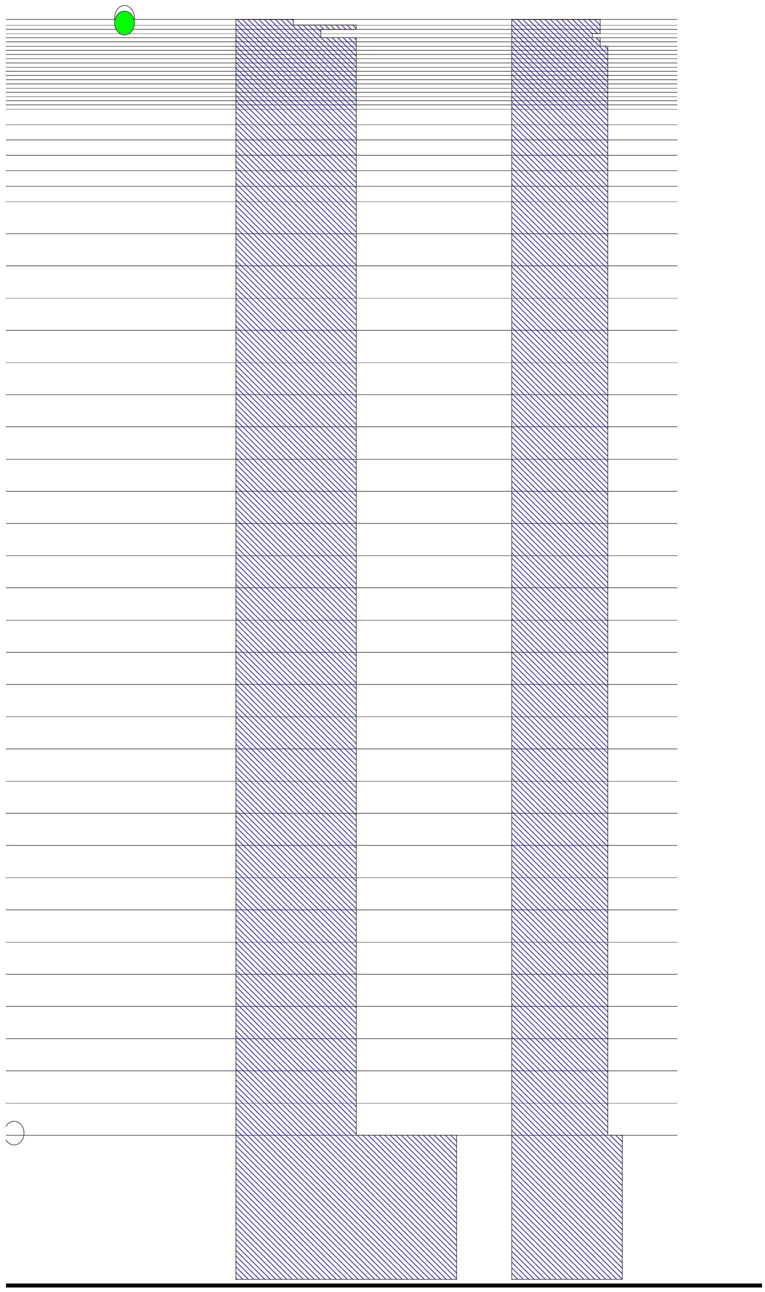
The following ProShake input profiles are for soil profiles with bedrock at the SPT boring depth. Profiles for larger depths have the same profile for the top 30 m (or 60 m for D1, D3, and D9), but the bedrock depth is larger.

Profile Name: D1CXW
Water Table:26.25 ft
Number of Layers: 57

Layer No.	Material Name	Thickness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	5.74	120	2312	787	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	4.92	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.96	120	4917	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	4.96	110	4508	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	4.96	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	4.96	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	4.96	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

22	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss(1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

53	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
56	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
57	Rock	Infinite	150	200732	6562	Rock	Rock

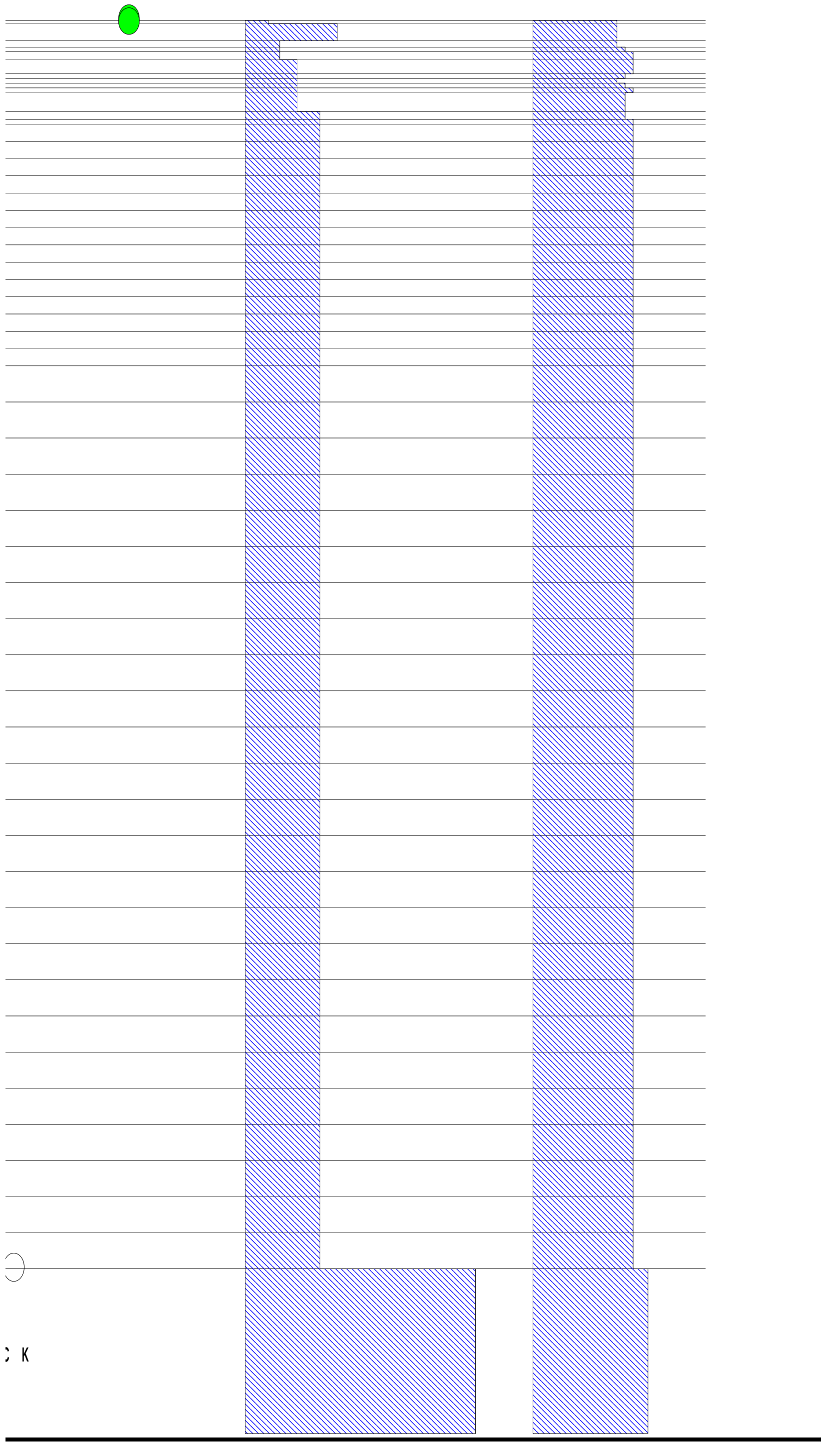


D1CXW

Profile Name: D2CXW
Water Table:91.86 ft
Number of Layers: 53

Layer No.	**Material Name**	**Thick-ness (ft)**	**Unit Weight (pcf)**	**Gmax (ksf)**	**Vs (ft/s)**	**Modulus Curve**	**Damping Curve**
1	SC/SD	3.28	110	1472	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	16.4	110	23552	2624	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	5.74	110	3312	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	4.92	120	3613	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	7.38	130	3914	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	12.3	130	8807	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	4.92	120	8129	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	4.92	110	7452	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.92	120	8129	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.92	130	8807	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	17.22	120	8129	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	7.38	120	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	4.92	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

26	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	Rock	Infinite	150	200731.8	6562	Rock	Rock



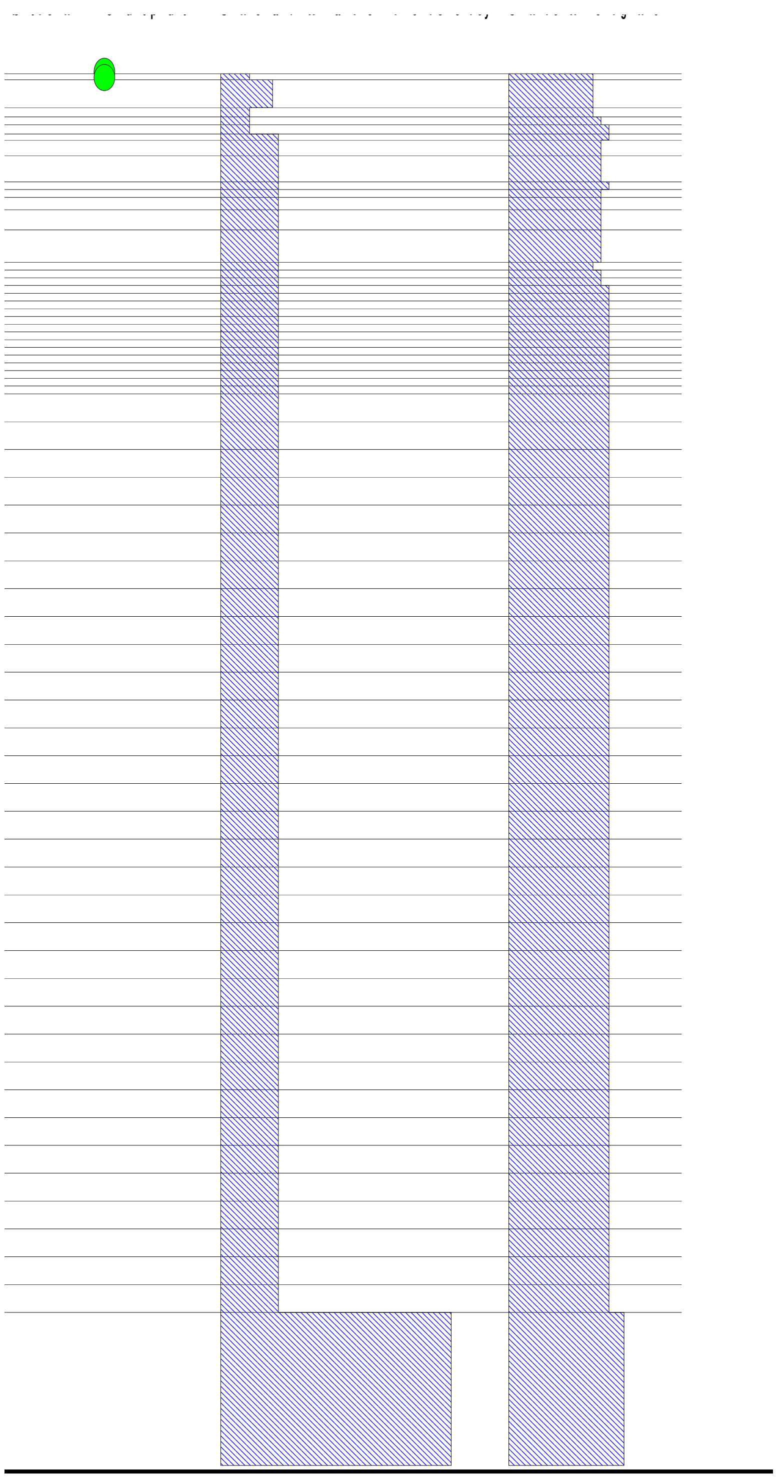
D2CXW

Profile Name: D3CXW
Water Table:95.14 ft
Number of Layers: 63

Layer No.	**Material Name**	**Thick-ness (ft)**	**Unit Weight (pcf)**	**Gmax (ksf)**	**Vs (ft/s)**	**Modulus Curve**	**Damping Curve**
1	SC/SD	3.28	110	2300	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	16.4	110	7452	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	5.74	110	2300	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	4.92	120	2509	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	5.74	130	2718	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	4.1	130	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	9.02	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	15.58	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.92	130	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.92	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	7.38	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	12.3	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	19.69	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	4.92	110	9200	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	4.92	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	4.92	120	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	4.92	130	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	4.92	130	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	4.92	130	10873	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

25	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	1082	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

56	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
57	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
58	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
59	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
60	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
61	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
62	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
63	Rock	Infinite	150	200731	6562	Rock	Rock

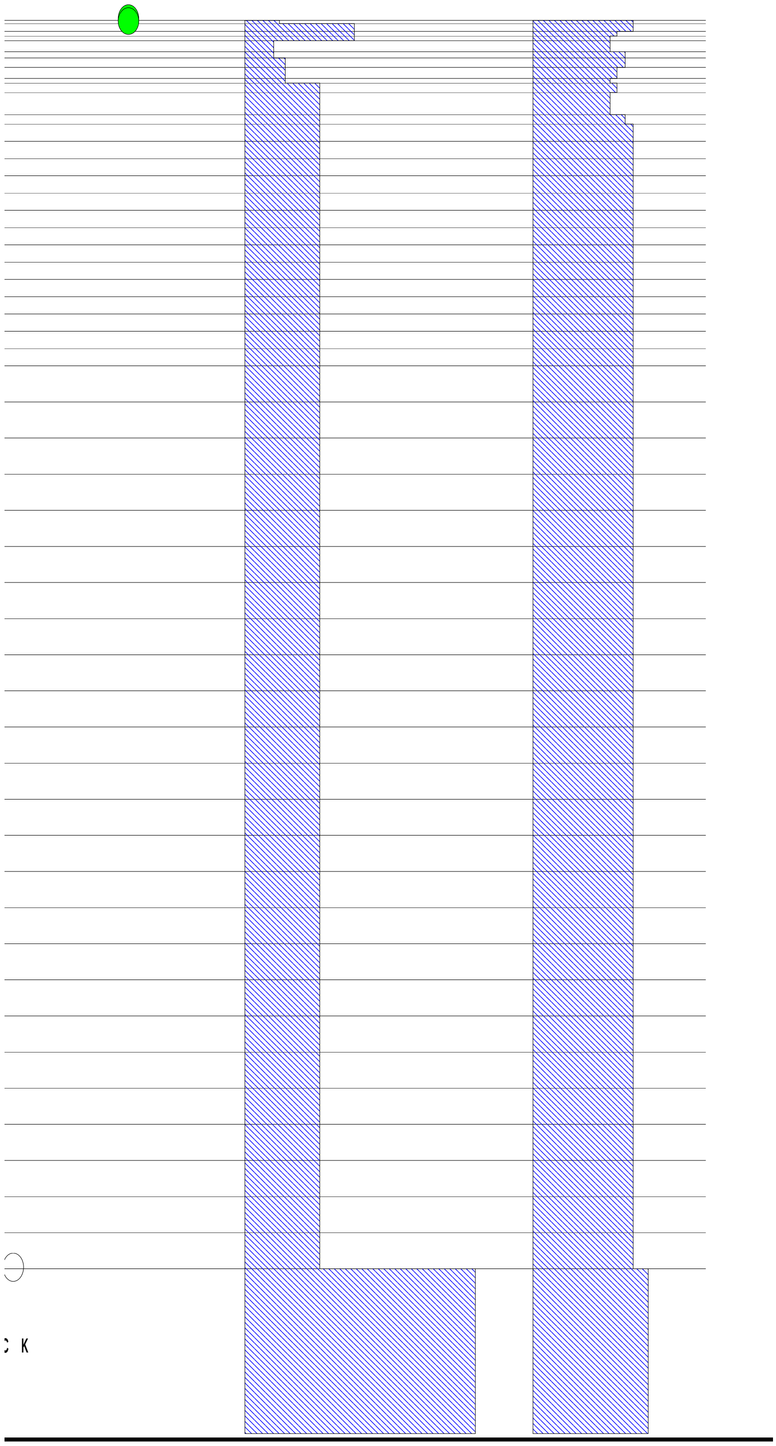


D3CXW

Profile Name: D4CXW
Water Table:8.20 ft
Number of Layers: 52

Layer No.	Material Name	Thickness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	3.28	130	3914	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	7.38	130	39251	3117	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.92	110	33212	3117	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	4.1	100	30193	3117	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	10.66	100	2090	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	5.74	120	2509	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	9.02	120	4917	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	9.84	110	4508	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.92	100	4098	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	9.02	110	15548	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	20.51	100	14134	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	9.02	120	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

27	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	Rock	Infinite	150	200731	6562	Rock	Rock



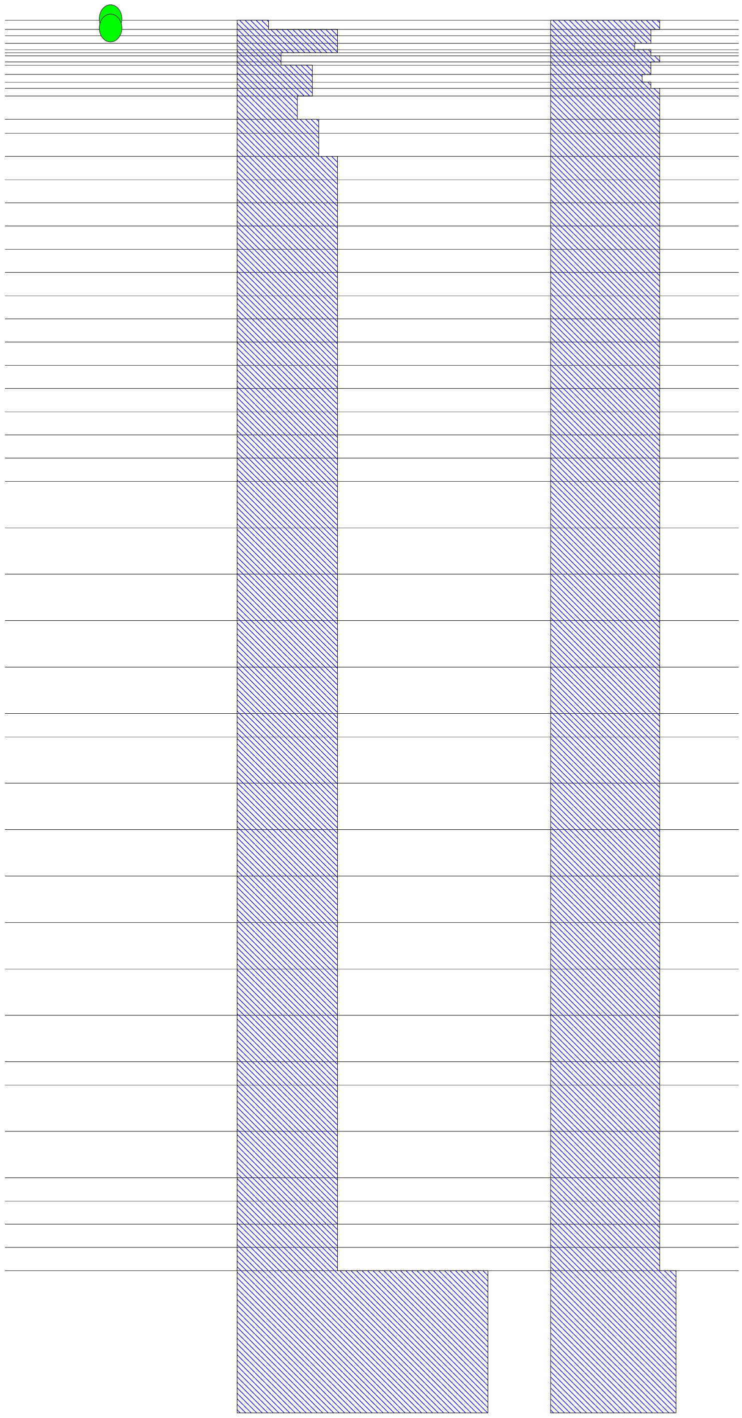
D4CXW

Profile Name: D5CXW
Water Table:26.25 ft
Number of Layers: 57

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	3.28	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	2.46	130	21311	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.92	120	19671	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	4.92	110	18032	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	0.82	100	16393	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	4.1	100	6774	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	4.92	120	14452	1968	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	4.92	130	15657	1968	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	2.46	120	14452	902	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	6.56	120	3036	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	5.74	110	5888	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	4.92	120	6423	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	2.46	130	6958	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	6.56	130	2718	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	6.56	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

26	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
56	SC/SD	32.81	130	13156	2296	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

57	Rock	Infinite	130	200731	6562	Rock	Rock

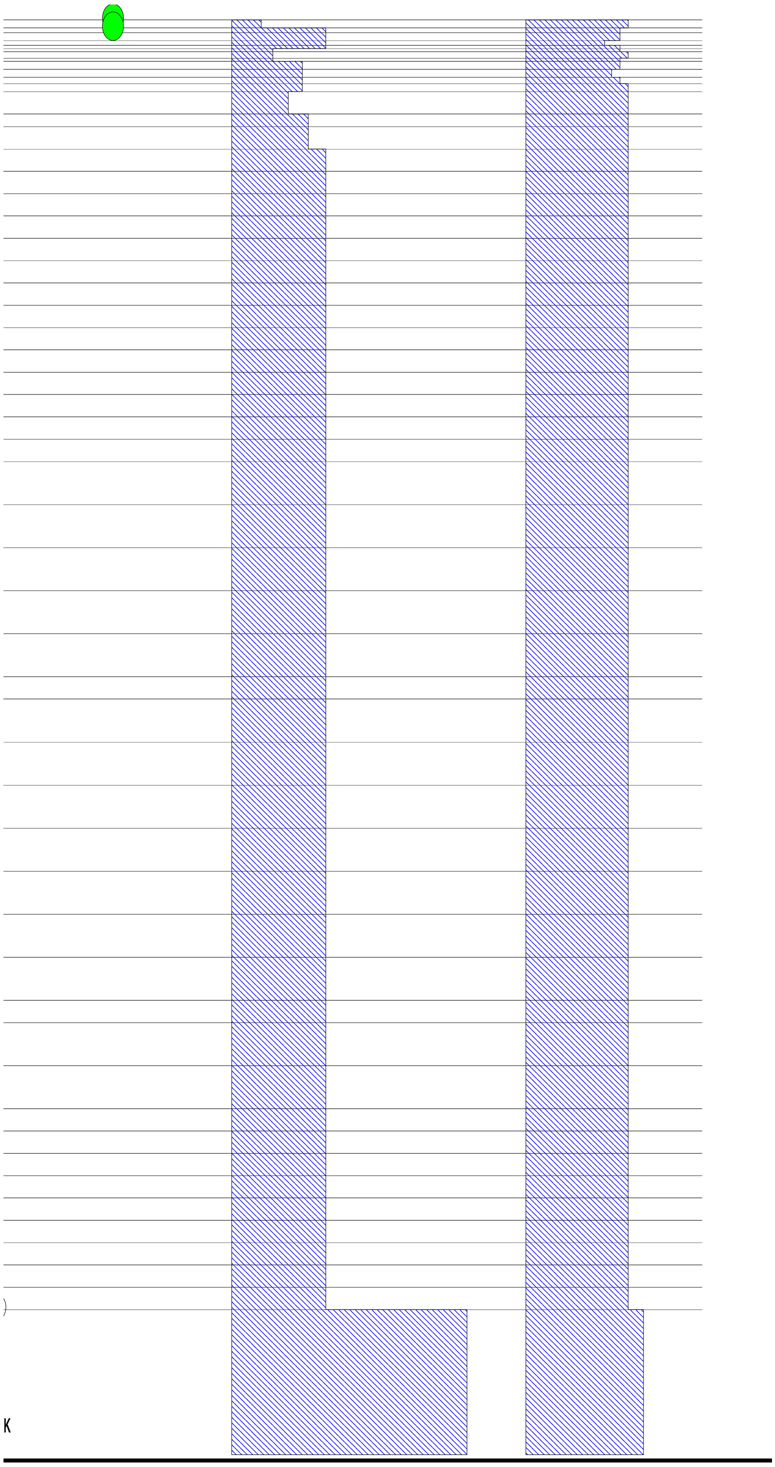


D5CXW

Profile Name: D5ACXW
Water Table:9.84 ft.
Number of Layers: 55

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	6.56	130	2718	820	Sand (Seed and Idriss 1970)	Sand Idriss 1990
2	SC/SD	4.1	120	25693	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
3	SC/SD	5.74	120	25693	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
4	SC/SD	4.1	100	21411	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
5	SC/SD	2.46	120	25693	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
6	SC/SD	2.46	120	4917	1148	Sand (Seed and Idriss 1970)	Sand Idriss 1990
7	SC/SD	4.92	130	5327	1148	Sand (Seed and Idriss 1970)	Sand Idriss 1990
8	SC/SD	2.46	120	4917	1148	Sand (Seed and Idriss 1970)	Sand Idriss 1990
9	SC/SD	6.56	120	14452	1968	Sand (Seed and Idriss 1970)	Sand Idriss 1990
10	SC/SD	5.74	110	13248	1968	Sand (Seed and Idriss 1970)	Sand Idriss 1990
11	SC/SD	4.92	120	1452	1968	Sand (Seed and Idriss 1970)	Sand Idriss 1990
12	SC/SD	5.74	130	15657	1968	Sand (Seed and Idriss 1970)	Sand Idriss 1990
13	SC/SD	16.4	130	9812	1558	Sand (Seed and Idriss 1970)	Sand Idriss 1990
14	SC/SD	9.84	130	18375	2132	Sand (Seed and Idriss 1970)	Sand Idriss 1990
15	SC/SD	16.4	130	18375	2132	Sand (Seed and Idriss 1970)	Sand Idriss 1990
16	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
17	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
18	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
19	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
20	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
21	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
22	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
23	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
24	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990

25	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
26	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
27	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
28	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
29	SC/SD	16.4	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
30	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
31	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
32	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
33	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
34	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
35	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
36	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
37	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
38	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
39	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
40	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
41	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
42	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
43	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
44	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
45	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
46	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
47	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
48	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
49	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
50	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
51	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
52	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
53	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
54	SC/SD	32.81	130	27834	2624	Sand (Seed and Idriss 1970)	Sand Idriss 1990
55	Rock	Infinite	150	200731	6562	Rock	Rock



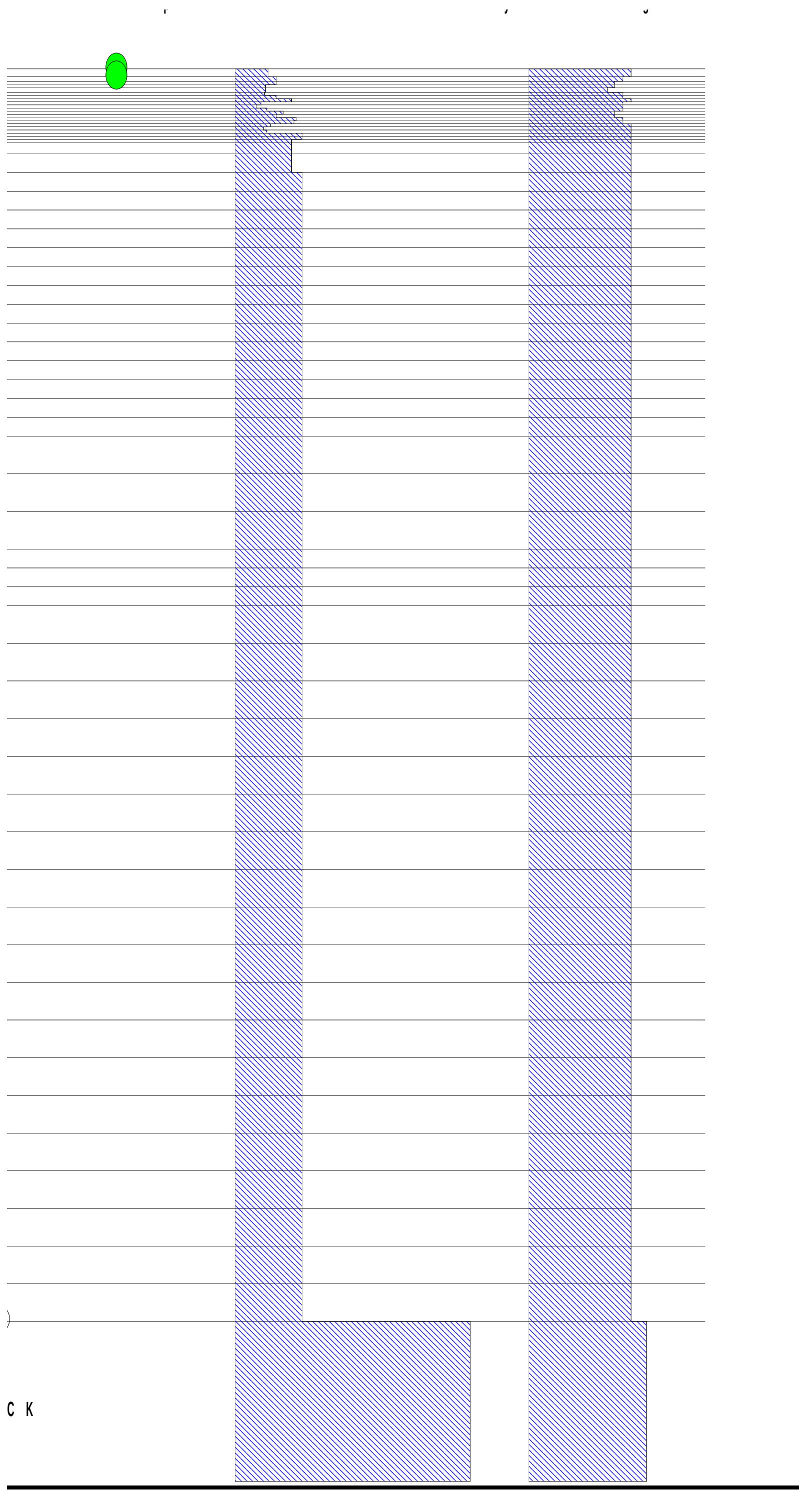
D5ACXW

Profile Name: D5CHC
Water Table:9.84 ft
Number of Layers: 63

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	6.56	130	331	905	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	4.1	120	4881	1141	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	2.46	110	4508	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	2.46	110	2487	853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	4.1	100	2261	853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	3.28	120	2489	817	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	3.28	120	4918	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	3.28	130	9895	1564	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	3.28	120	1978	728	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	3.28	120	1300	590	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	3.28	120	2992	895	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	3.28	110	6307	1358	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	3.28	110	4508	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	3.28	120	10855	1706	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	3.28	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	3.28	130	3940	987	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	3.28	130	2505	787	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	3.28	130	3077	872	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	3.28	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	3.28	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	3.28	130	9812	1558	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	9.84	130	9812	1558	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	9812	1558	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

26	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	16.4	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
56	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

57	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
58	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
59	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
60	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
61	SC/SD	32.81	130	13883	1853	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
62	SC/SD	32.81	130	13883	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
63	Rock	Infinite	150	200731	6562	Rock	Rock



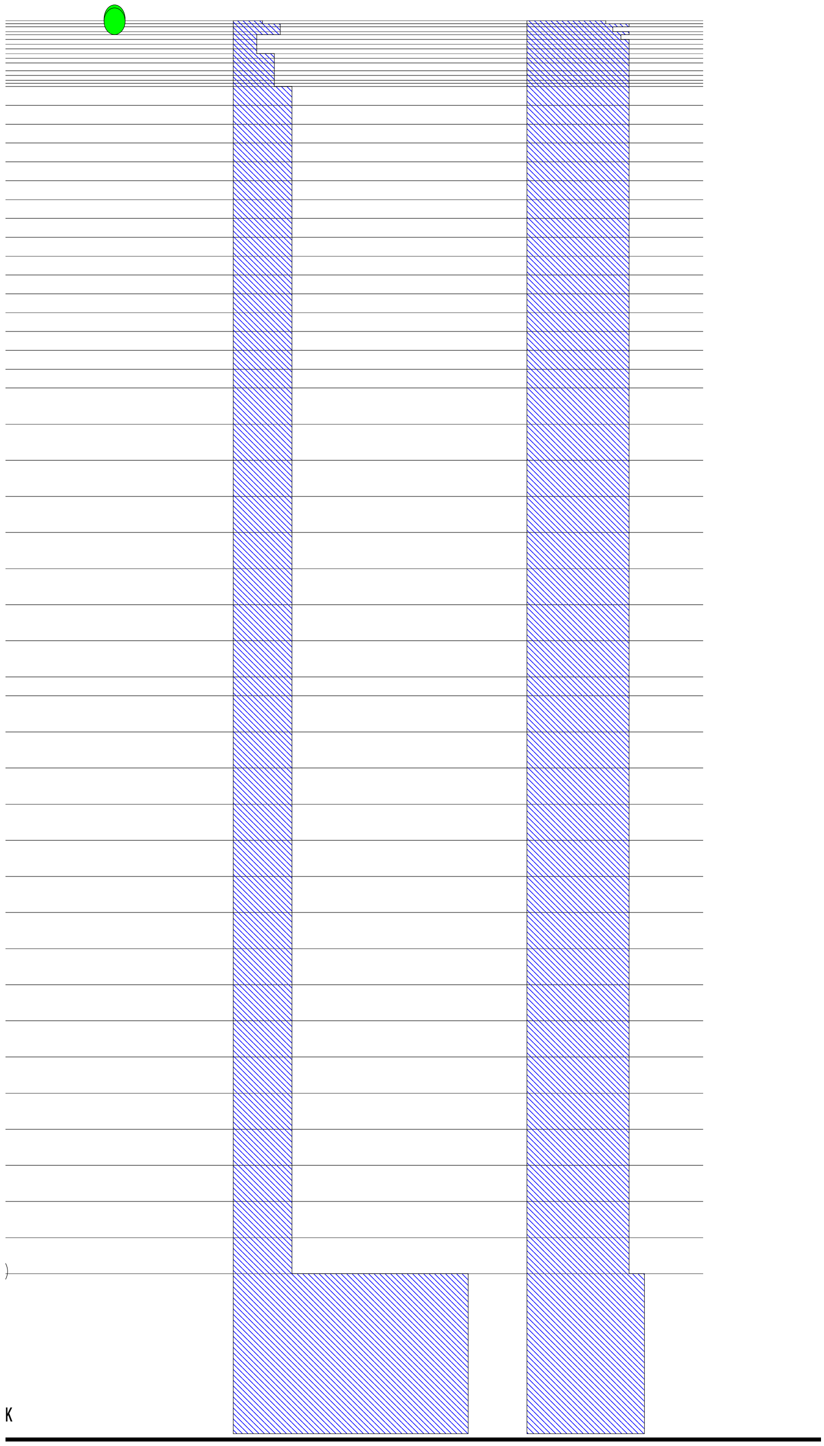
D5CHC

Profile Name: D6CXW
Water Table:82.02 ft
Number of Layers: 57

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	3.28	100	2090	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	2.46	130	6958	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.92	110	5888	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	2.46	130	6958	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	4.92	120	1605	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	4.92	130	1739	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	4.92	130	1739	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	4.92	130	1739	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.92	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.92	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	6.56	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	4.92	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	4.92	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	3.28	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	3.28	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

26	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
56	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

57	Rock	Infinite	150	200731	6562	Rock	Rock

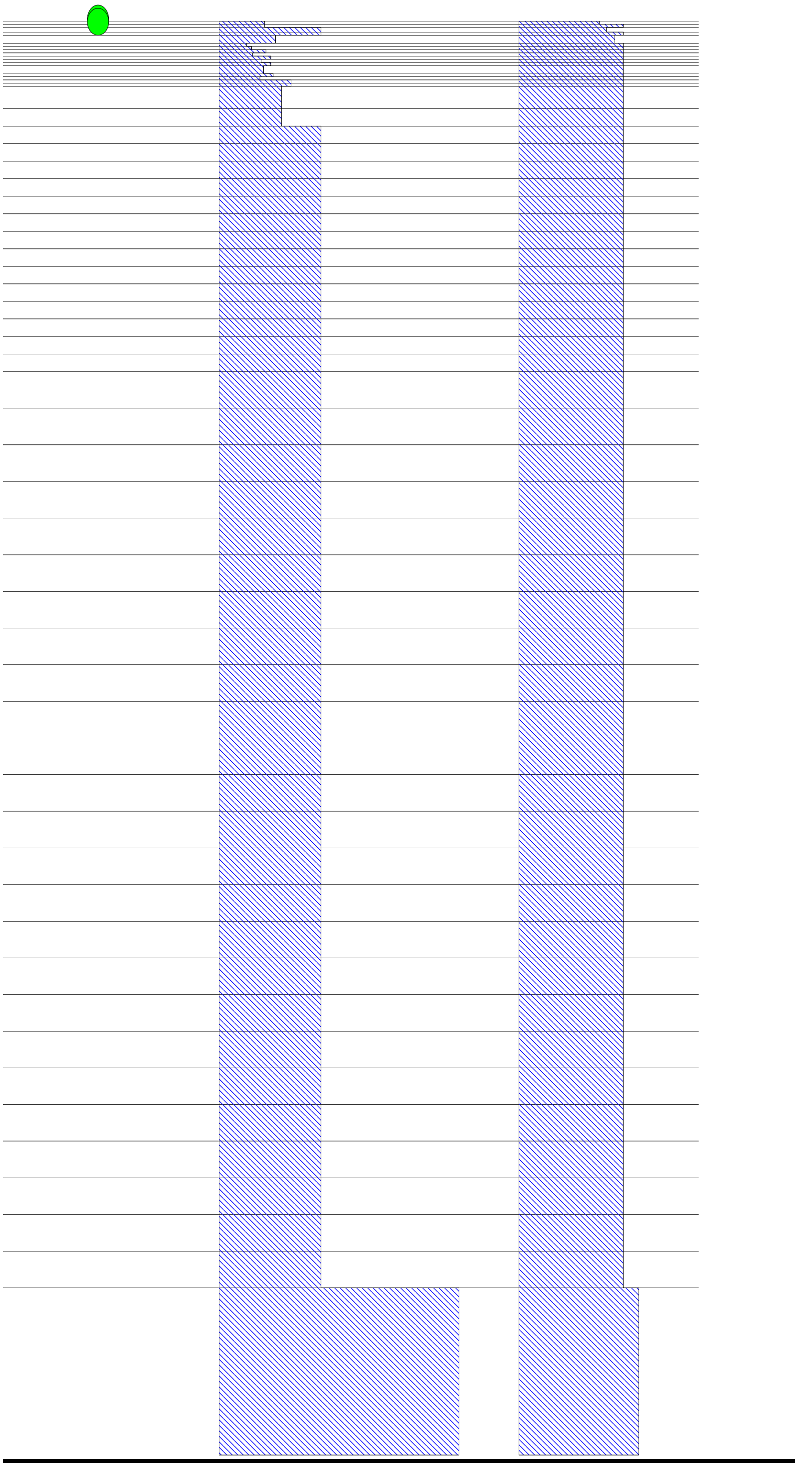


D6CXW

Profile Name: D6CHC							
Water Table:82.02 ft							
Number of Layers: 59							
Layer No.	**Material Name**	**Thick-ness (ft)**	**Unit Weight (pcf)**	**Gmax (ksf)**	**Vs (ft/s)**	**Modulus Curve**	**Damping Curve**
1	SC/SD	3.28	100	4856	1250	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	3.28	130	6313	1250	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.1	110	26463	2782	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	2.46	130	31275	2782	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	6.56	120	8755	1532	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	3.28	130	2361	764	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	3.28	130	3100	875	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	3.28	130	6581	1276	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	3.28	130	3507	931	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	3.28	130	8079	1414	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	3.28	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	3.28	130	8079	1414	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	6.56	130	6083	1227	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	3.28	130	8729	1469	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	3.28	130	5057	1119	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	3.28	130	15604	1965	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	3.28	130	15604	1965	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	19.69	130	11850	1712	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	11850	1712	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

26	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	16.4	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
56	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

57	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
58	SC/SD	32.81	130	31422	2788	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
59	Rock	Infinite	150	200731	6562	Rock	Rock

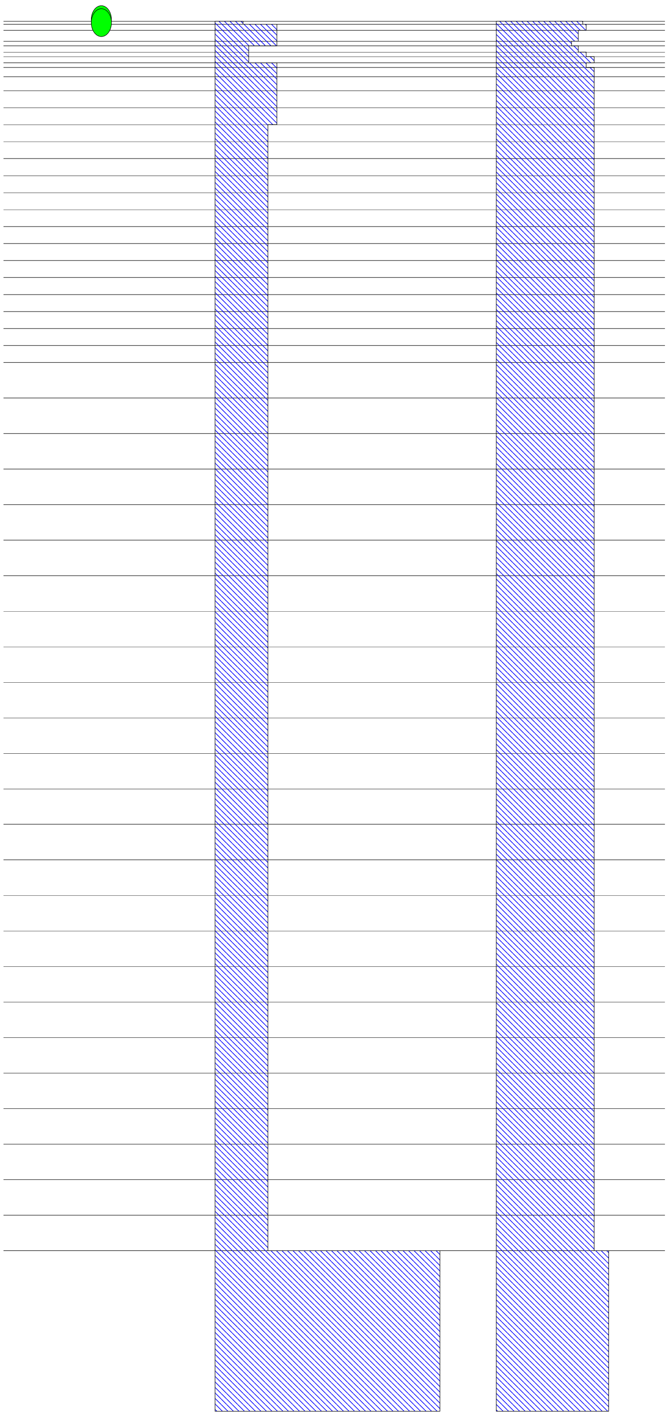


D6CHC

Profile Name: D7CXW
Water Table:85.30 ft
Number of Layers: 52

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	3.28	115	2404	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	5.74	120	12144	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	9.84	110	11132	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	4.1	100	10120	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	5.74	110	3312	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	4.92	120	3613	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	5.74	130	3914	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	4.1	120	12144	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	9.02	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	13.12	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

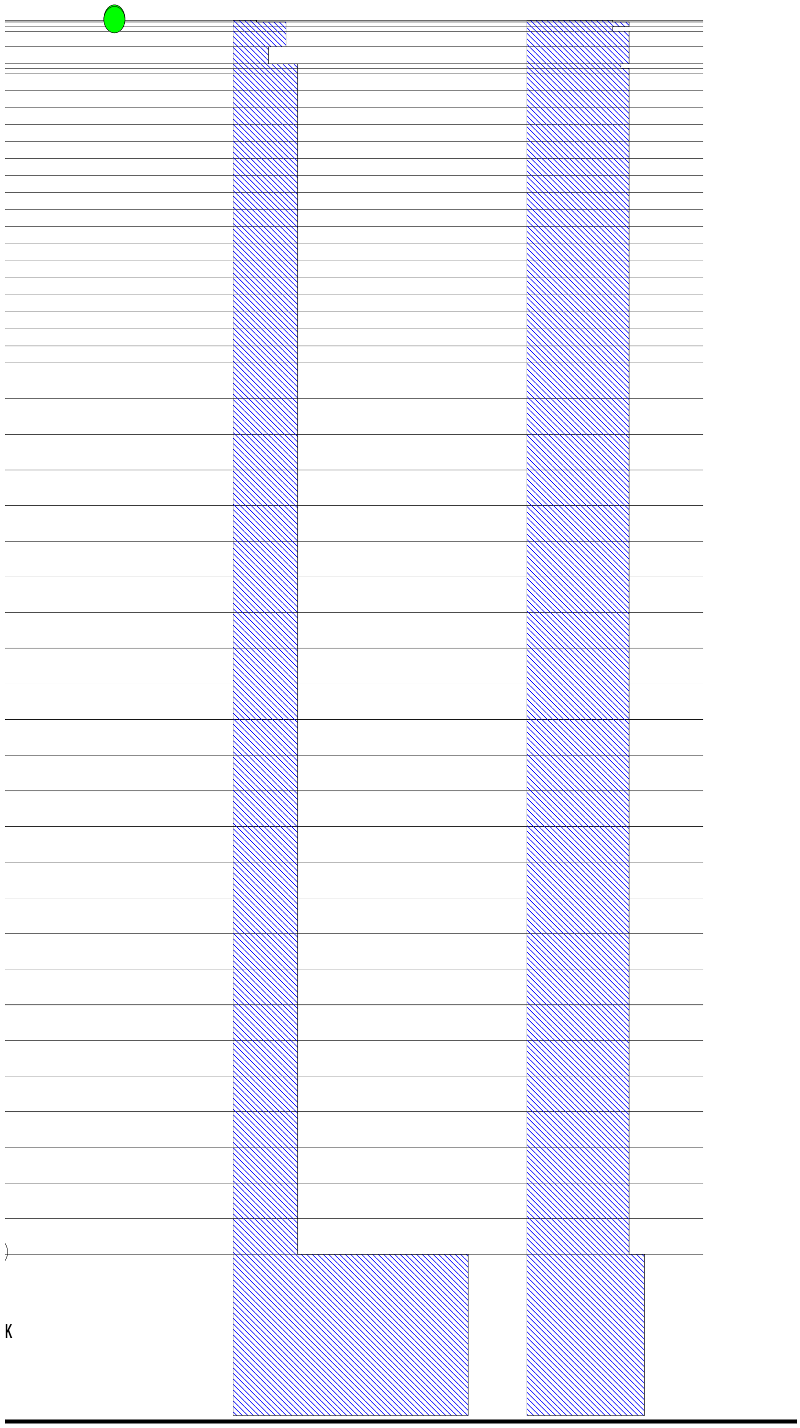
26	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	and (Idriss 1990)
33	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	Rock	Infinite	150	200731	6562	Rock	Rock



D7CXW

Profile Name: D8CXW							
Water Table:82.02 ft							
Number of Layers: 50							
Layer No.	**Material Name**	**Thickness (ft)**	**Unit Weight (pcf)**	**Gmax (ksf)**	**Vs (ft/s)**	**Modulus Curve**	**Damping Curve**
1	SC/SD	1.64	110	1472	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	4.92	130	8807	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.1	110	7452	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	13.94	130	8807	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	16.4	130	3914	984	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	4.1	120	12144	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	4.1	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

25	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	Rock	Infinite	150	200731	6562	Rock	Rock

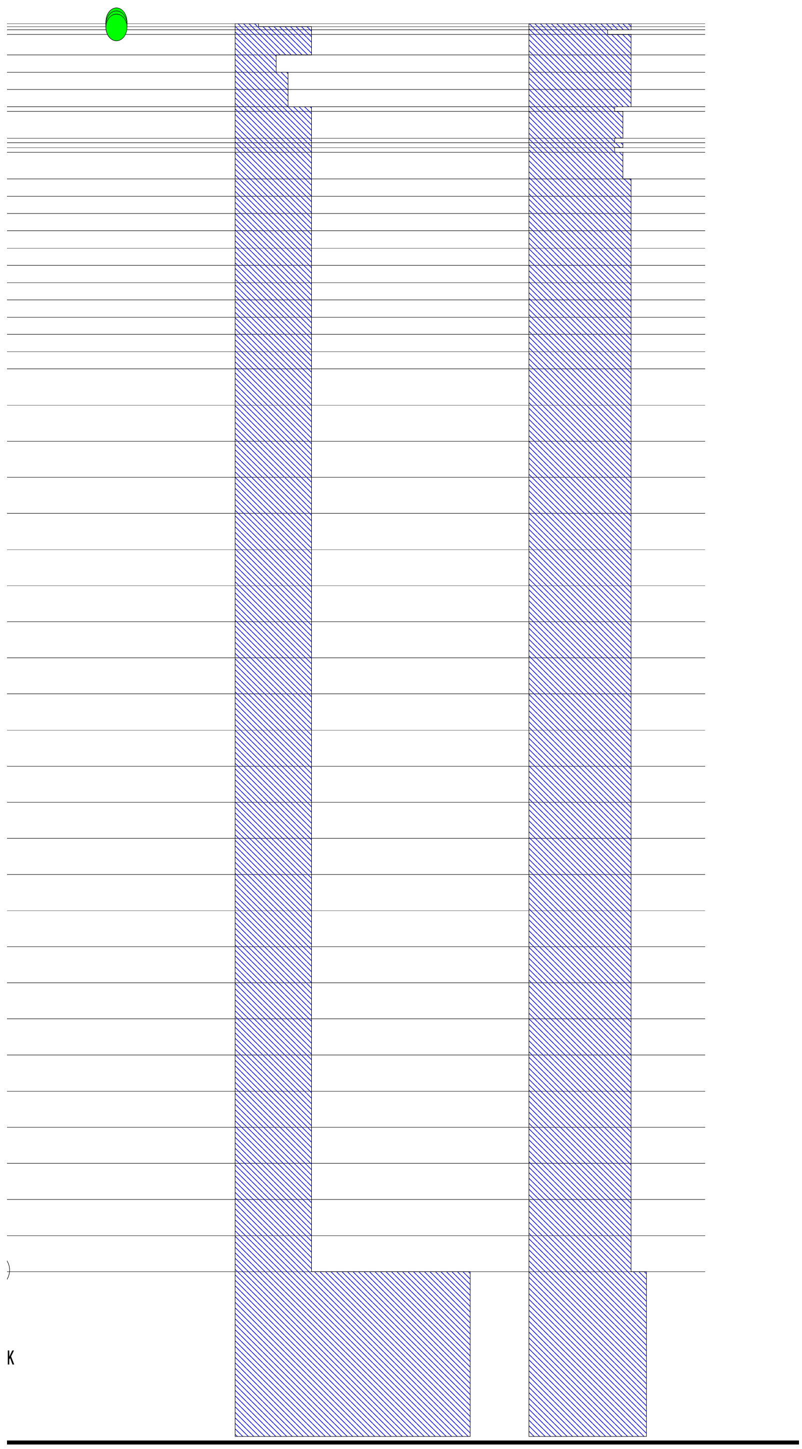


D8CXW

Profile Name: D9CXW
Water Table:82.02 ft
Number of Layers: 50

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	3.28	130	1739	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	2.46	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	4.92	100	14134	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	18.86	130	18375	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	16.4	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	16.4	130	8807	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	16.4	130	8807	1476	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	4.92	110	15548	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	24.61	120	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.92	110	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	4.92	120	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	4.92	110	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	24.61	120	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

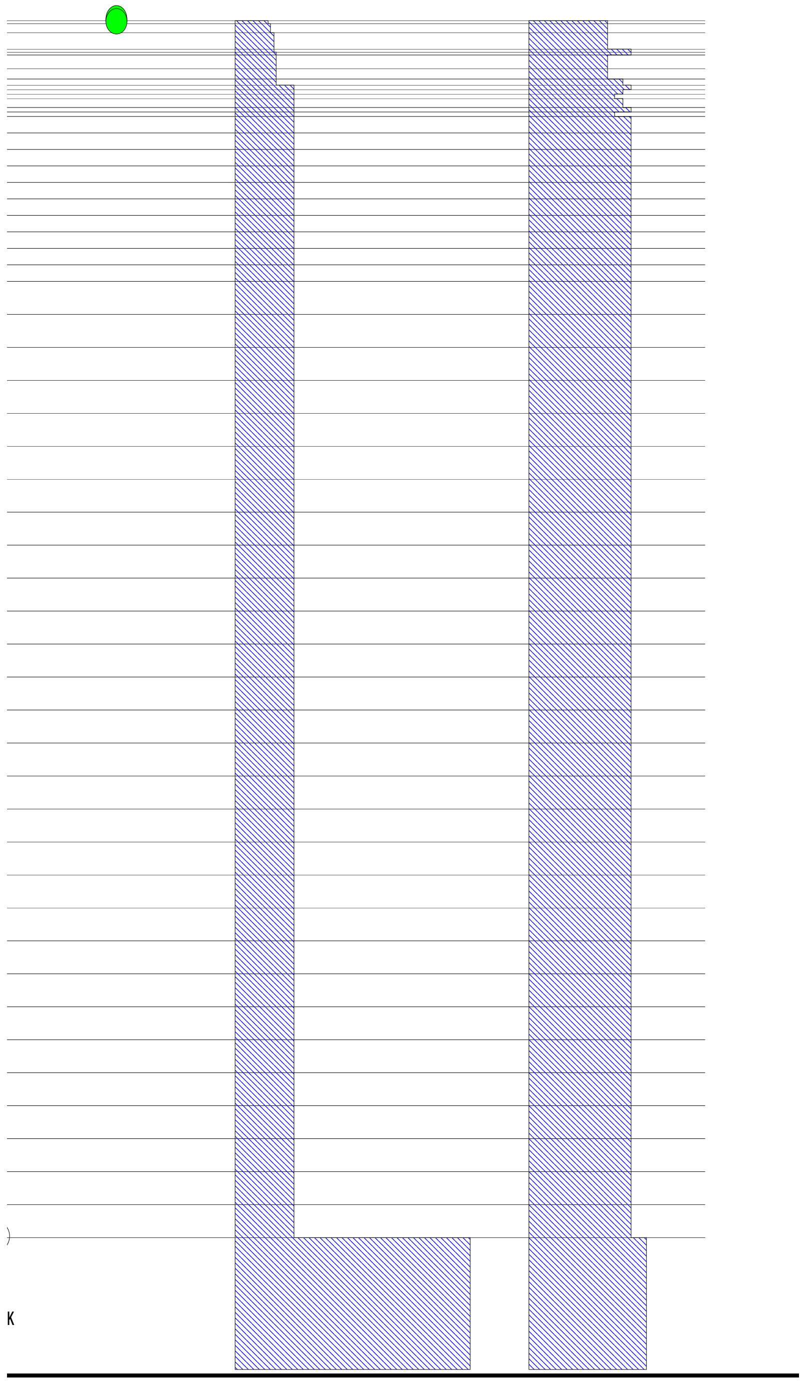
26	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	16961	2132	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	Rock	Infinite	150	200731	6562	Rock	Rock



D9CXW

Profile Name: D11CXW							
Water Table:39.37 ft							
Number of Layers: 54							
Layer No.	**Material Name**	**Thick-ness (ft)**	**Unit Weight (pcf)**	**Gmax (ksf)**	**Vs (ft/sec)**	**Modulus Curve**	**Damping Curve**
1	SC/SD	3.28	100	25630	902	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	9.84	100	3010	964	Sand (Seed and Idriss1970)	Sand (Idriss 1990)
3	SC/SD	17.22	100	3533	1066	Sand (Seed and Idriss 970)	Sand (Idriss 1990)
4	SC/SD	2.46	130	4593	1066	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	2.46	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	13.94	100	4095	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	10.66	100	4095	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	5.74	120	4917	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.1	120	10062	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	4.92	110	9200	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	9.84	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	4.92	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	4.92	110	9200	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

24	SC/SD	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	Rock	Infinite	150	200731	6562	Rock	Rock



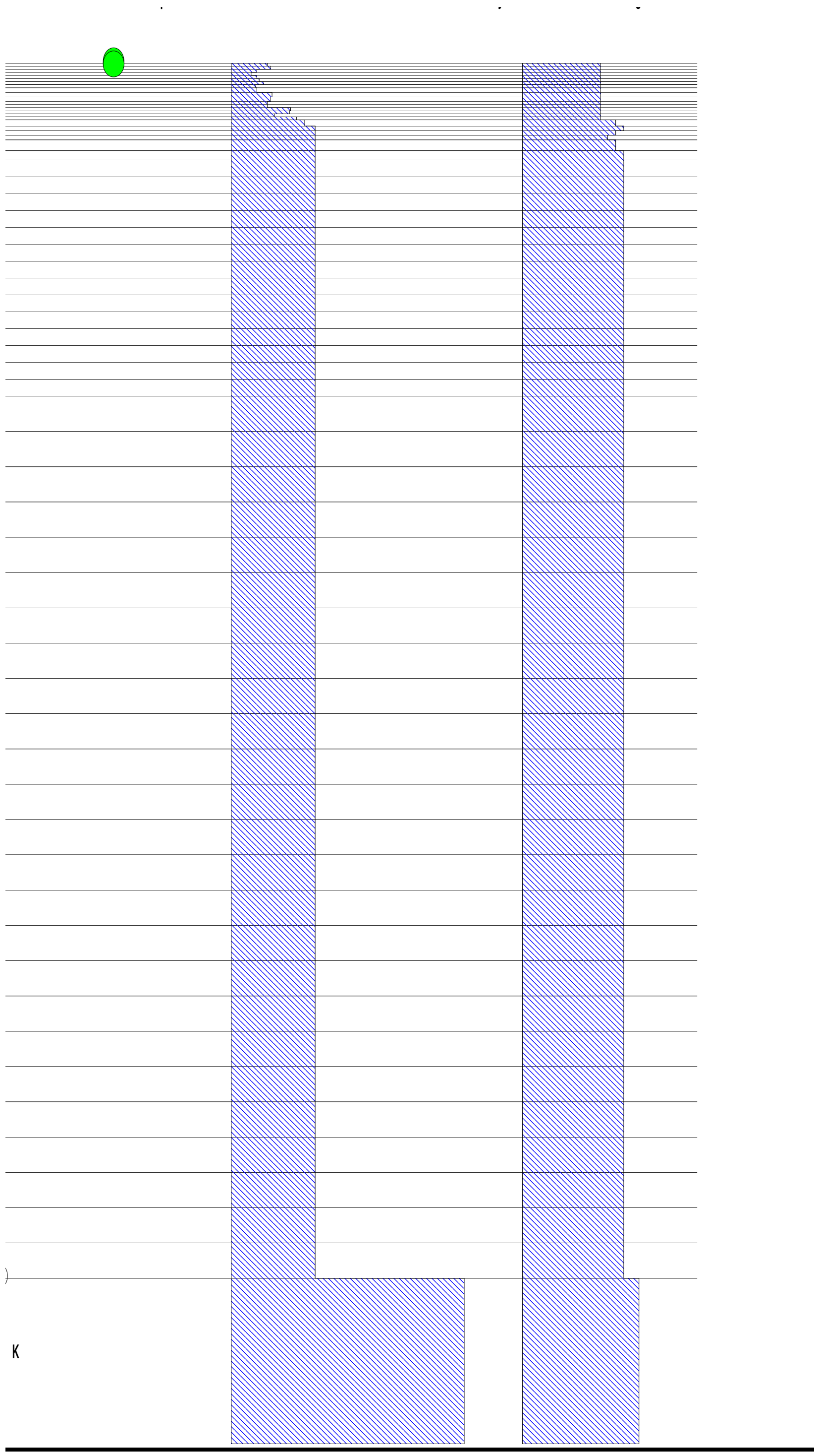
D11CXW

Profile Name: D11CHC
Water Table:39.37 ft
Number of Layers: 63

Layer No.	Material Name	Thickness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	3.28	100	3153	1007	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	3.28	100	3867	1115	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	3.28	100	1633	725	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	3.28	100	966	557	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	3.28	100	1560	708	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	3.28	100	1991	800	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	3.28	100	2622	918	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	3.28	100	1461	685	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	4.1	100	1633	725	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	4.92	100	4145	1154	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	4.1	100	3867	1115	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	3.28	100	3298	1030	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	3.28	100	3173	1010	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	3.28	100	8531	1656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	3.28	100	8297	1633	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	3.28	120	8297	1204	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	3.28	130	4506	1843	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	5.74	120	10566	2050	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	4.92	110	15682	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	4.92	120	22546	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	4.92	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	9.84	130	19077	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	9.02	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

25	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	16.4	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

56	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
57	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
58	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
59	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
60	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
61	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
62	SC/SD	32.81	130	20811	2362	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
63	Rock	Infinite	150	200731	6562	Rock	Rock

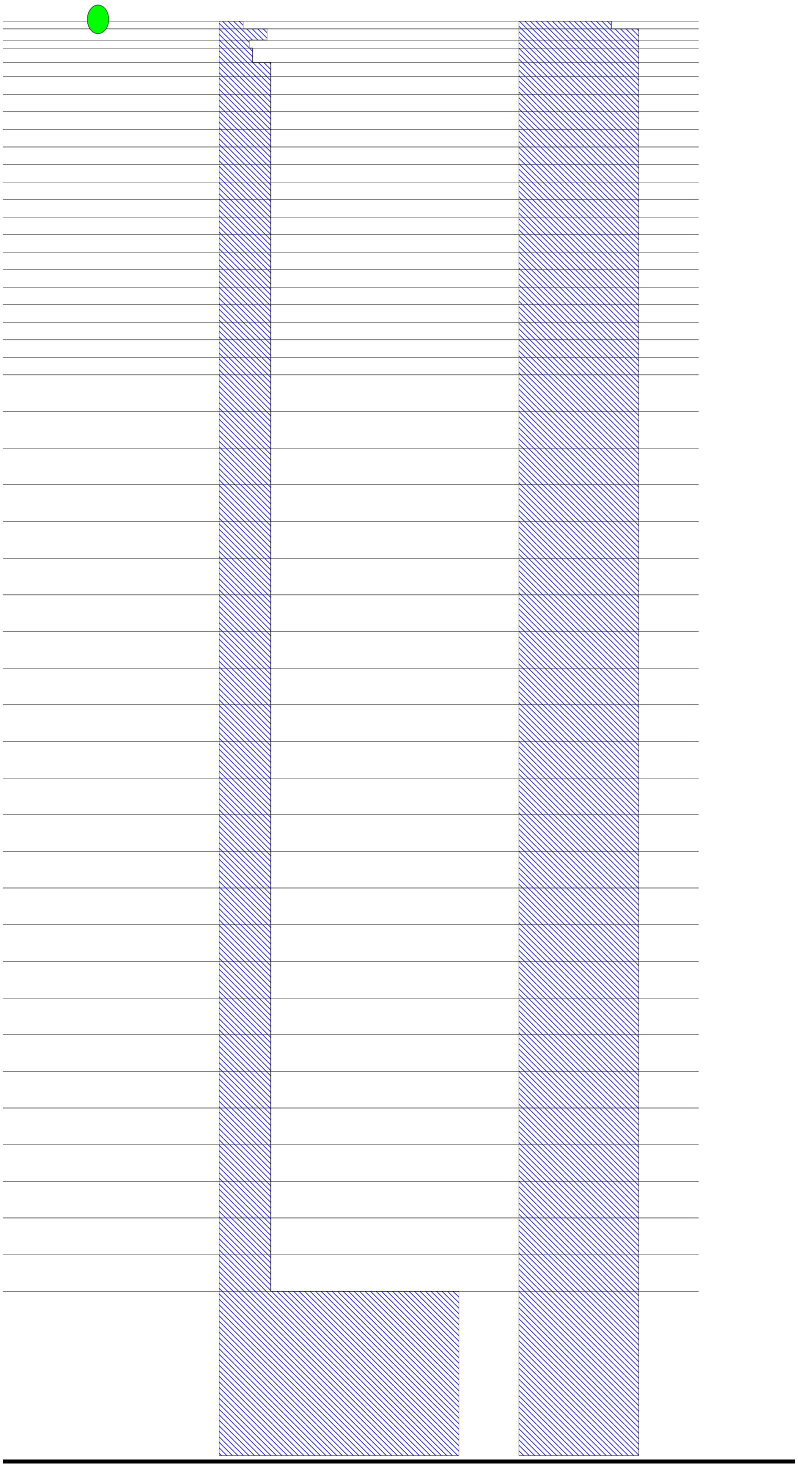


D11CHC

Profile Name: D12CXW
Water Table:39.37 ft
Number of Layers: 48

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	6.56	100	1338	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	9.84	130	6958	1312	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	6.56	130	2718	820	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	13.12	130	3289	902	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	13.12	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

24	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	7855	1394	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	Rock	Infinite	150	200731	6562	Rock	Rock



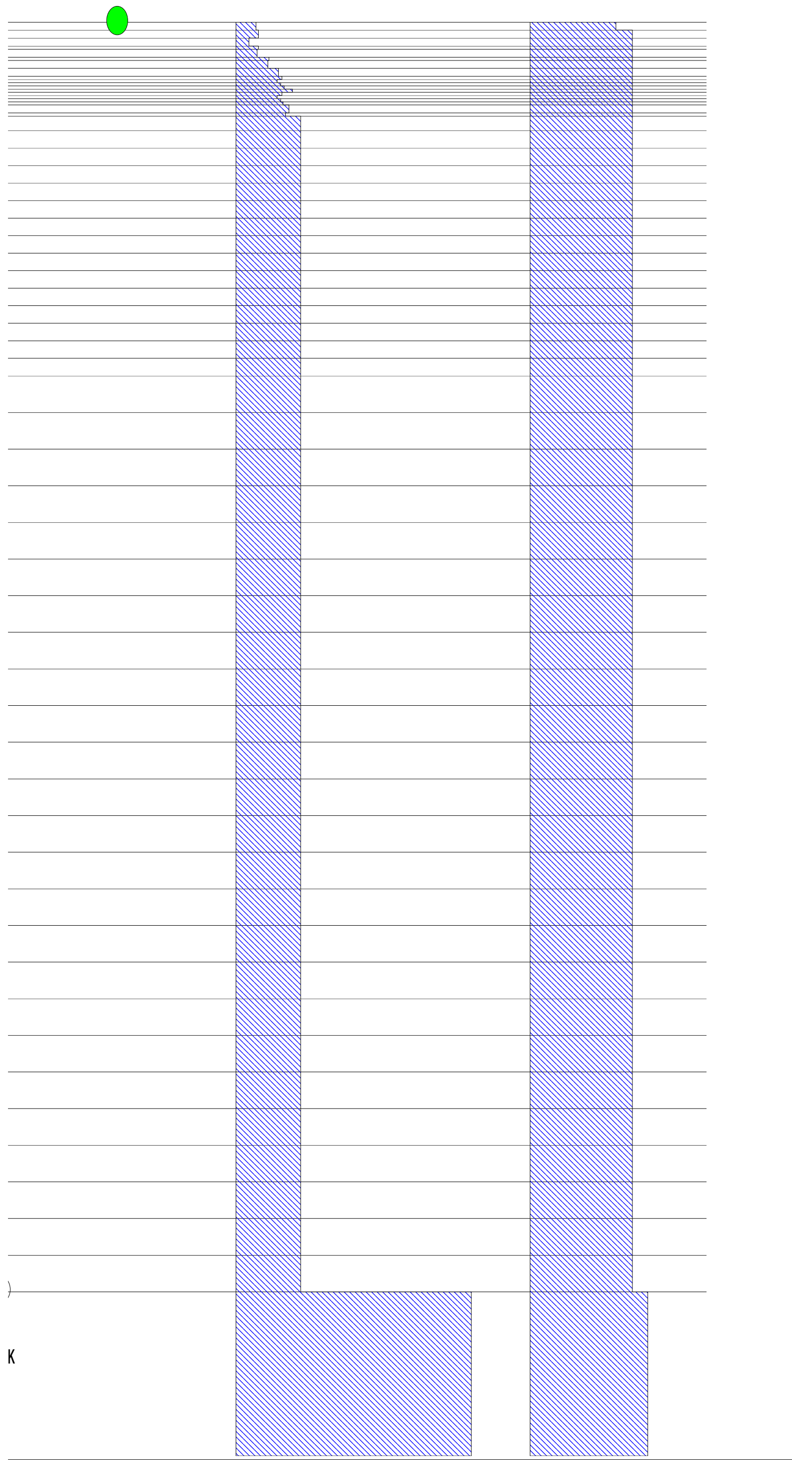
D12CXW

Profile Name: D12CH
Water Table:39.37 ft
Number of Layers: 60

Layer No.	Material Name	Thick-ness (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/s)	Modulus Curve	Damping Curve
1	SC/SD	6.56	110	1078	561	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	SC/SD	6.56	130	1573	616	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	SC/SD	6.56	130	555	370	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	SC/SD	3.28	130	1566	626	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	SC/SD	6.56	130	1472	603	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	SC/SD	3.28	130	3434	921	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	SC/SD	6.56	130	3194	889	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	SC/SD	6.56	130	5481	1164	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	SC/SD	3.28	130	6547	1272	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	SC/SD	3.28	130	5327	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	SC/SD	3.28	130	6346	1253	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	SC/SD	3.28	130	7169	1332	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	SC/SD	3.28	130	9978	1571	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	SC/SD	3.28	130	6547	1272	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	SC/SD	3.28	130	5206	1135	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	SC/SD	3.28	130	6313	1250	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	SC/SD	3.28	130	6889	1305	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	SC/SD	3.28	130	8885	1482	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	SC/SD	3.28	130	7635	1374	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	SC/SD	13.12	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

26	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
34	SC/SD	16.4	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
53	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
54	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
55	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
56	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

57	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
58	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
59	SC/SD	32.81	130	13156	1804	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
60	Rock	Infinite	150	200731	6562	Rock	Rock



D12CHC

4. Dynamic Analysis (ProShake) Results for Al-Durrah Site

ProShake Report (A)

Bedrock at SPT (T_A= 30 or 60 m)boring depth

Soil Profile

Profile Name: D1ACXW
Tests Types and Designations: SPT (60)-CXW
Water Table Depth: 8 m.
Number of Layers: 28

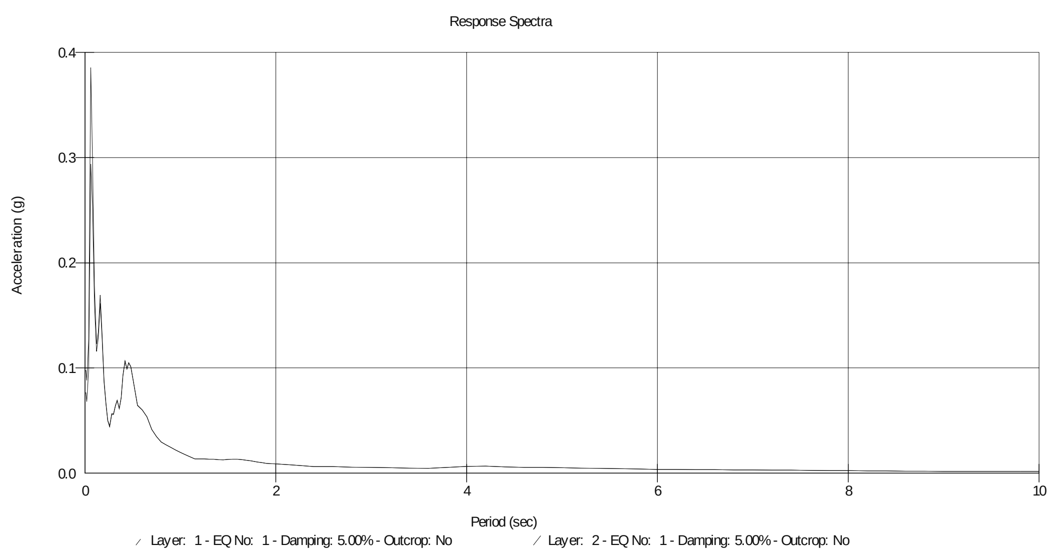
Input Motion

RAN230.EQ

Output Locations

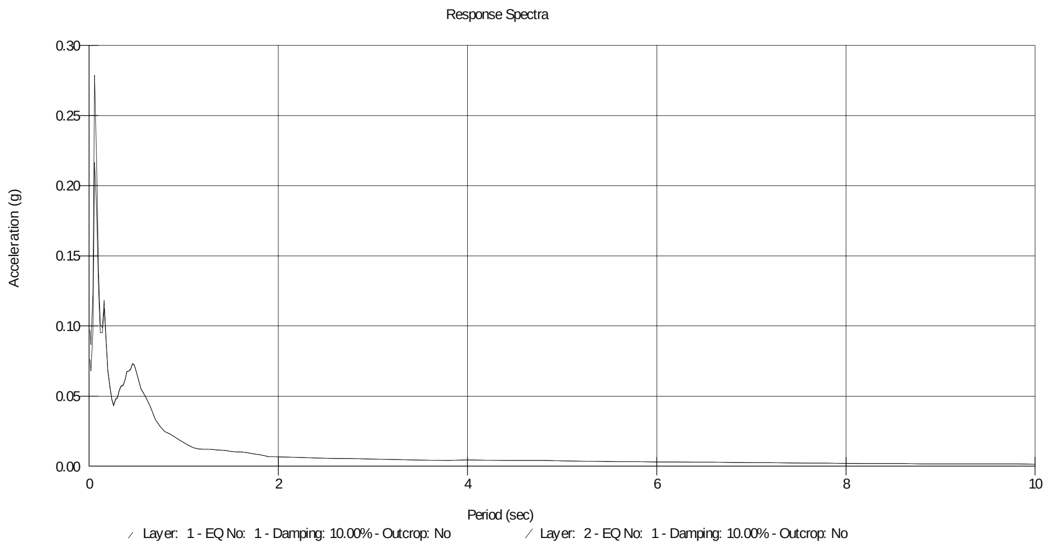
Layers: 1 and 2
Response Spectra

a) 5% Soil Damping



A_{max} = 0.39 g at T= 0.064 sec.

b) 10% Soil Damping



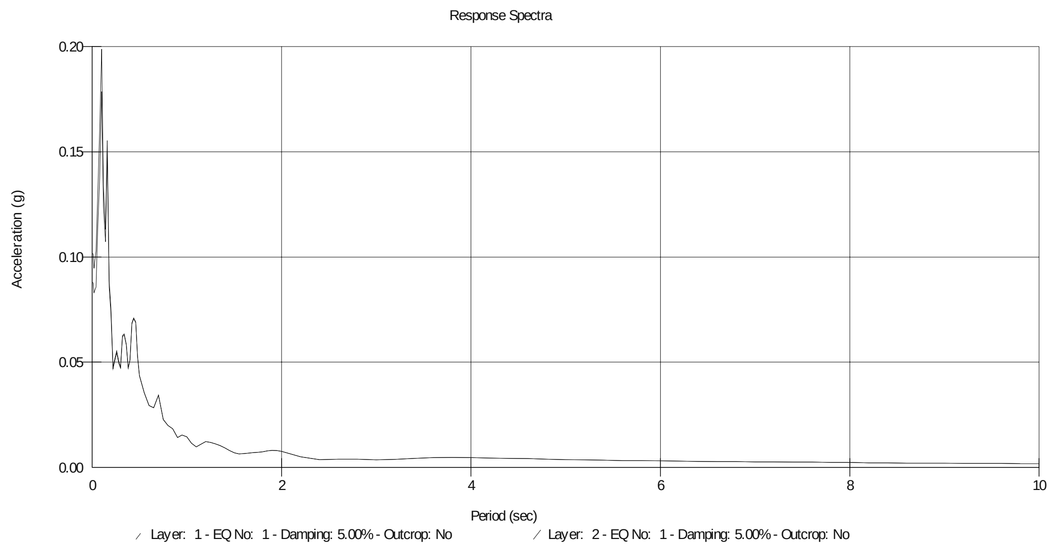
A_{max} =0.28g at T= 0.064 sec.

Input Motion

RAN330.EQ

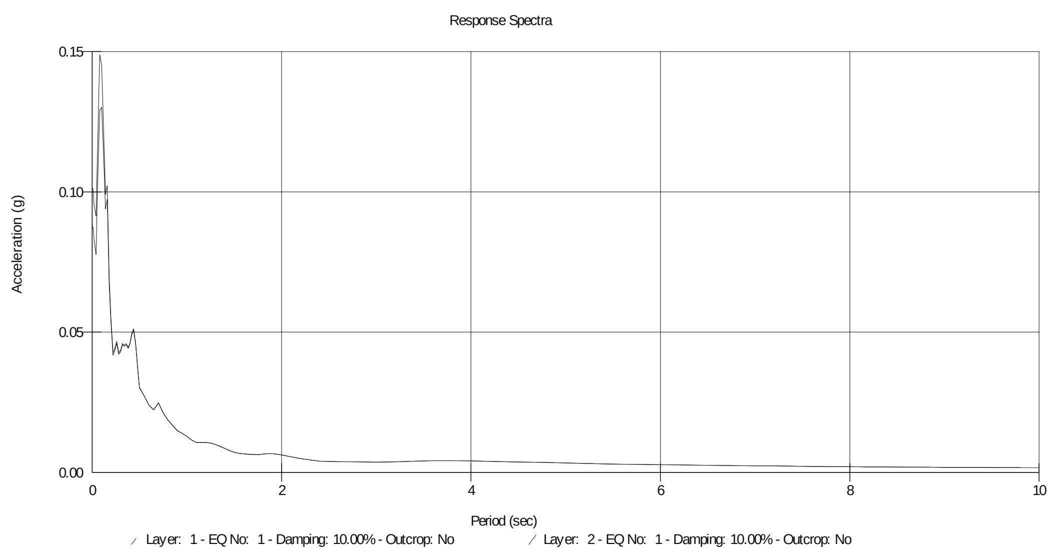
Response Spectra)

a) 5% Soil Damping



A_{max} = 0.20g at T= 0.098 sec.

b) 10% Soil Damping



A_{max} = 0.15g at T= 0.088 sec.

Profile Name: D2A
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 28 m.
Number of Layers: 14

<u>Input Motion</u>

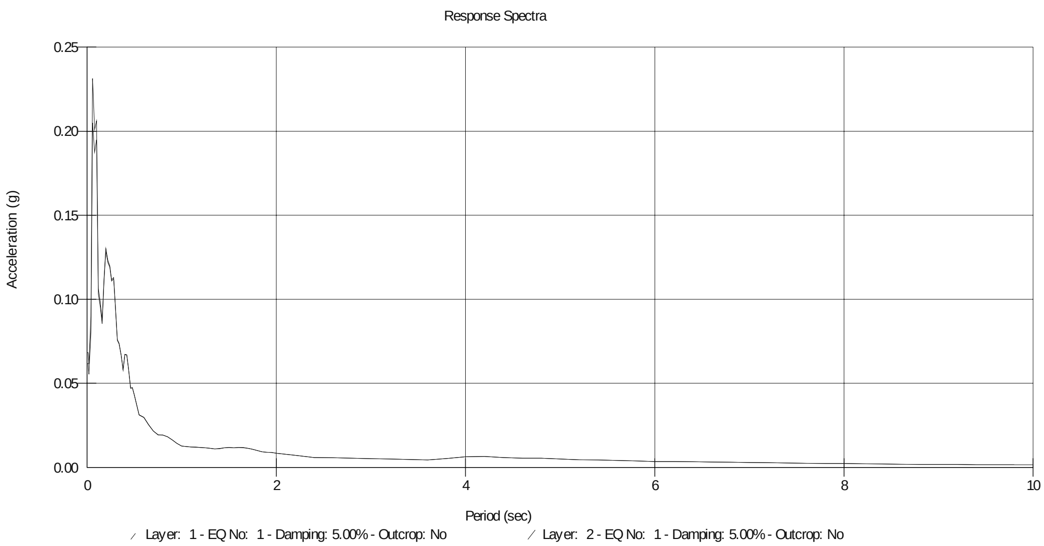
RAN230.EQ

<u>Output Locations</u>

Layers: 1 and 2

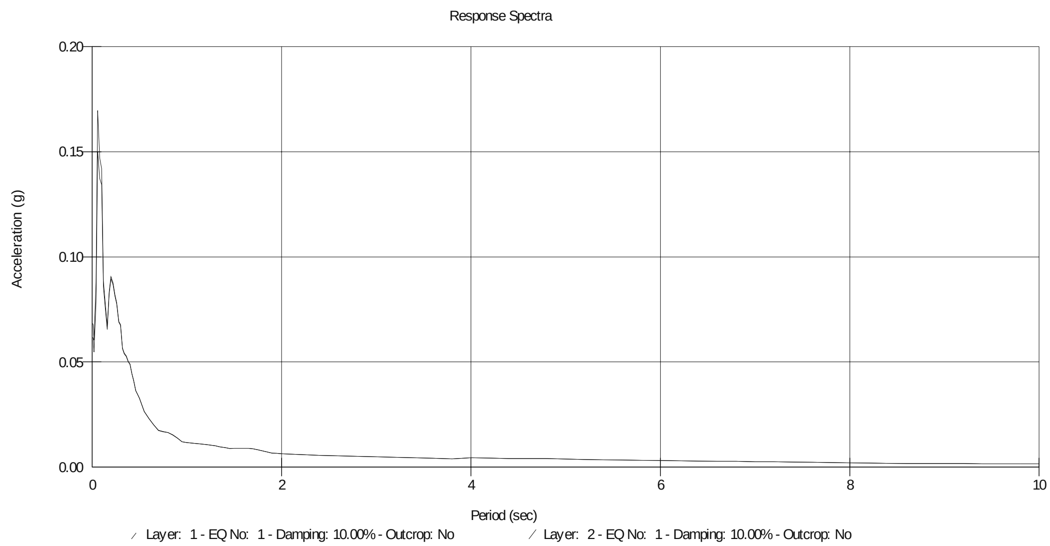
<u>Response Spectra</u>

a) 5% Soil Damping



A_{max} = 0.23g at T= 0.054 sec

b) 10% Soil Damping



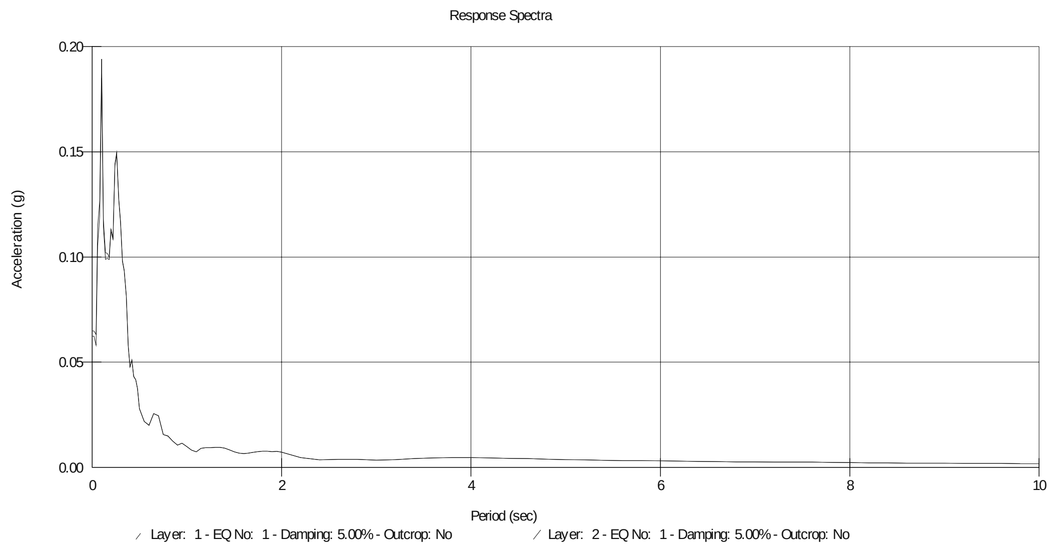
A_{max} = 0.17g at T= 0.054 sec

Input Motion

RAN330.EQ

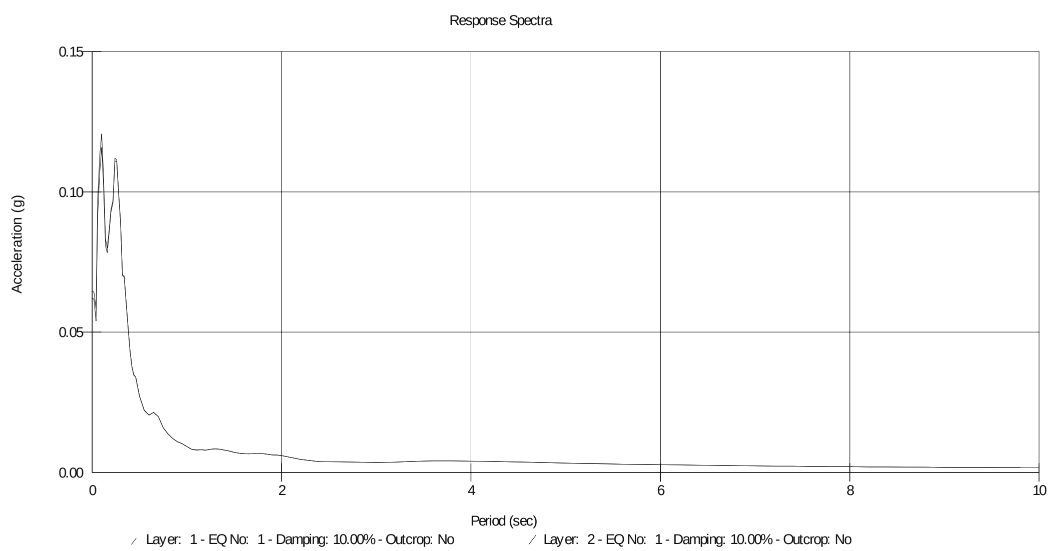
Response Spectra

a) 5% Soil Damping



A_{max} = 0.20g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.098 sec

Soil Profile

Profile Name: D3ACXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 29 m.
Number of Layers: 64

Input Motion

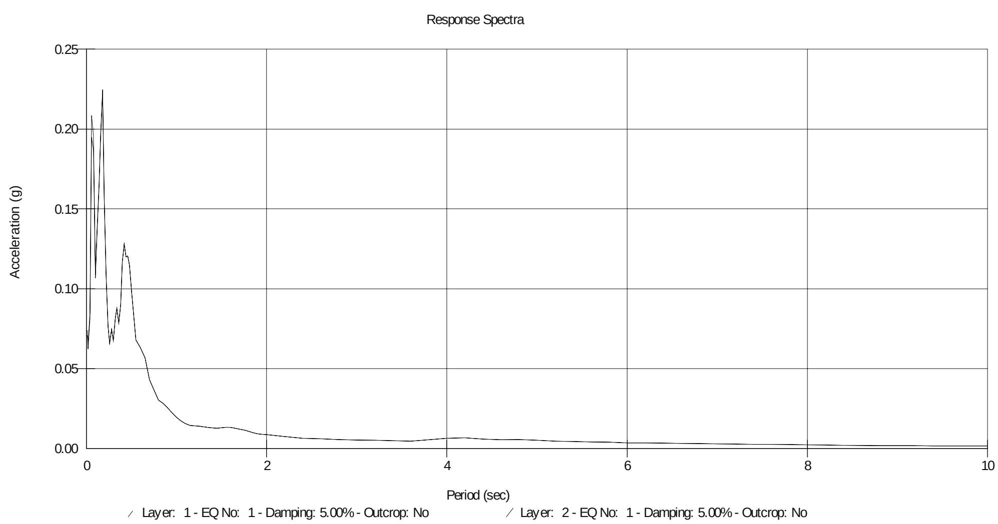
RAN230.EQ

Output Locations

Layers: 1 and 2

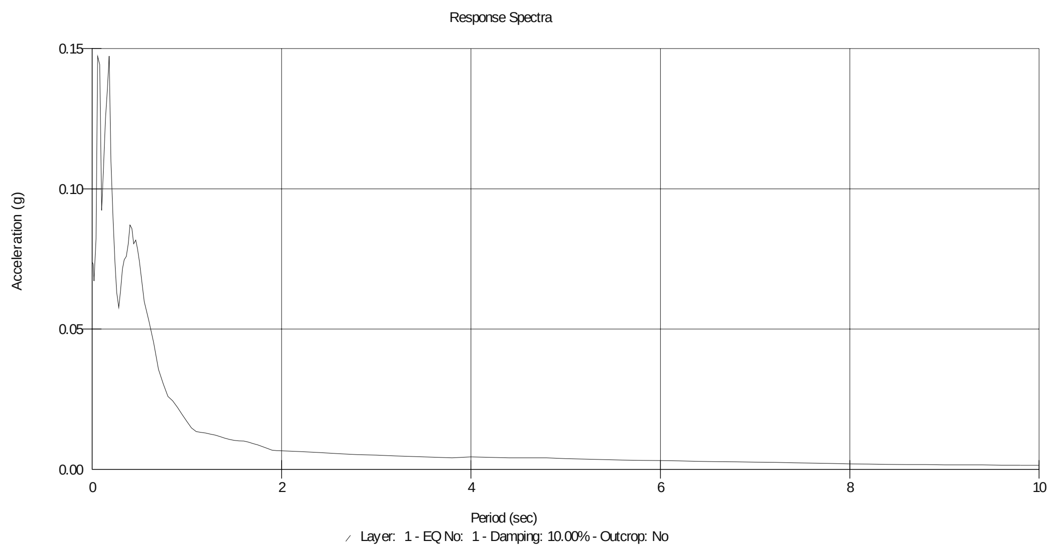
Response Spectra

a) 5% Soil Damping



A_{max} = 0.23g at T= 0.20 sec

b) 10% Soil Damping



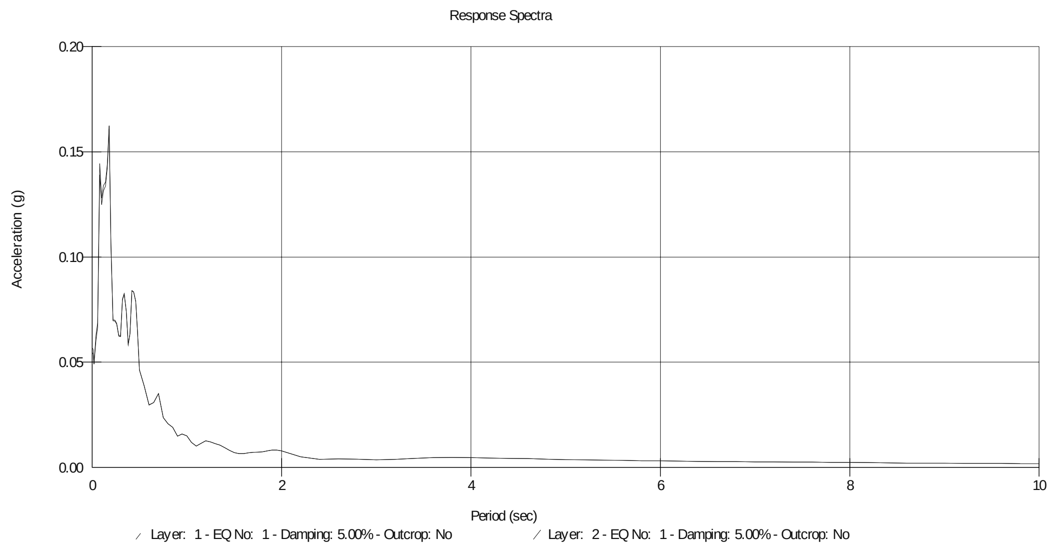
$A_{max} = 0.15g$ at $T = 0.077$ sec

Input Motion

RAN330.EQ

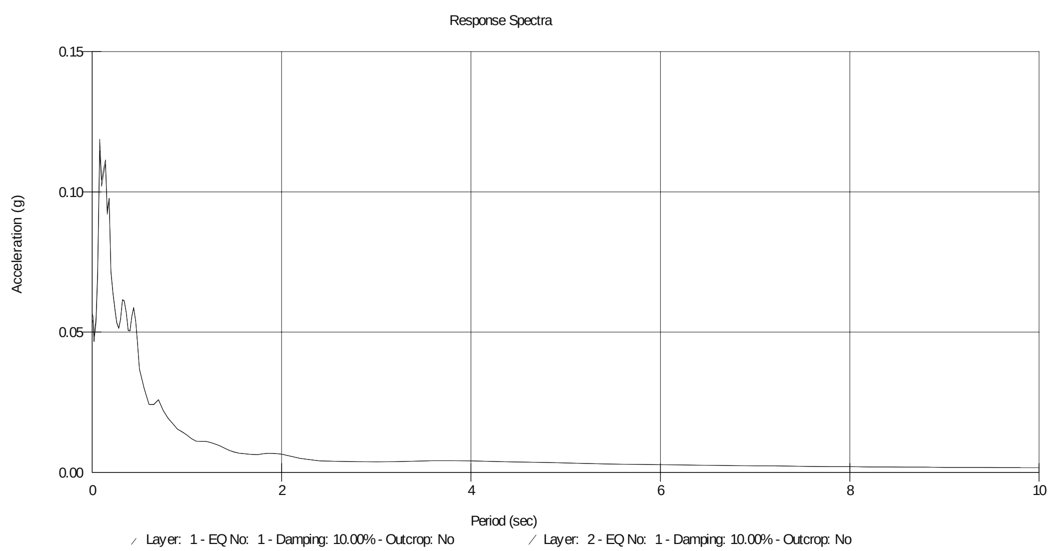
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.20 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.078 sec

Soil Profile

Profile Name: D4ACXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 2.5 m.
Number of Layers: 13

Input Motion

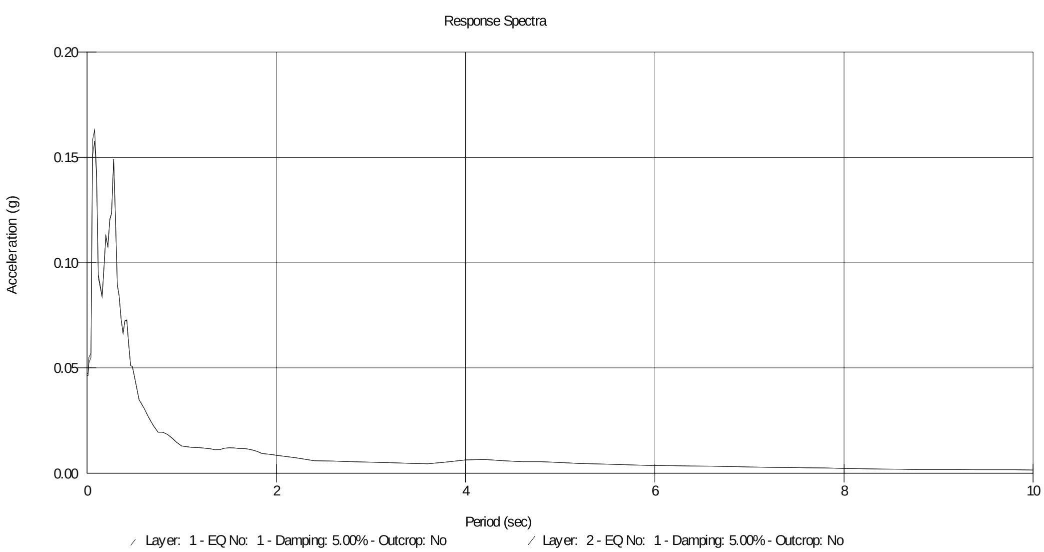
RAN230.EQ

Output Locations

Layers: 1 and 2

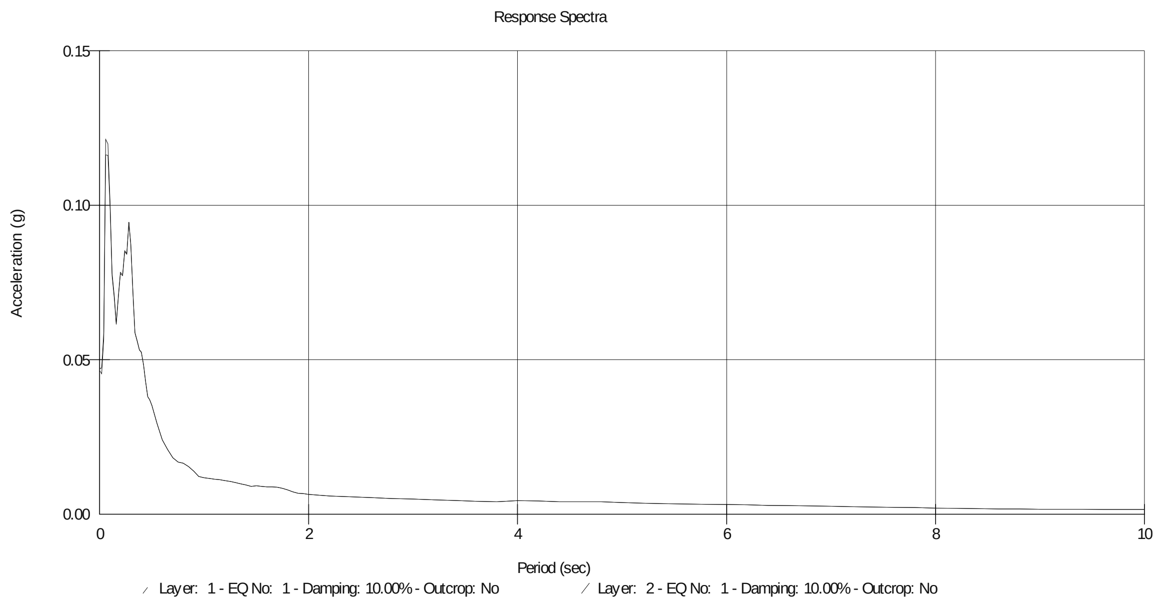
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.088 sec

b) 10% Soil Damping



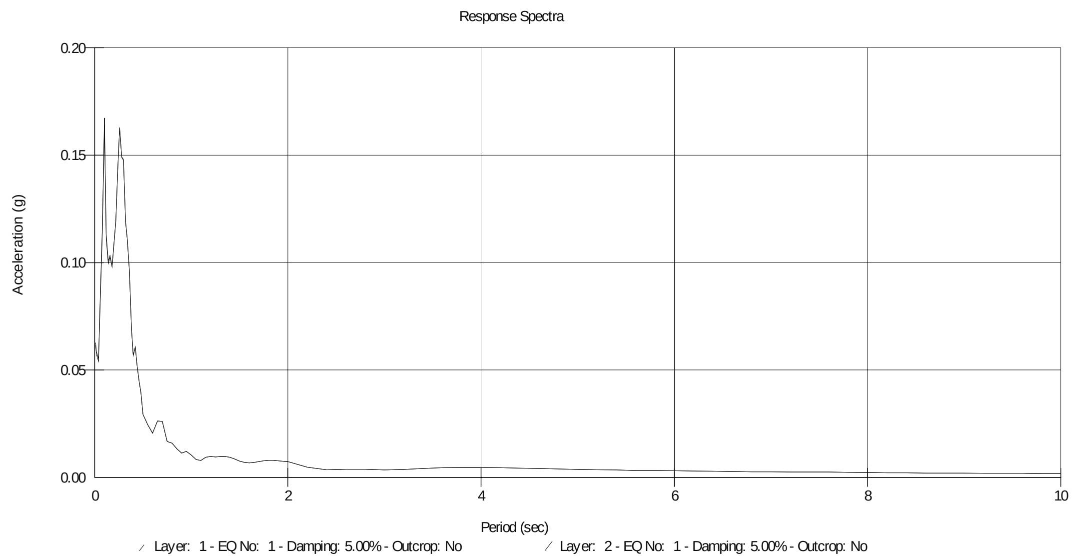
A_{max} = 0.12g at T= 0.064 sec

Input Motion

RAN330.EQ

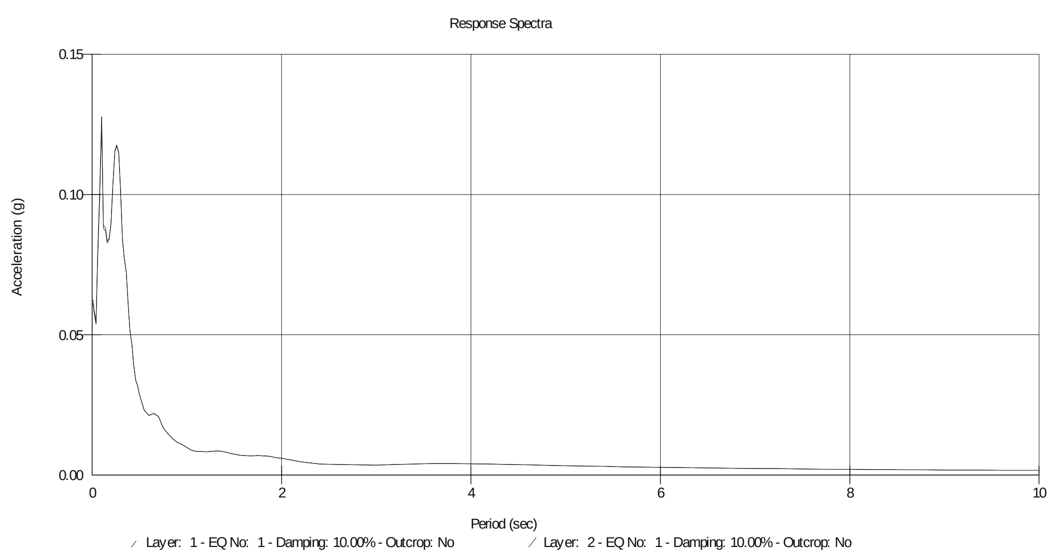
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.098 sec

Soil Profile

Profile Name: (D5A)A(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 16

Input Motion

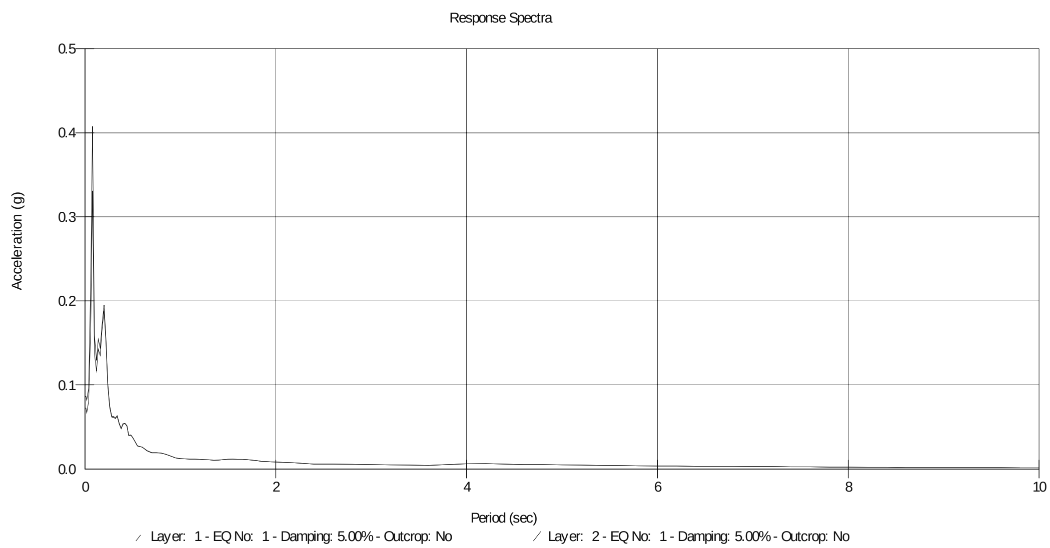
RAN230.EQ

Output Locations

Layers: 1 and 2

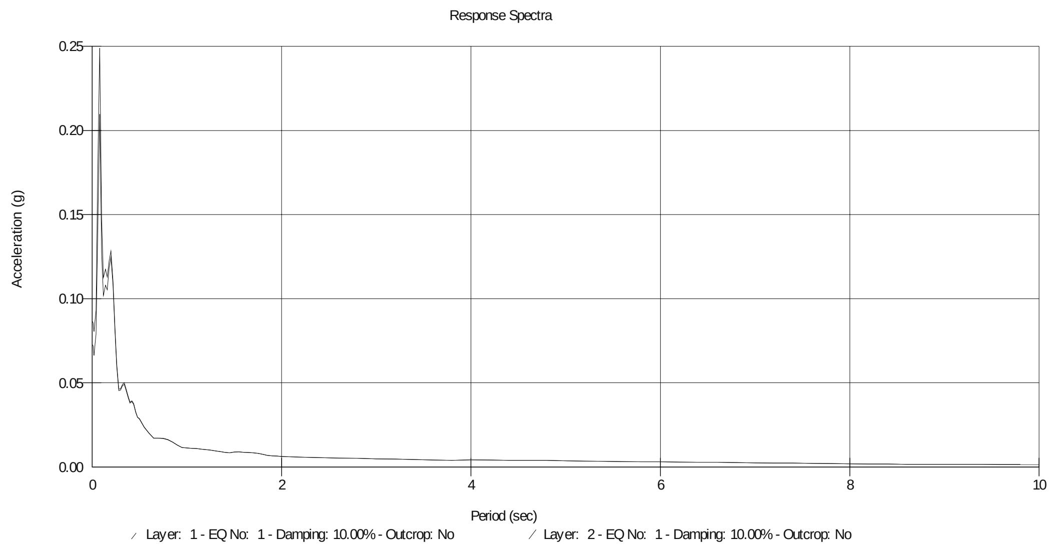
Response Spectra

a) 5% Soil Damping



A_{max} = 0.41g at T= 0.077 sec

b) 10% Soil Damping



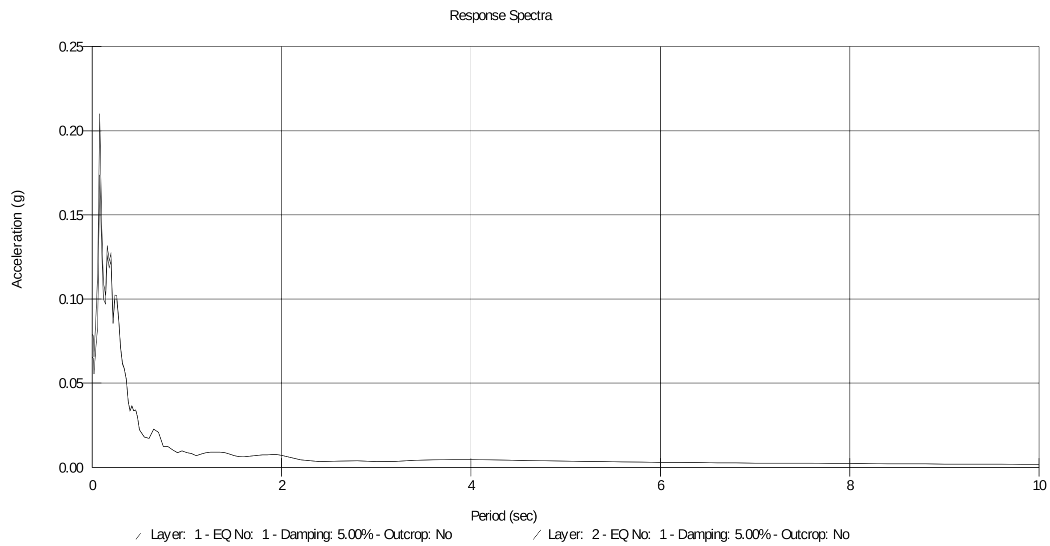
$A_{max} = 0.25g$ at $T = 0.077$ sec

Input Motion

RAN330.EQ

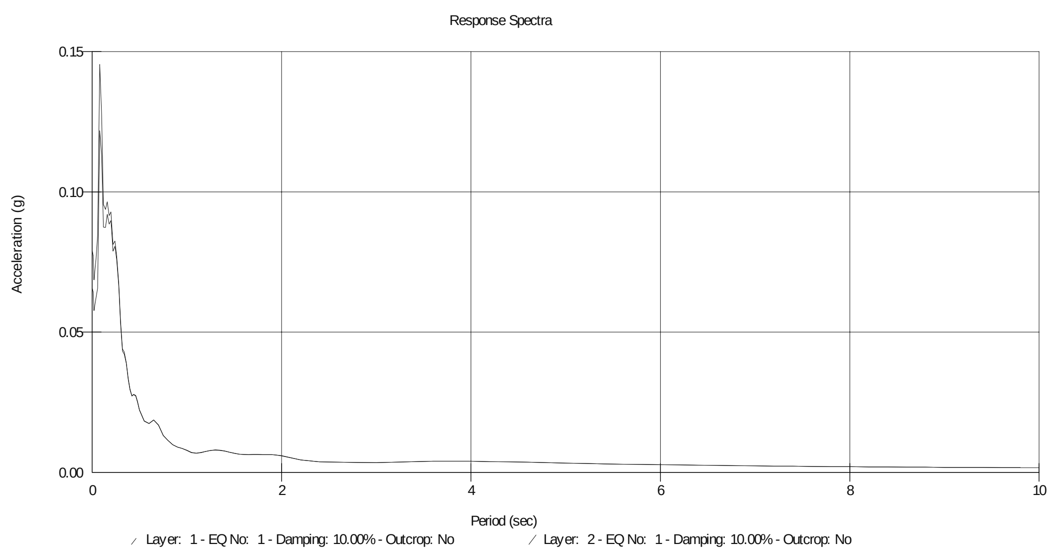
Response Spectra

a) 5% Soil Damping



A_{max} = 0.21 g at *T*= 0.088 sec

b) 10% Soil Damping



A_{max} = 0.15g at *T*= 0.077 sec

Soil Profile

Profile Name: D5A2(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 18

Input Motion

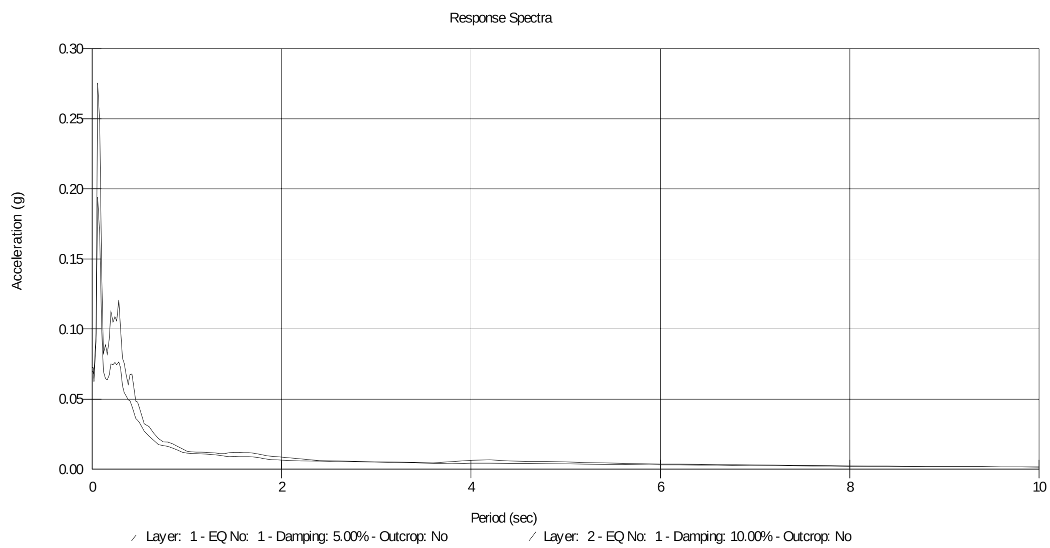
RAN230.EQ

Output Locations

Layers: 1 and 2

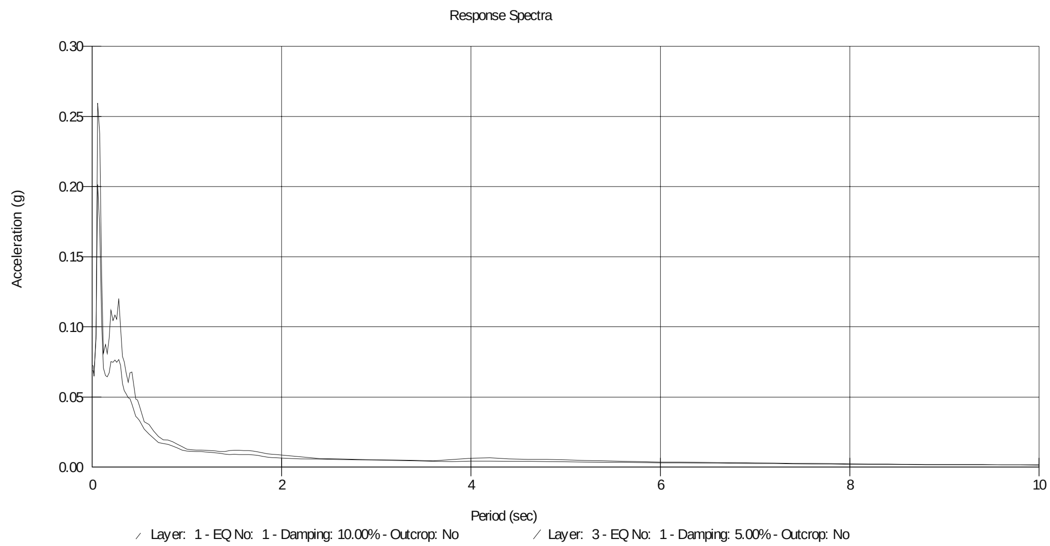
Response Spectra

a) 5% Soil Damping



A_{max} = 0.27g at T= 0.064 sec

b) 10% Soil Damping



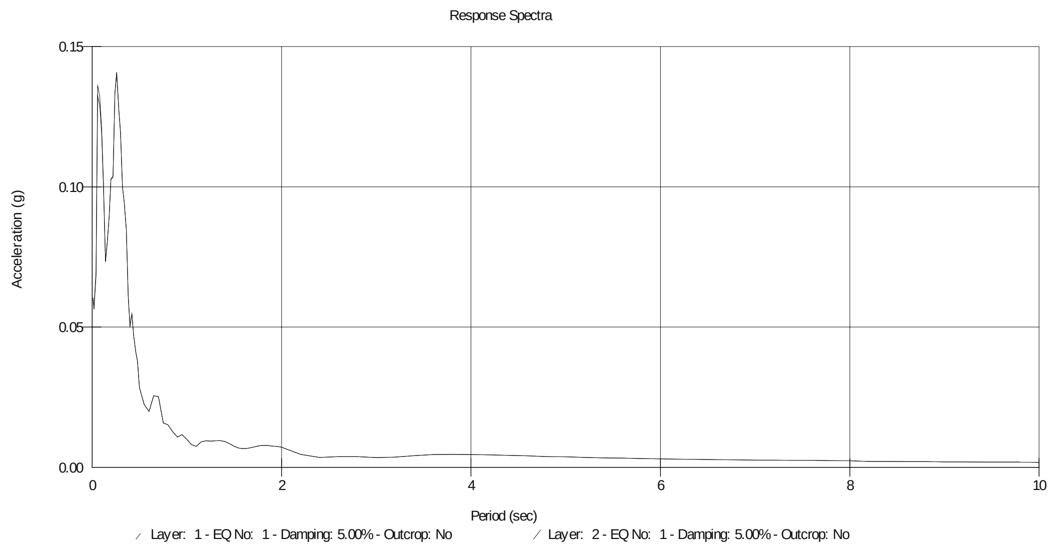
A_{max} = 0.26g at T= 0.064 sec

Input Motion

RAN330.EQ

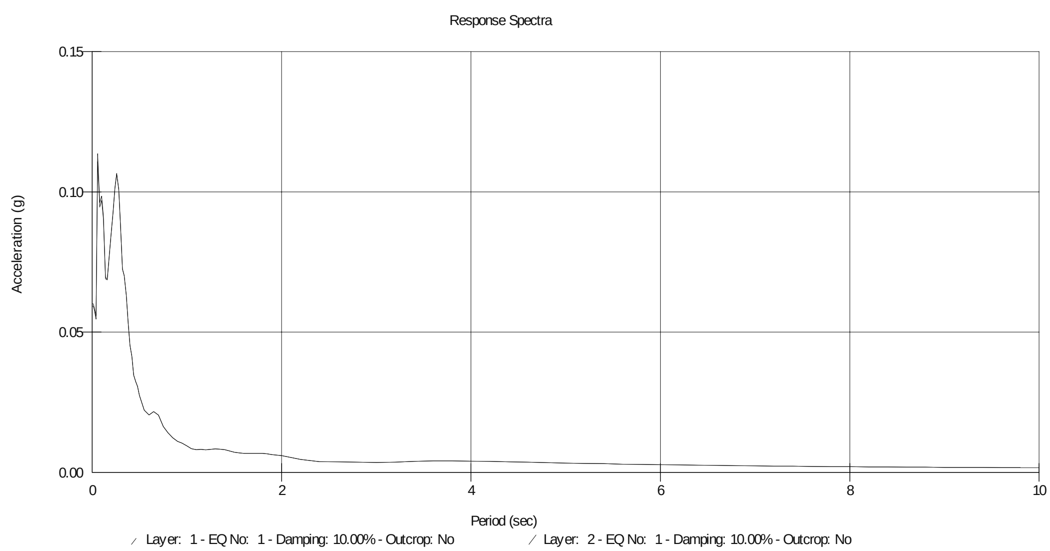
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.25 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.064 sec

Soil Profile

Profile Name: D5CHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 24

Input Motion

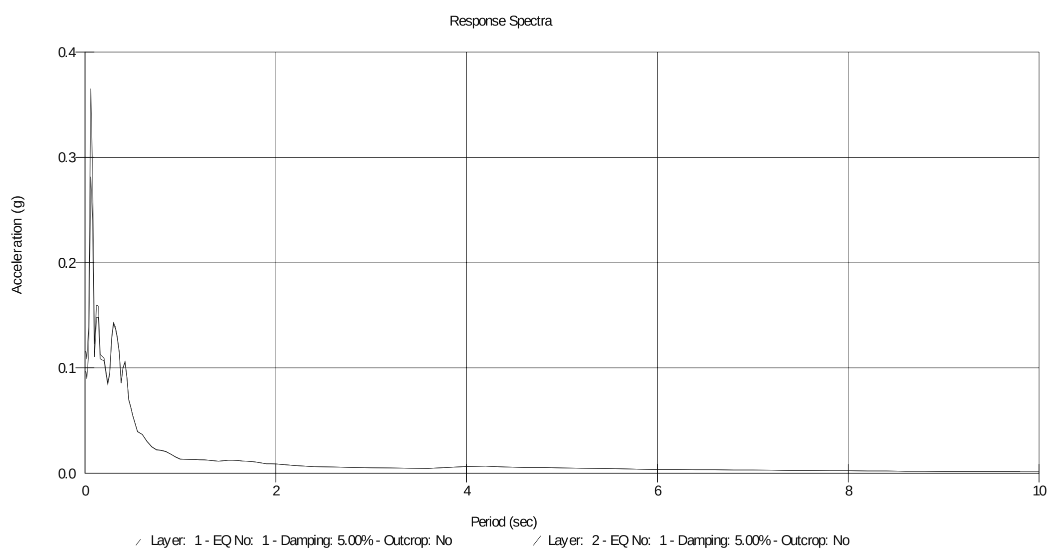
RAN230.EQ

Output Locations

Layers: 1 and 2

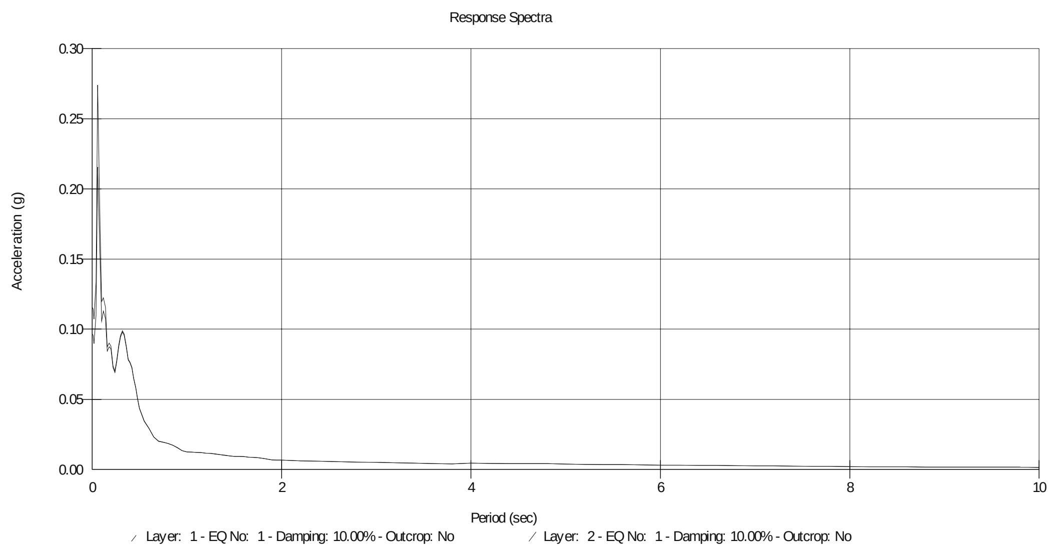
Response Spectra

a) 5% Soil Damping



A_{max} = 0.37g at T= 0.064 sec

b) 10% Soil Damping



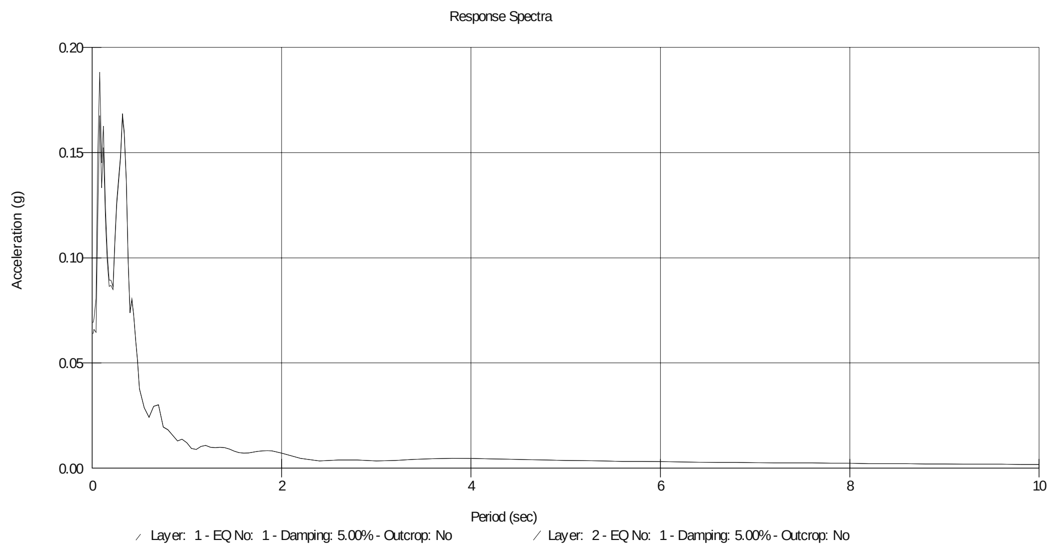
A_{max} = 0.27g at T= 0.054 sec

Input Motion

RAN330.EQ

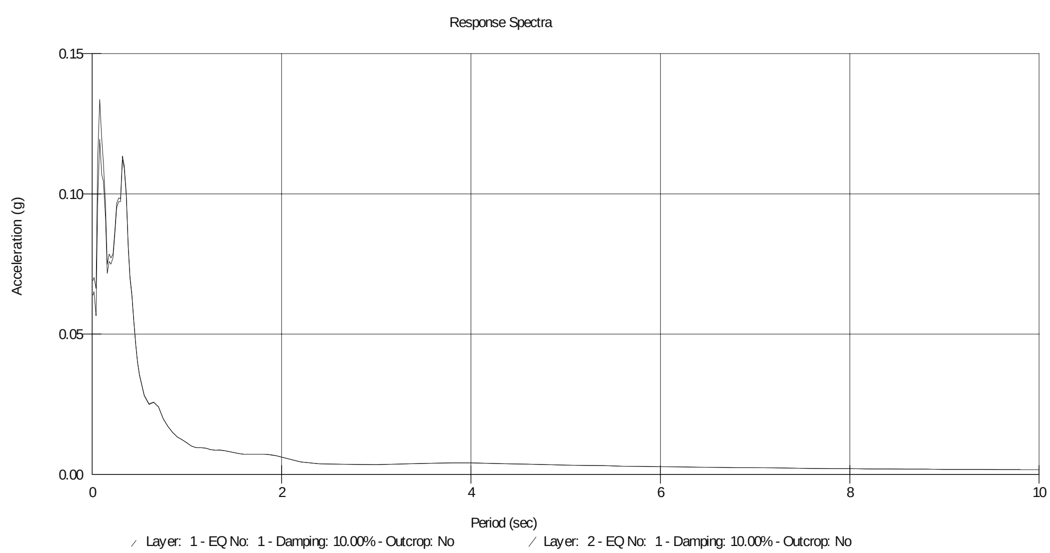
Response Spectra

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.088 sec

b) 10% Soil Damping



A_{max} = 0.13g at T= 0.088 sec

Soil Profile

Profile Name: D6A(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 18

Input Motion

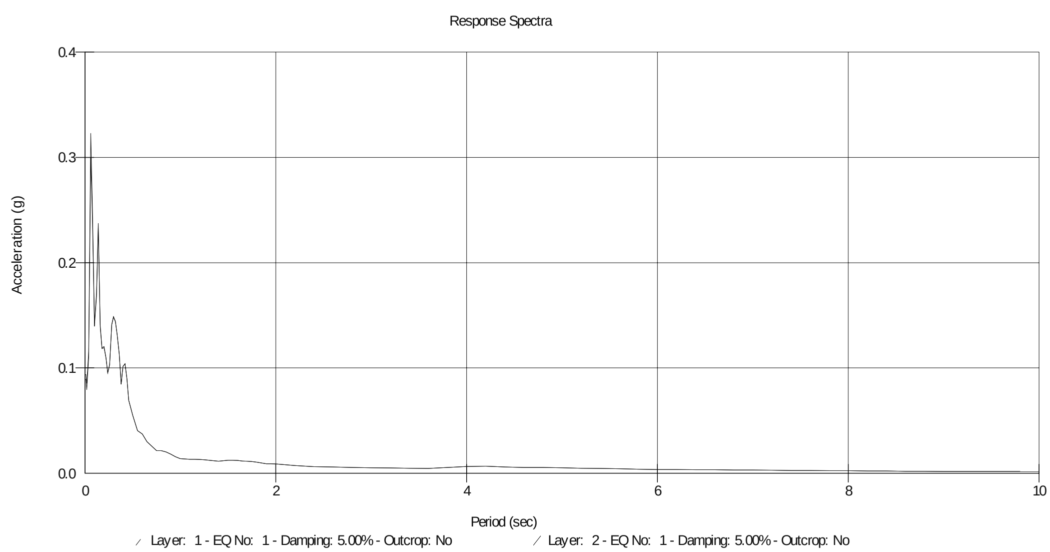
RAN230.EQ

Output Locations

Layers: 1 and 2

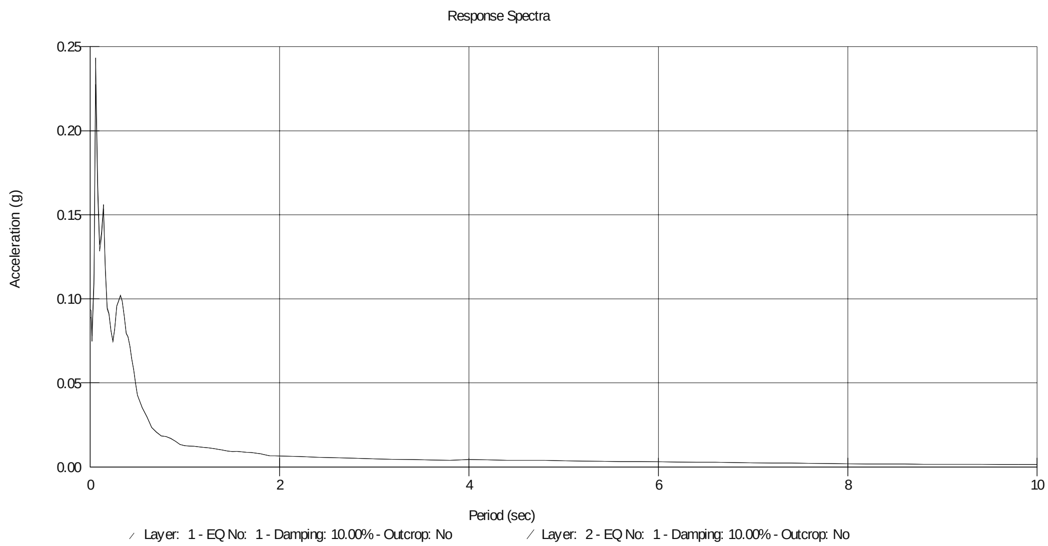
Response Spectra

a) 5% Soil Damping



A_{max} = 0.32g at T= 0.064 sec

b) 10% Soil Damping



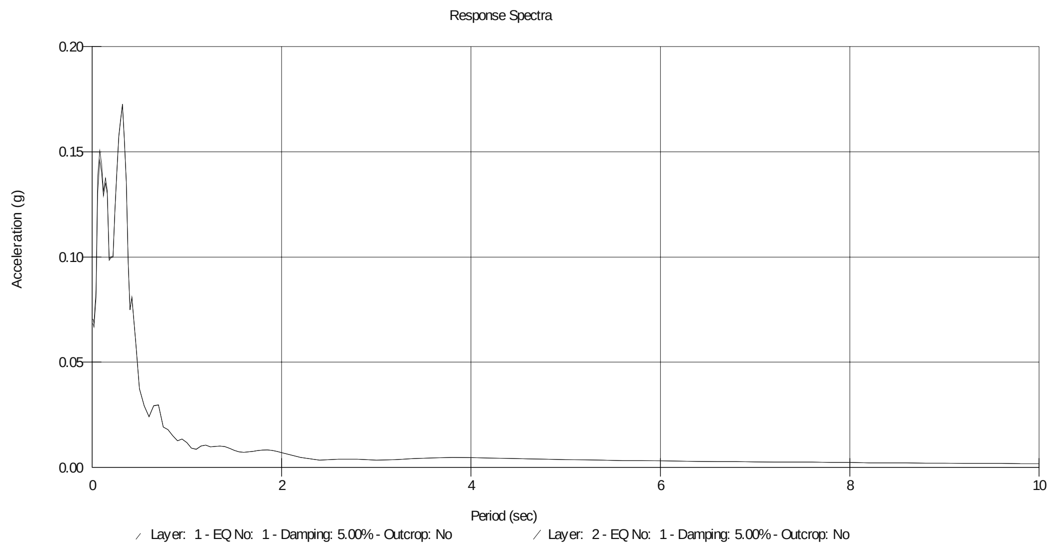
A_{max} = 0.25g at T= 0.054 sec

Input Motion

RAN330.EQ

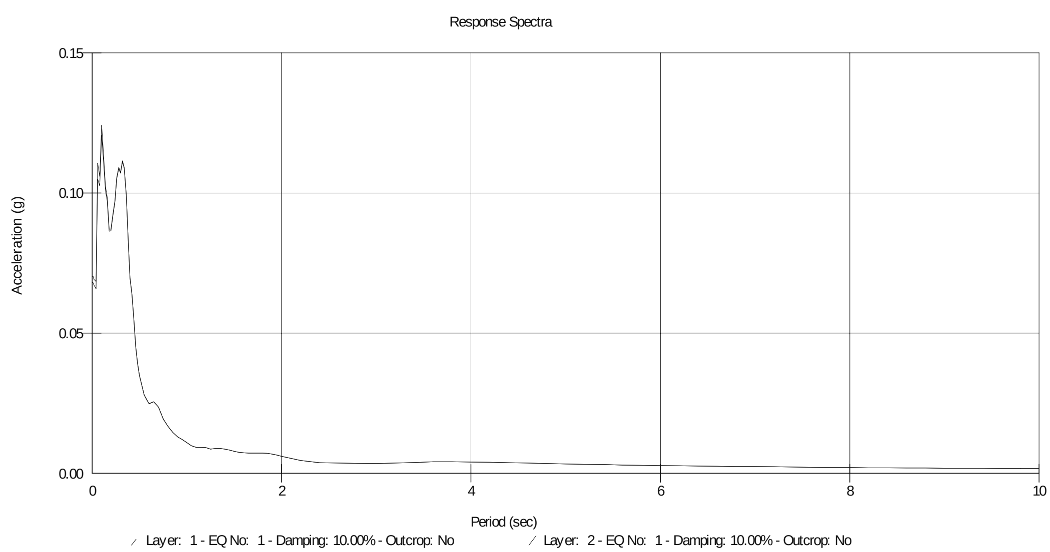
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.32 sec

b) 10% Soil Damping



A_{max} = 0.13g at T= 0.098 sec

Soil Profile

Profile Name: D6ACHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 20

Input Motion

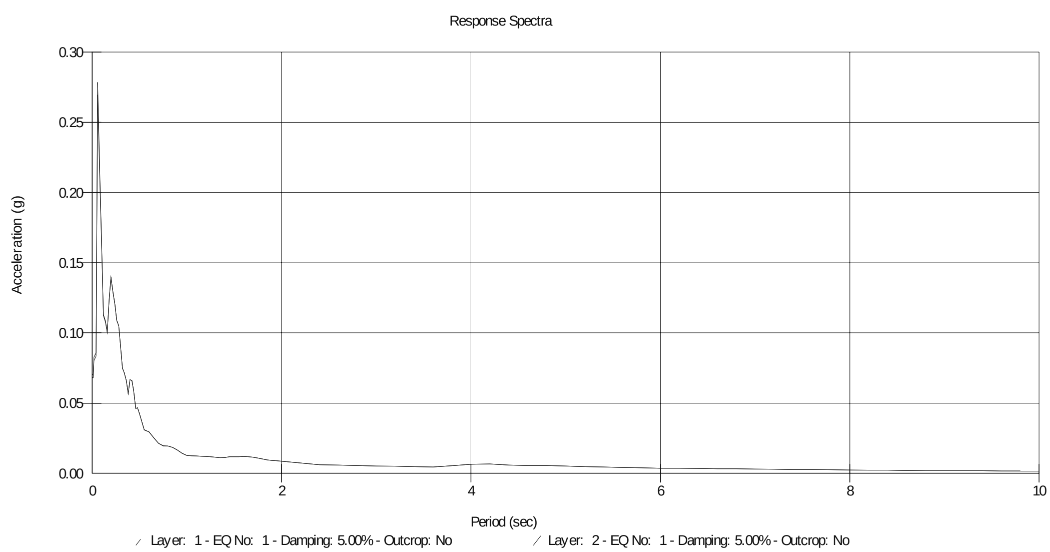
RAN230.EQ

Output Locations

Layers: 1 and 2

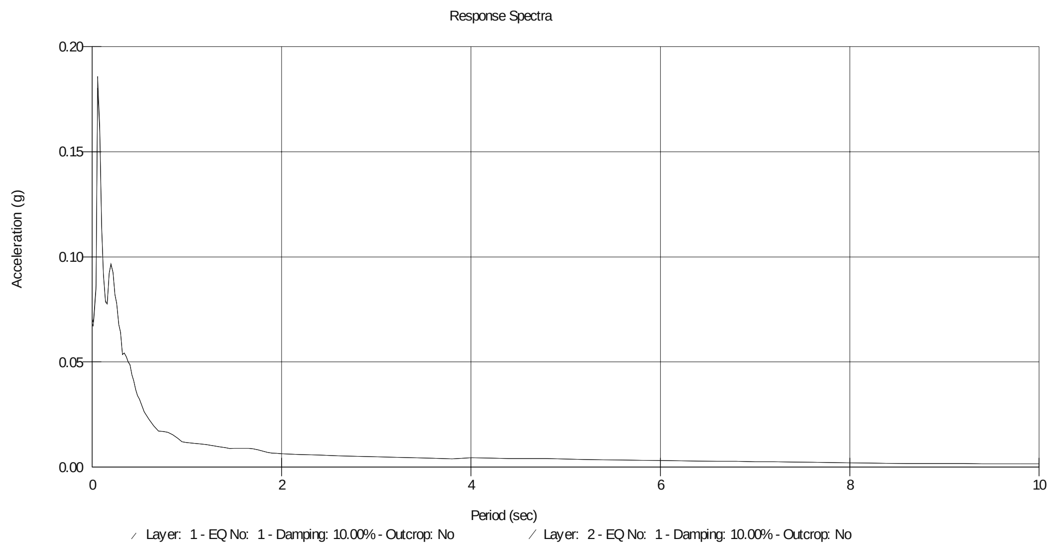
Response Spectra

a) 5% Soil Damping



A_{max} = 0.28g at T= 0.064 sec

b) 10% Soil Damping



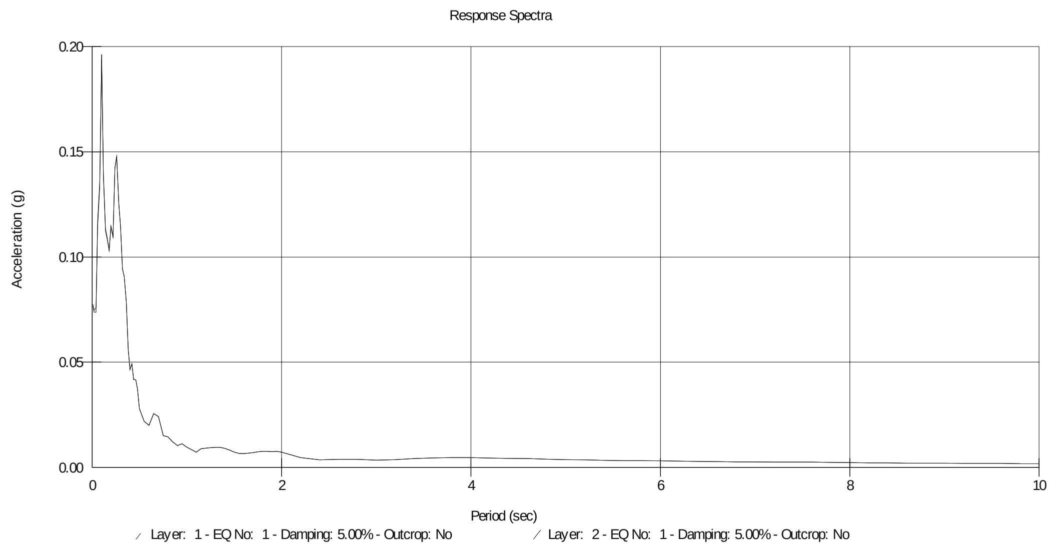
A_{max} = 0.19g at T= 0.054 sec

Input Motion

RAN330.EQ

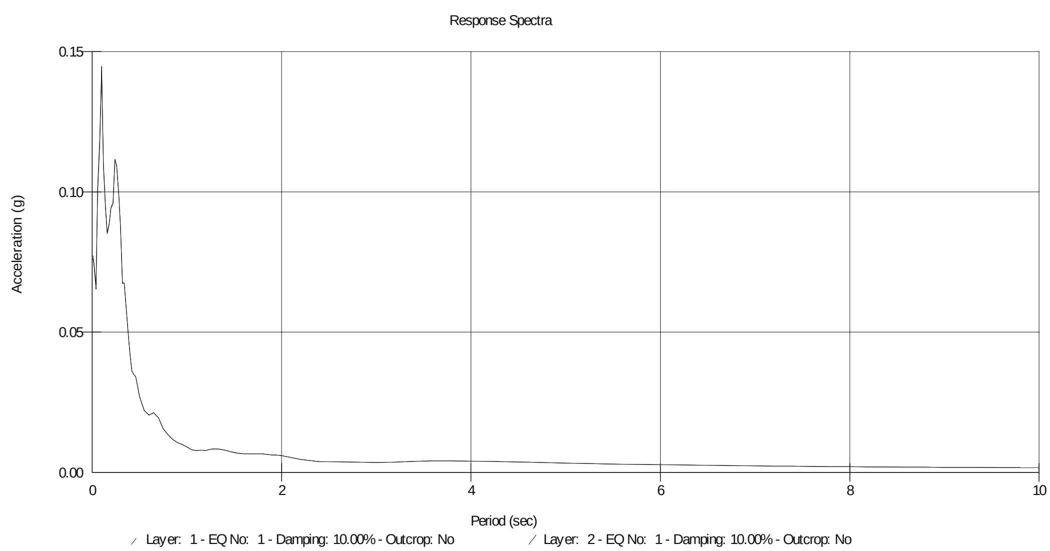
Response Spectra

a) 5% Soil Damping



A_{max} = 0.2g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.098 sec

Soil Profile

Profile Name: D7ACXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 26 m.
Number of Layers: 13

Input Motion

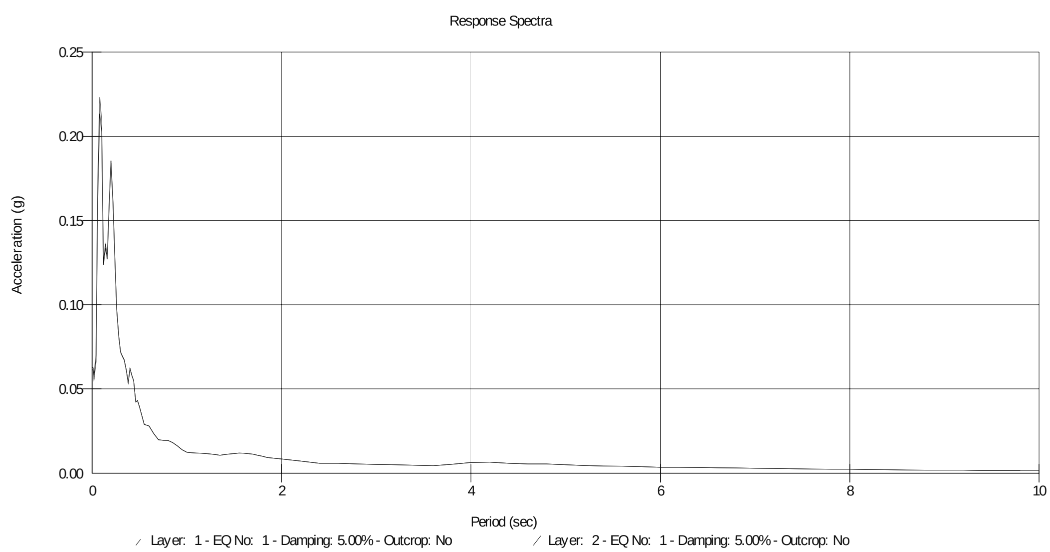
RAN230.EQ

Output Locations

Layers: 1 and 2

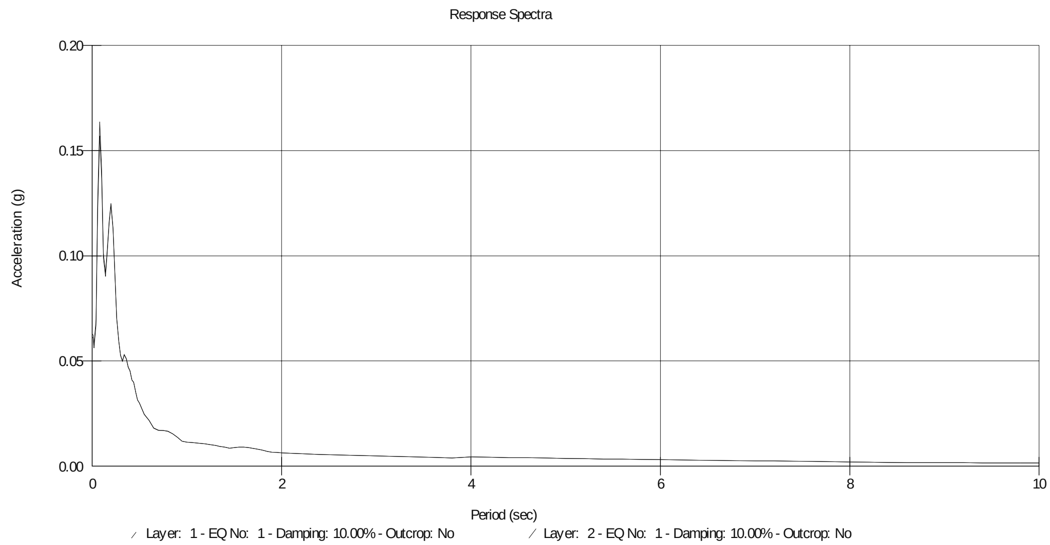
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.088 sec

b) 10% Soil Damping



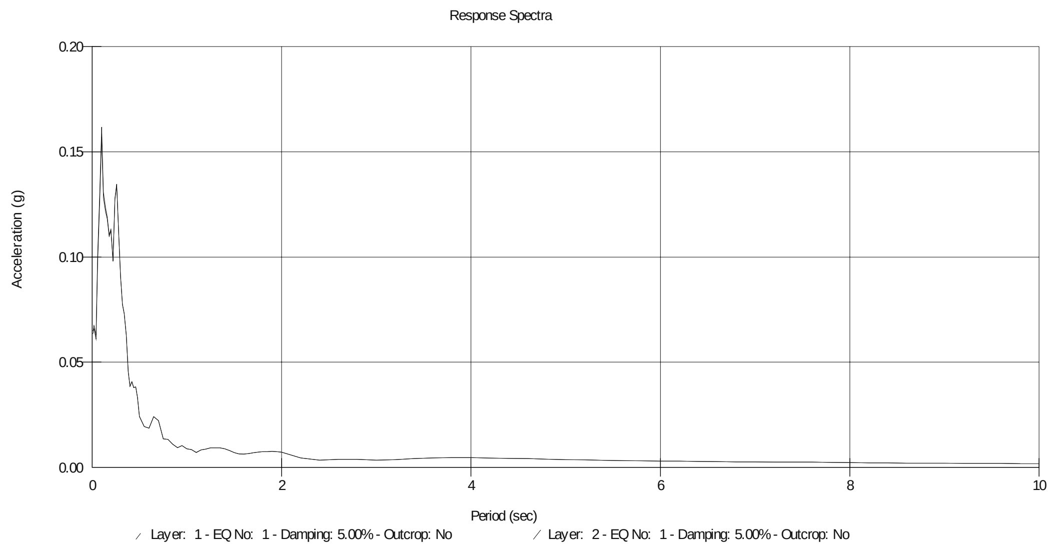
A_{max} = 0.16g at *T*= 0.088 sec

Input Motion

RAN330.EQ

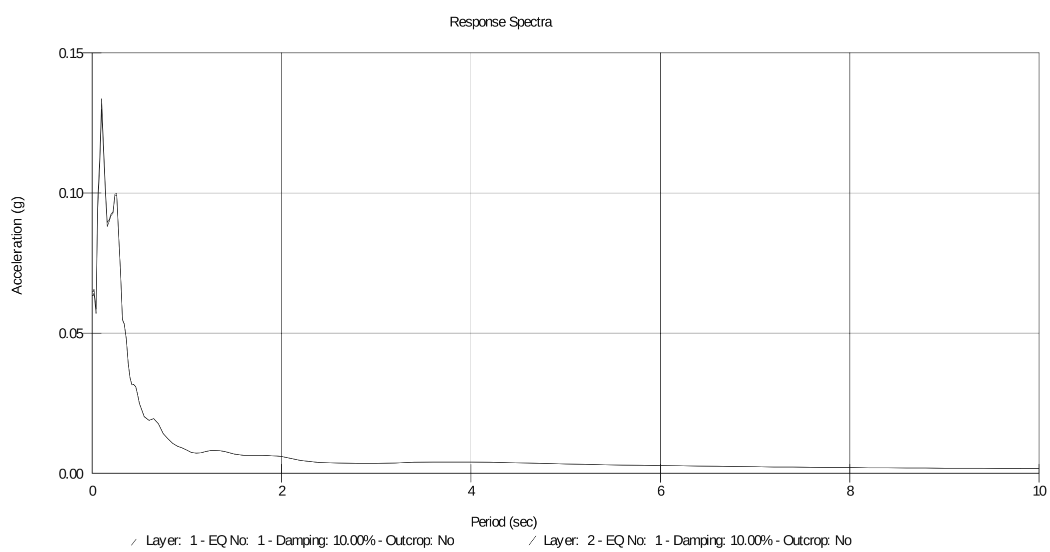
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.098 sec

Soil Profile

Profile Name: D8ACXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 25 m.
Number of Layers: 11

Input Motion

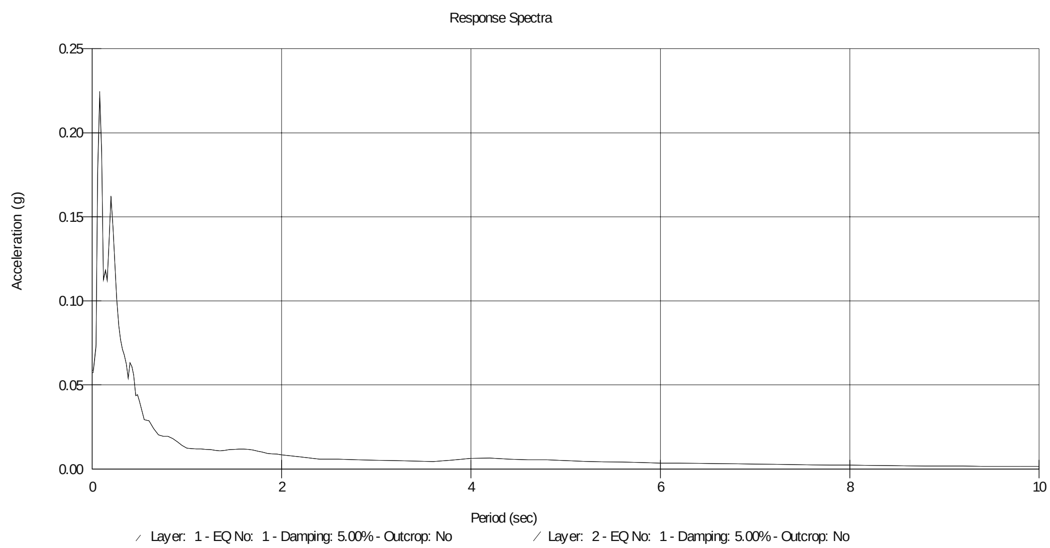
RAN230.EQ

Output Locations

Layers: 1 and 2

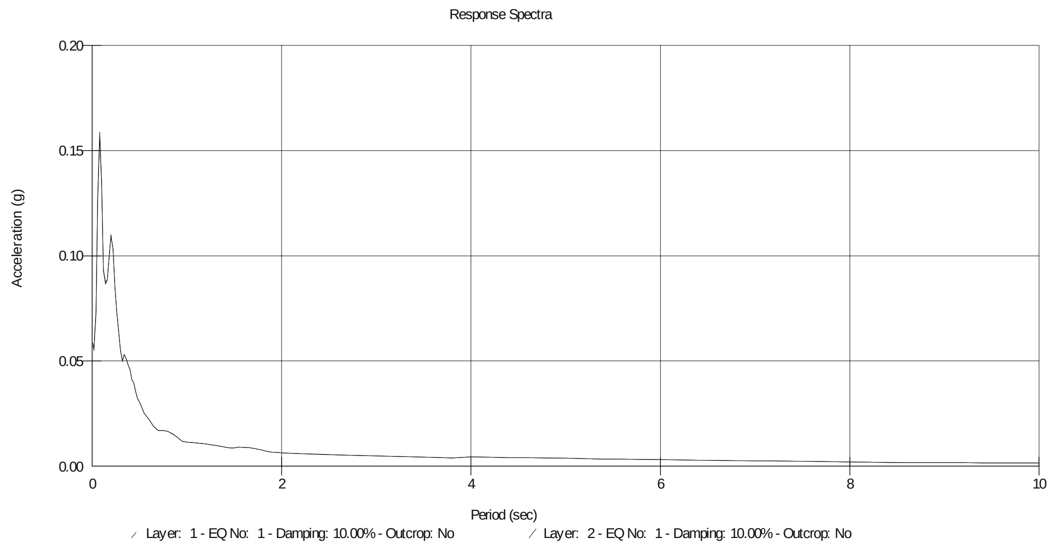
Response Spectra

a) 5% Soil Damping



A_{max} = 0.23g at T= 0.077 sec

b) 10% Soil Damping



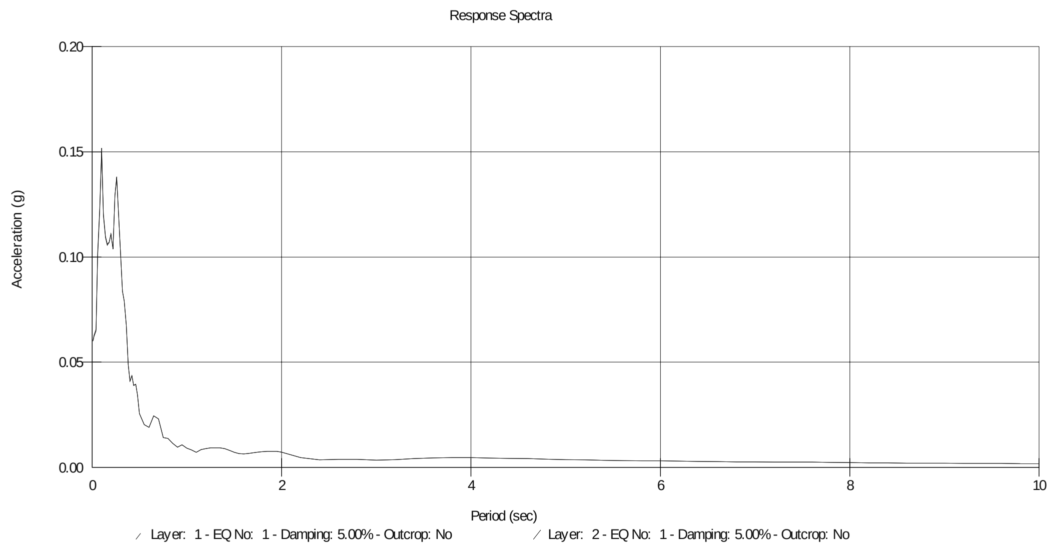
A_{max} = 0.16g at T= 0.077 sec

Input Motion

RAN330.EQ

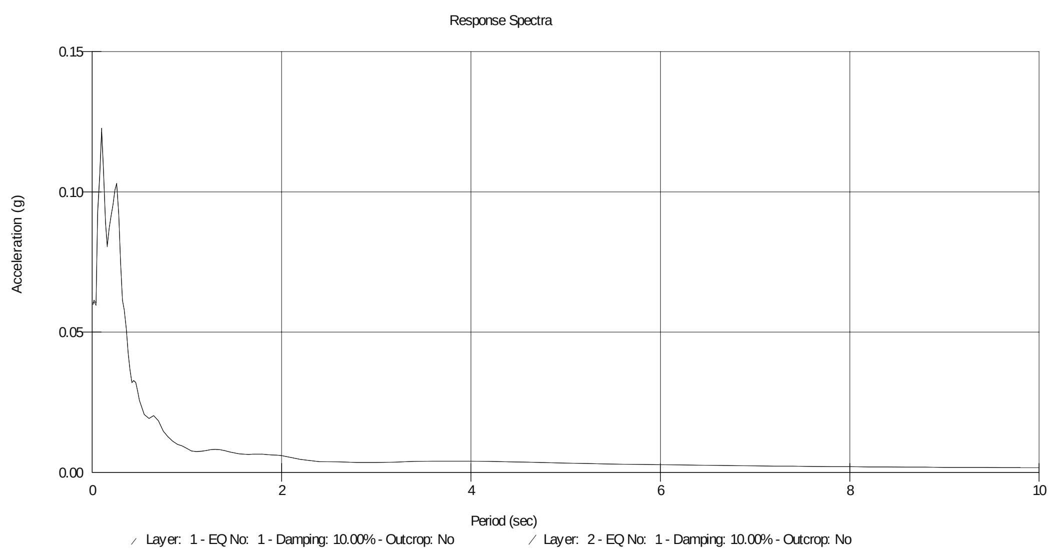
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.11 sec

Soil Profile

Profile Name: D9ACXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 25 m.
Number of Layers: 17

Input Motion

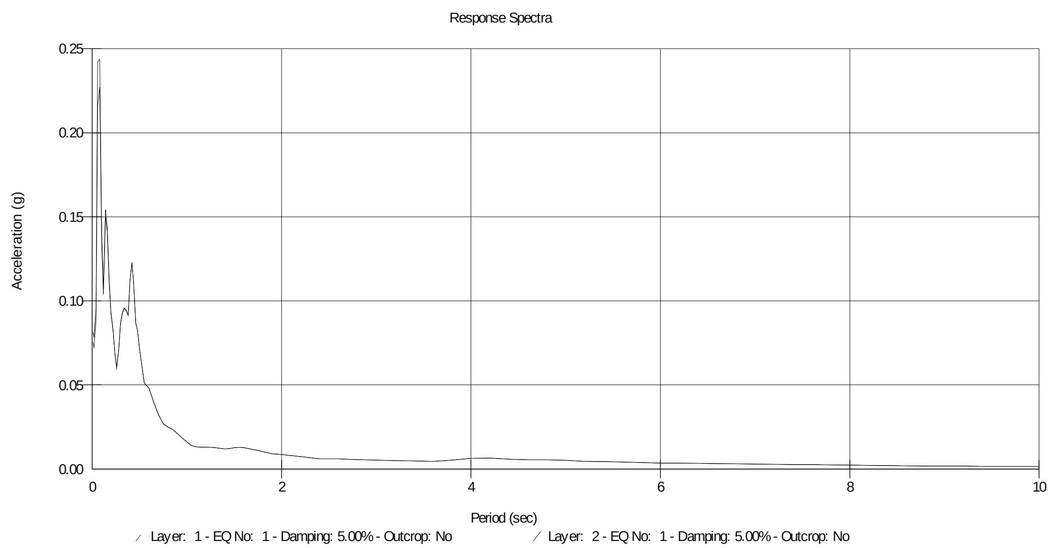
RAN230.EQ

Output Locations

Layers: 1 and 2

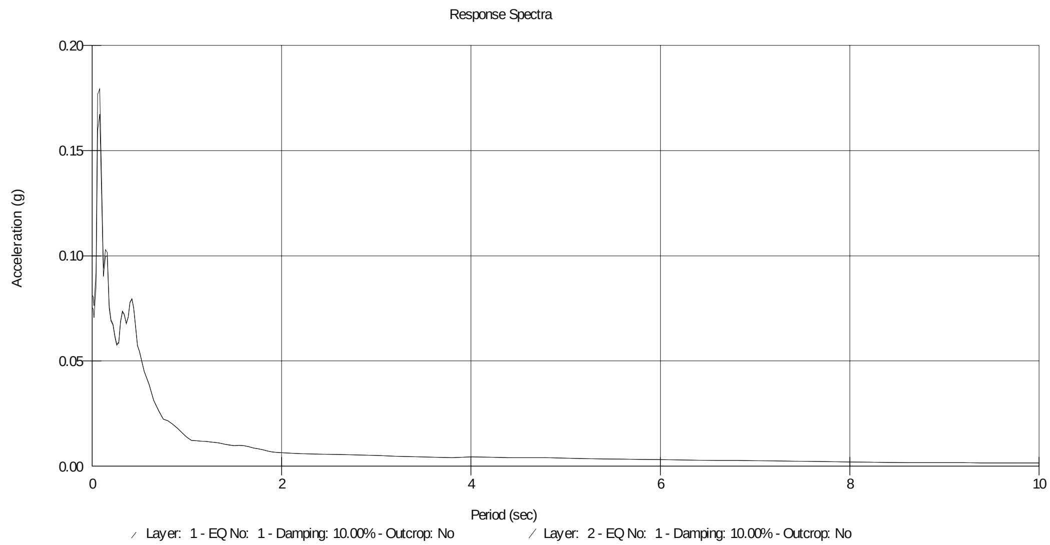
Response Spectra

a) 5% Soil Damping



A_{max} = 0.24g at T= 0.077 sec

b) 10% Soil Damping



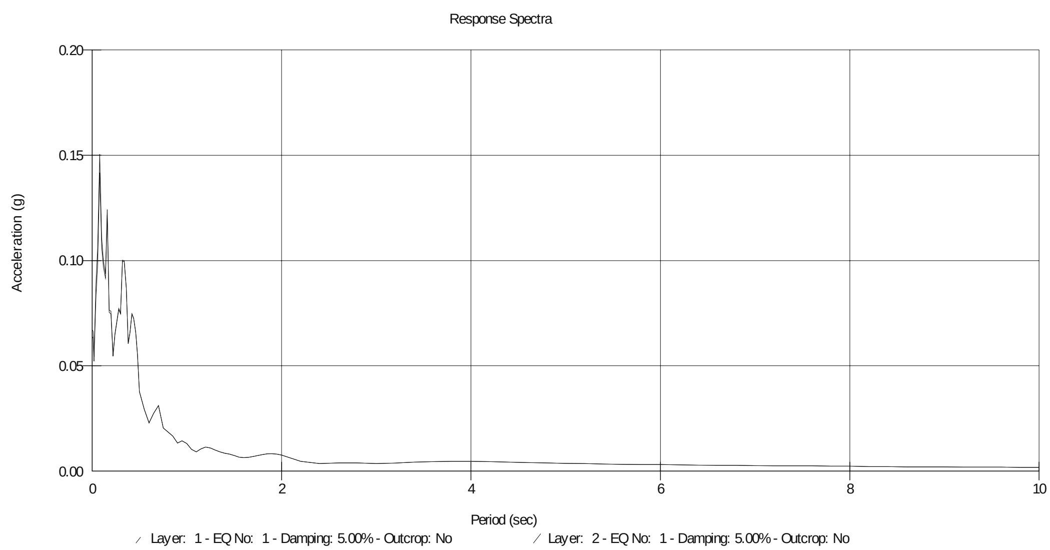
$A_{max} = 0.18g$ at $T = 0.077$ sec

Input Motion

RAN330.EQ

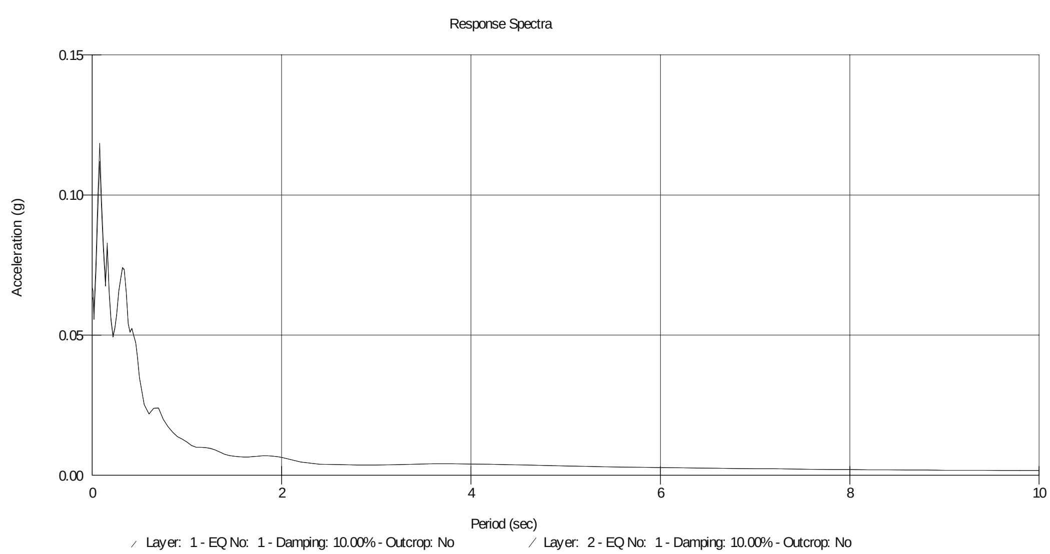
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.077 sec

Soil Profile

Profile Name: D11A(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6m.
Number of Layers: 15

Input Motion

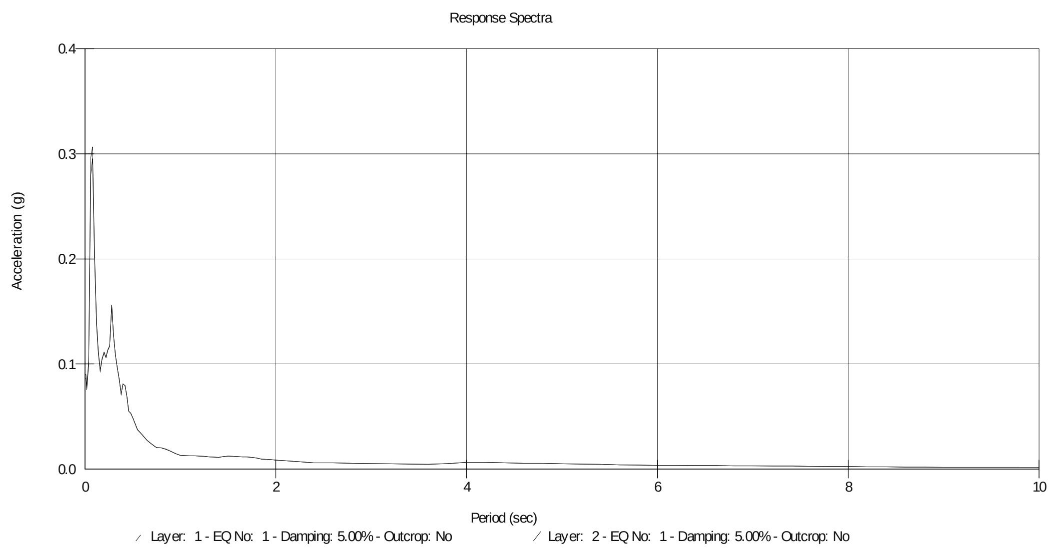
RAN230.EQ

Output Locations

Layers: 1 and 2

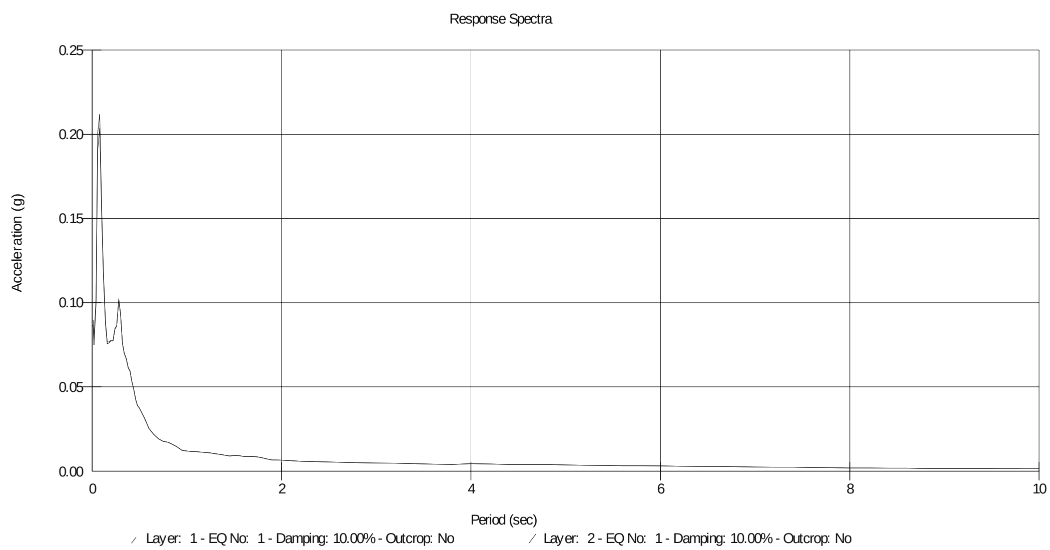
Response Spectra

a) 5% Soil Damping



A_{max} = 0.31g at T= 0.077 sec

b) 10% Soil Damping



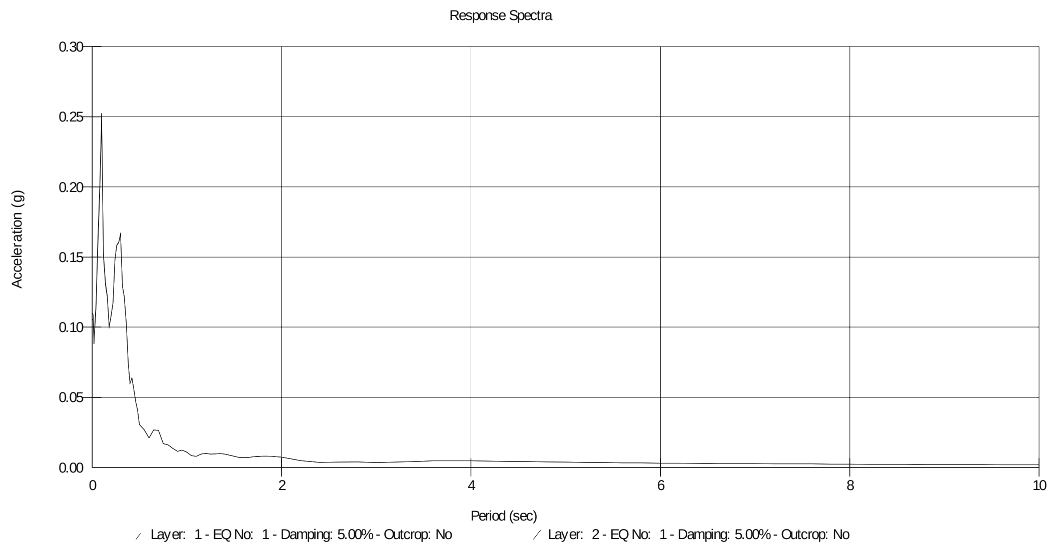
A_{max} = 0.21g at T= 0.077 sec

Input Motion

RAN330.EQ

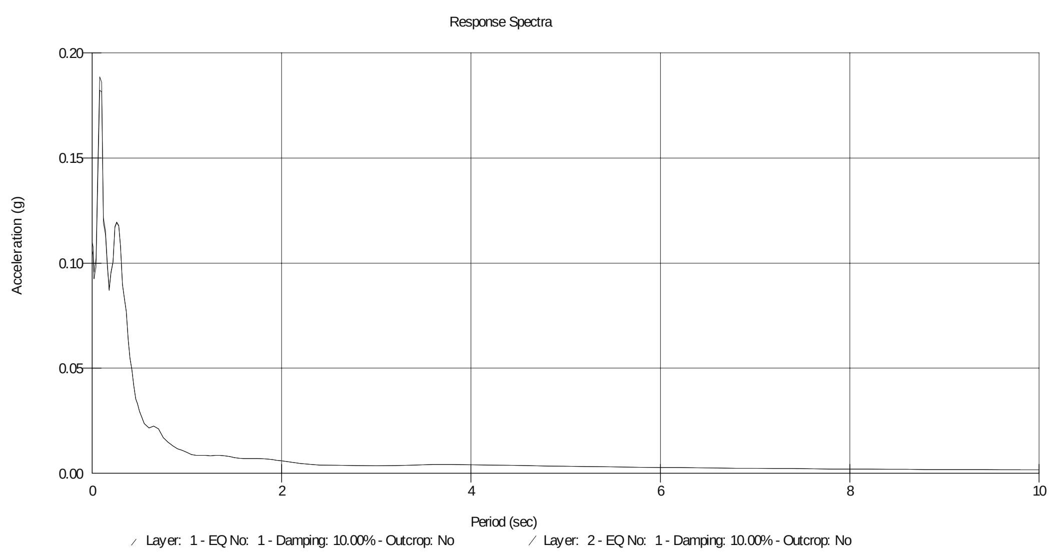
Response Spectra

a) 5% Soil Damping



A_{max} = 0.26g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.19g at T= 0.098 sec

Soil Profile

Profile Name: D11A (CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6 m.
Number of Layers: 24

Input Motion

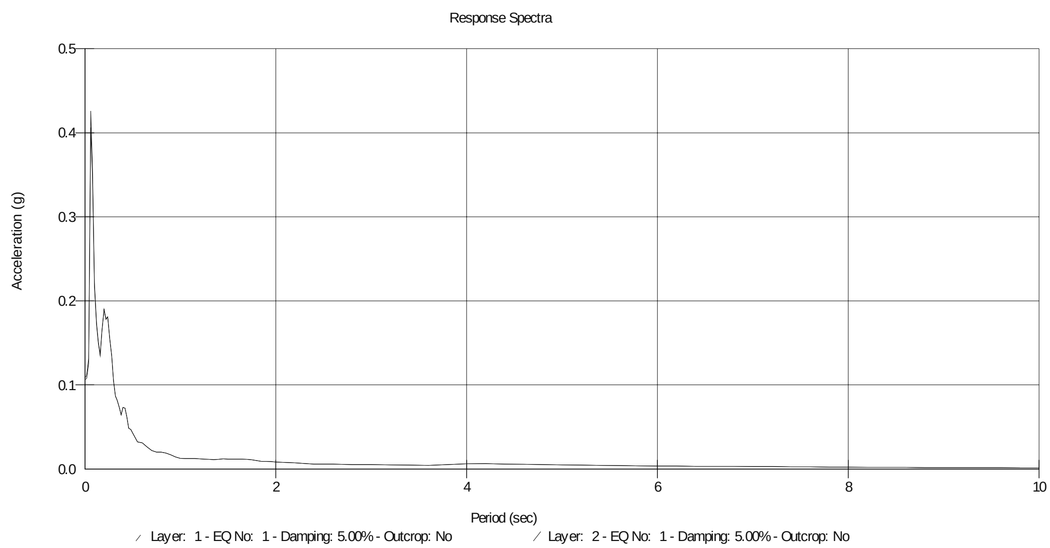
RAN230.EQ

Output Locations

Layers: 1 and 2

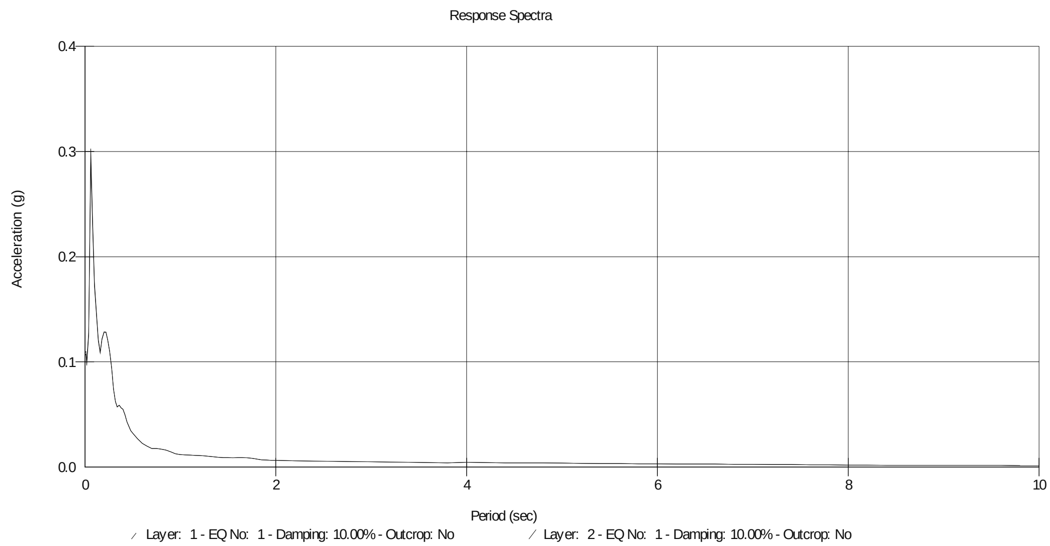
Response Spectra

a) 5% Soil Damping



A_{max} = 0.43g at T= 0.064 sec

b) 10% Soil Damping



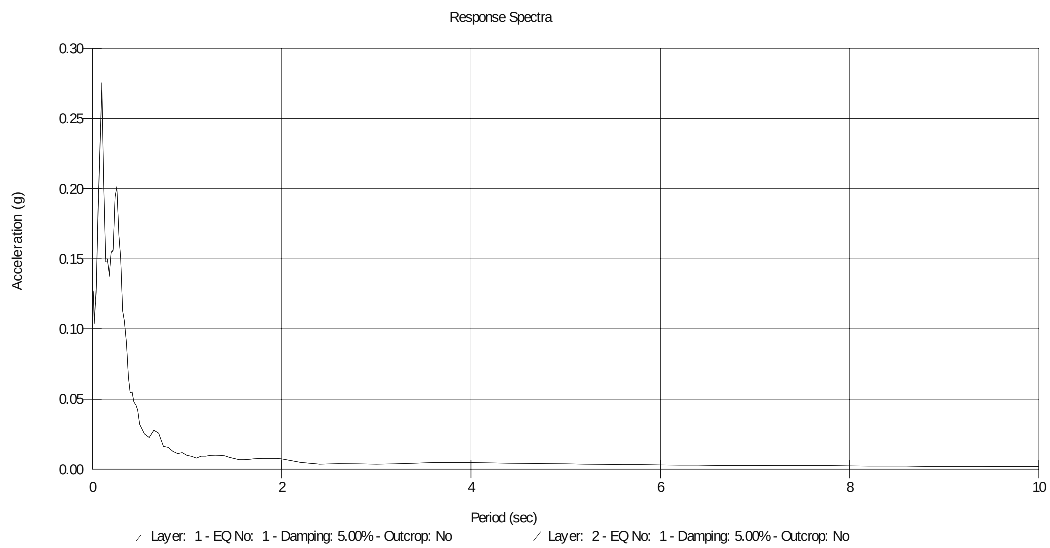
A_{max} = 0.31g at T= 0.064 sec

Input Motion

RAN330.EQ

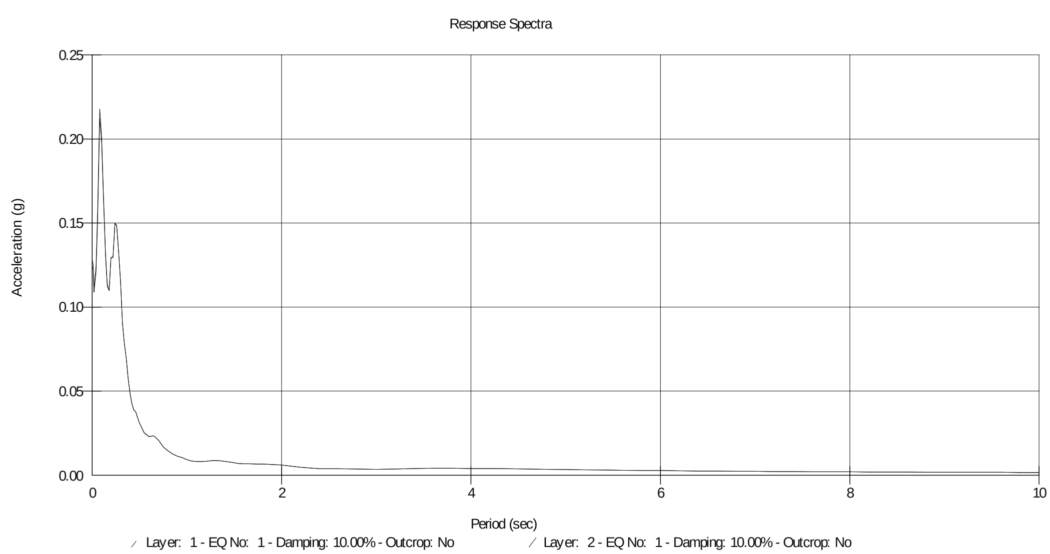
Response Spectra

a) 5% Soil Damping



A_{max} = 0.28g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.22g at T= 0.077 sec

Soil Profile

Profile Name: D12A(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 9

Input Motion

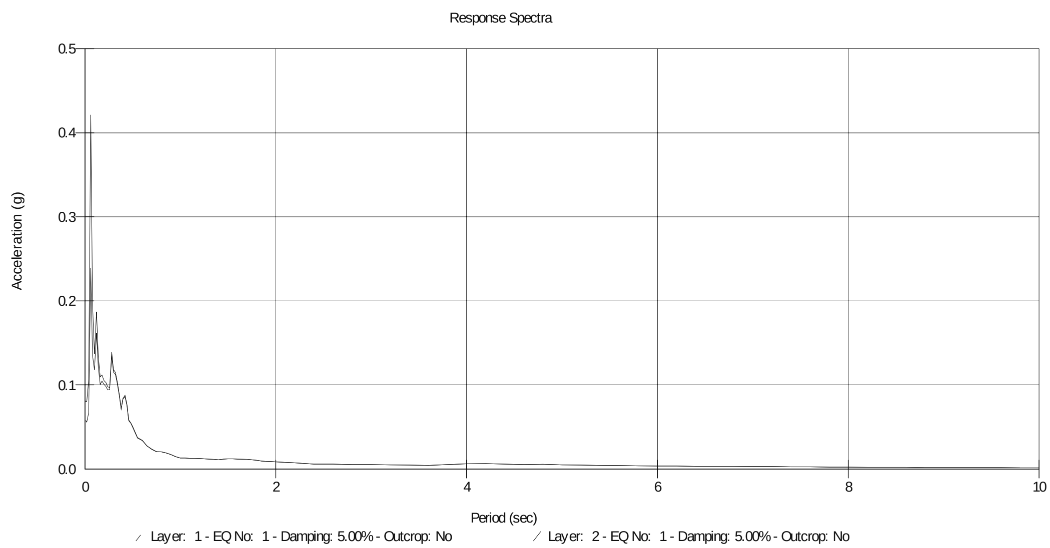
RAN230.EQ

Output Locations

Layers: 1 and 2

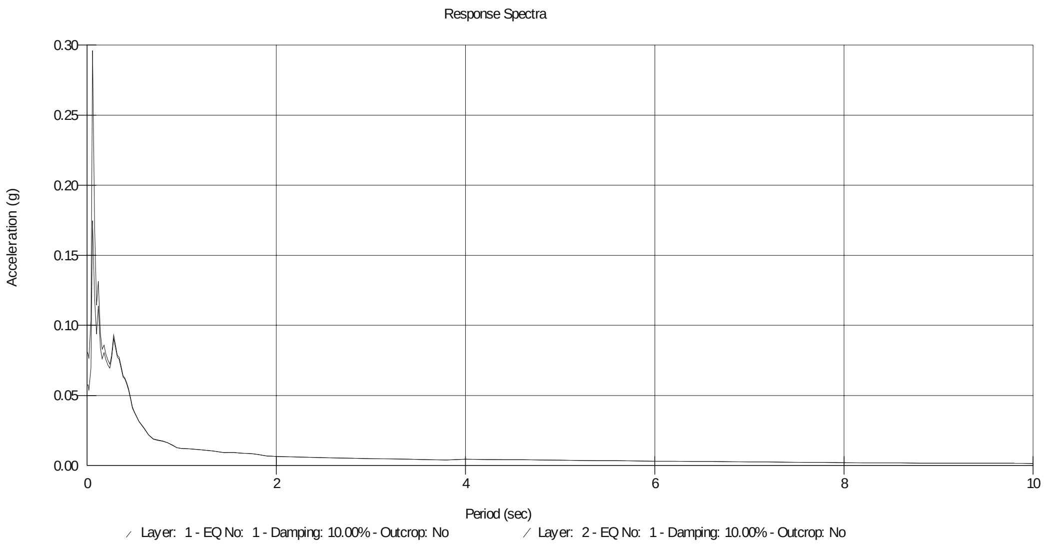
Response Spectra

a) 5% Soil Damping



A_{max} = 0.43g at T= 0.064 sec

b) 10% Soil Damping



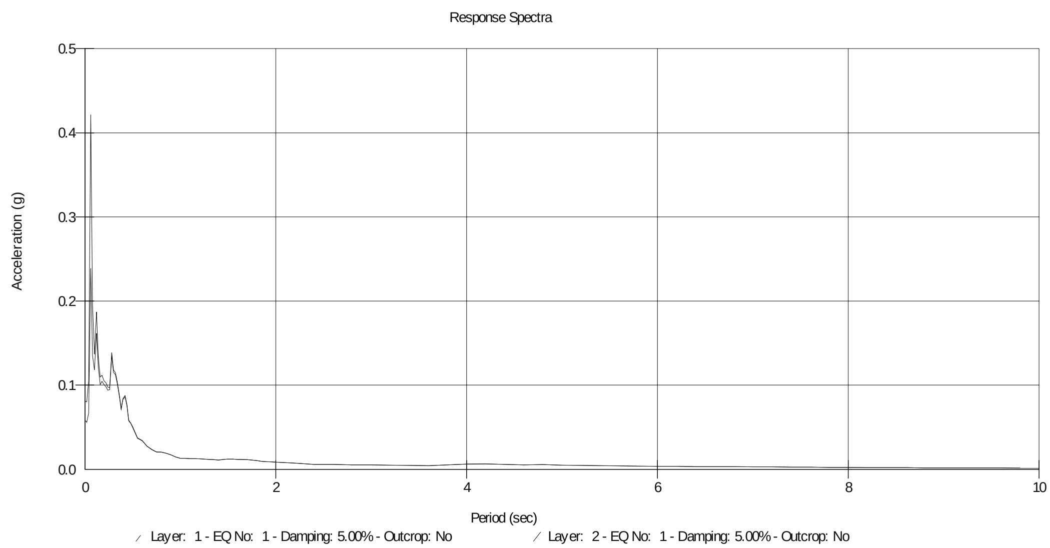
$A_{max} = 0.29g$ at $T = 0.054$ sec

<u>Input Motion</u>

RAN330.EQ

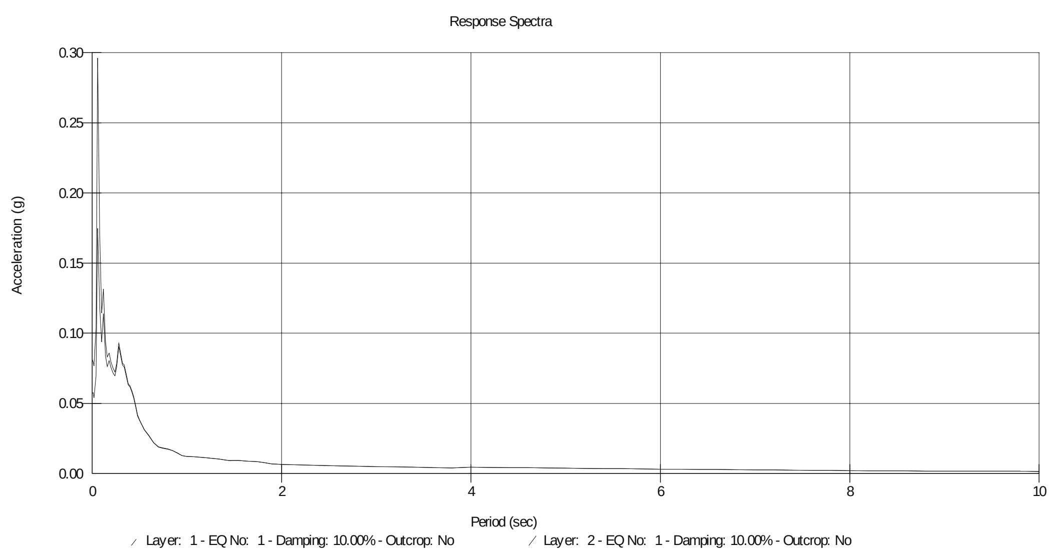
<u>Response Spectra</u>

a) 5% Soil Damping



A_{max} = 0.42g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.30g at T= 0.054 sec

Soil Profile

Profile Name: D12A(CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 21

Input Motion

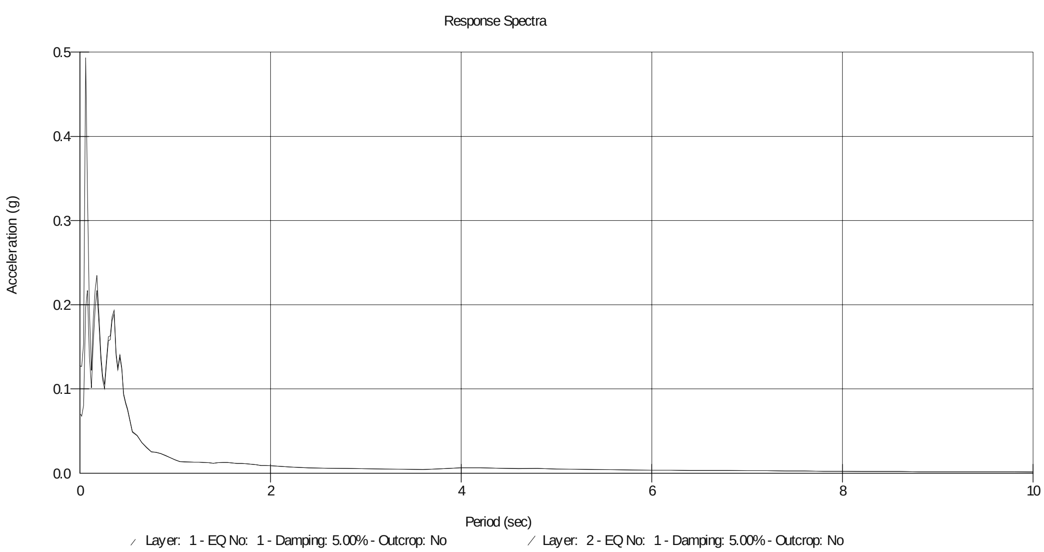
RAN230.EQ

Output Locations

Layers: 1 and 2

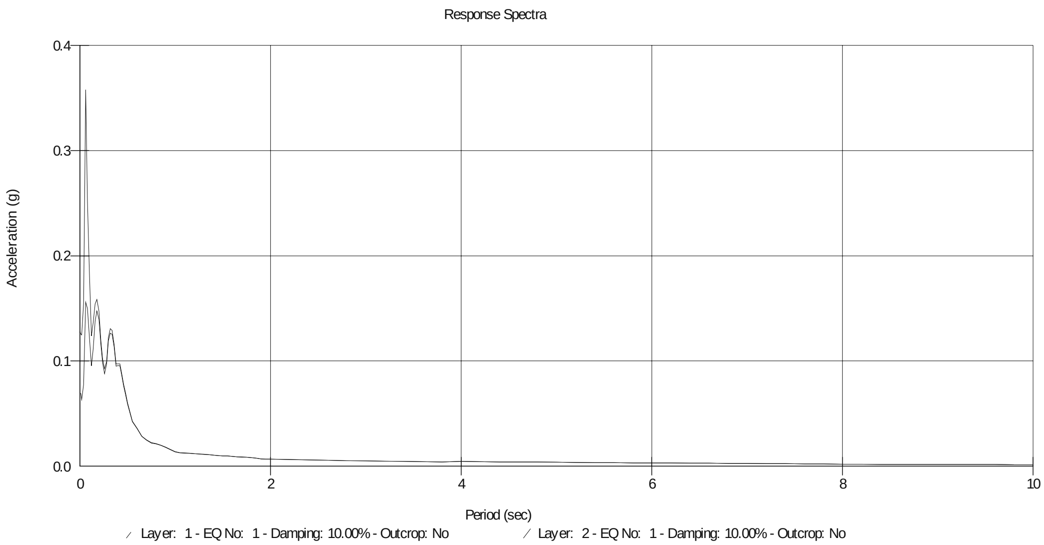
Response Spectra

a) 5% Soil Damping



A_{max} = 0.50g at T= 0.077 sec

b) 10% Soil Damping



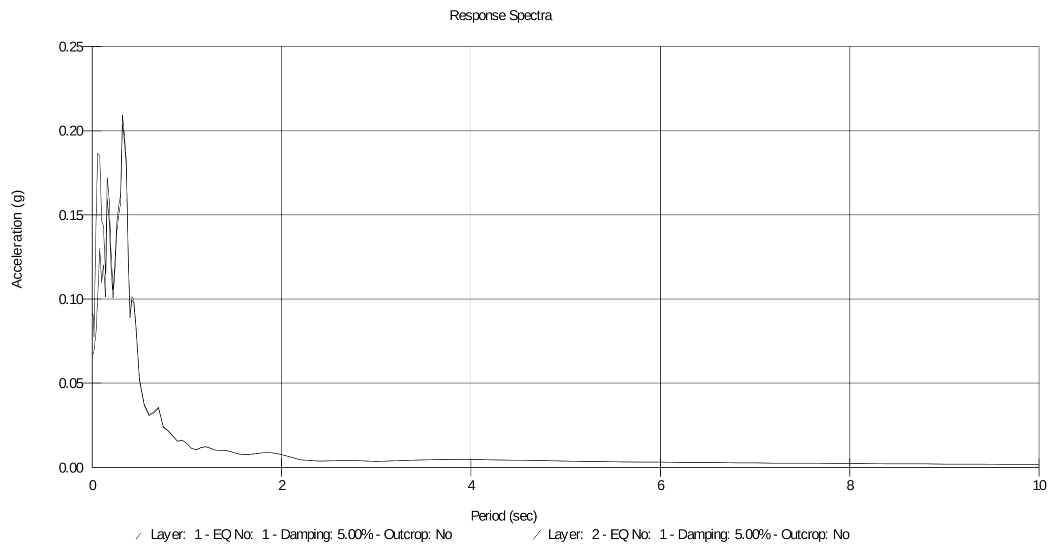
A_{max} = 0.36g at T= 0.064 sec

Input Motion

RAN330.EQ

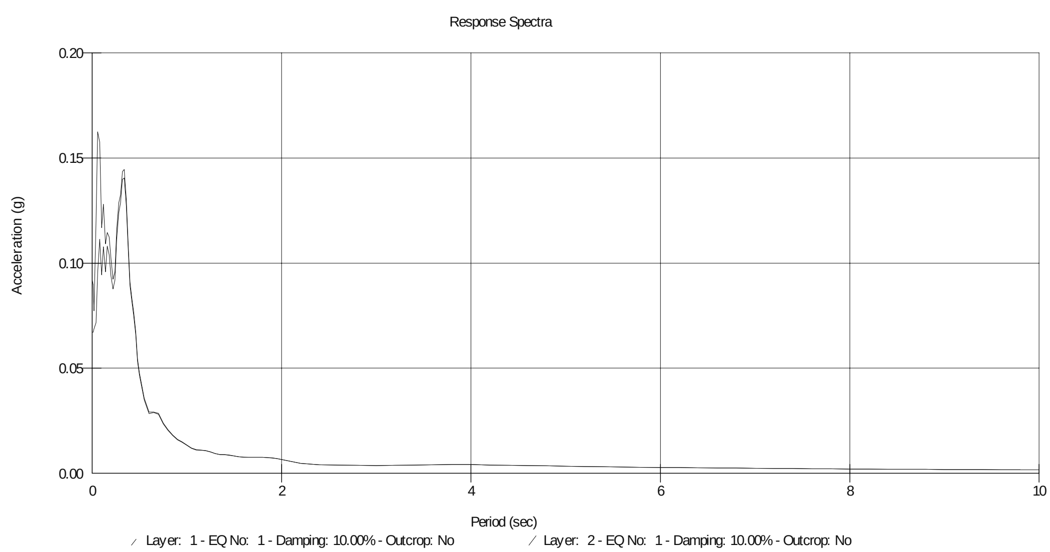
Response Spectra

a) 5% Soil Damping



A_{max} = 0.21g at T= 0.33 sec

b) 10% Soil Damping



A_{max} = 0.16g at T= 0.064 sec

ProShake Report (B)

Bedrock at (T_B =100m) depth

Soil Profile

Profile Name: D1BCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 8 m.
Number of Layers: 32

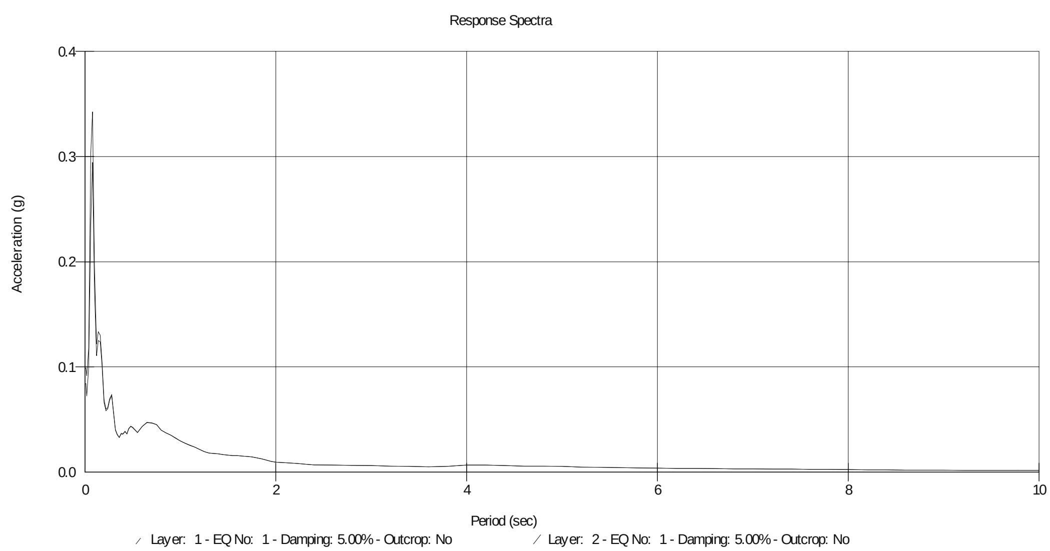
Input Motion

RAN230.EQ

Output Locations

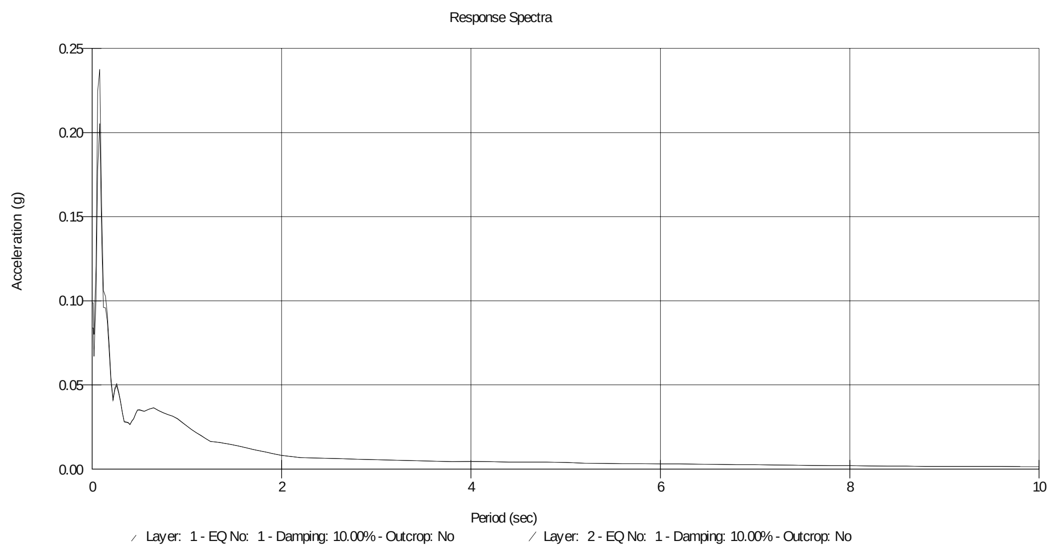
Layers: 1 and 2
Response Spectra

a) 5% Soil Damping



A_{max} = 0.35 g at T= 0.077 sec.

b) 10% Soil Damping



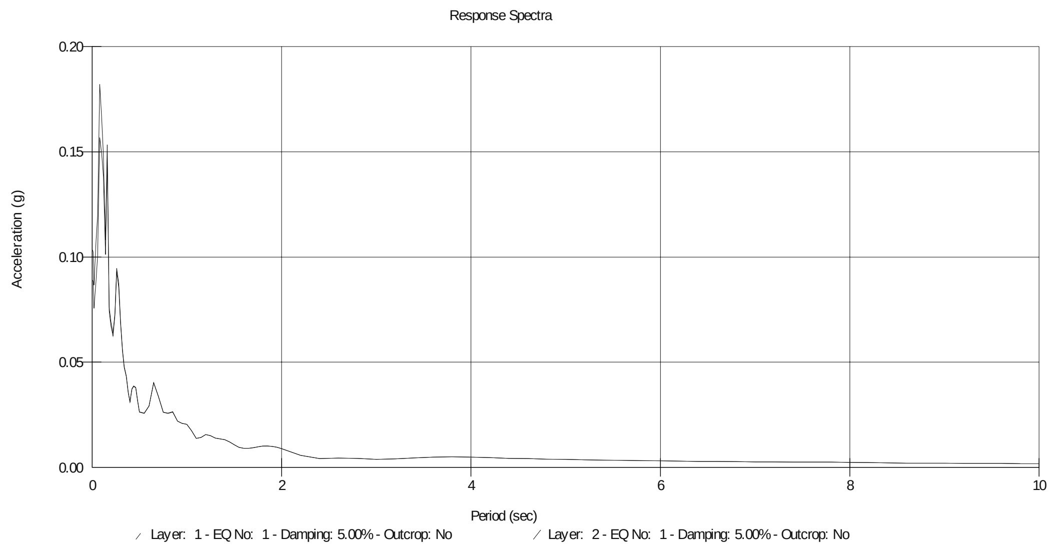
A_{max} =0.24g at T= 0.077 sec.

Input Motion

RAN330.EQ

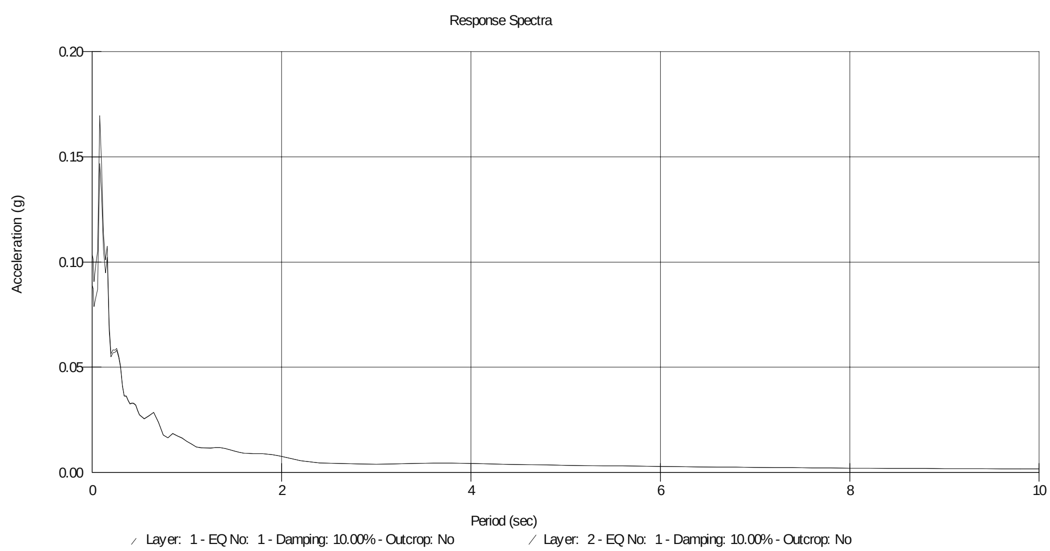
Response Spectra)

a) 5% Soil Damping



$A_{max} = 0.18g$ at $T = 0.088$ sec.

b) 10% Soil Damping



$A_{max} = 0.17g$ at $T = 0.077$ sec.

Soil Profile

Profile Name: D2BCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 28 m.
Number of Layers: 28

Input Motion

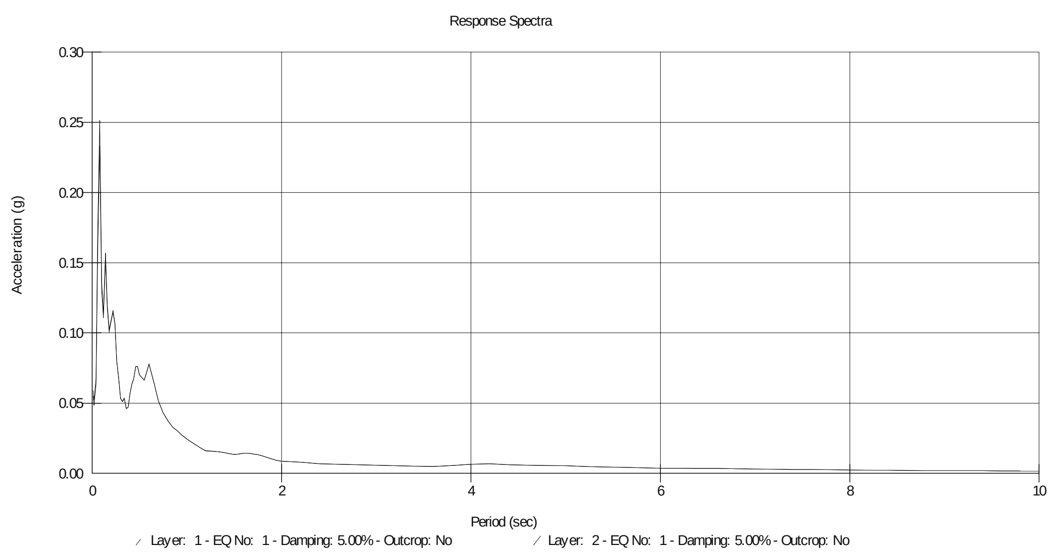
RAN230.EQ

Output Locations

Layers: 1 and 2

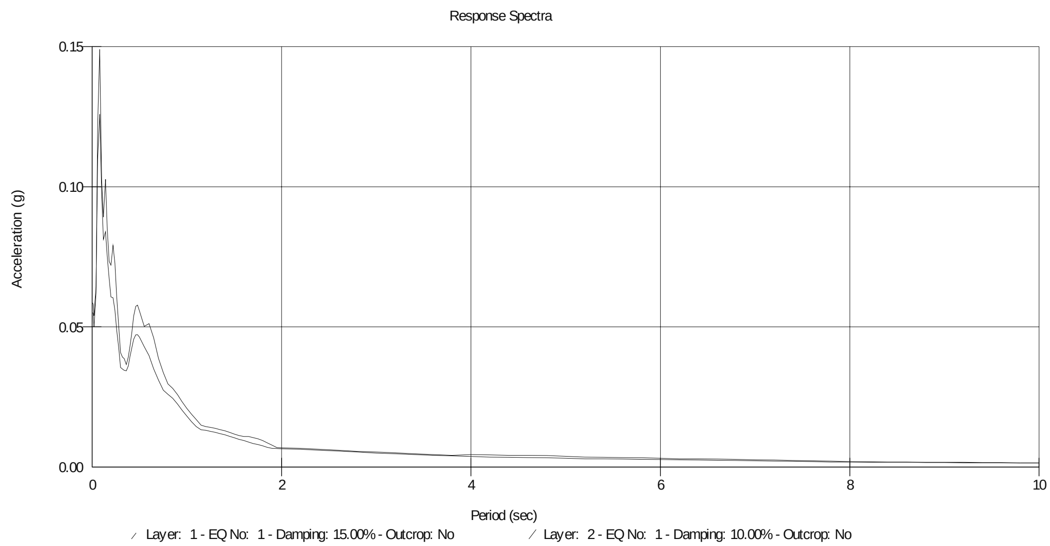
Response Spectra

a) 5% Soil Damping



A_{max} = 0.25g at T= 0.077 sec

b) 10% Soil Damping



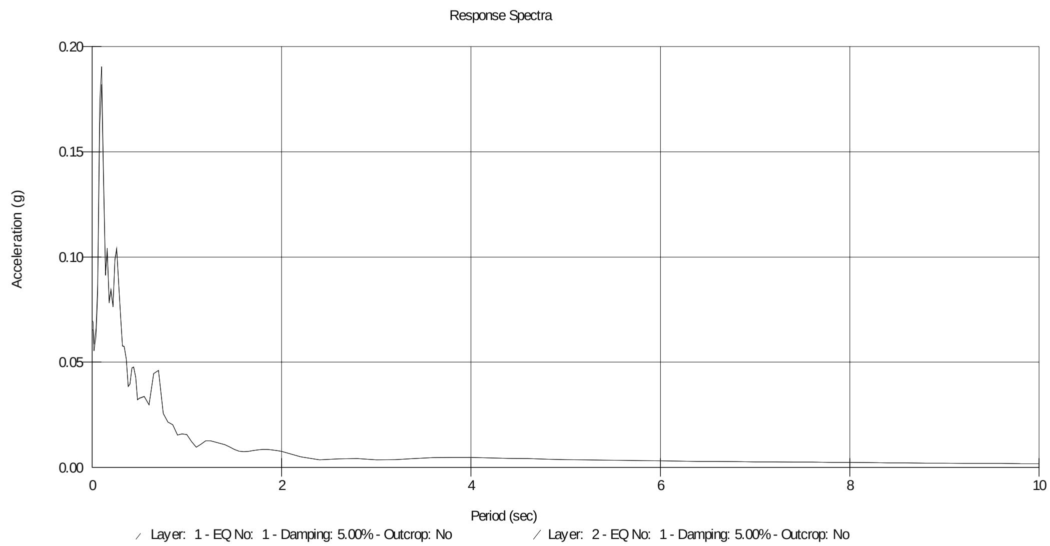
A_{max} = 0.15g at T= 0.077 sec

Input Motion

RAN330.EQ

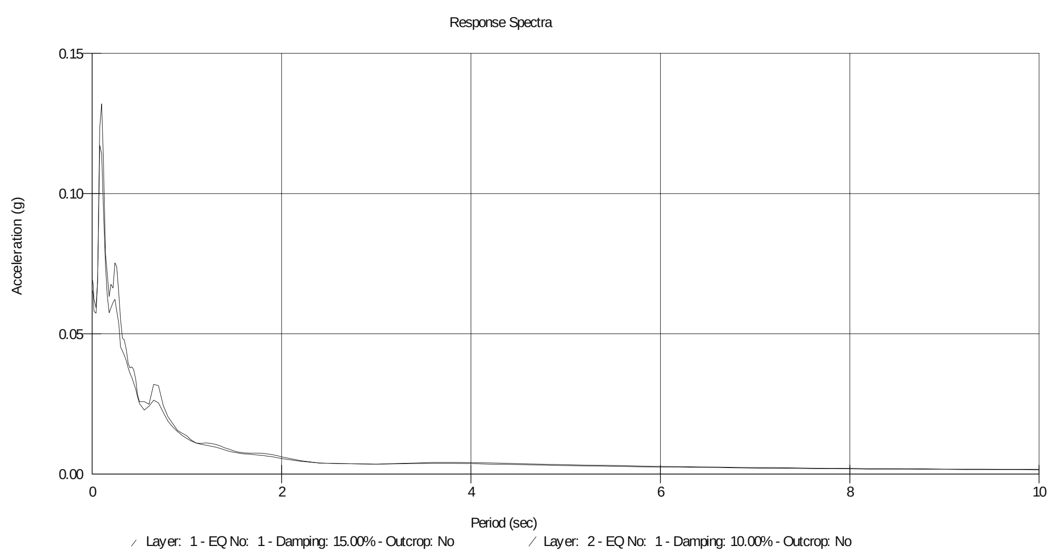
Response Spectra

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.13g at T= 0.098 sec

Soil Profile

Profile Name: D3BCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 29 m.
Number of Layers: 38

Input Motion

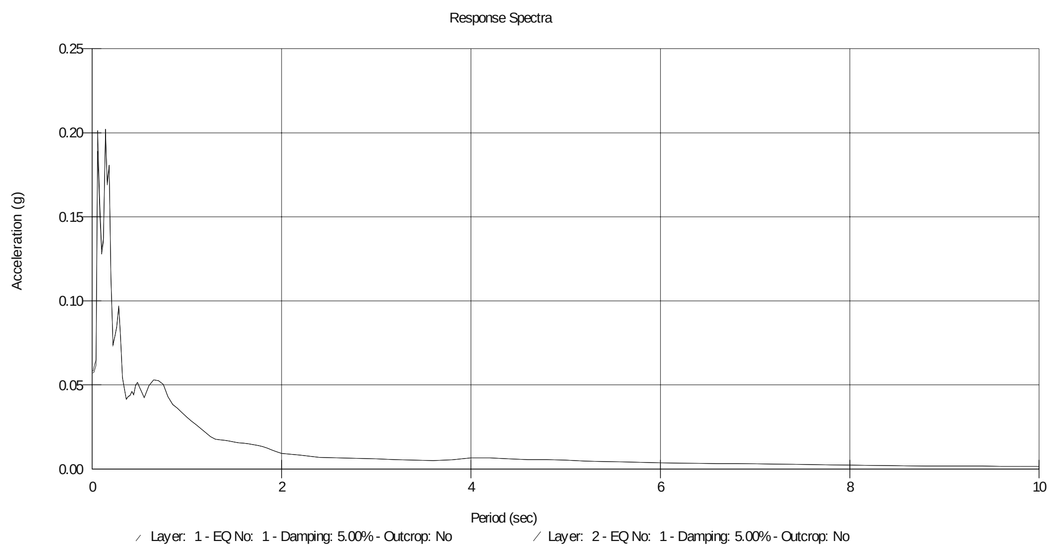
RAN230.EQ

Output Locations

Layers: 1 and 2

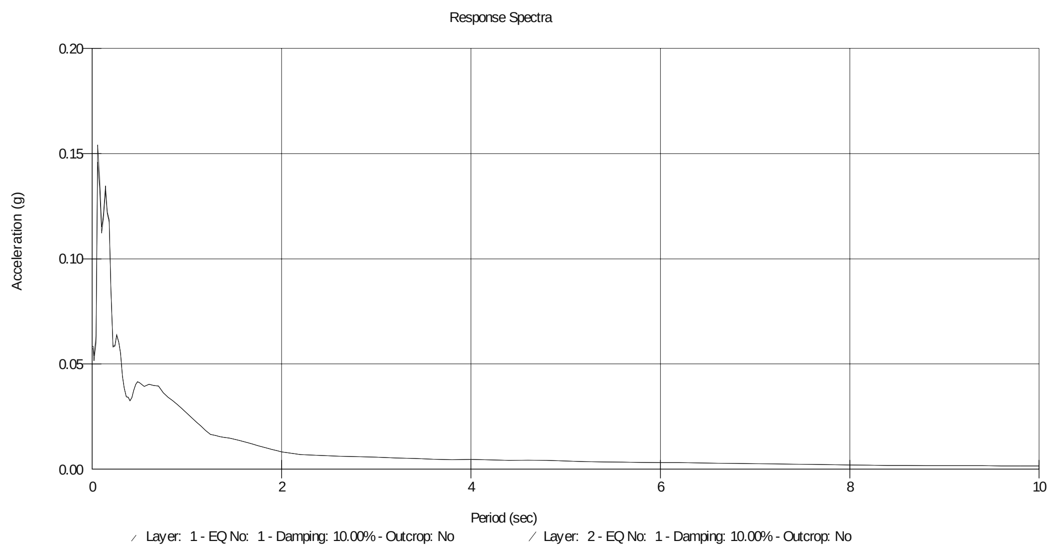
Response Spectra

a) 5% Soil Damping



A_{max} = 0.20g at T= 0.14 sec

b) 10% Soil Damping



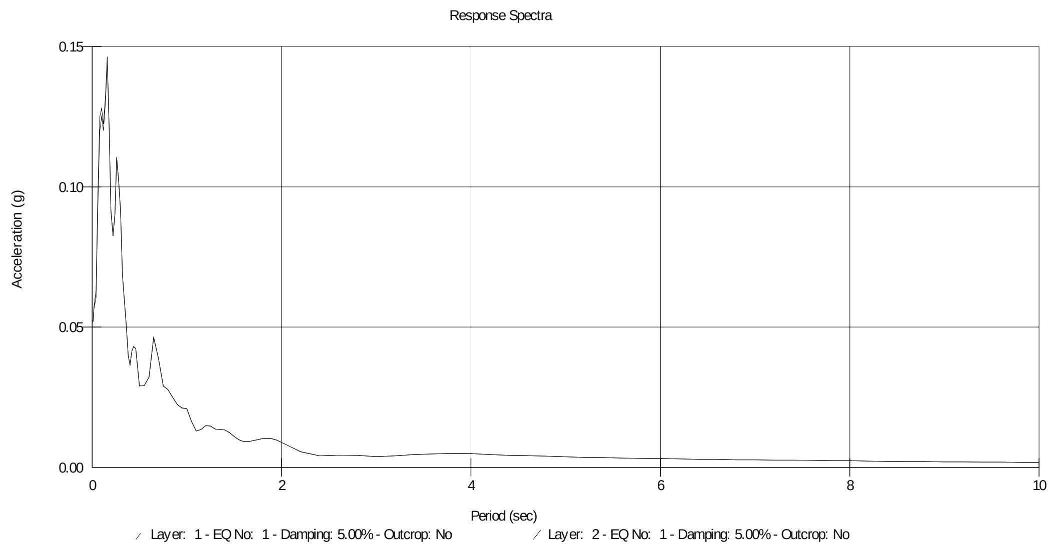
A_{max} = 0.16g at T= 0.054 sec

Input Motion

RAN330.EQ

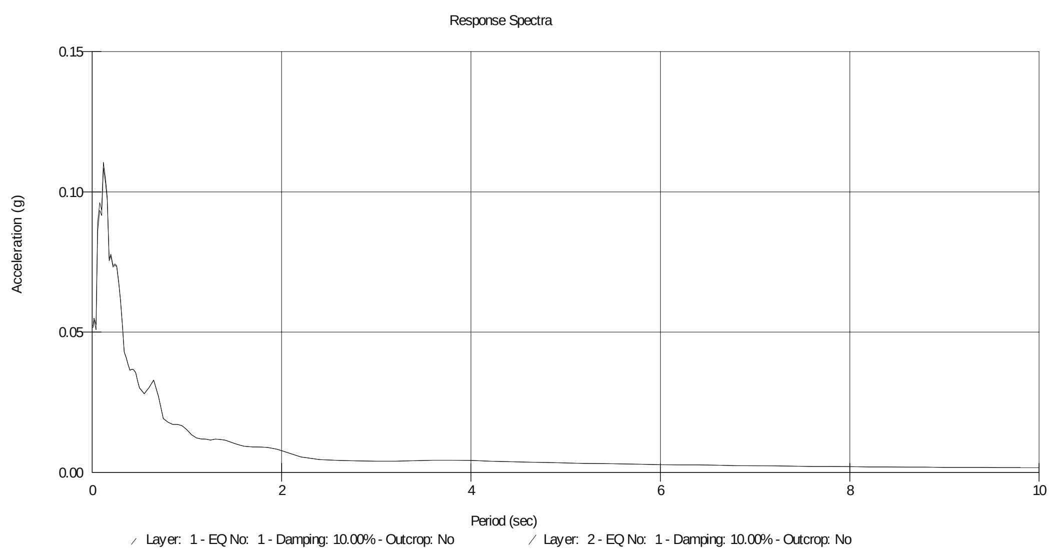
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.16 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.12 sec

Soil Profile

Profile Name: D4BCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 2.5 m.
Number of Layers: 52

Input Motion

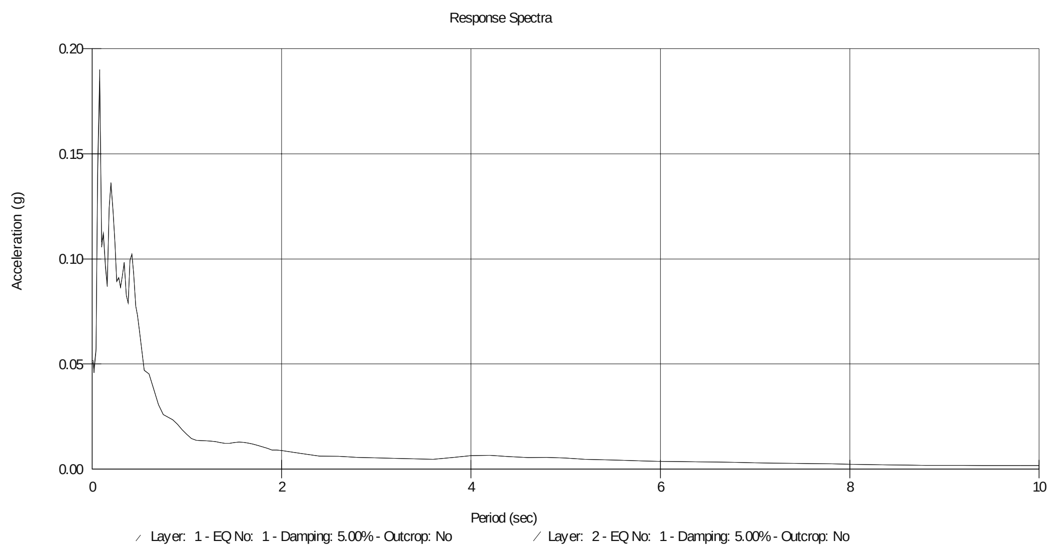
RAN230.EQ

Output Locations

Layers: 1 and 2

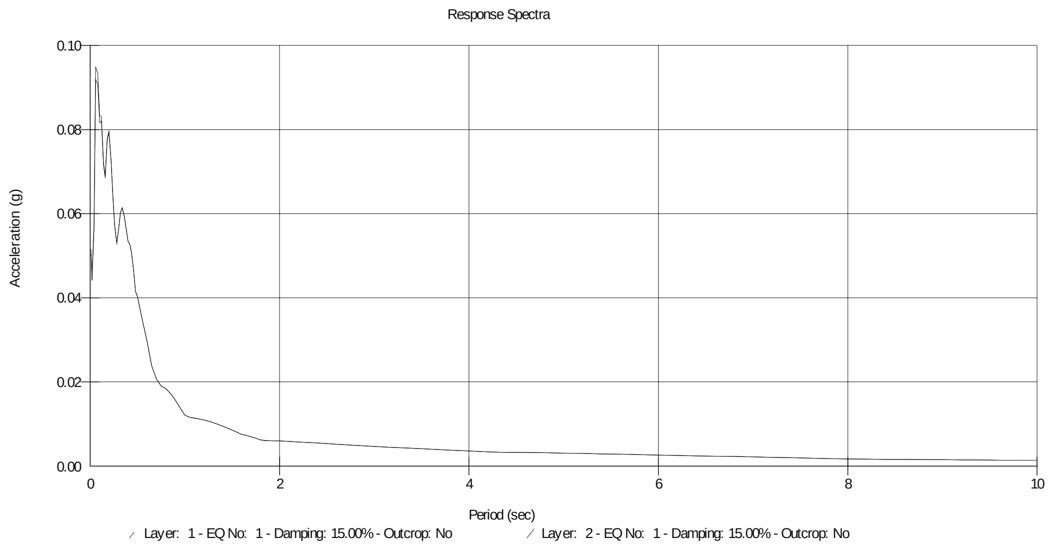
Response Spectra

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.077 sec

b) 10% Soil Damping



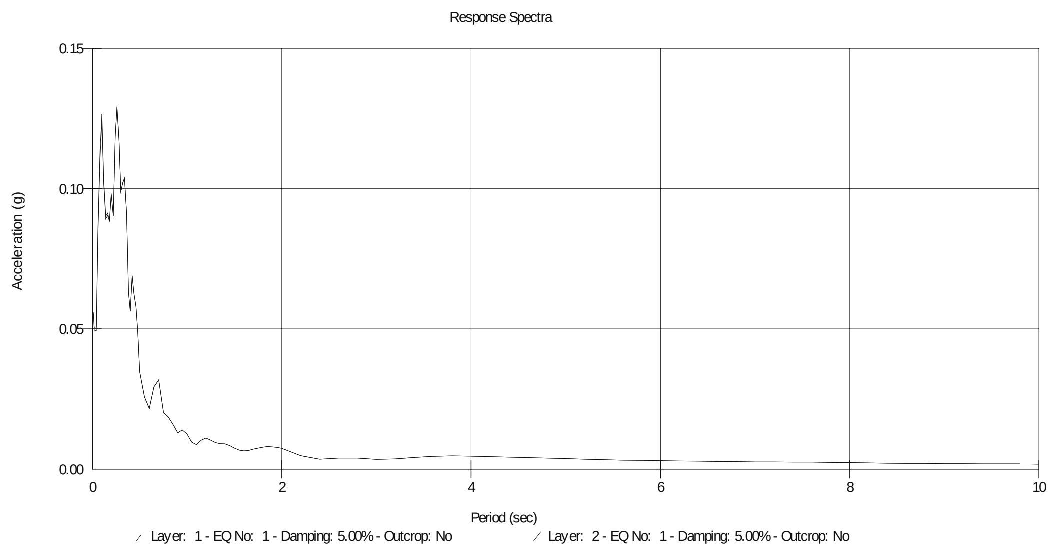
A_{max} = 0.095g at T= 0.064 sec

Input Motion

RAN330.EQ

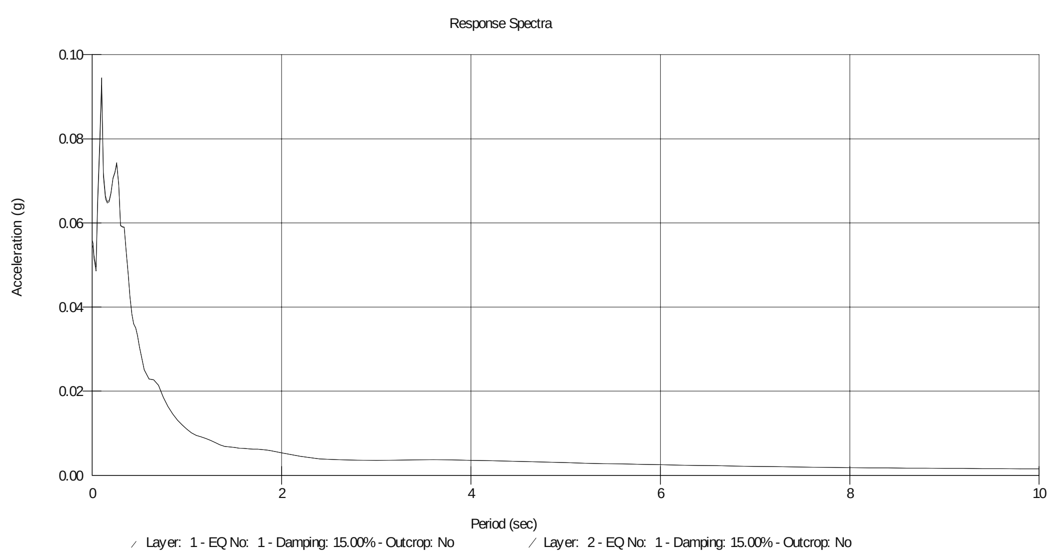
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.26 sec

b) 10% Soil Damping



A_{max} = 0.098g at T= 0.095 sec

Soil Profile

Profile Name: (D5A)B(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 30

Input Motion

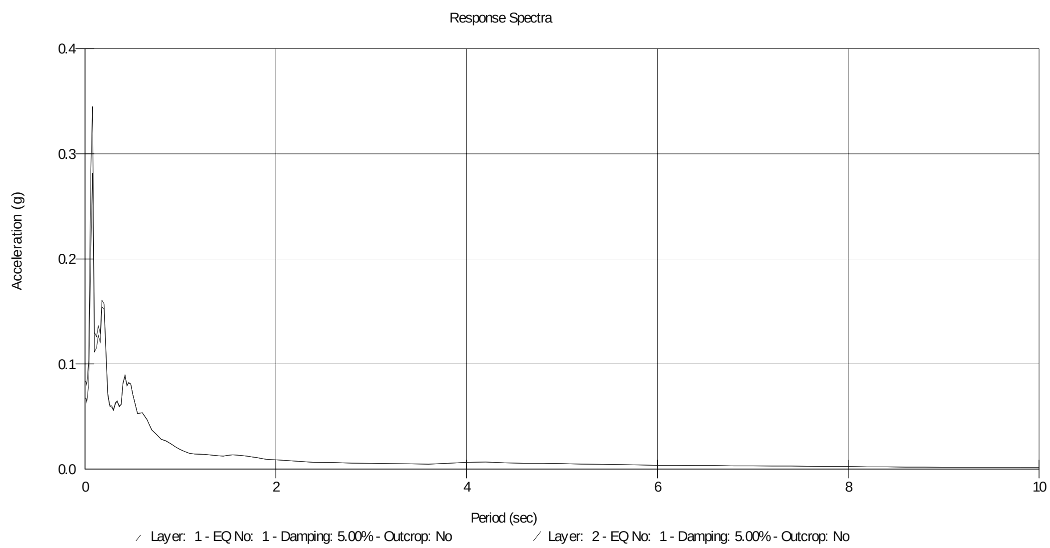
RAN230.EQ

Output Locations

Layers: 1 and 2

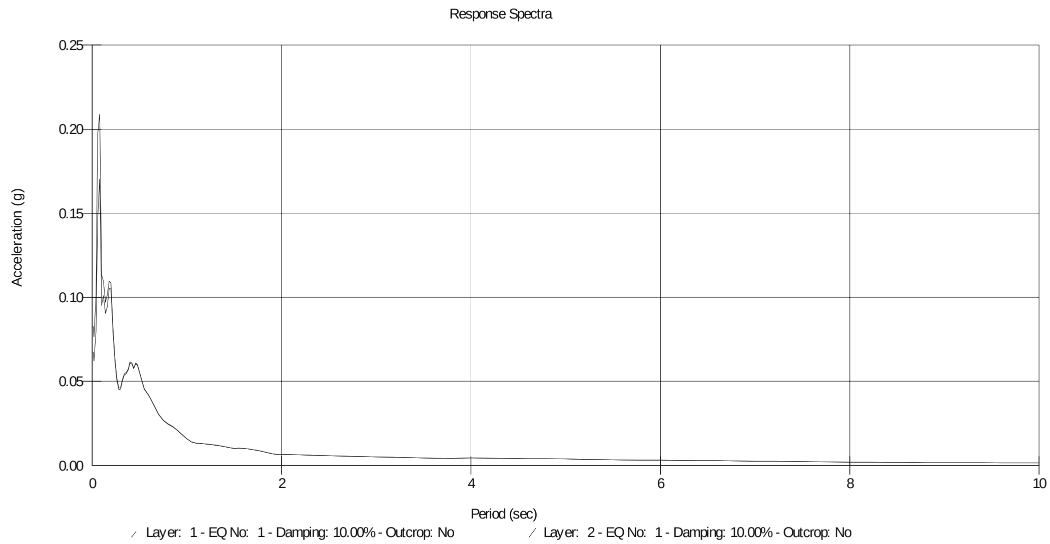
Response Spectra

a) 5% Soil Damping



A_{max} = 0.34g at T= 0.077 sec

b) 10% Soil Damping



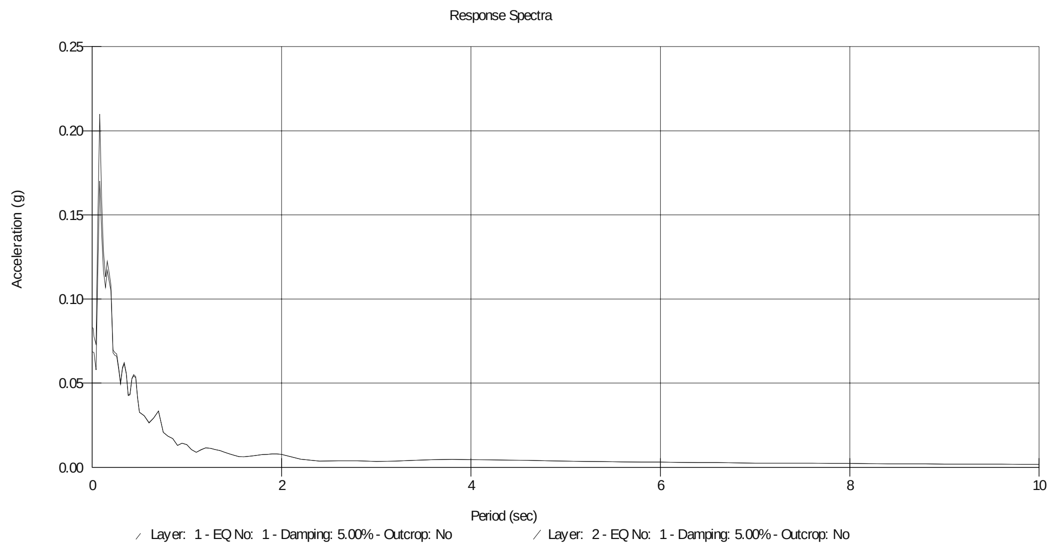
A_{max} = 0.21 at T= 0.077 sec

Input Motion

RAN330.EQ

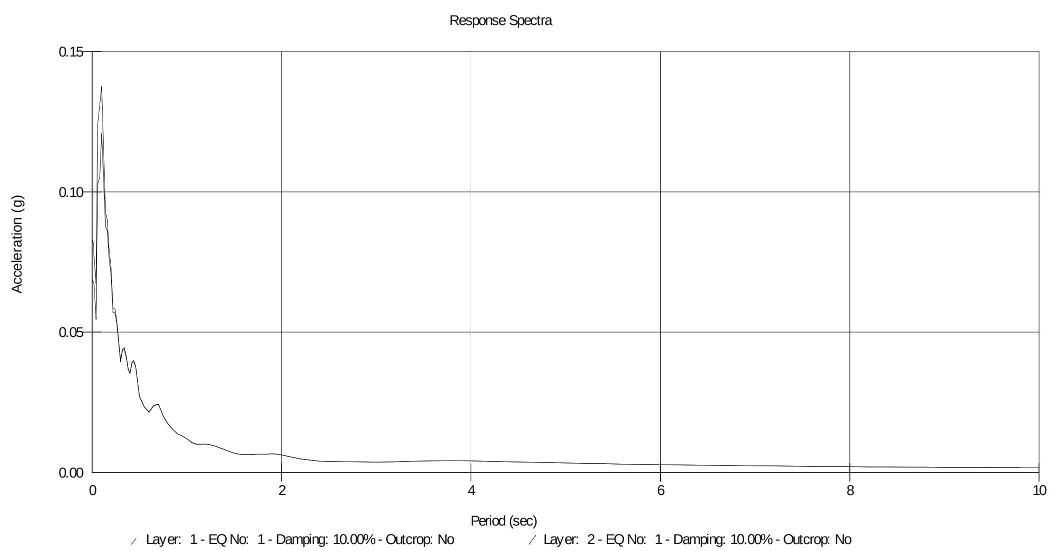
Response Spectra

a) 5% Soil Damping



A_{max} = 0.21g at T= 0.088 sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.098 sec

Soil Profile

Profile Name: D5B2(CXW)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 32

Input Motion

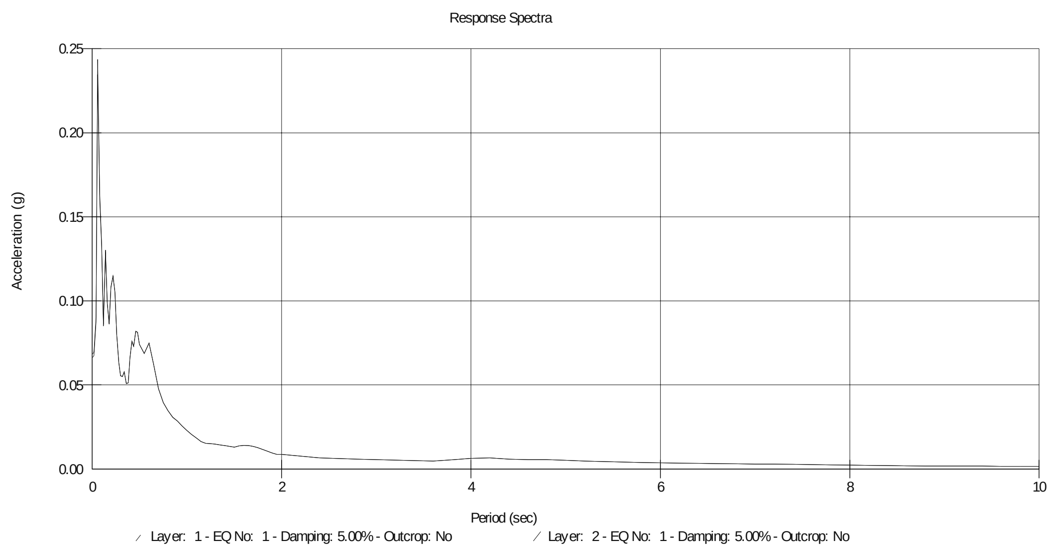
RAN230.EQ

Output Locations

Layers: 1 and 2

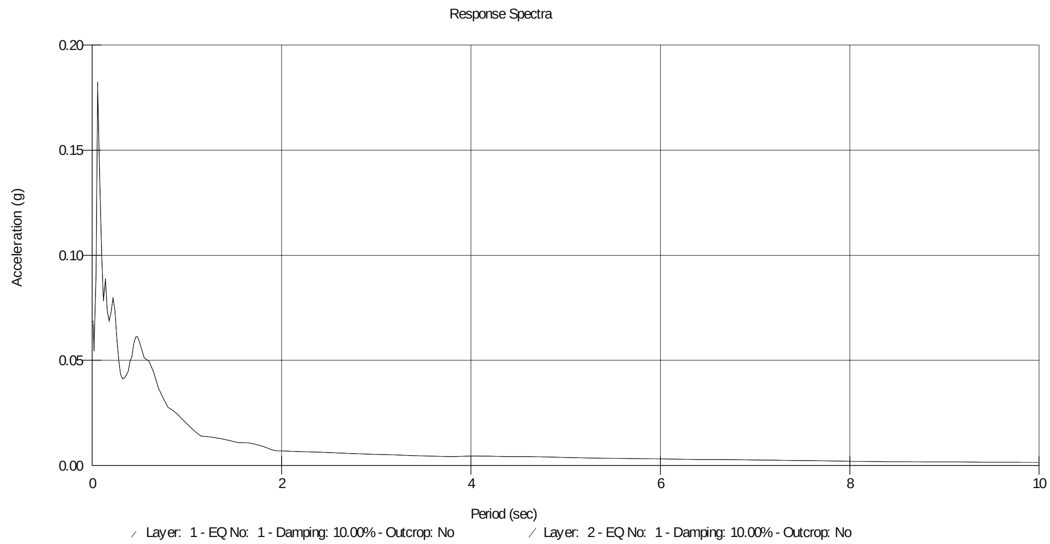
Response Spectra

a) 5% Soil Damping



A_{max} = 0.24g at T= 0.054 sec

b) 10% Soil Damping



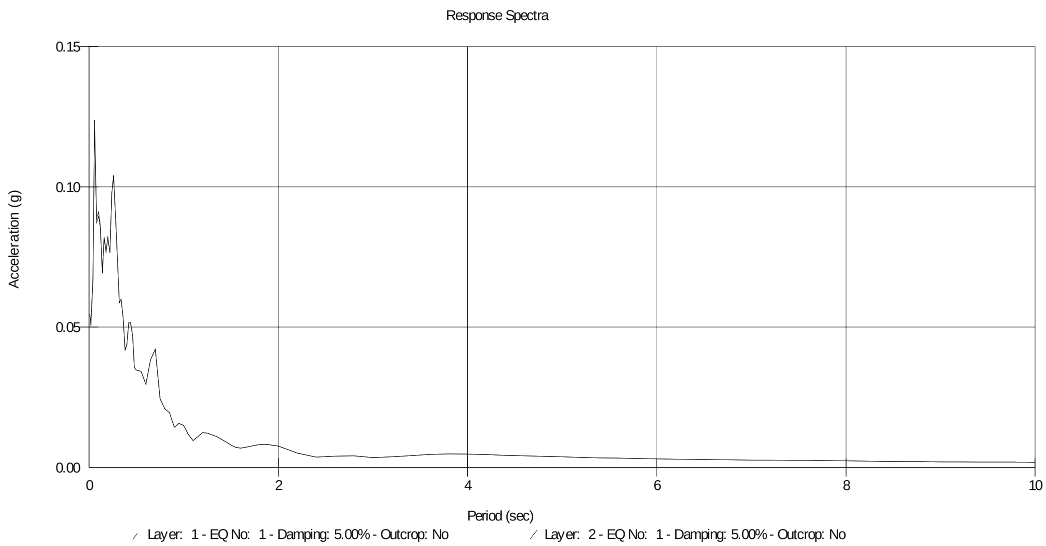
A_{max} = 0.19g at T= 0.054 sec

Input Motion

RAN330.EQ

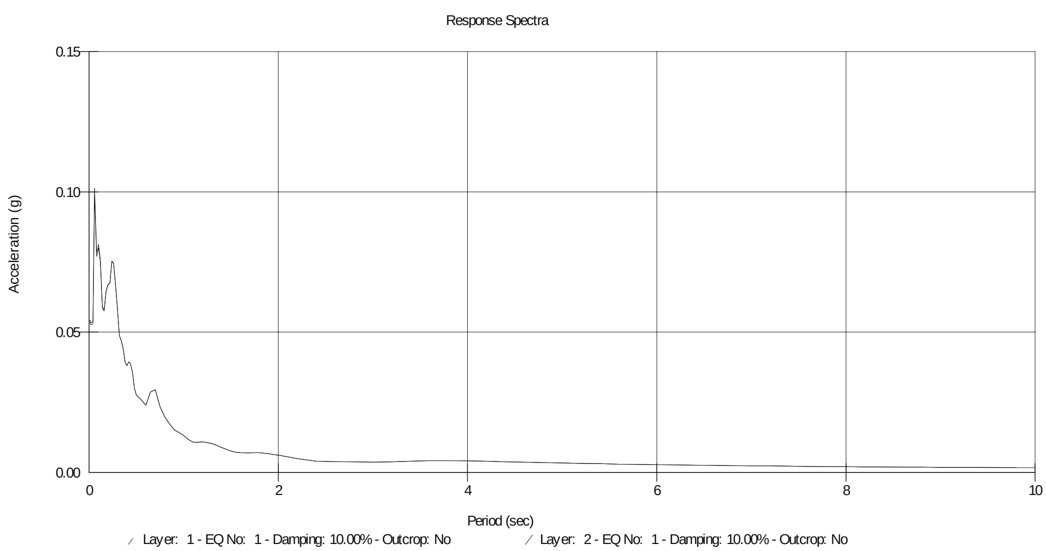
Response Spectra

a) 5% Soil Damping



A_{max} = 0.12g at T= 0.045 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.054 sec

Soil Profile

Profile Name: D5BCHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 38

Input Motion

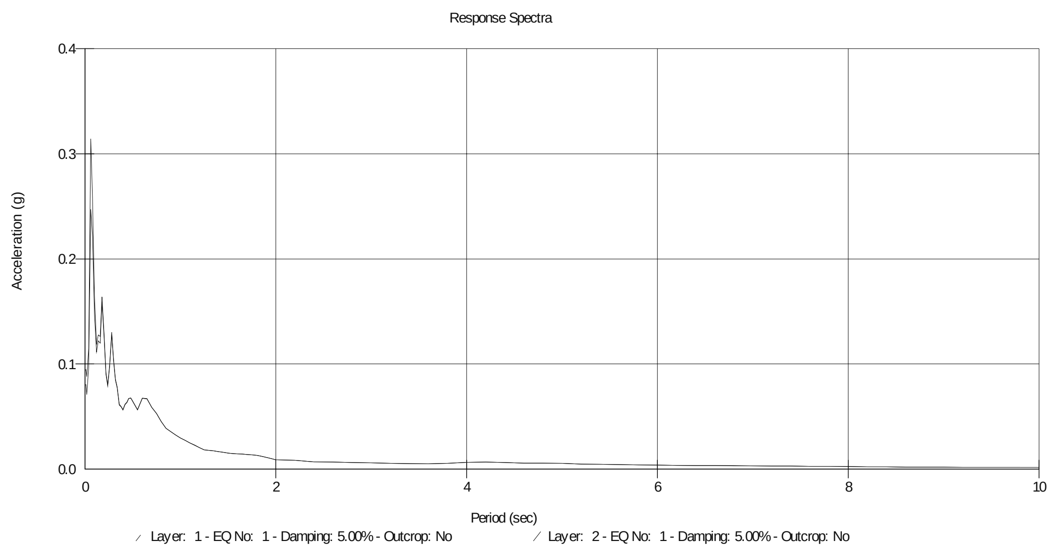
RAN230.EQ

Output Locations

Layers: 1 and 2

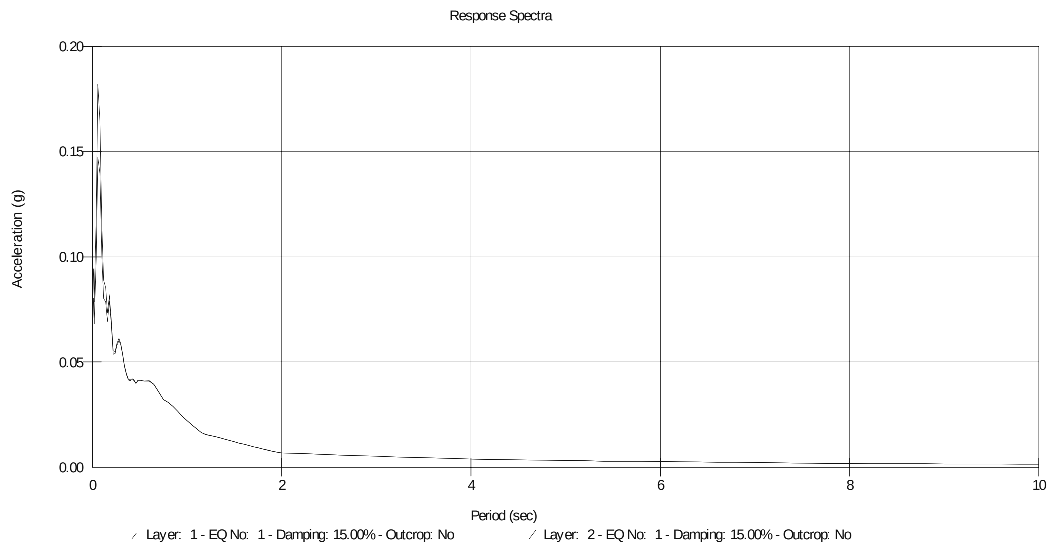
Response Spectra

a) 5% Soil Damping



A_{max} = 0.32g at T= 0.064 sec

b) 10% Soil Damping



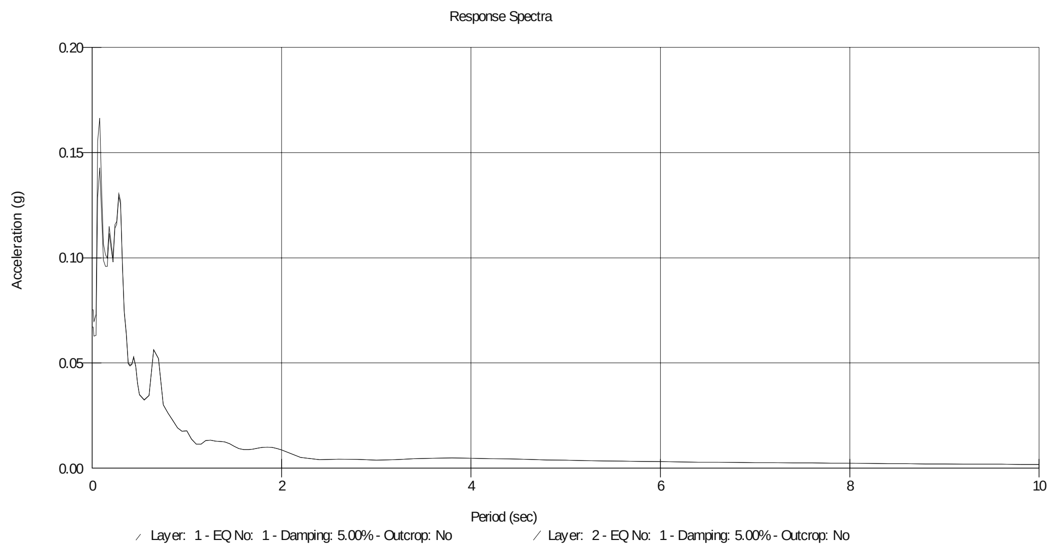
A_{max} = 0.18g at T= 0.054sec

Input Motion

RAN330.EQ

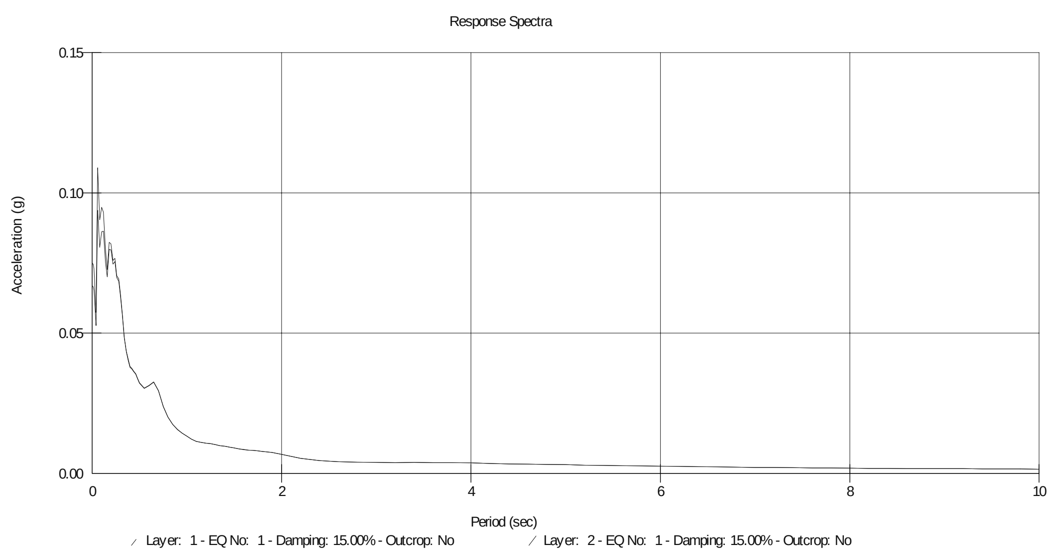
Response Spectra

a) 5% Soil Damping



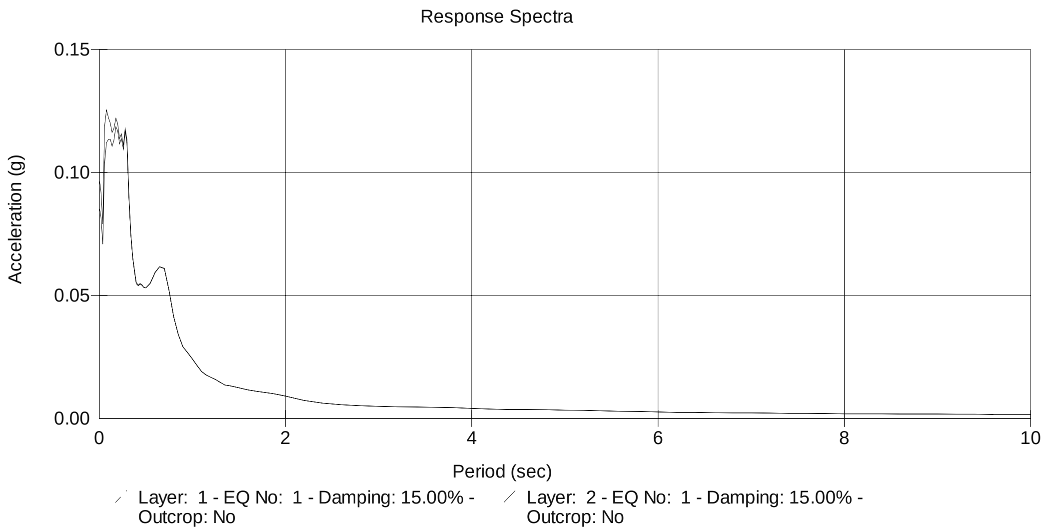
A_{max} = 0.17g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.054 sec

C) 15% Soil Damping



$A_{max} = 0.13g$ at $T = 0.079$ sec

Soil Profile

Profile Name: D6B(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 32

Input Motion

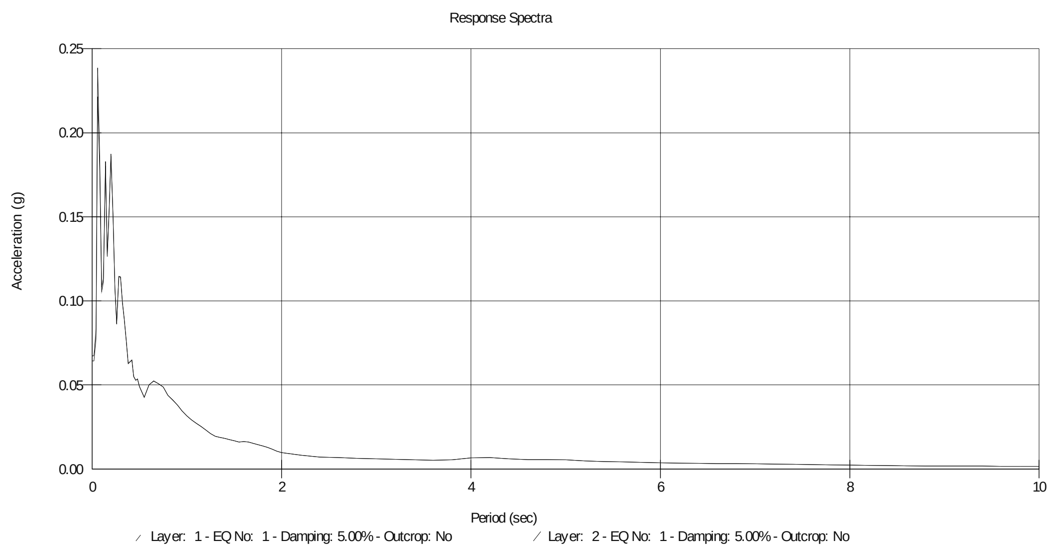
RAN230.EQ

Output Locations

Layers: 1 and 2

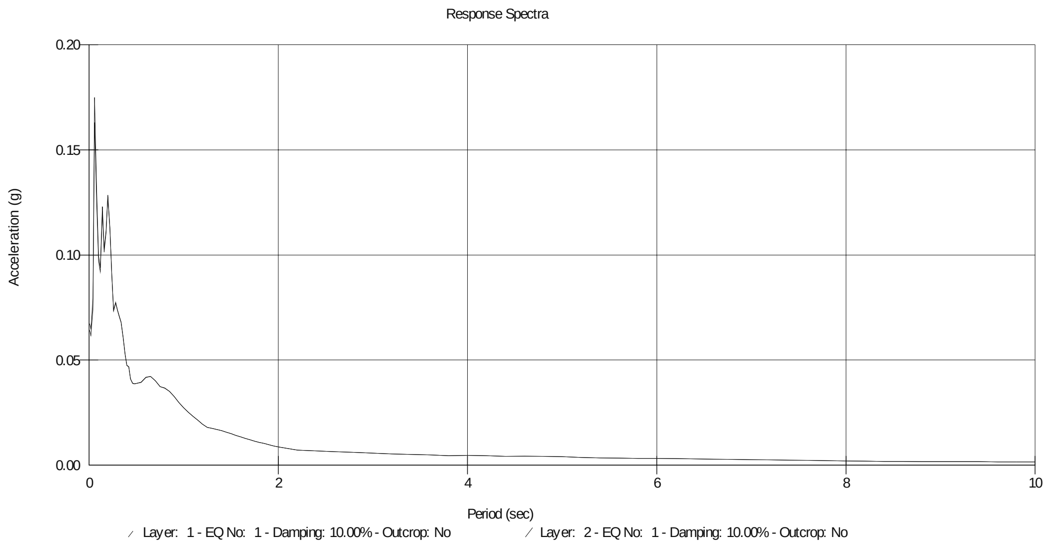
Response Spectra

a) 5% Soil Damping



A_{max} = 0.24g at T= 0.064 sec

b) 10% Soil Damping



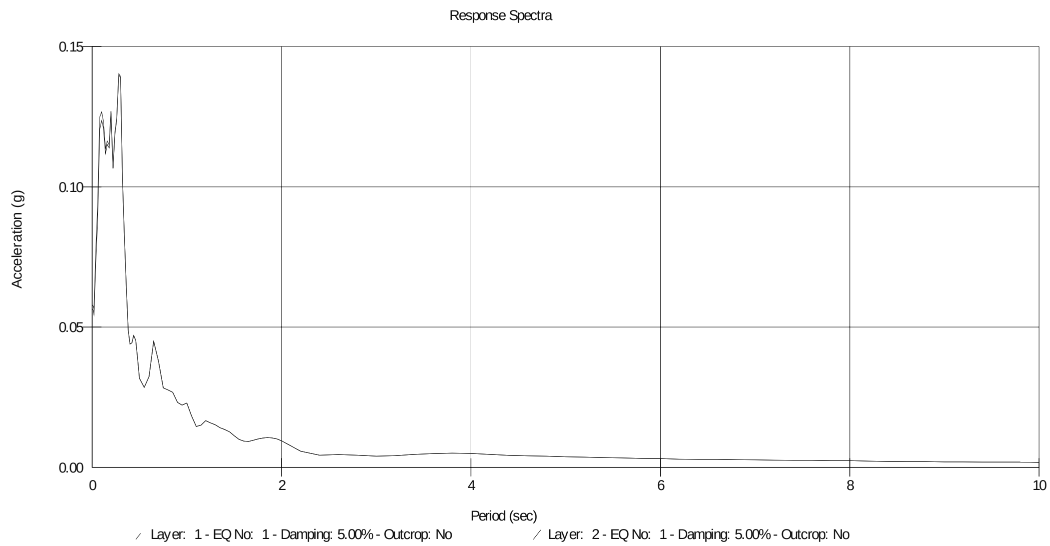
A_{max} = 0.18g at T= 0.054 sec

Input Motion

RAN330.EQ

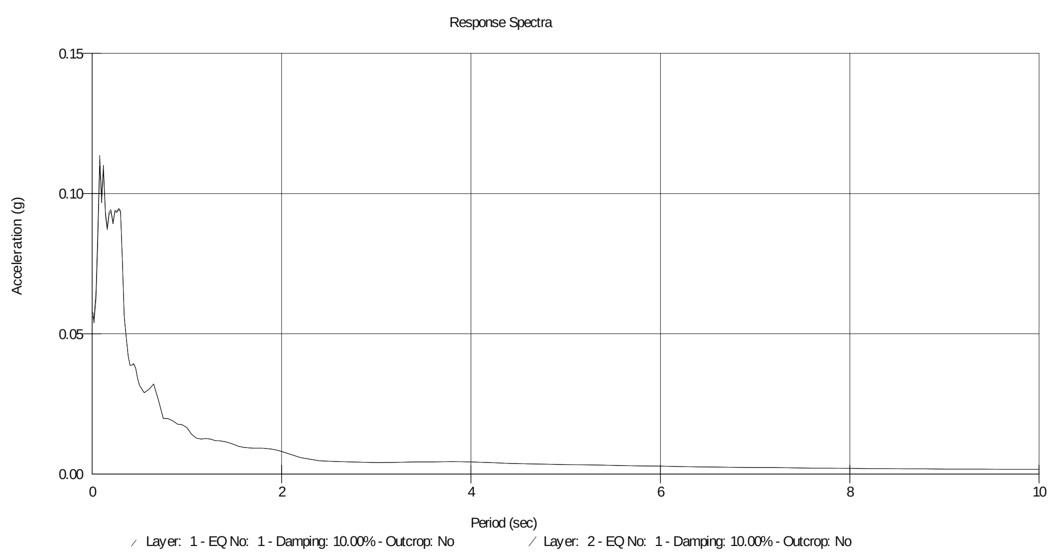
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.29 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.077 sec

Soil Profile

Profile Name: D6BCHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 34

Input Motion

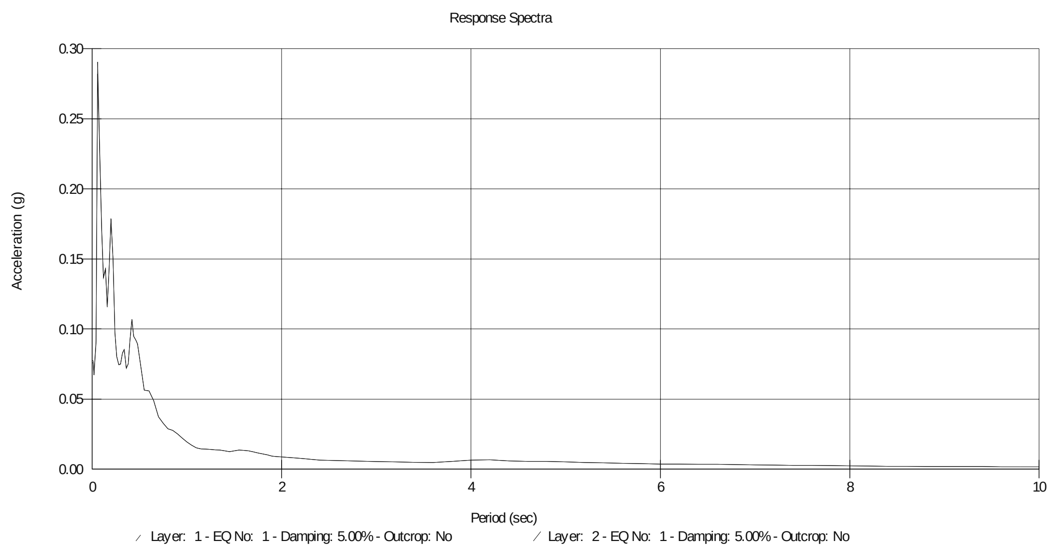
RAN230.EQ

Output Locations

Layers: 1 and 2

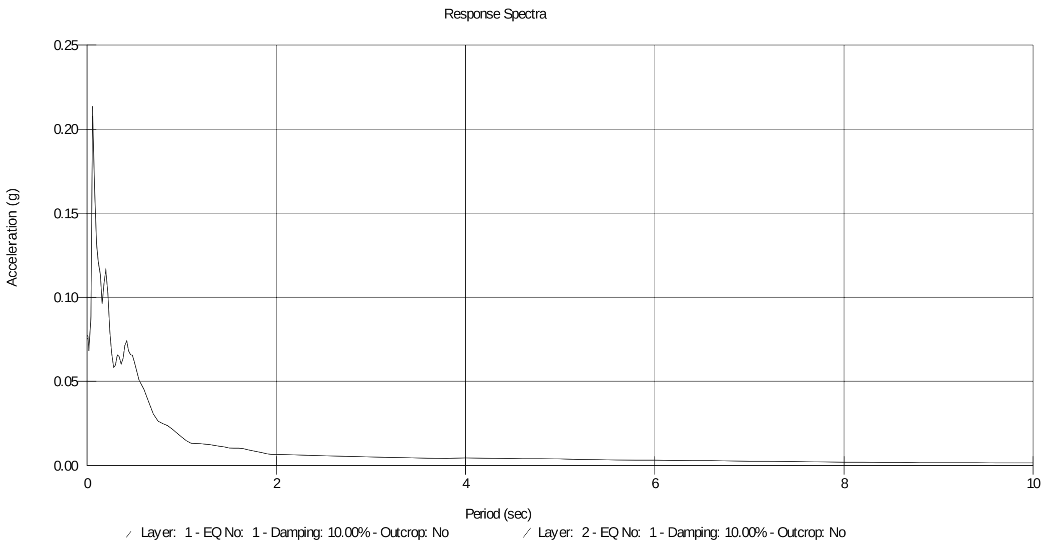
Response Spectra

a) 5% Soil Damping



A_{max} = 0.29g at T= 0.054 sec

b) 10% Soil Damping



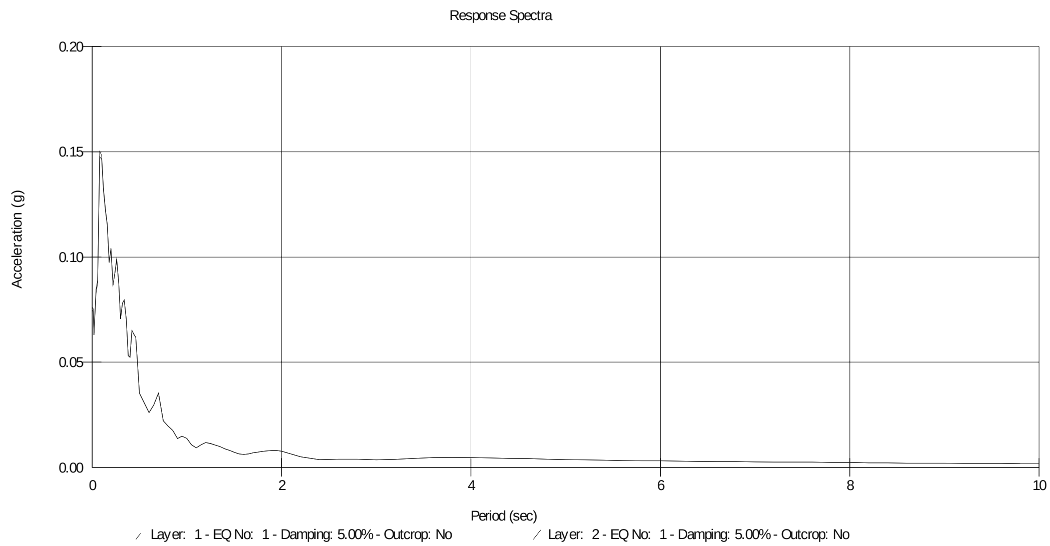
$A_{max} = 0.21g$ at $T = 0.054$ sec

Input Motion

RAN330.EQ

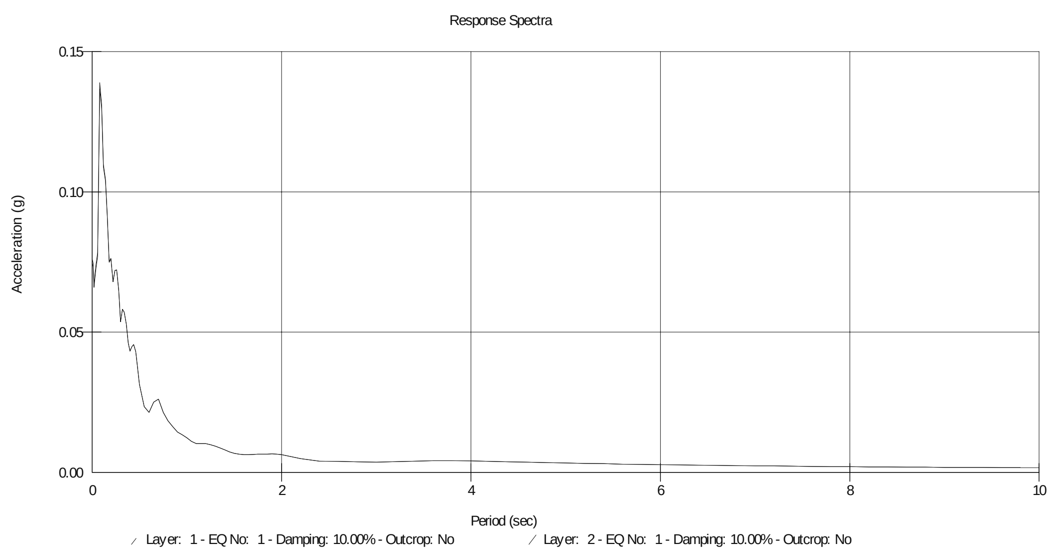
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.15g$ at $T = 0.088$ sec

b) 10% Soil Damping



$A_{max} = 0.14g$ at $T = 0.077$ sec

Input Motion

Soil Profile

Profile Name: D7BCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 26 m.
Number of Layers: 27

Input Motion

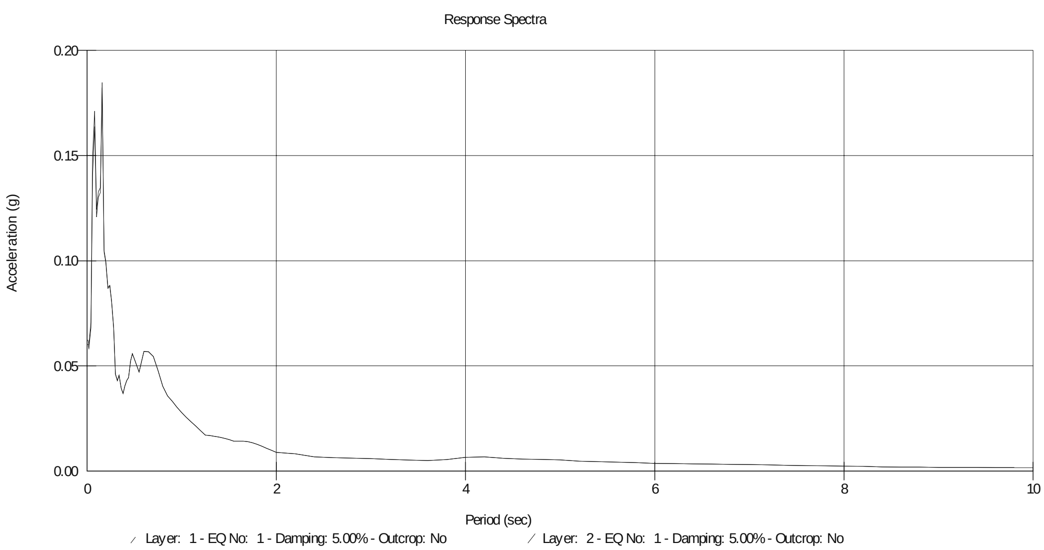
RAN230.EQ

Output Locations

Layers: 1 and 2

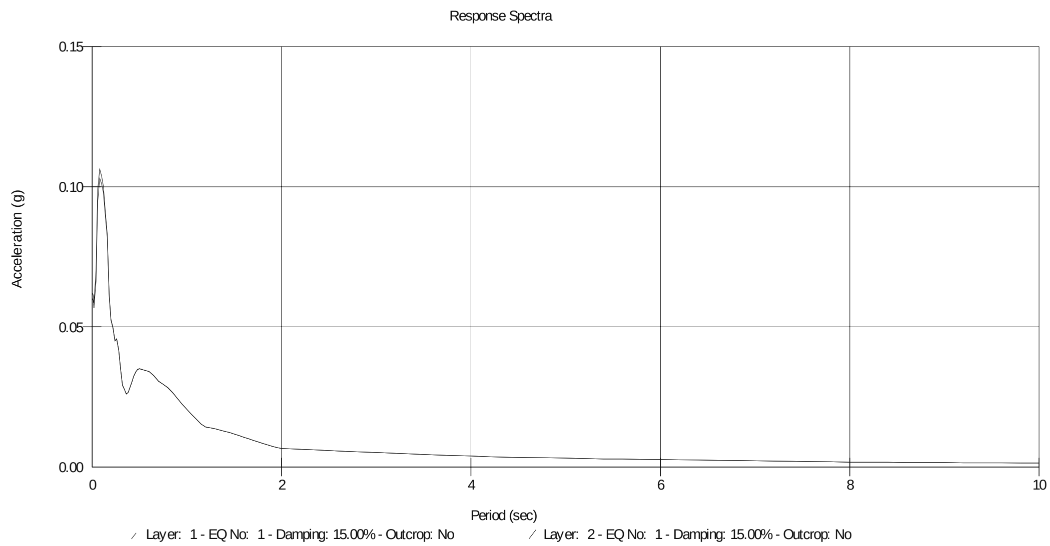
Response Spectra

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.17 sec

b) 10% Soil Damping



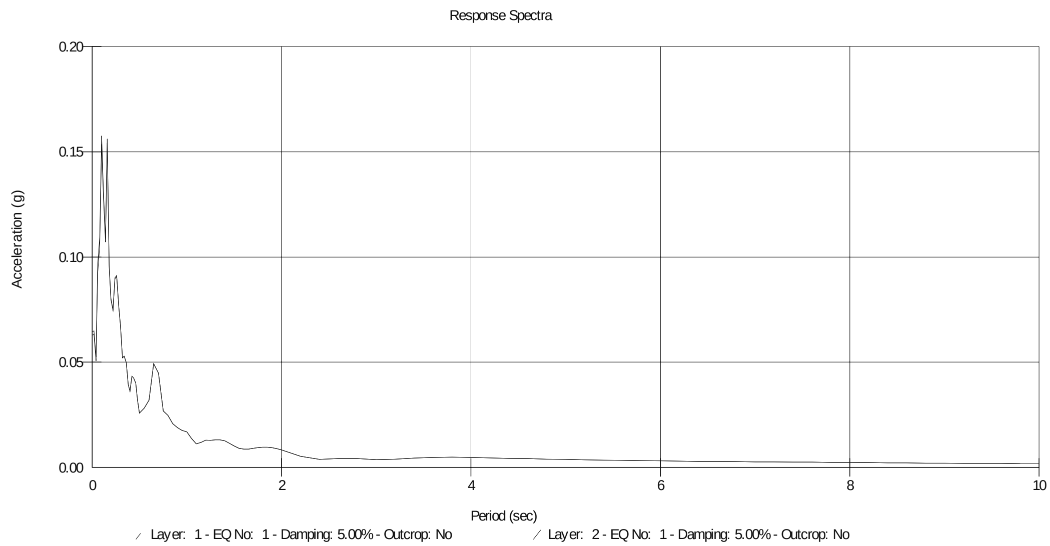
A_{max} = 0.11g at T= 0.088 sec

Input Motion

RAN330.EQ

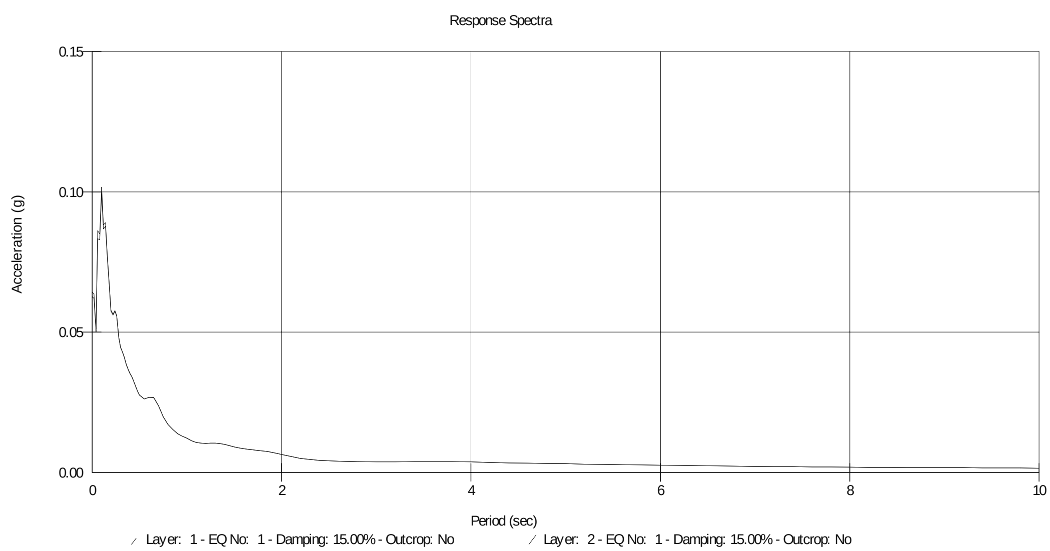
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.11 sec

Soil Profile

Profile Name: D8BCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 25 m.
Number of Layers: 25

Input Motion

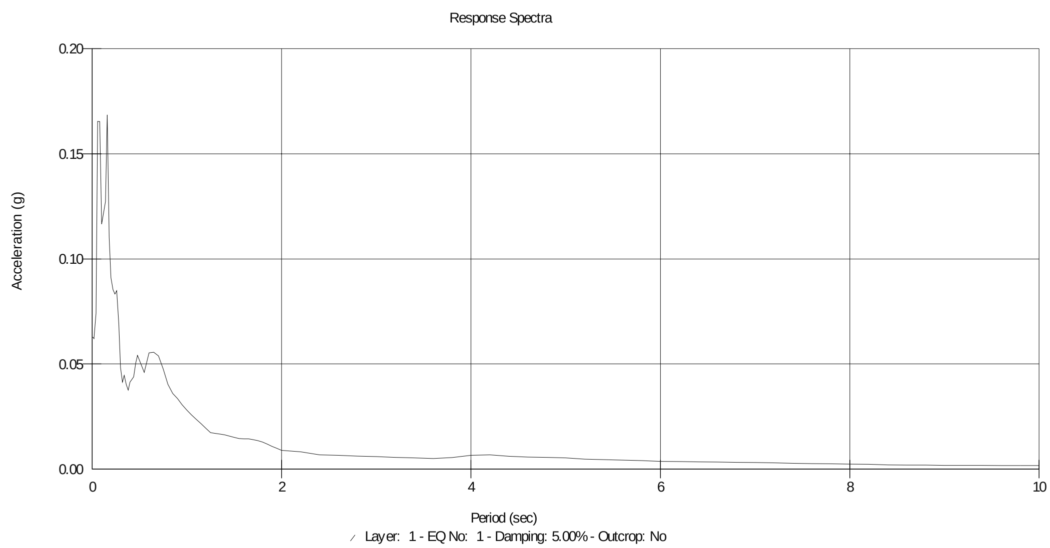
RAN230.EQ

Output Locations

Layers: 1 and 2

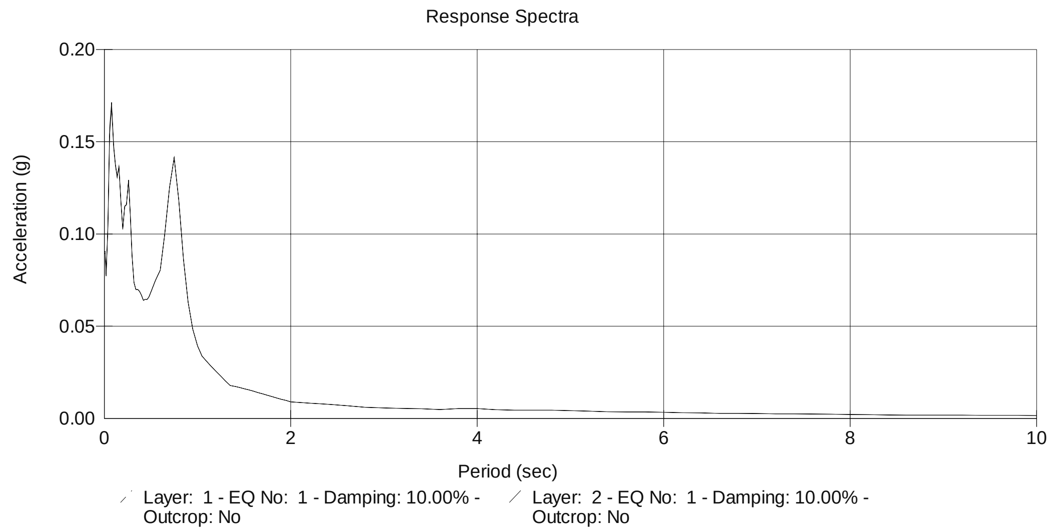
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.16 sec

b) 10% Soil Damping



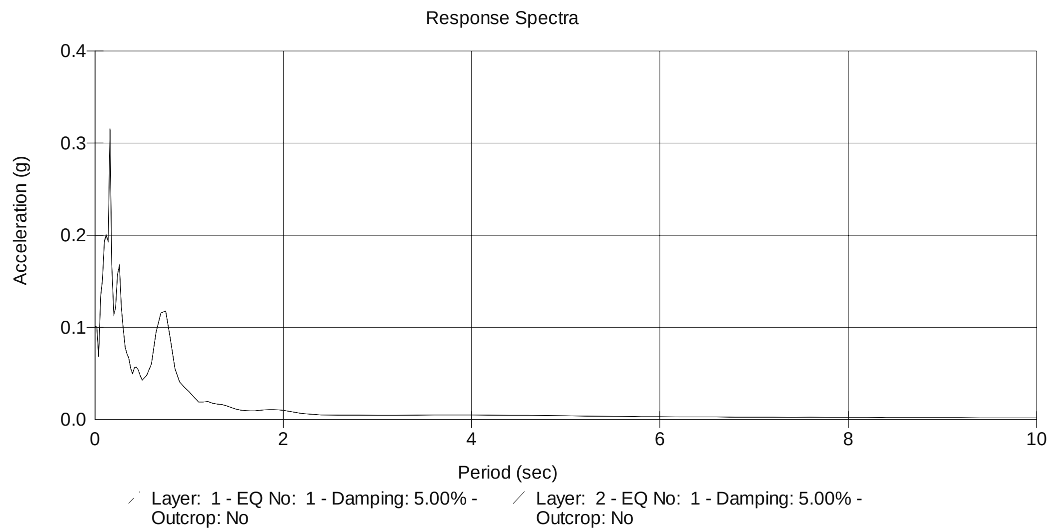
A_{max} = 0.17g at T= 0.0788 sec

Input Motion

RAN330.EQ

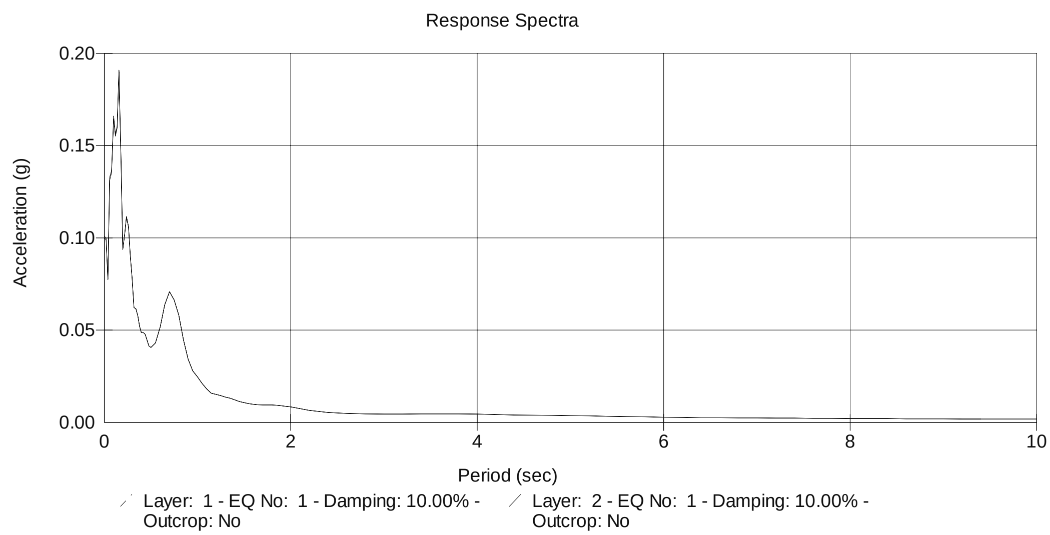
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.32g$ at $T = 0.15$ sec

b) 10% Soil Damping



$A_{max} = 0.19g$ at $T = 0.16$ sec

Soil Profile

Profile Name: D9BCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 25 m.
Number of Layers: 25

Input Motion

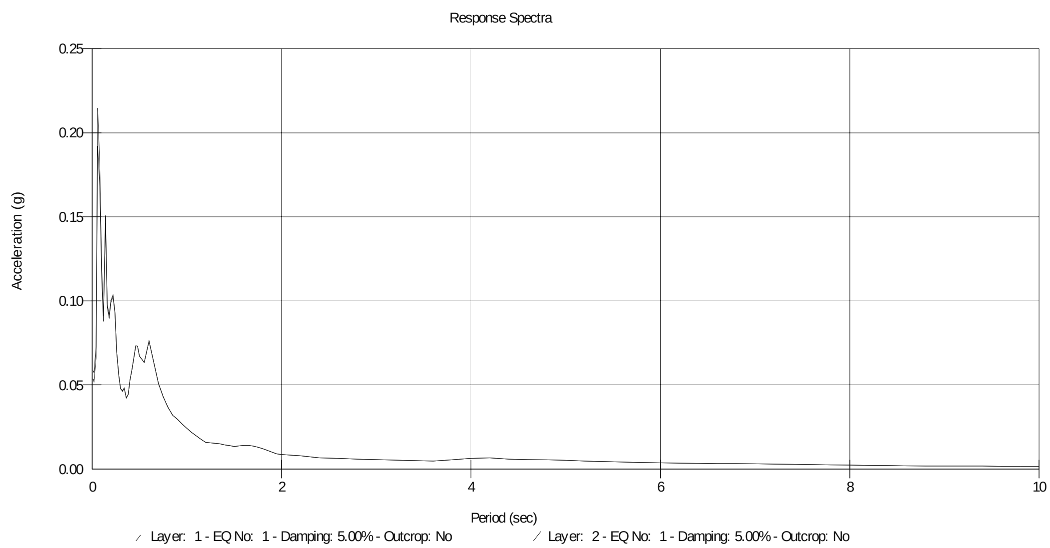
RAN230.EQ

Output Locations

Layers: 1 and 2

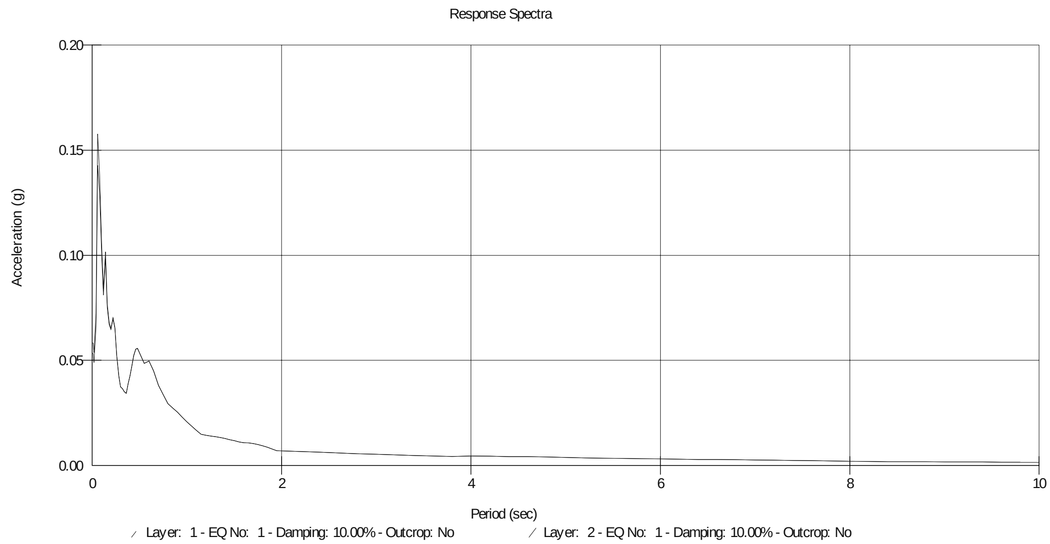
Response Spectra

a) 5% Soil Damping



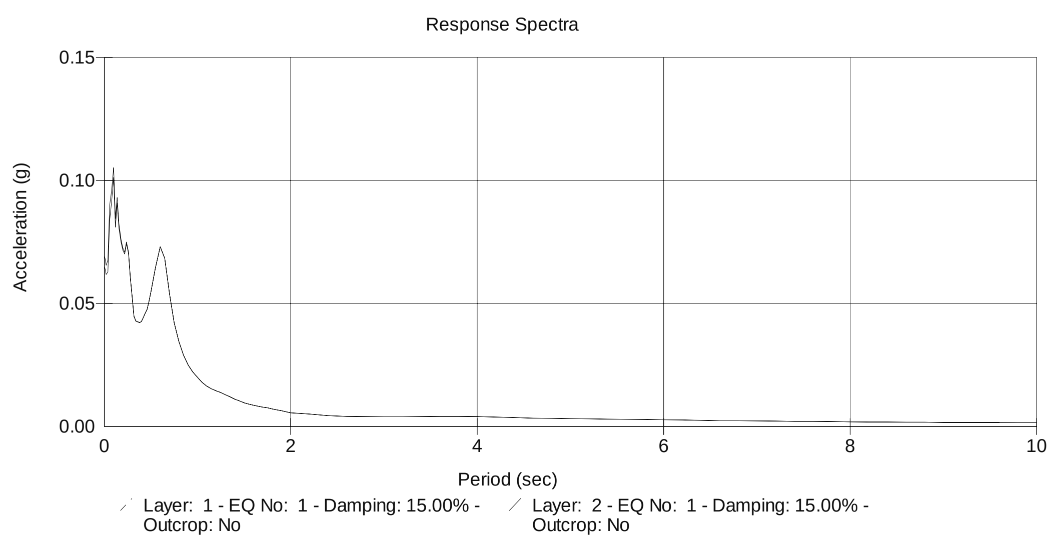
A_{max} = 0.22g at T= 0.054 sec

b) 10% Soil Damping



$A_{max} = 0.17g$ at $T = 0.045$ sec

C) 15% Soil Damping



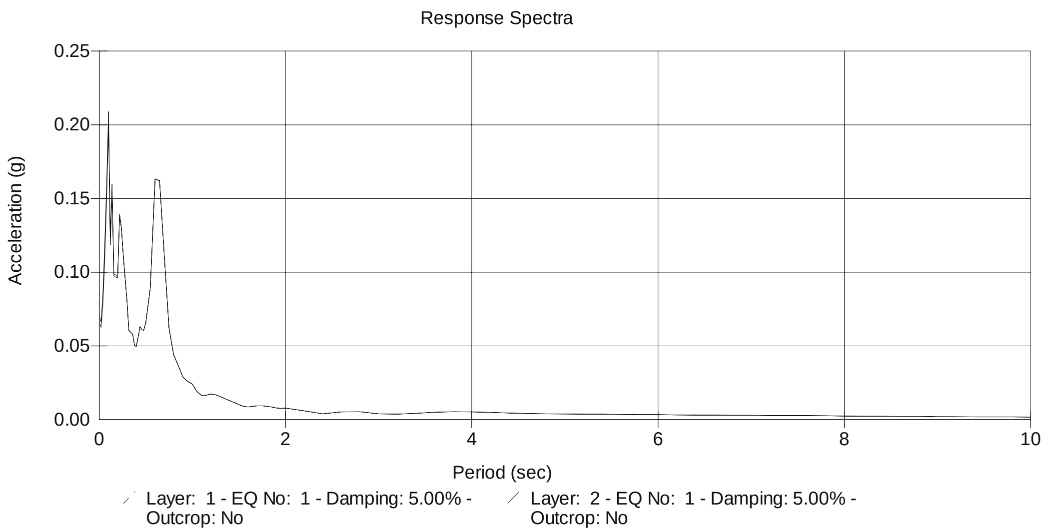
$A_{max} = 0.11g$ at $T = 0.10$ sec

<u>Input Motion</u>

RAN330.EQ

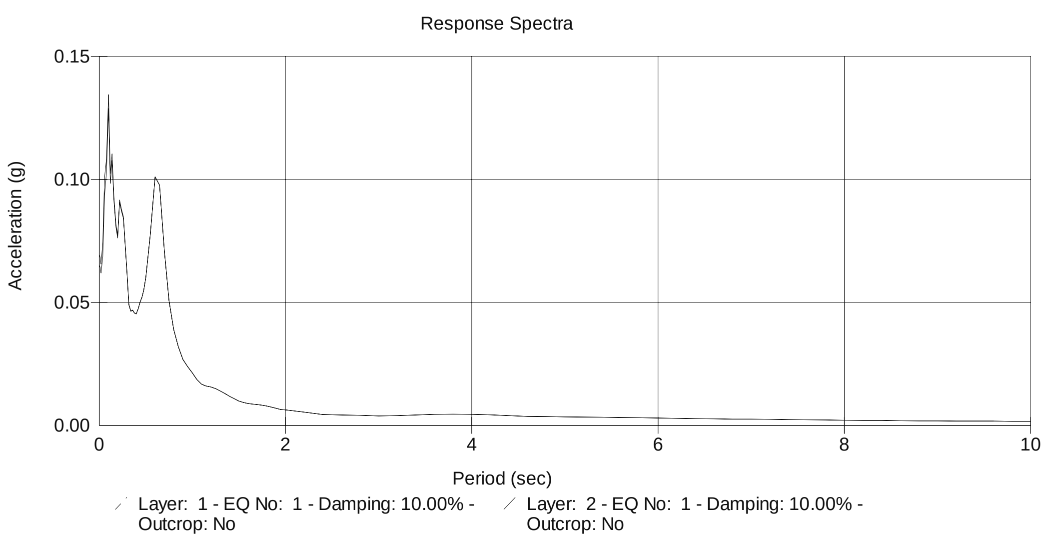
<u>Response Spectra</u>

a) 5% Soil Damping



A_{max} = 0.21g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.13g at T= 0.10 sec

Soil Profile

Profile Name: D11B(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6m.
Number of Layers: 29

Input Motion

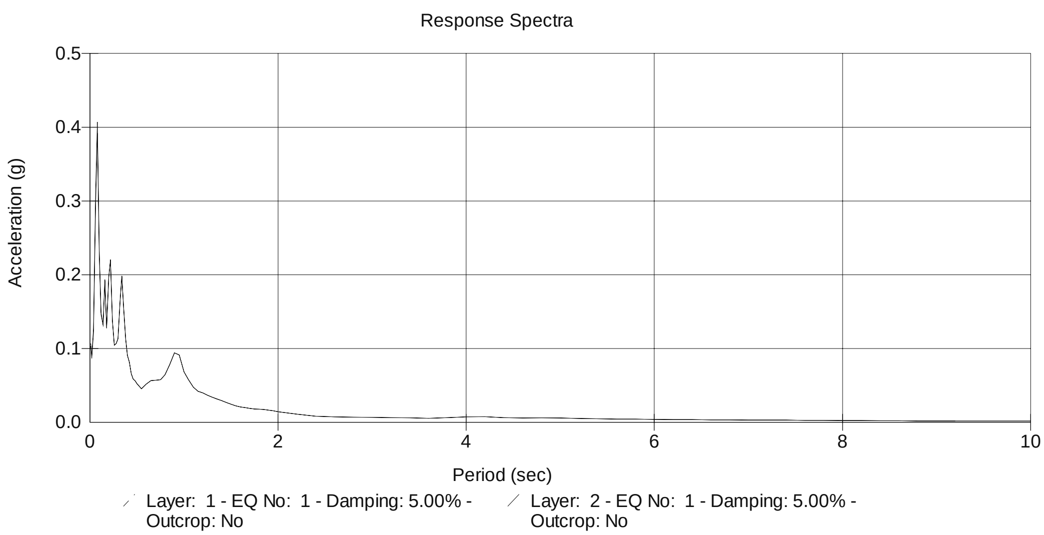
RAN230.EQ

Output Locations

Layers: 1 and 2

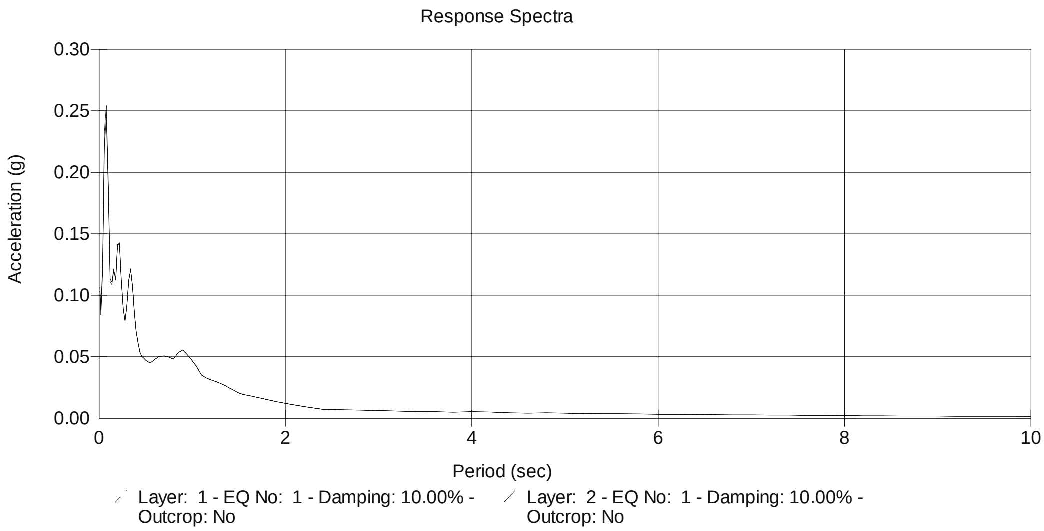
Response Spectra

a) 5% Soil Damping



A_{max} = 0.41g at T= 0.078 sec

b) 10% Soil Damping



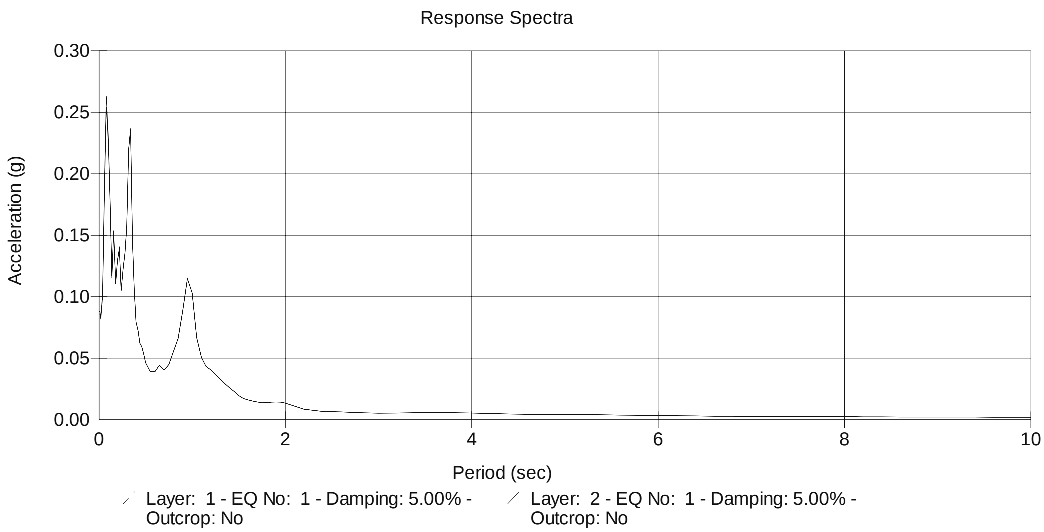
$A_{max} = 0.25g$ at $T = 0.0788$ sec

Input Motion

RAN330.EQ

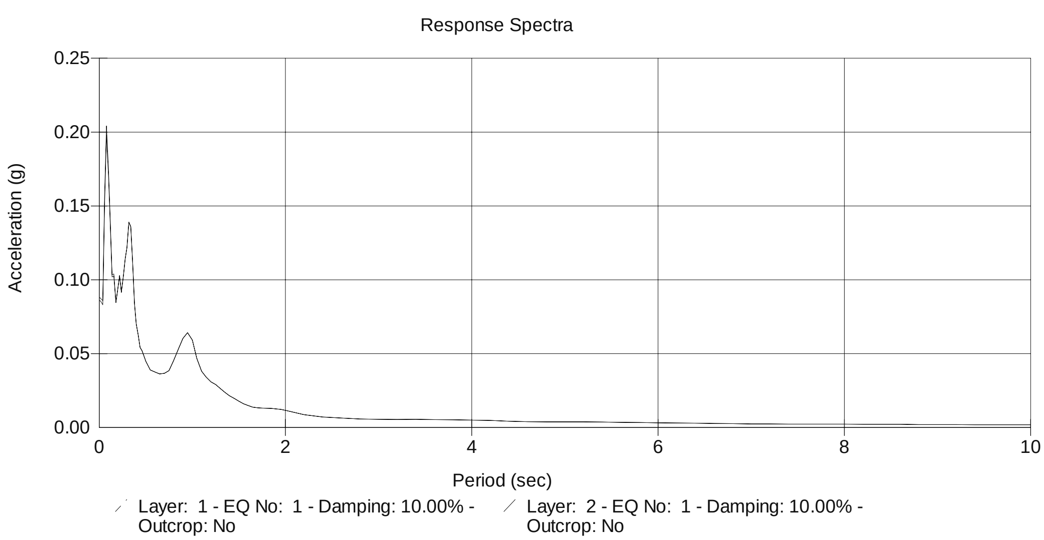
Response Spectra

a) 5% Soil Damping



A_{max} = 0.26g at T= 0.0788 sec

b) 10% Soil Damping



A_{max} = 0.21g at T= 0.0788 sec

Soil Profile

Profile Name: D11B (CH)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6 m.
Number of Layers: 38

Input Motion

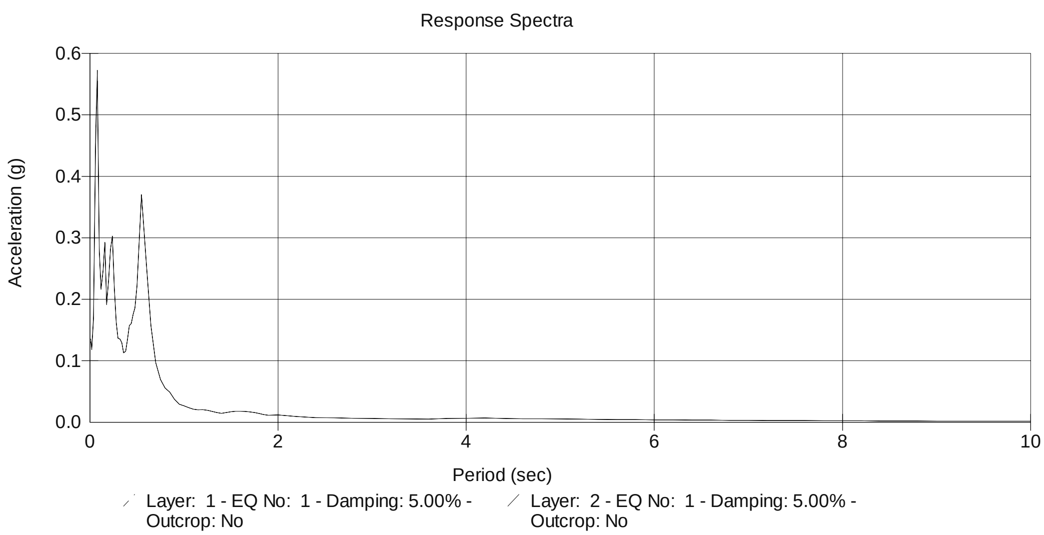
RAN230.EQ

Output Locations

Layers: 1 and 2

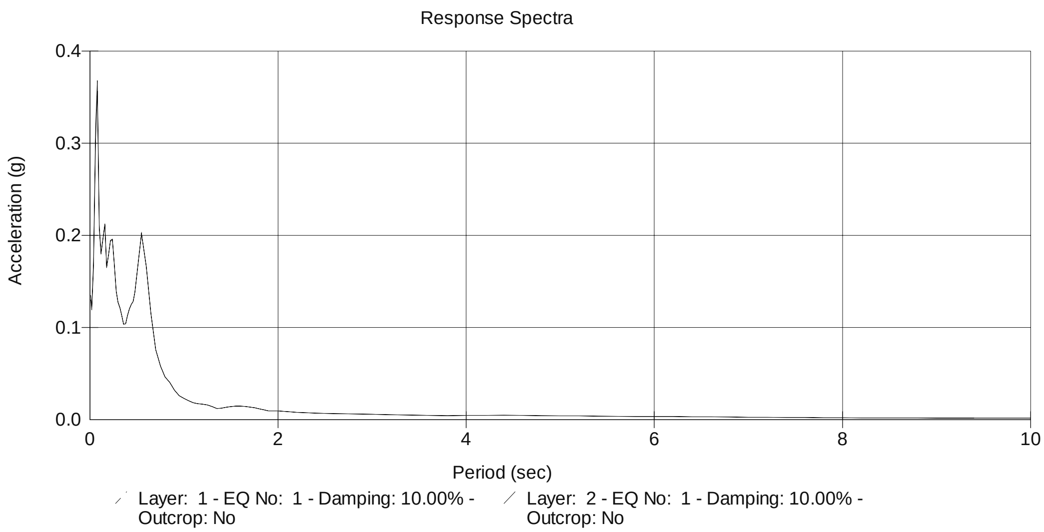
Response Spectra

a) 5% Soil Damping



A_{max} = 0.57g at T= 0.0788 sec

b) 10% Soil Damping



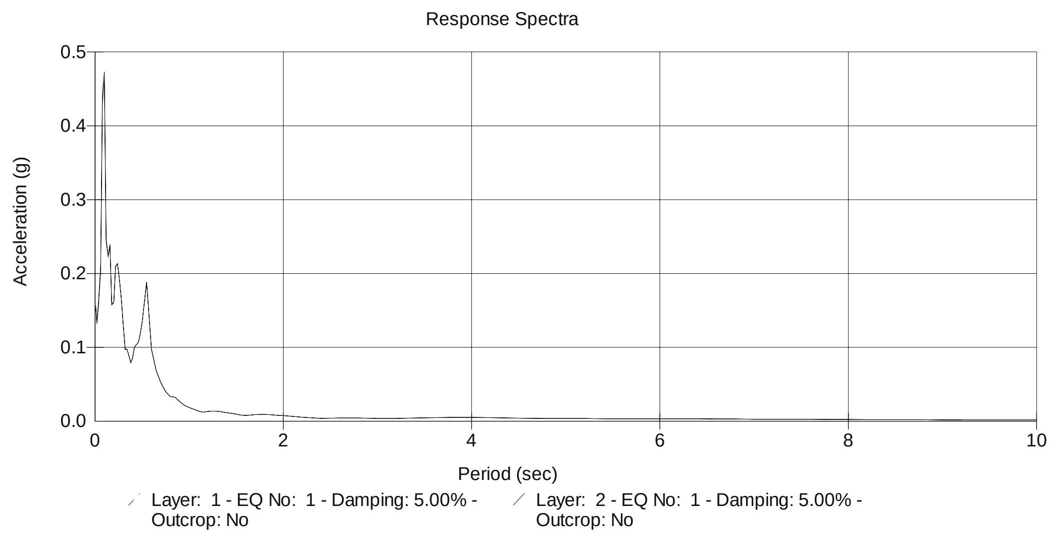
A_{max} = 0.37g at T= 0.0788 sec

Input Motion

RAN330.EQ

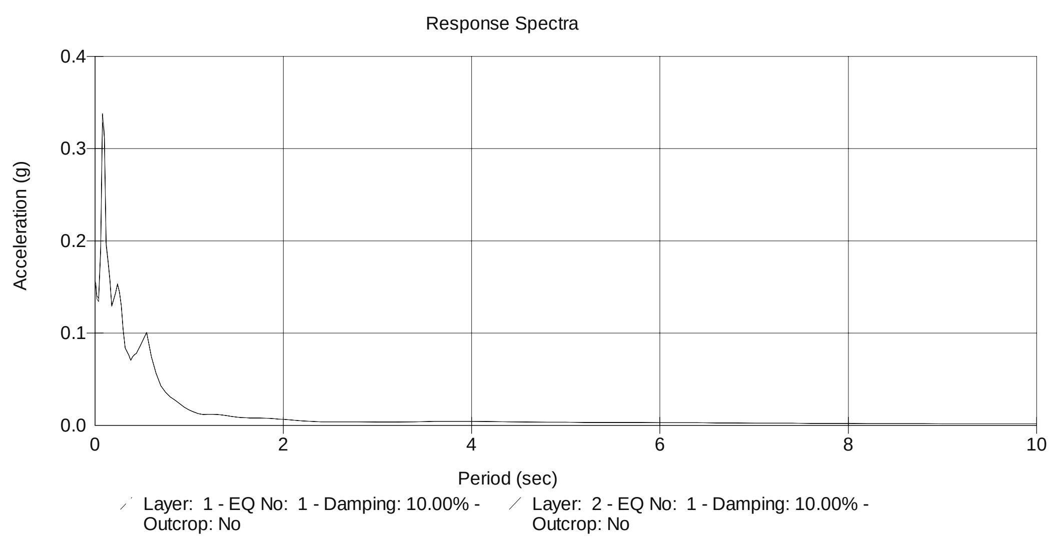
Response Spectra

a) 5% Soil Damping



A_{max} = 0.47g at T= 0.0996 sec

b) 10% Soil Damping



A_{max} = 0.34g at T= 0.0996 sec

Soil Profile

Profile Name: D12B(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 23

Input Motion

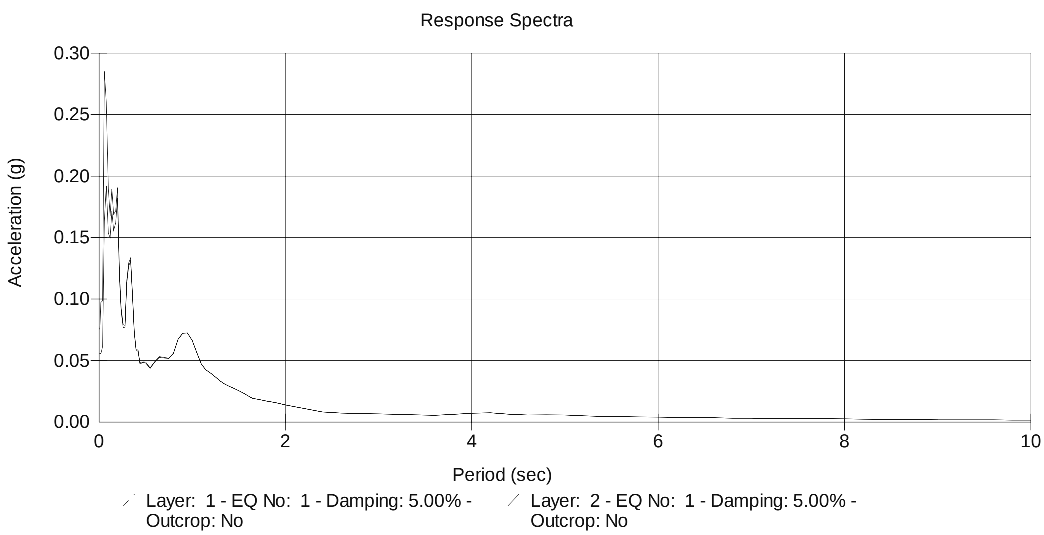
RAN230.EQ

Output Locations

Layers: 1 and 2

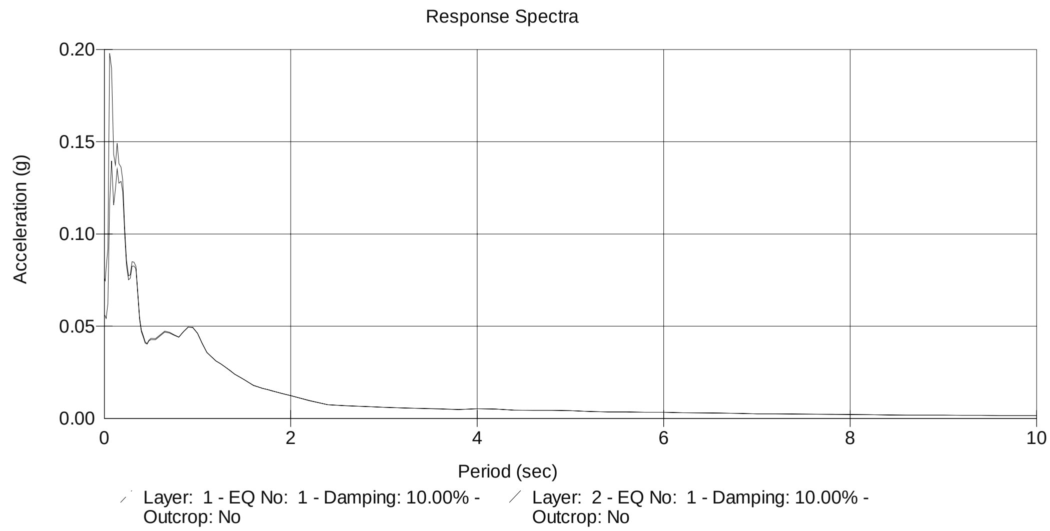
Response Spectra

a) 5% Soil Damping



A_{max} = 0.29g at T= 0.0691 sec

b) 10% Soil Damping



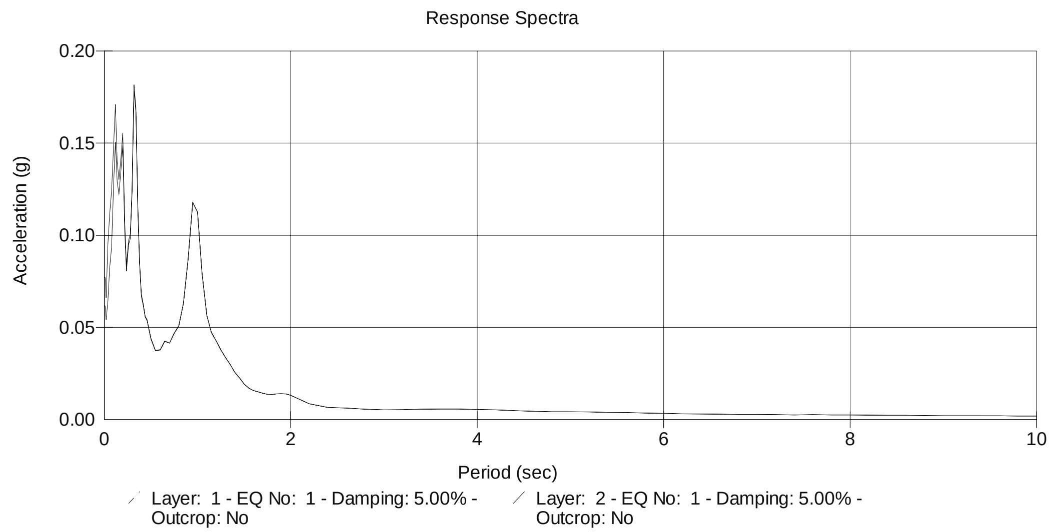
A_{max} = 0.20g at T= 0.0569 sec

Input Motion

RAN330.EQ

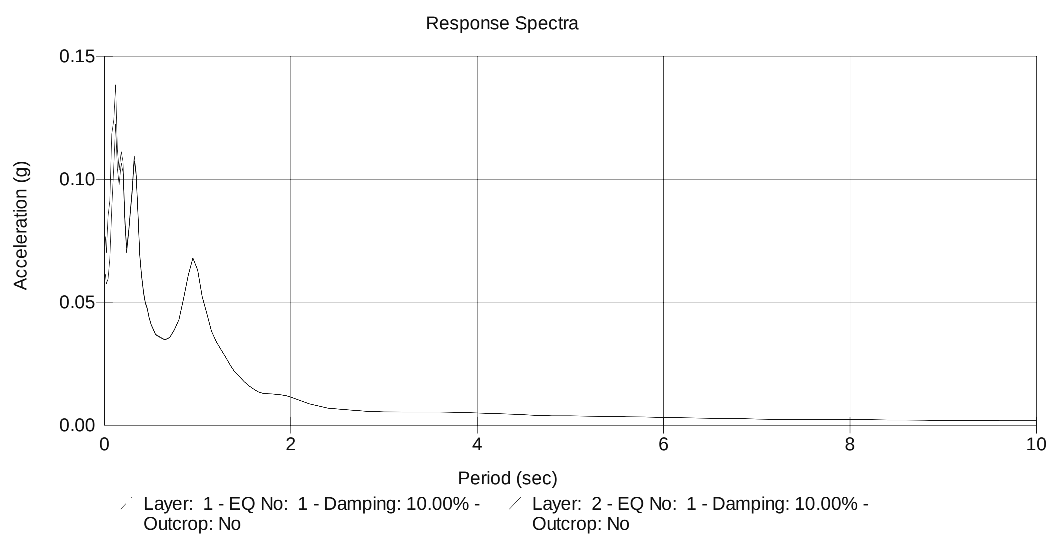
Response Spectra

a) 5% Soil Damping



A_{max} = 0.18g at T= 0.33 sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.13 sec

Soil Profile

Profile Name: D12B(CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 35

Input Motion

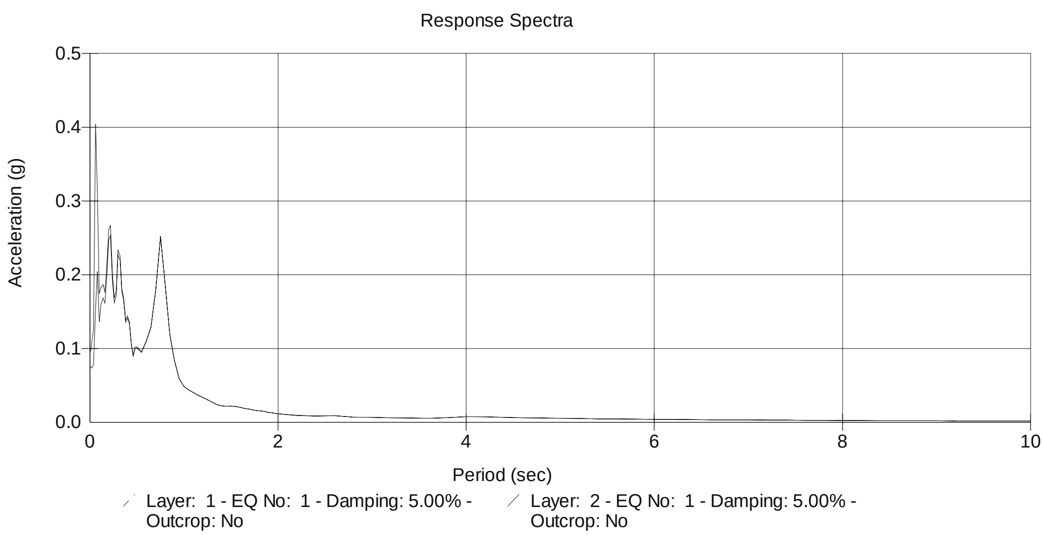
RAN230.EQ

Output Locations

Layers: 1 and 2

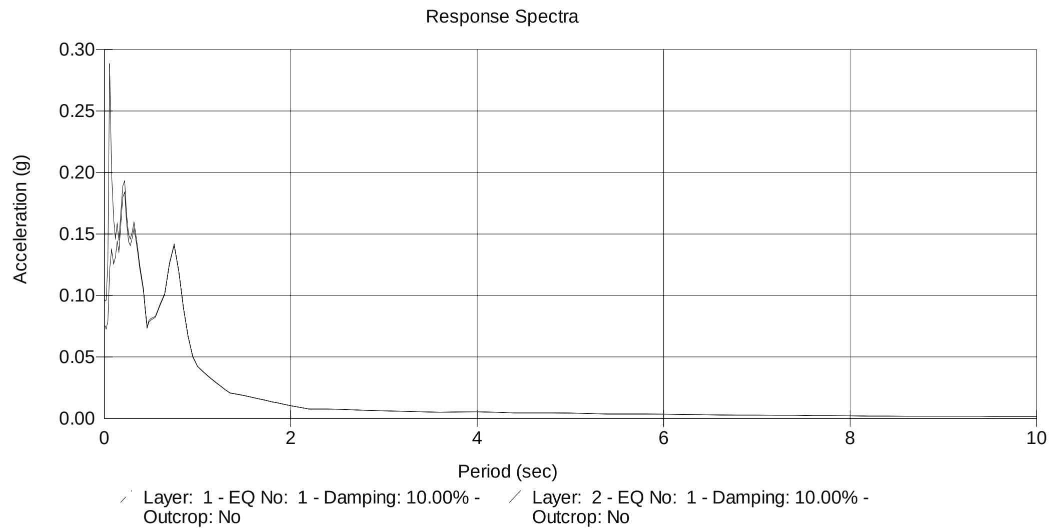
Response Spectra

a) 5% Soil Damping



A_{max} = 0.40g at T= 0.0564 sec

b) 10% Soil Damping



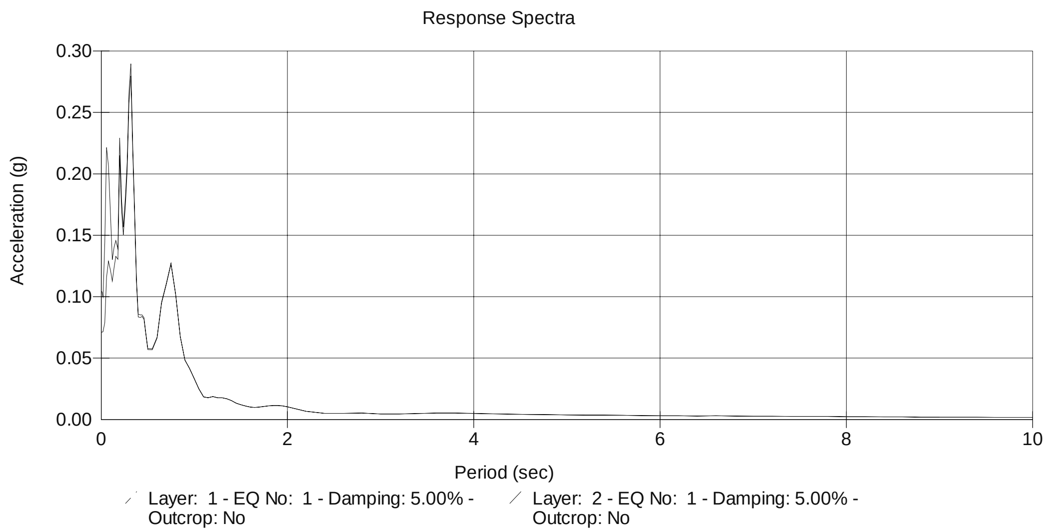
A_{max} = 0.29g at T= 0.0569 sec

Input Motion

RAN330.EQ

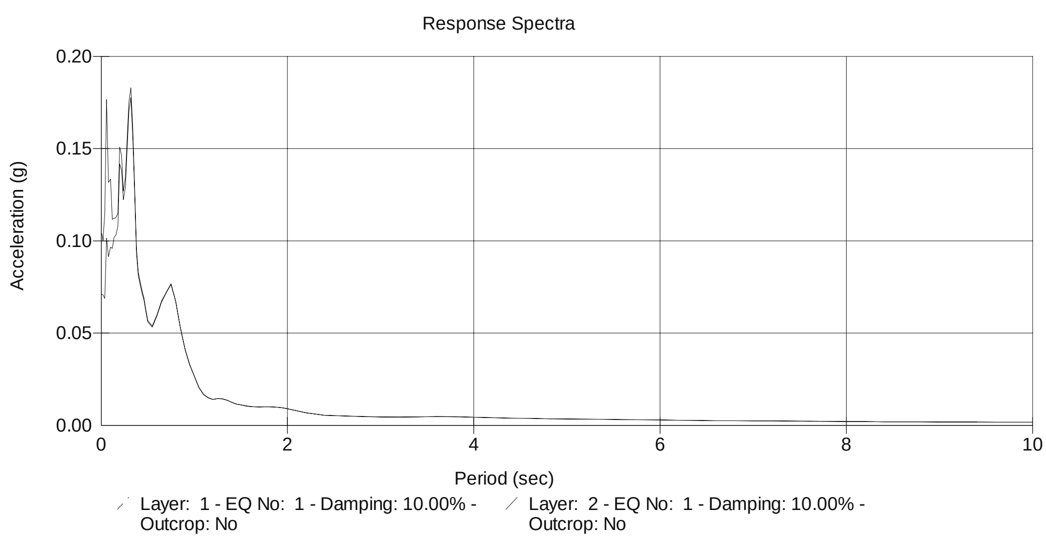
Response Spectra

a) 5% Soil Damping



A_{max} = 0.29g at T= 0.33 sec

b) 10% Soil Damping



A_{max} = 0.18g at T= 0.33 sec

ProShake Report (C)

Bedrock at (T_C =200m) depth

Soil Profile

Profile Name: D1CCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 8 m.
Number of Layers: 42

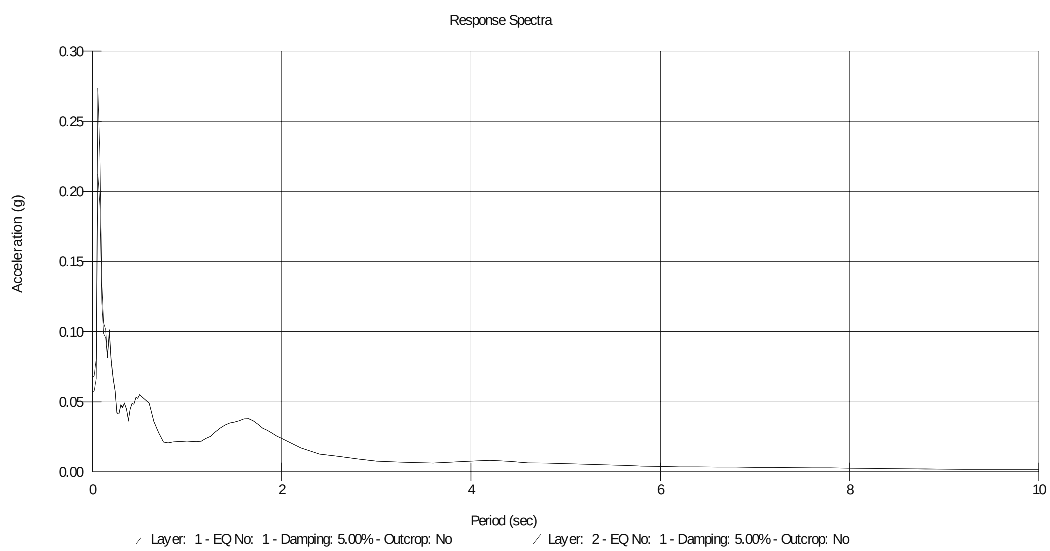
Input Motion

RAN230.EQ

Output Locations

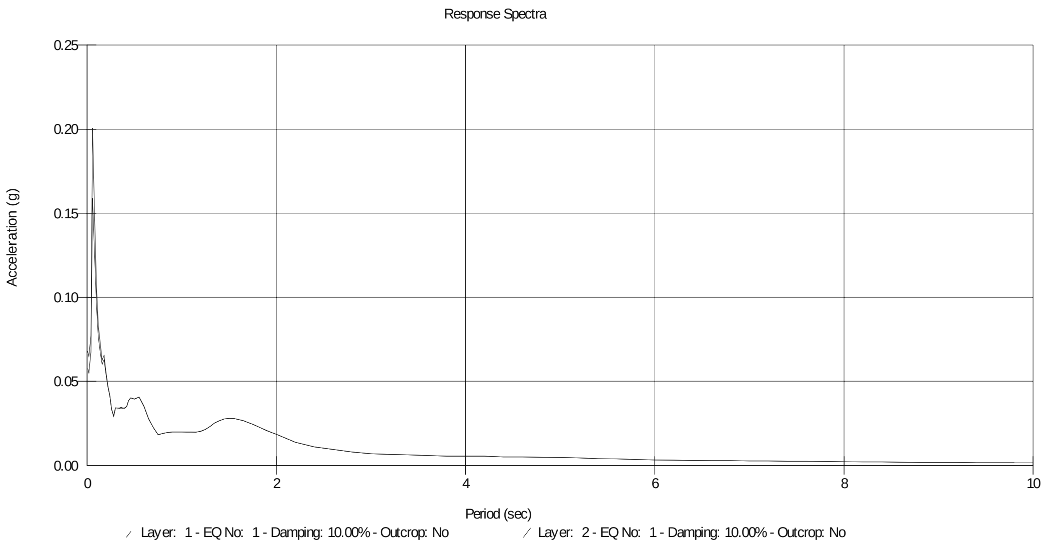
Layers: 1 and 2
Response Spectra

a) 5% Soil Damping



A_{max} = 0.27 g at T= 0.054 sec.

b) 10% Soil Damping



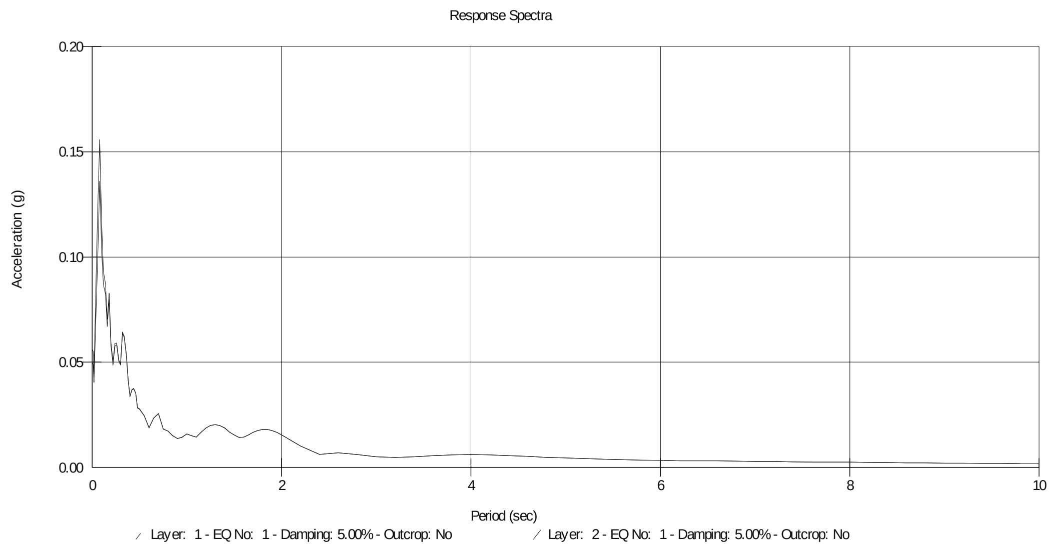
A_{max} =0.20g at T= 0.064 sec.

Input Motion

RAN330.EQ

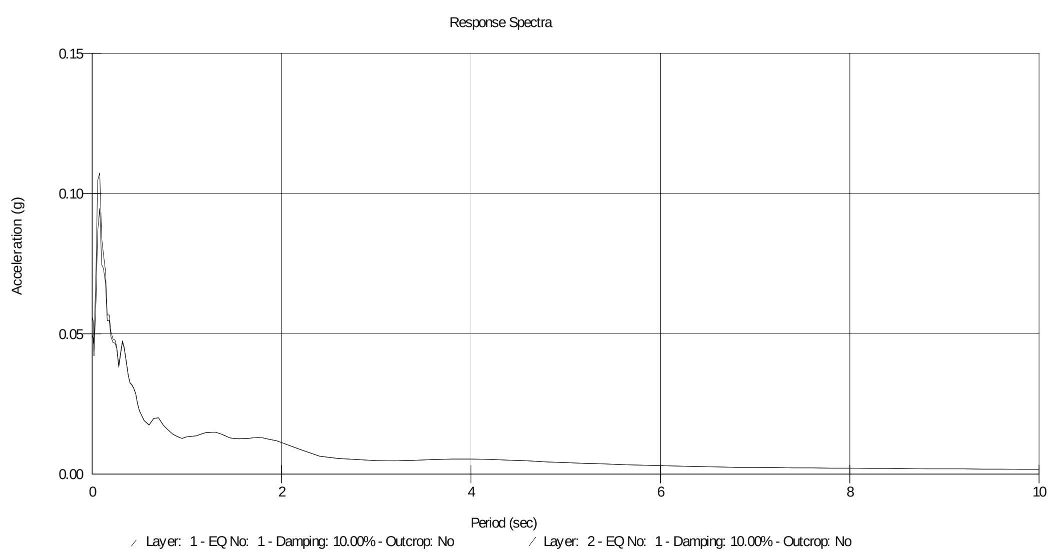
Response Spectra)

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.077 sec.

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.077 sec.

Soil Profile

Profile Name: D2CCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 28 m.
Number of Layers: 38

Input Motion

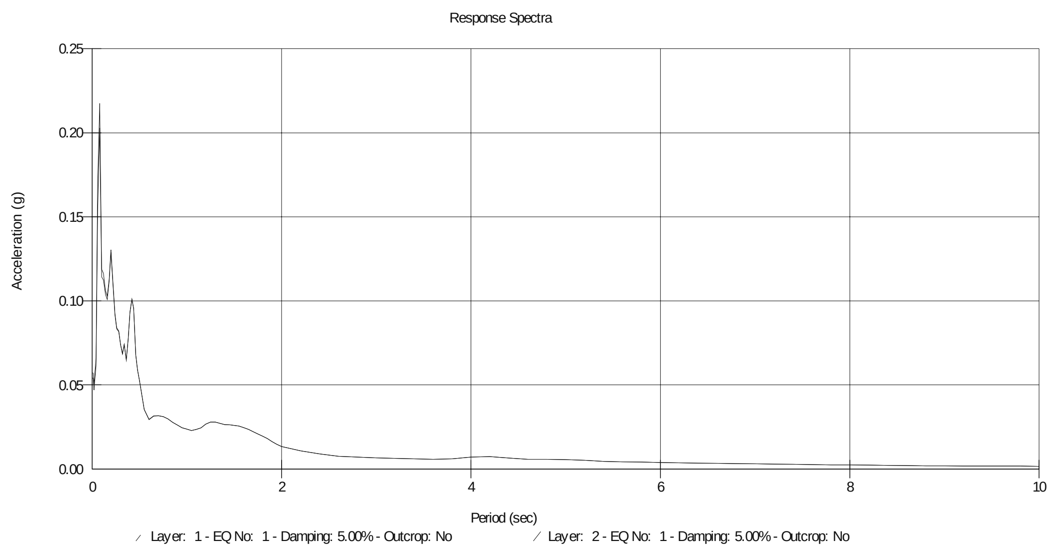
RAN230.EQ

Output Locations

Layers: 1 and 2

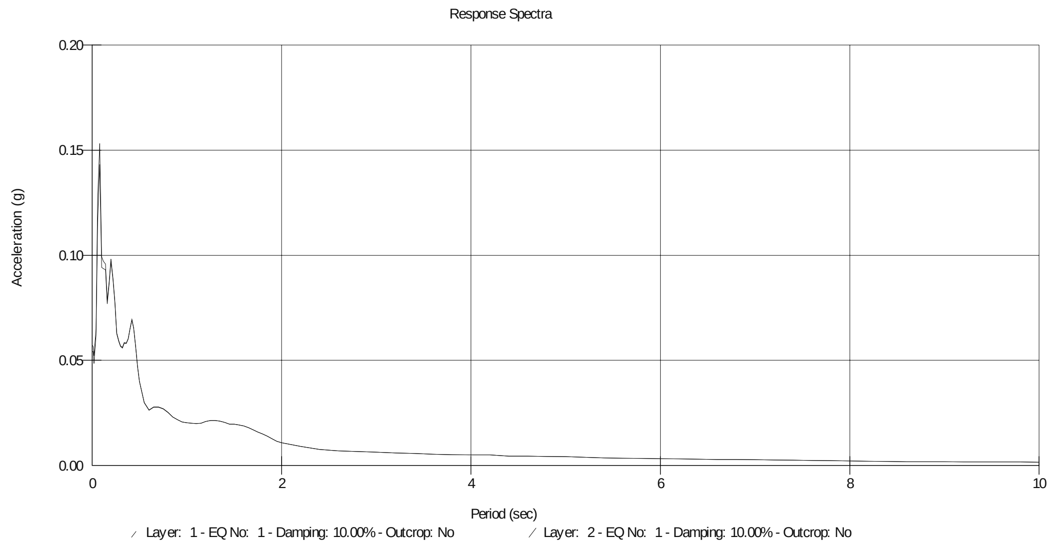
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.088 sec

b) 10% Soil Damping



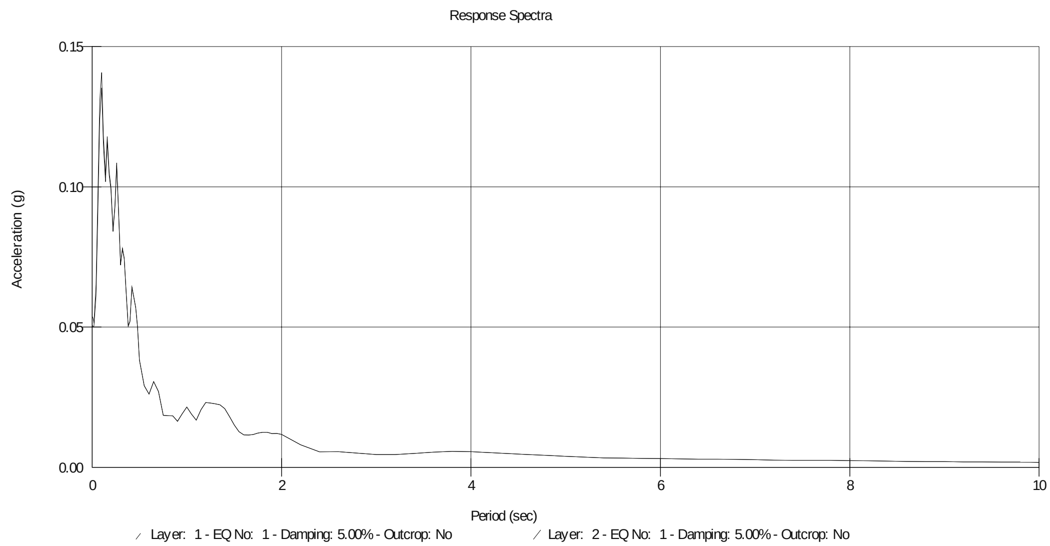
A_{max} = 0.15g at T= 0.077 sec

Input Motion

RAN330.EQ

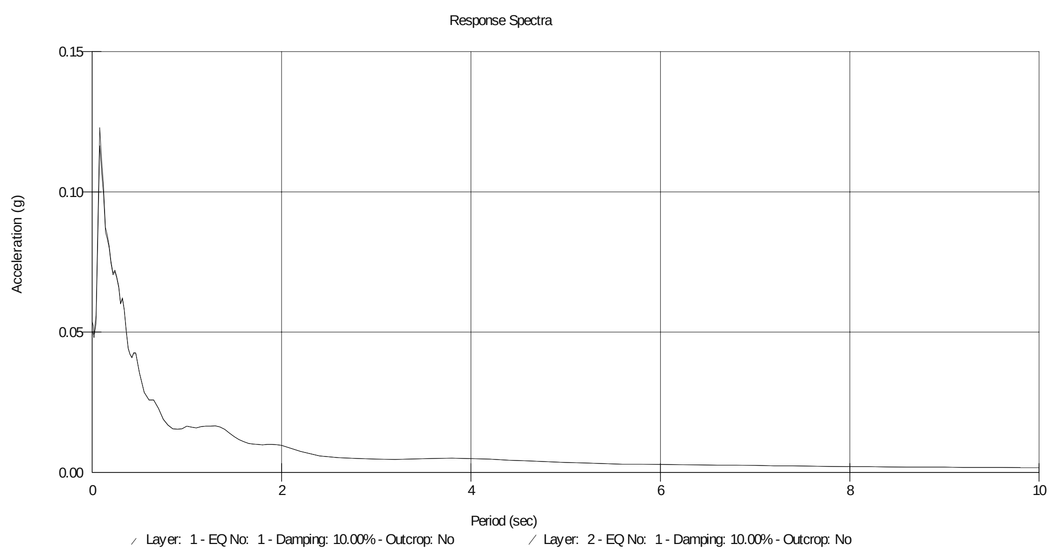
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.088 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.077 sec

Soil Profile

Profile Name: D3CCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 29 m.
Number of Layers: 64

Input Motion

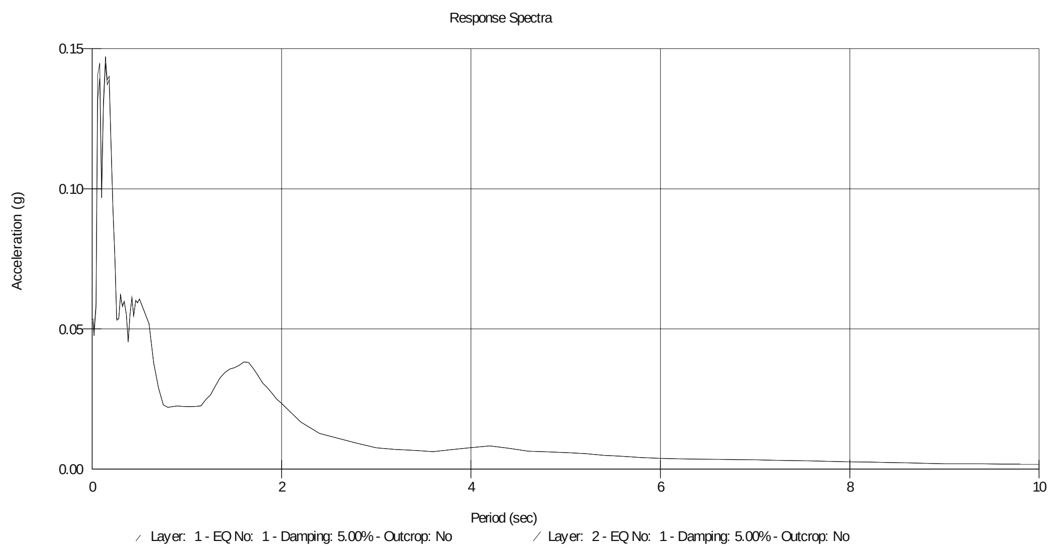
RAN230.EQ

Output Locations

Layers: 1 and 2

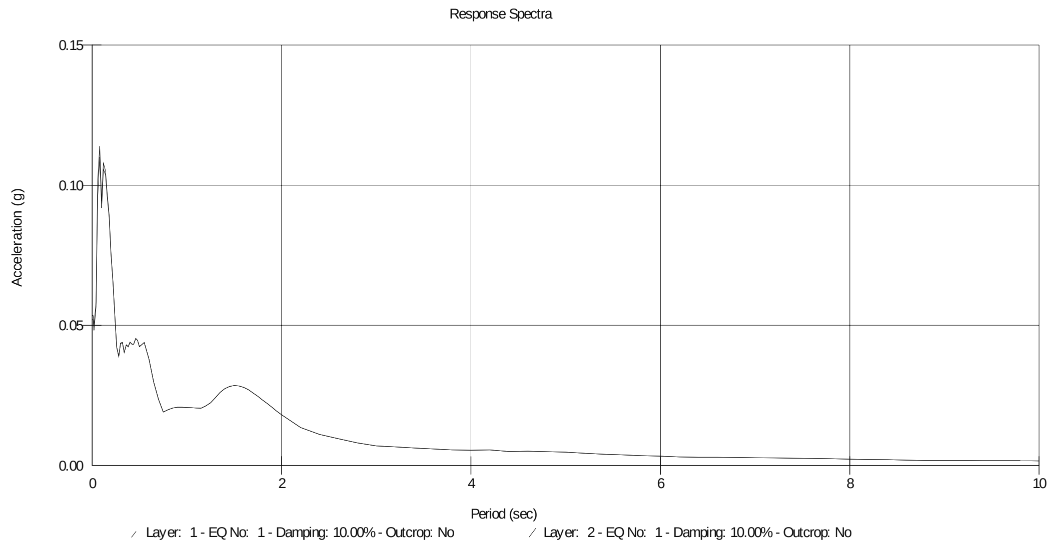
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.15g$ at $T = 0.088$ sec

b) 10% Soil Damping



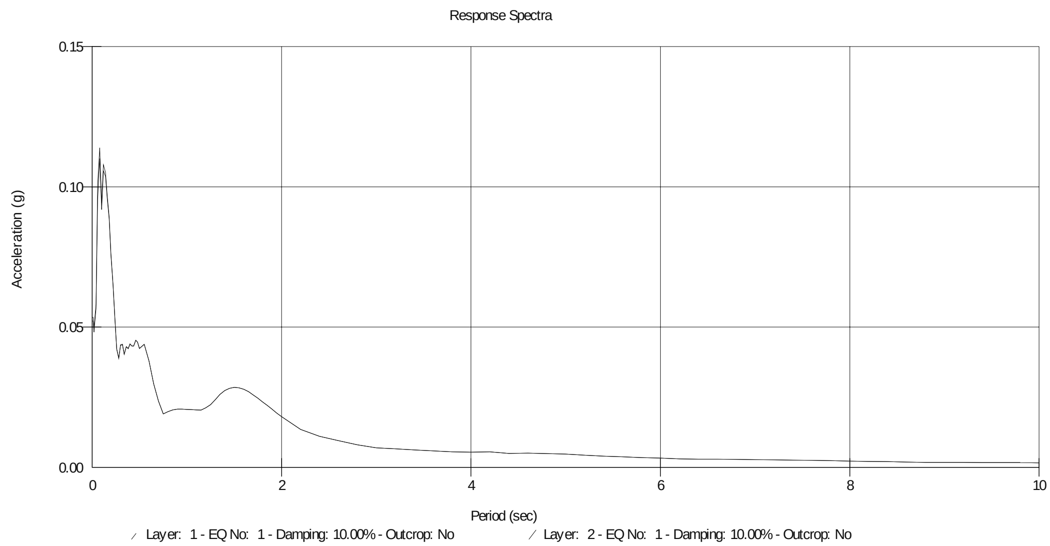
A_{max} = 0.11g at T= 0.064 sec

Input Motion

RAN330.EQ

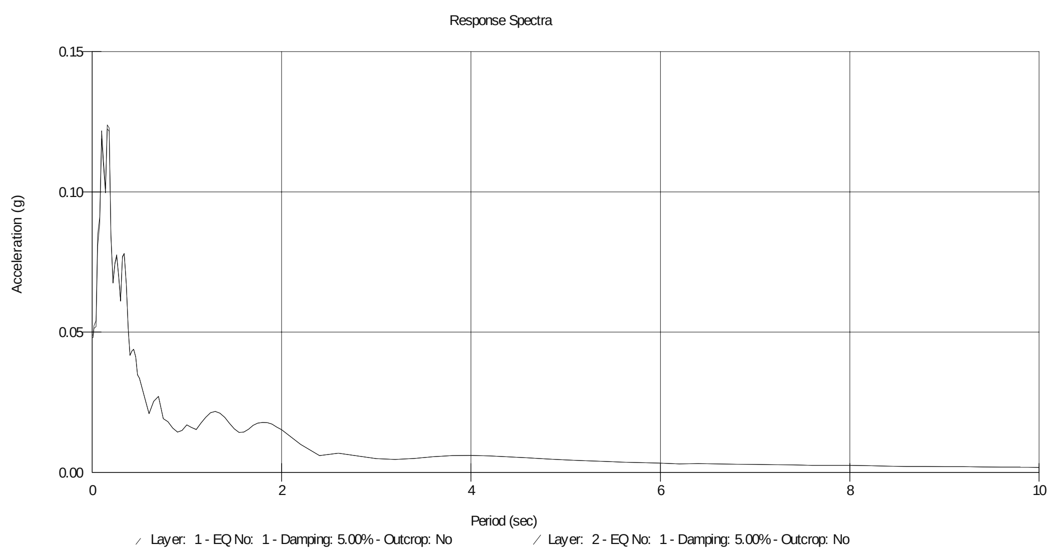
Response Spectra

a) 5% Soil Damping



A_{max} = 0.12g at T= 0.16 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.11 sec

Soil Profile

Profile Name: D4CCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 2.5 m.
Number of Layers: 37

Input Motion

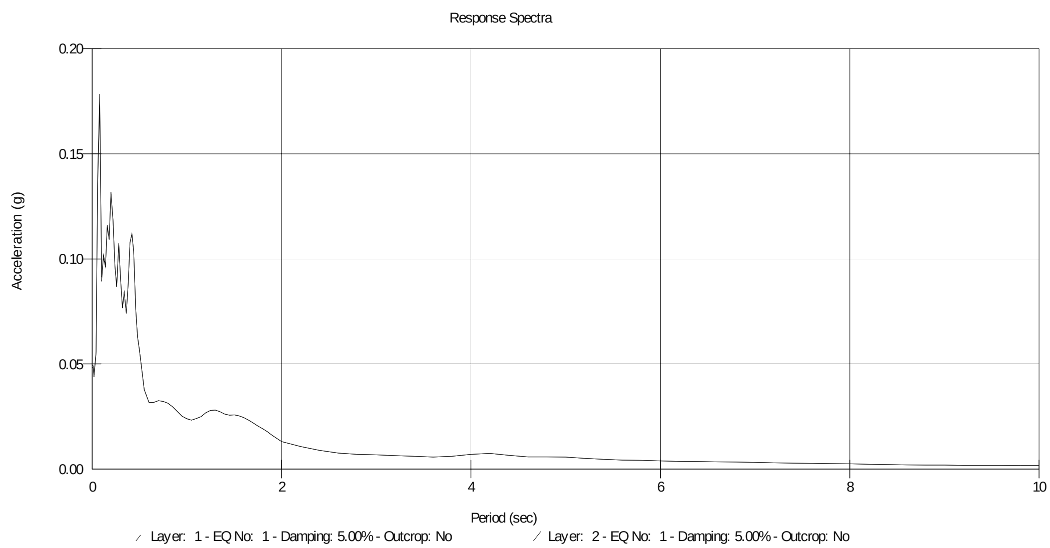
RAN230.EQ

Output Locations

Layers: 1 and 2

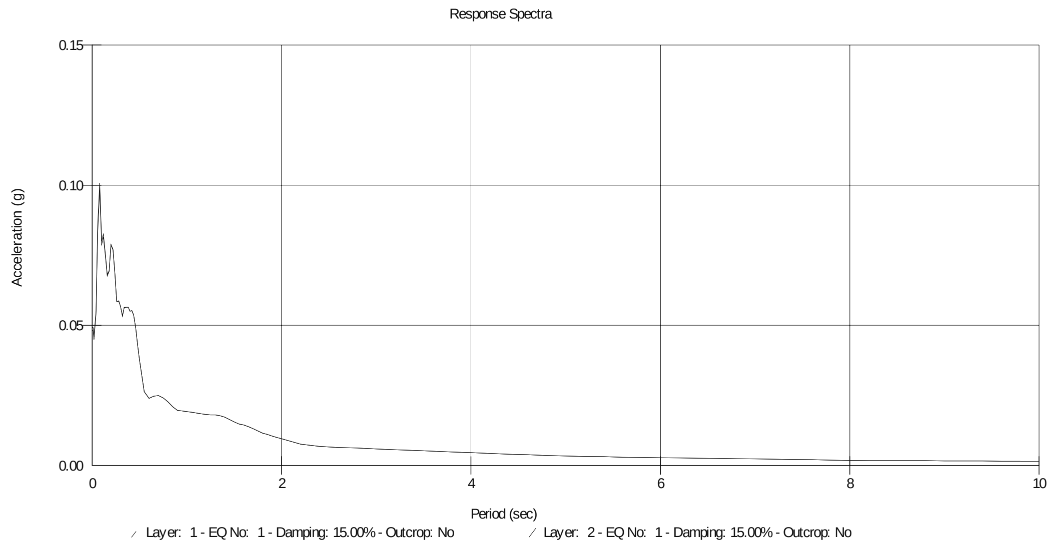
Response Spectra

a) 5% Soil Damping



A_{max} = 0.18g at T= 0.077 sec

b) 10% Soil Damping



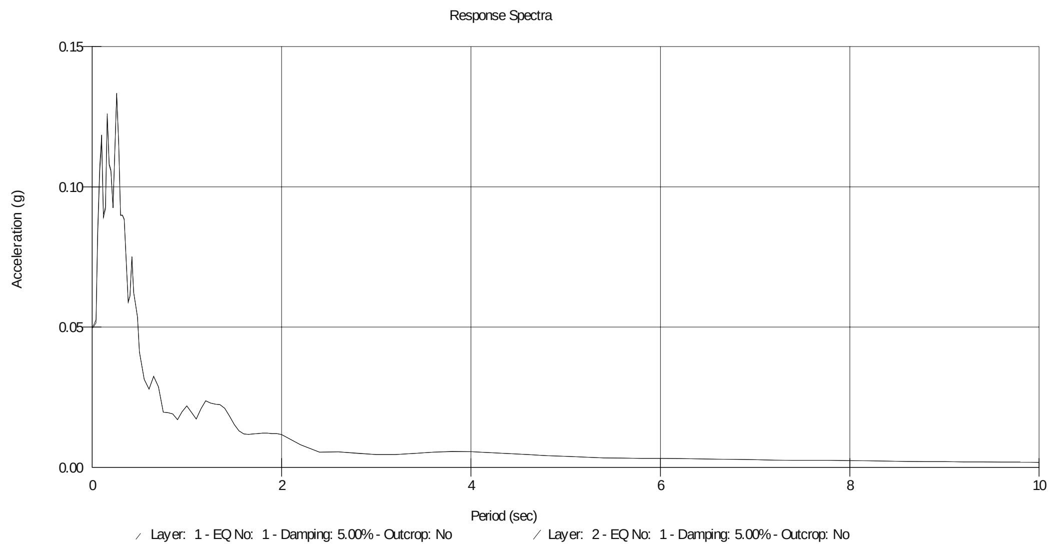
A_{max} = 0.10g at T= 0.077 sec

Input Motion

RAN330.EQ

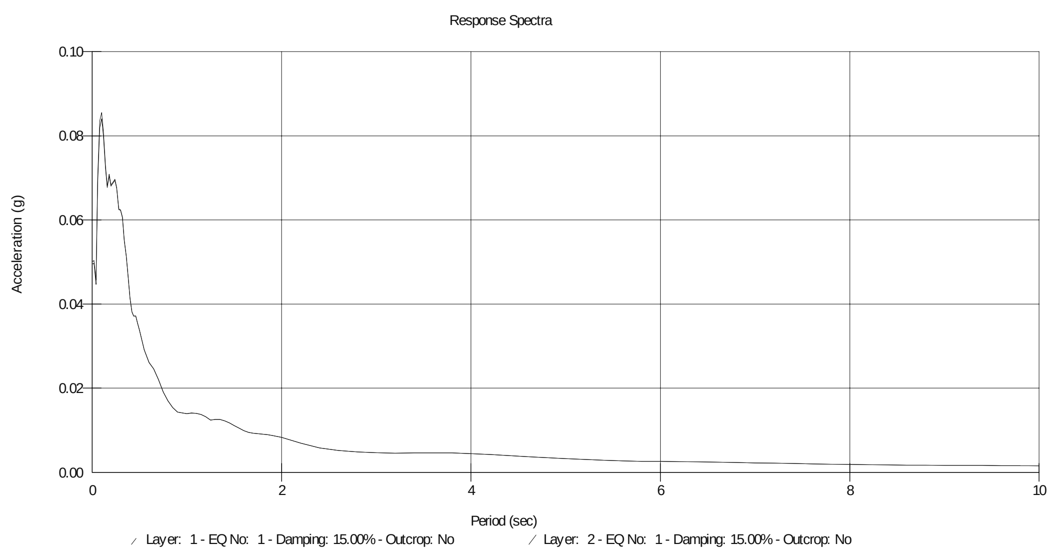
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.27 sec

b) 10% Soil Damping



A_{max} = 0.086 at T= 0.098 sec

Soil Profile

Profile Name: D5AC(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 40

Input Motion

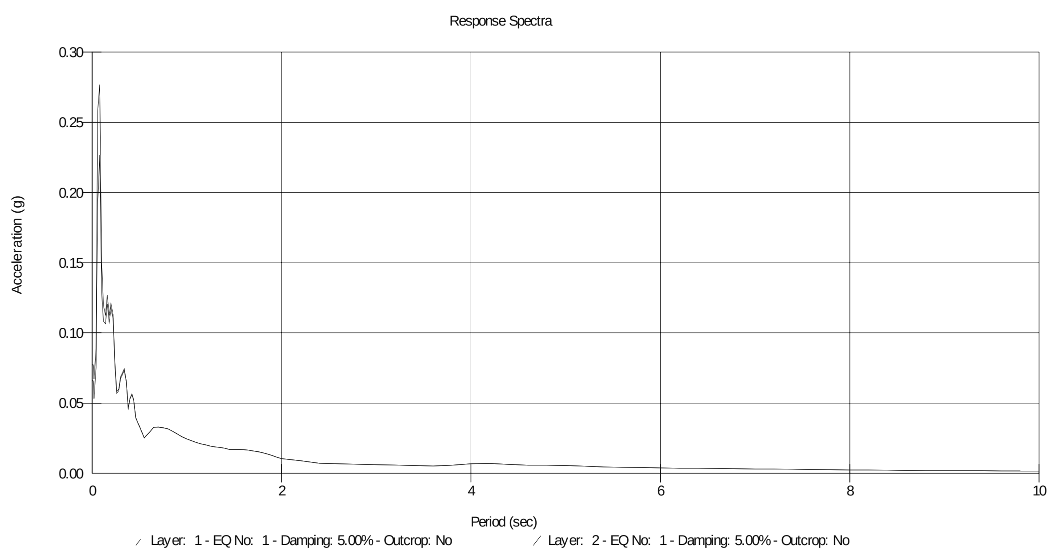
RAN230.EQ

Output Locations

Layers: 1 and 2

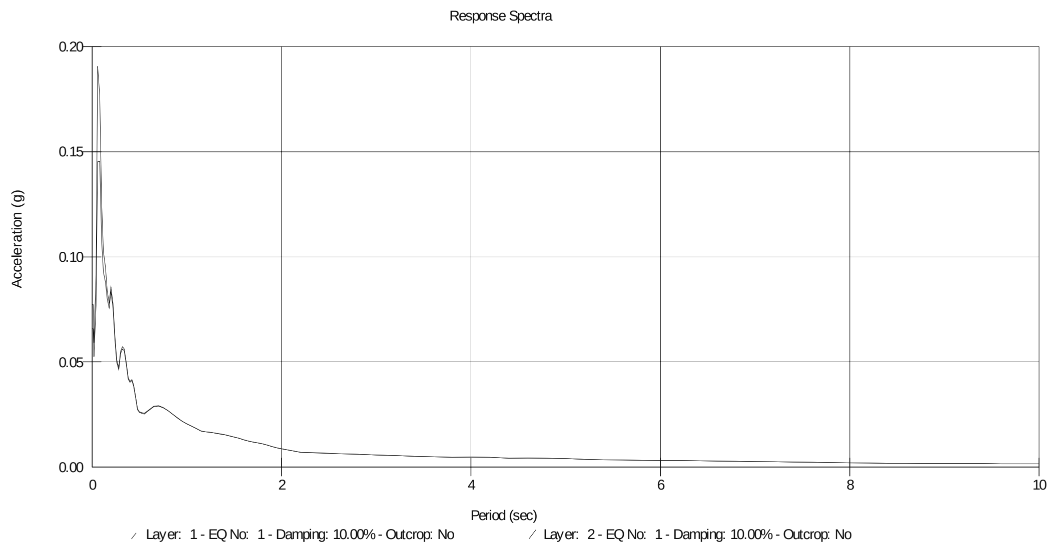
Response Spectra

a) 5% Soil Damping



A_{max} = 0.28g at T= 0.088 sec

b) 10% Soil Damping



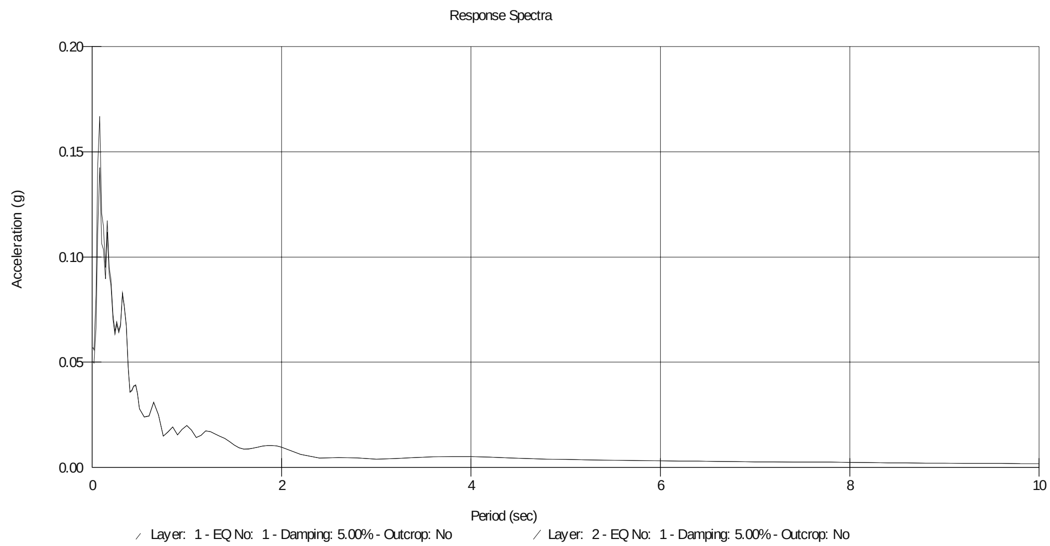
A_{max} = 0.19g at T= 0.064 sec

Input Motion

RAN330.EQ

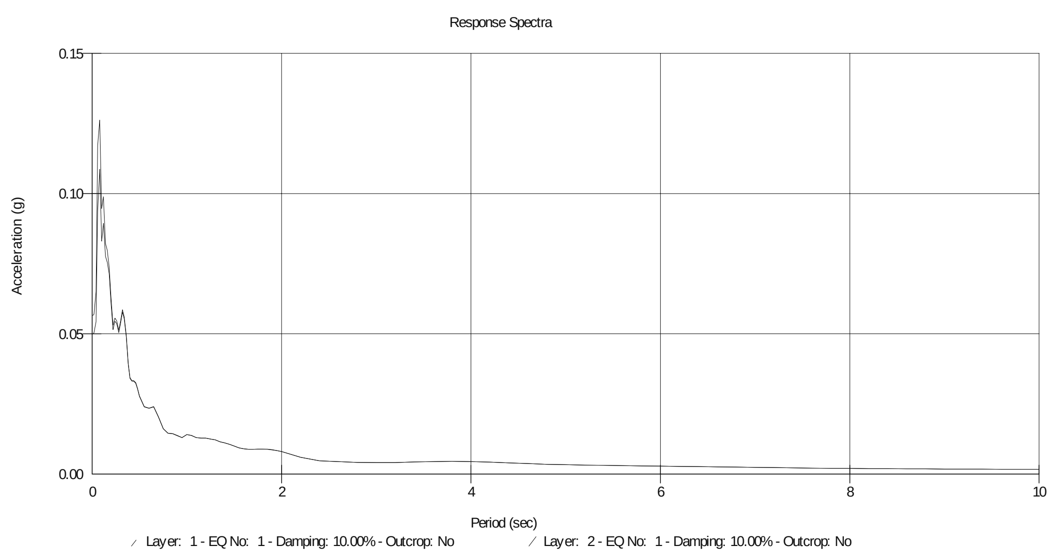
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at *T*= 0.088 sec

b) 10% Soil Damping



A_{max} = 0.13g at *T*= 0.077 sec

Soil Profile

Profile Name: D5C2(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 57

Input Motion

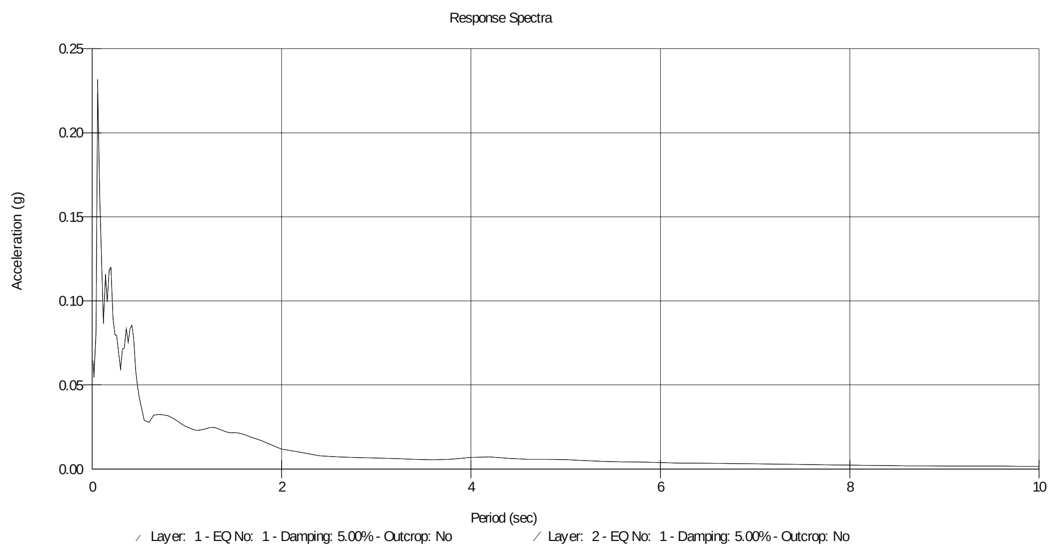
RAN230.EQ

Output Locations

Layers: 1 and 2

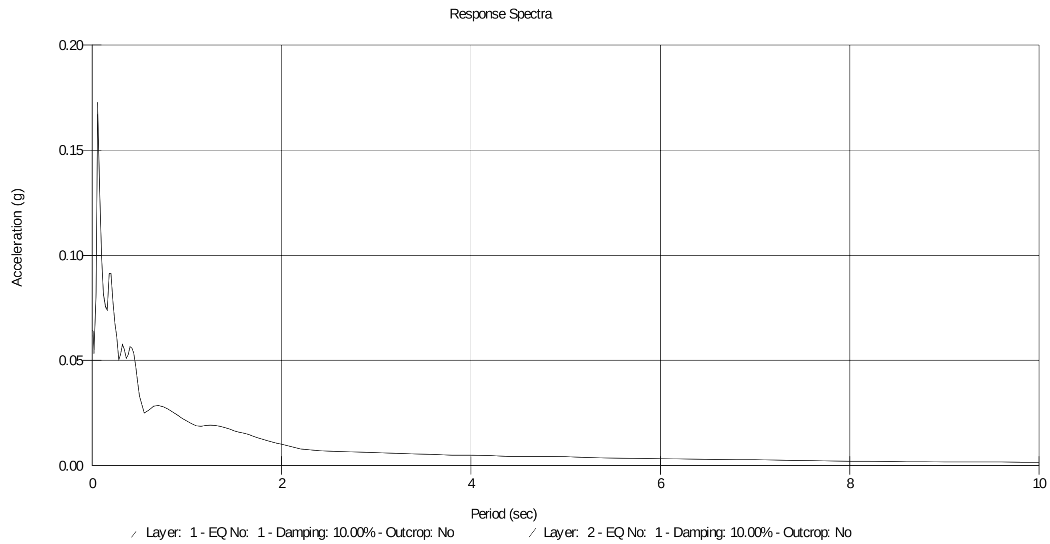
Response Spectra

a) 5% Soil Damping



A_{max} = 0.23g at T= 0.054 sec

b) 10% Soil Damping



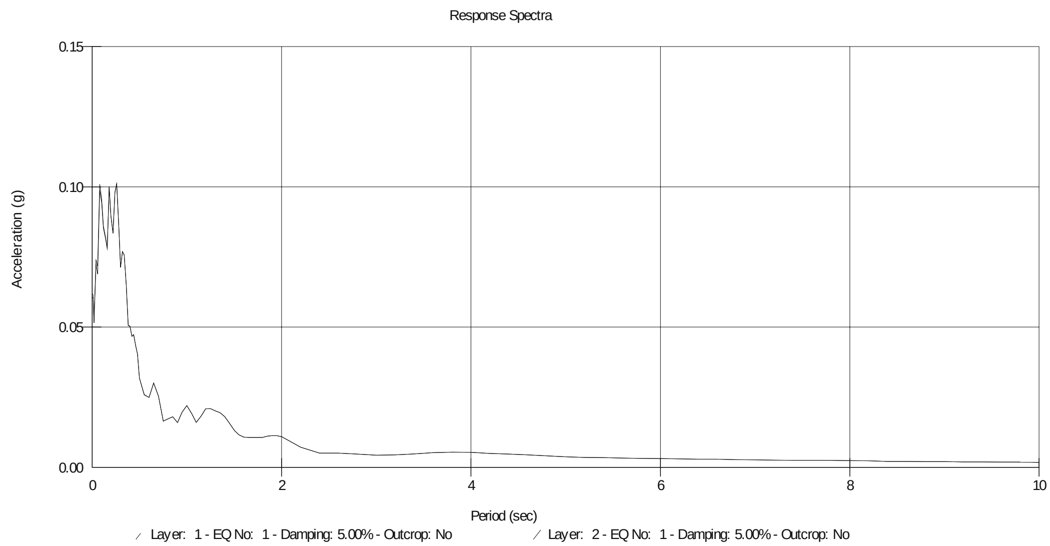
A_{max} = 0.17g at T= 0.054 sec

Input Motion

RAN330.EQ

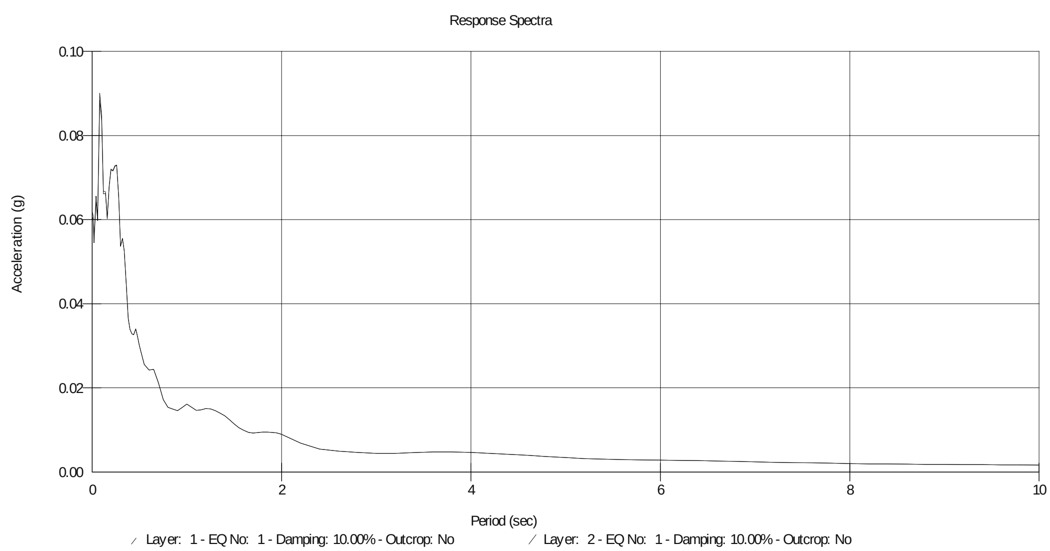
Response Spectra

a) 5% Soil Damping



A_{max} = 0.10 at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.09g at T= 0.077 sec

Soil Profile

Profile Name: D5CCHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 48

Input Motion

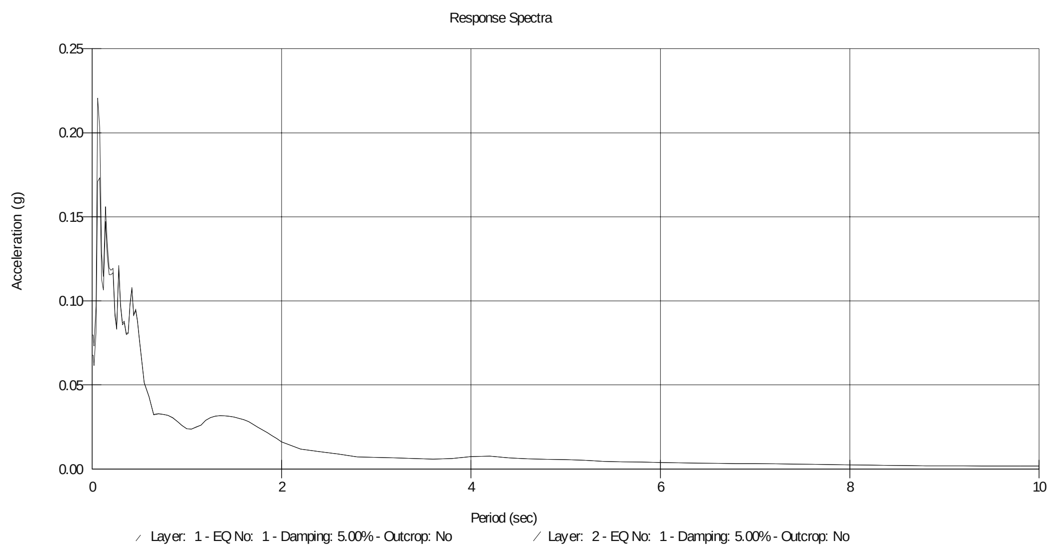
RAN230.EQ

Output Locations

Layers: 1 and 2

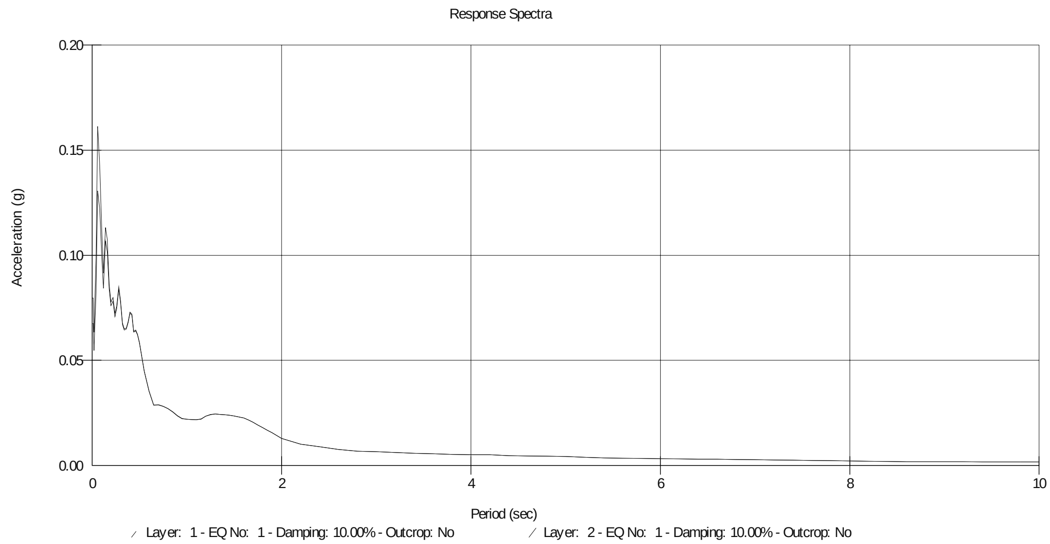
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.064 sec

b) 10% Soil Damping



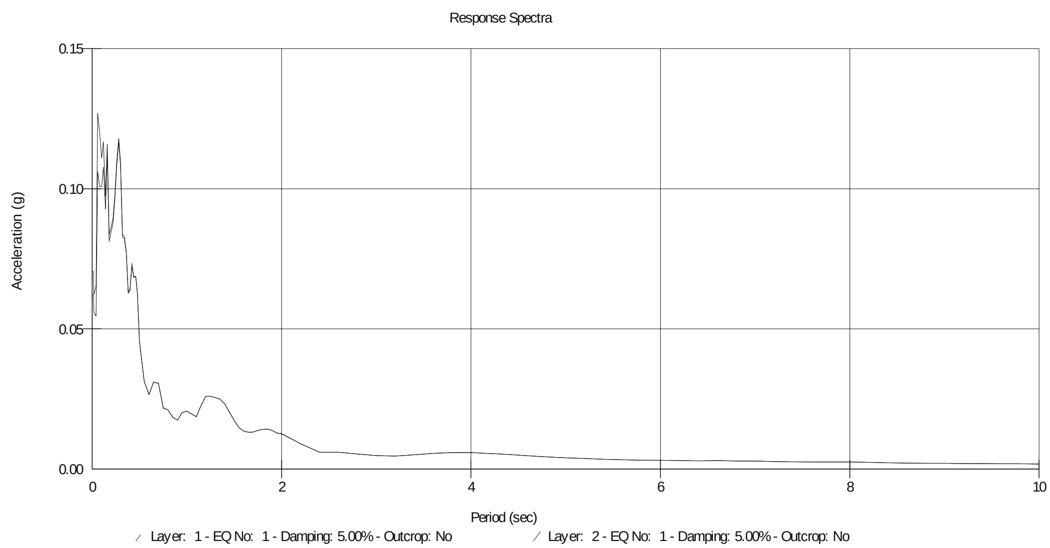
$A_{max} = 0.16g$ at $T = 0.064$ sec

Input Motion

RAN330.EQ

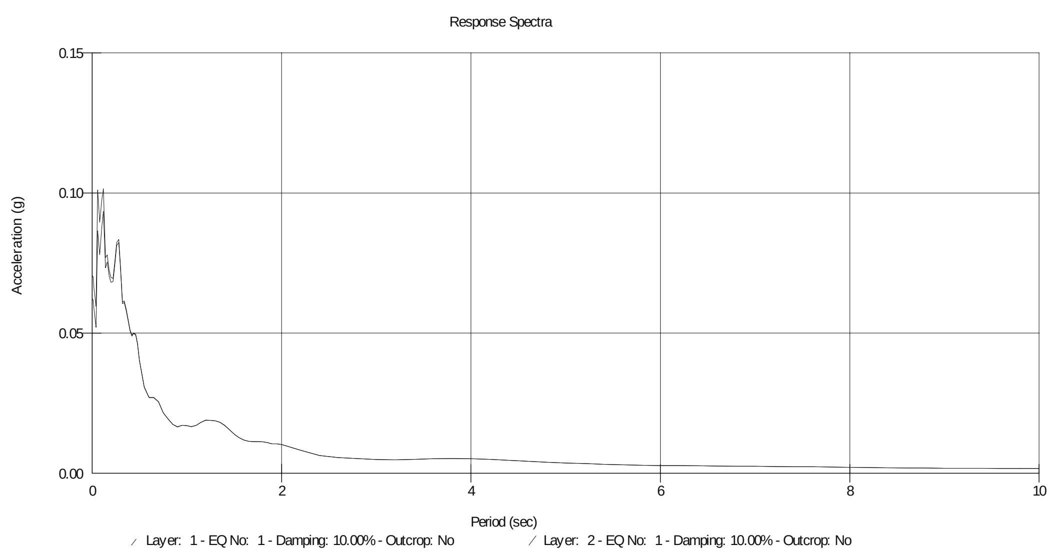
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.064 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.054 sec

Soil Profile

Profile Name: D6C(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 42

Input Motion

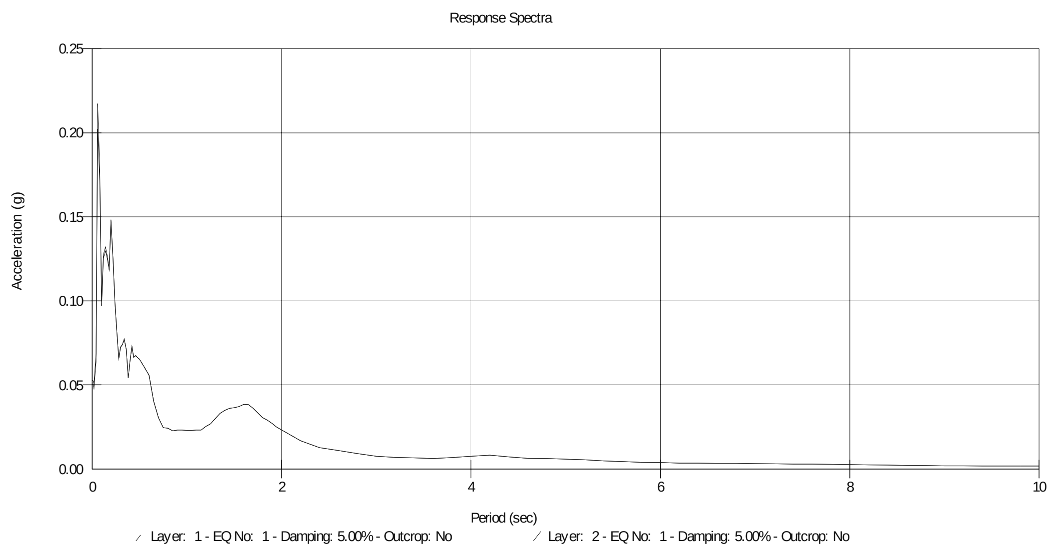
RAN230.EQ

Output Locations

Layers: 1 and 2

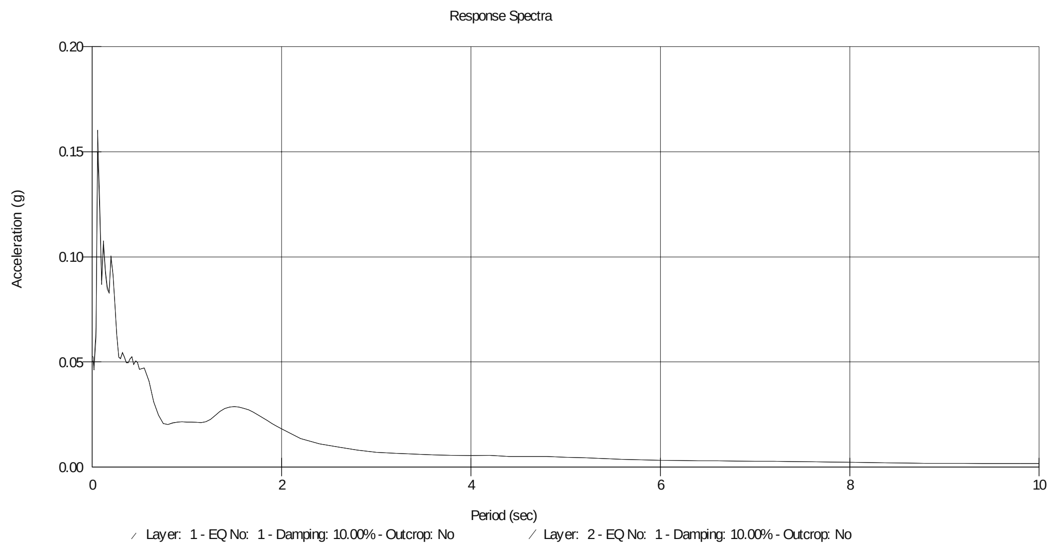
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.054 sec

b) 10% Soil Damping



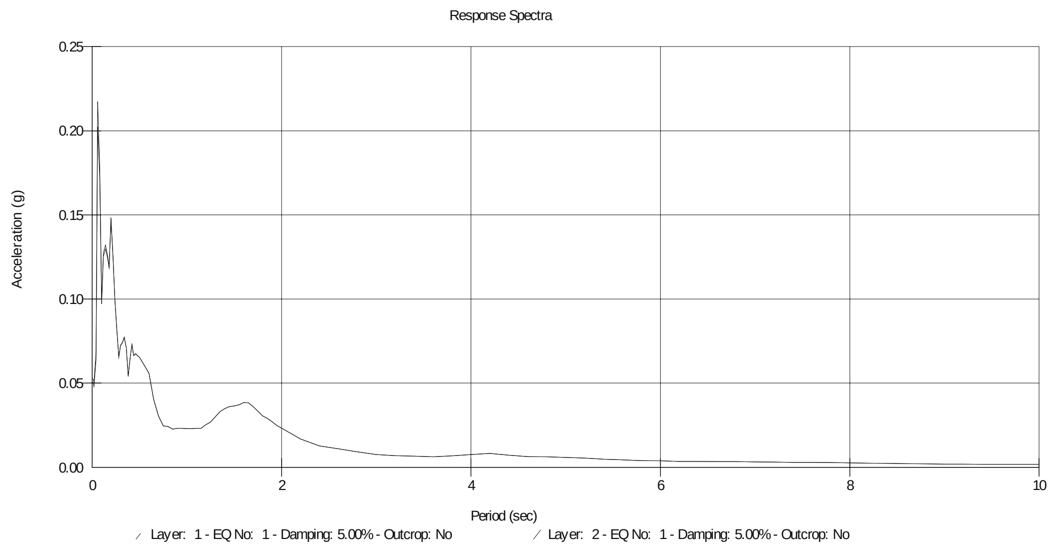
A_{max} = 0.16g at T= 0.064 sec

Input Motion

RAN330.EQ

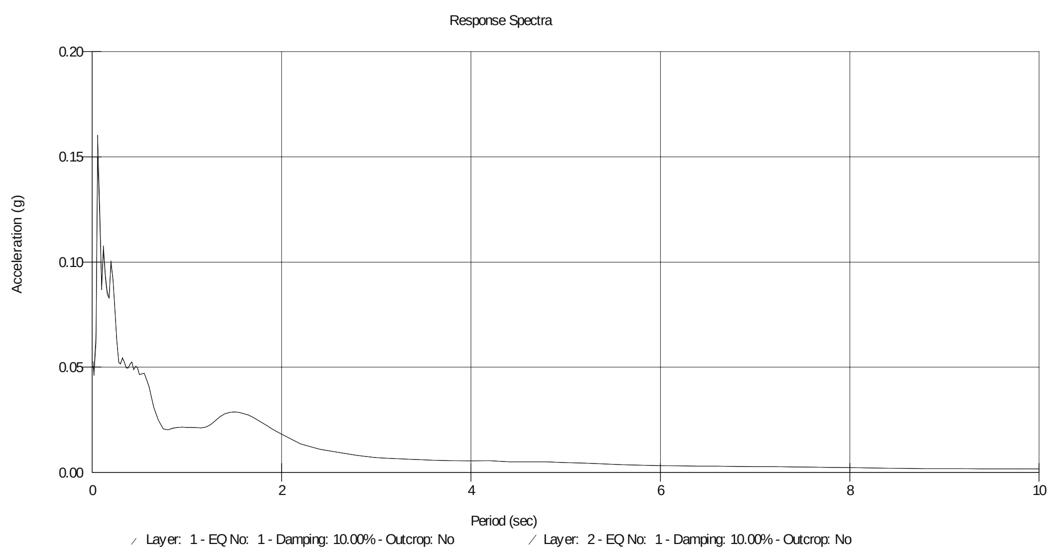
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.054 sec

b) 10% Soil Damping



A_{max} = 0.16g at T= 0.064 sec

Soil Profile

Profile Name: D6CCHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 44

Input Motion

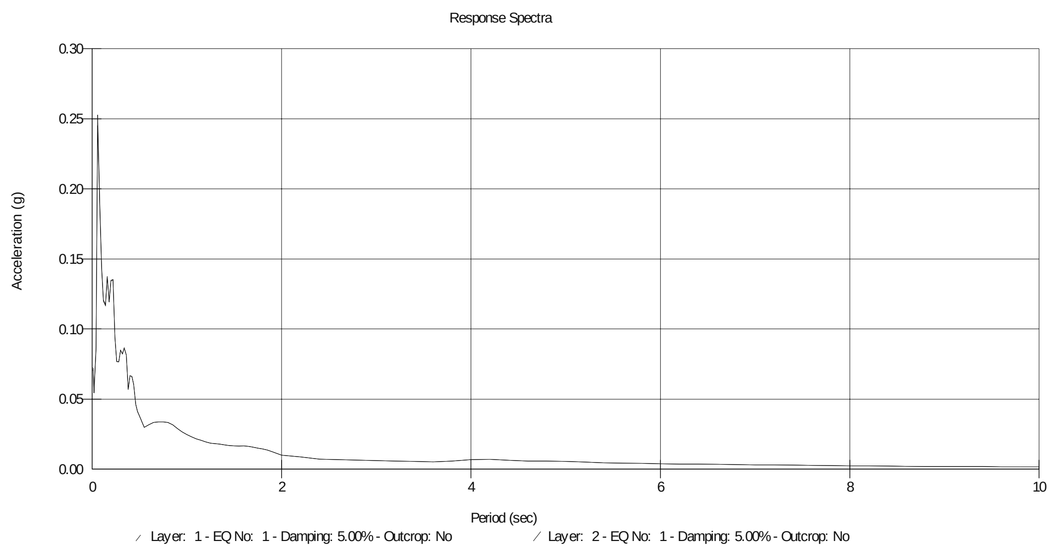
RAN230.EQ

Output Locations

Layers: 1 and 2

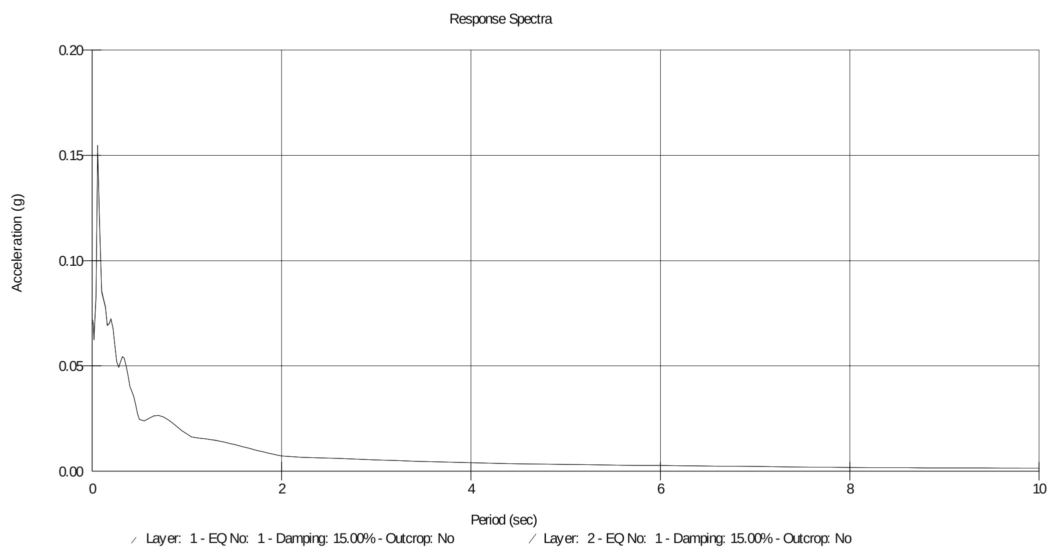
Response Spectra

a) 5% Soil Damping



A_{max} = 0.25g at T= 0.054 sec

b) 10% Soil Damping



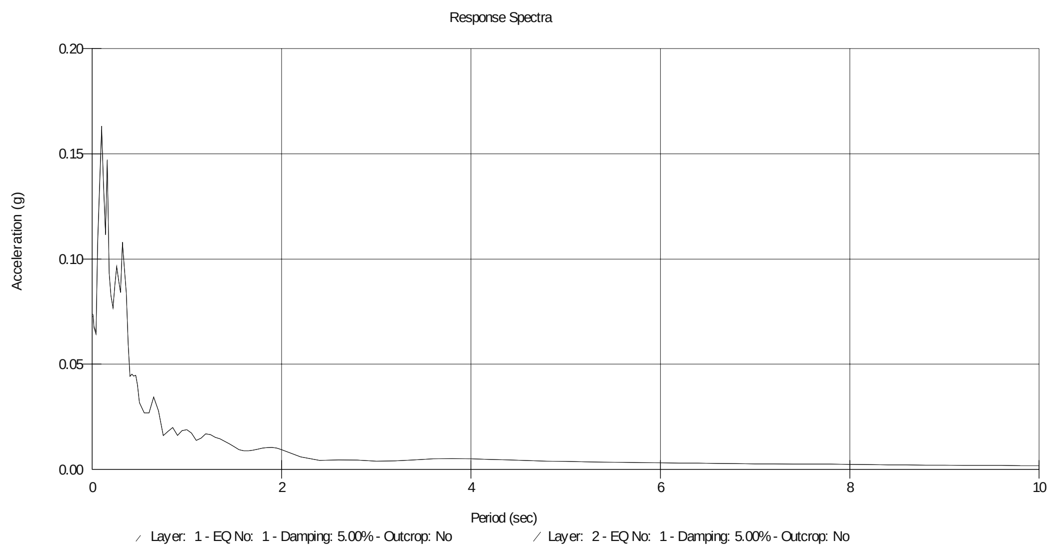
A_{max} = 0.16g at T= 0.054 sec

Input Motion

RAN330.EQ

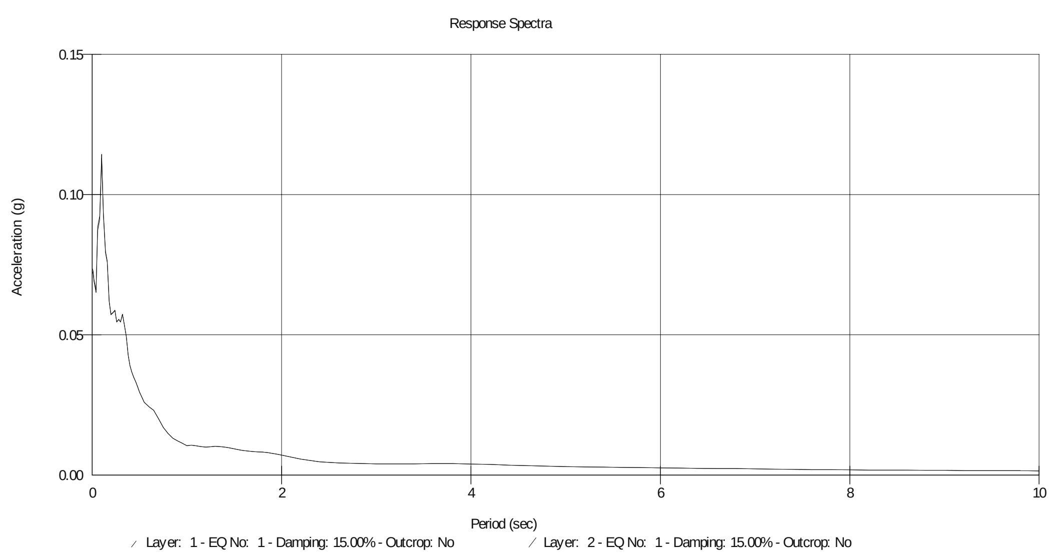
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.098 sec

Soil Profile

Profile Name: D7CCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 26 m.
Number of Layers: 37

Input Motion

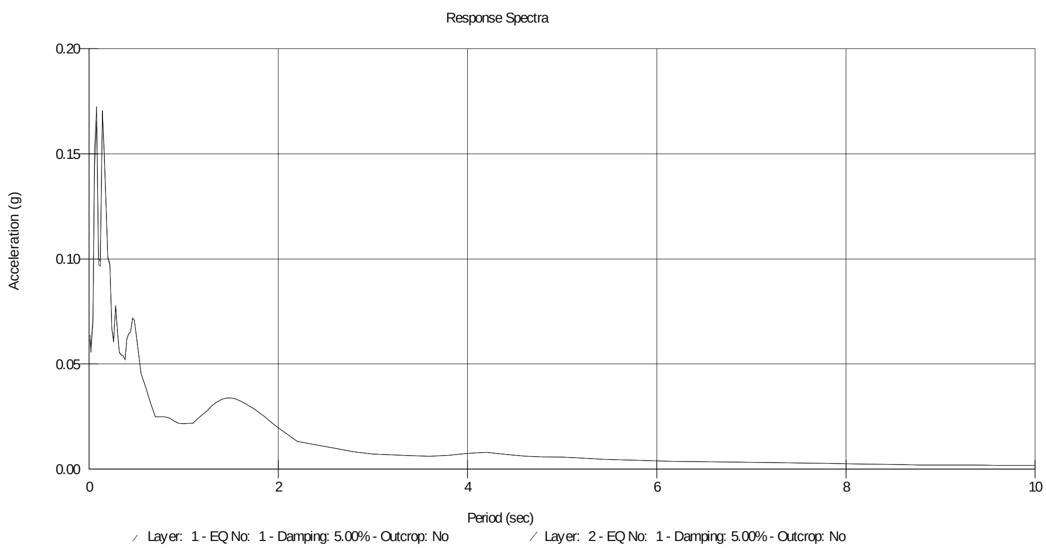
RAN230.EQ

Output Locations

Layers: 1 and 2

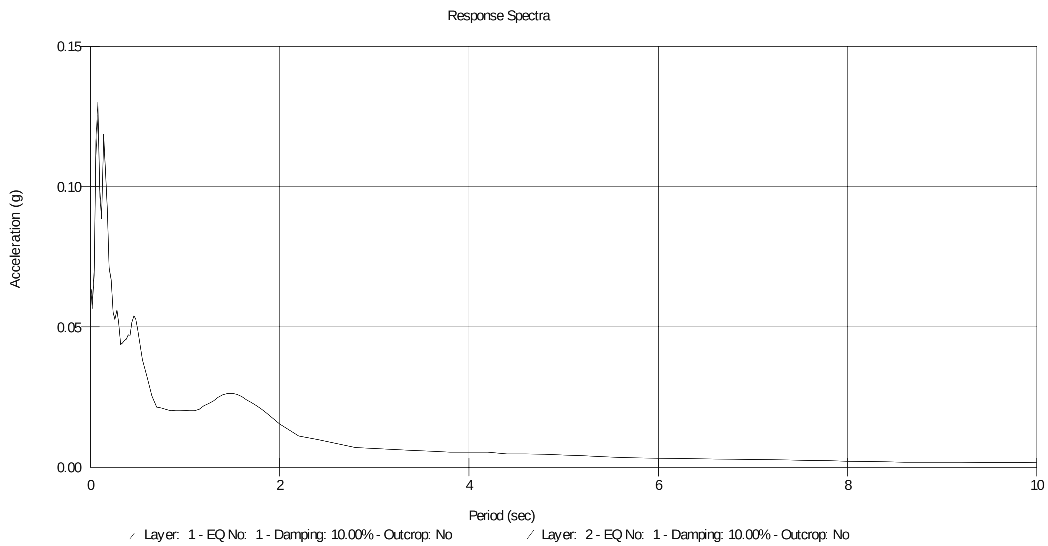
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.077 sec

b) 10% Soil Damping



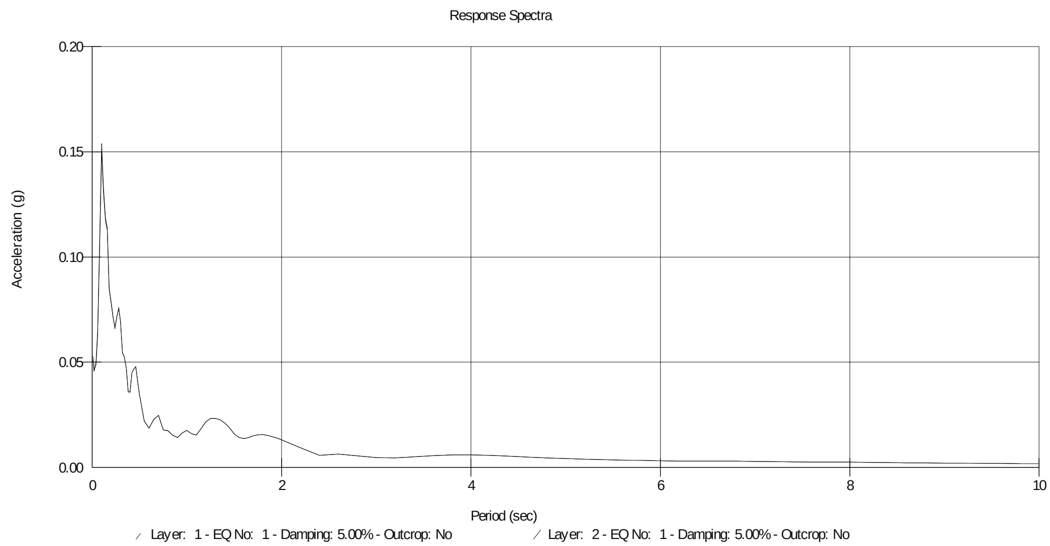
A_{max} = 0.13g at T= 0.077 sec

Input Motion

RAN330.EQ

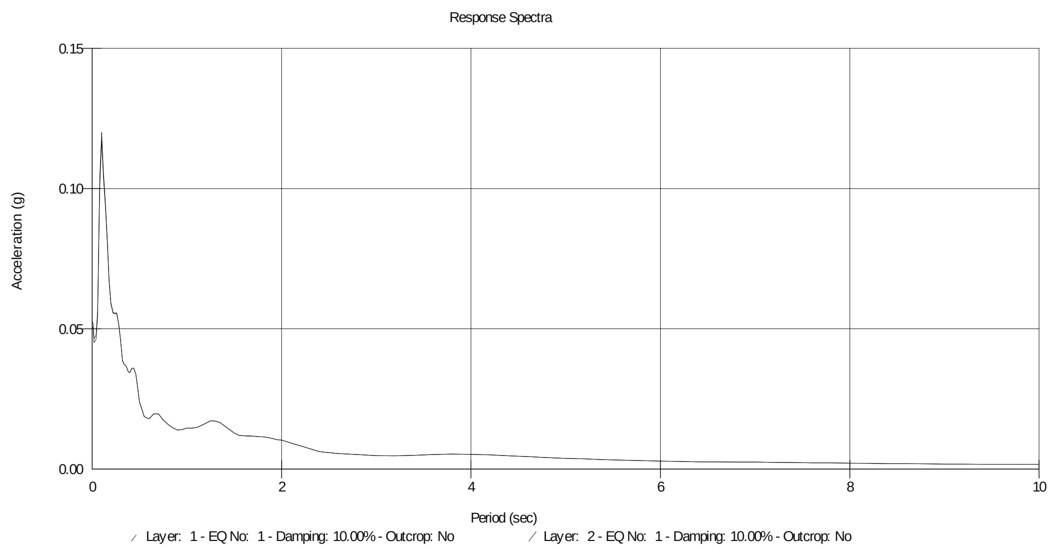
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.098 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.11 sec

Soil Profile

Profile Name: D8CCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 25 m.
Number of Layers: 35

Input Motion

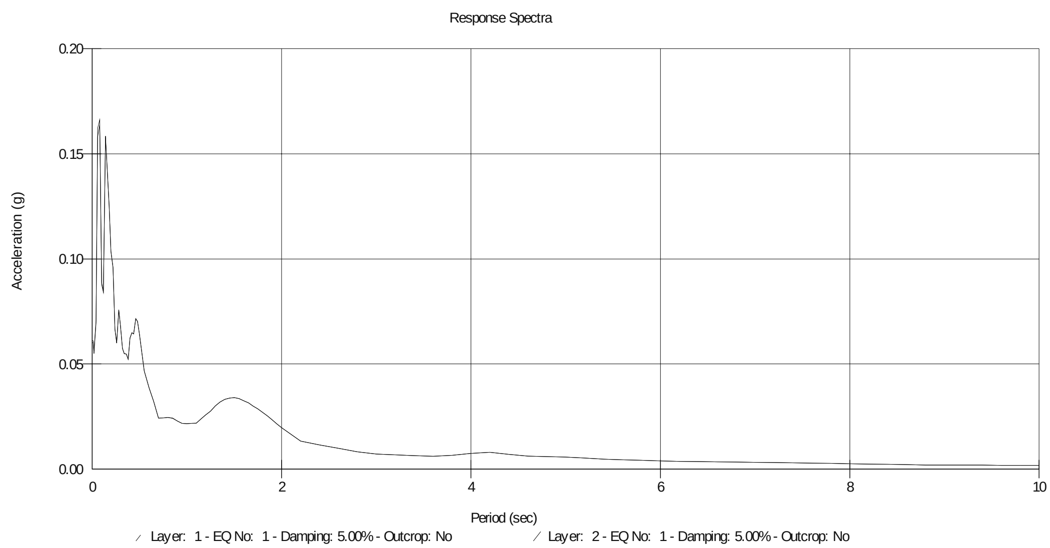
RAN230.EQ

Output Locations

Layers: 1 and 2

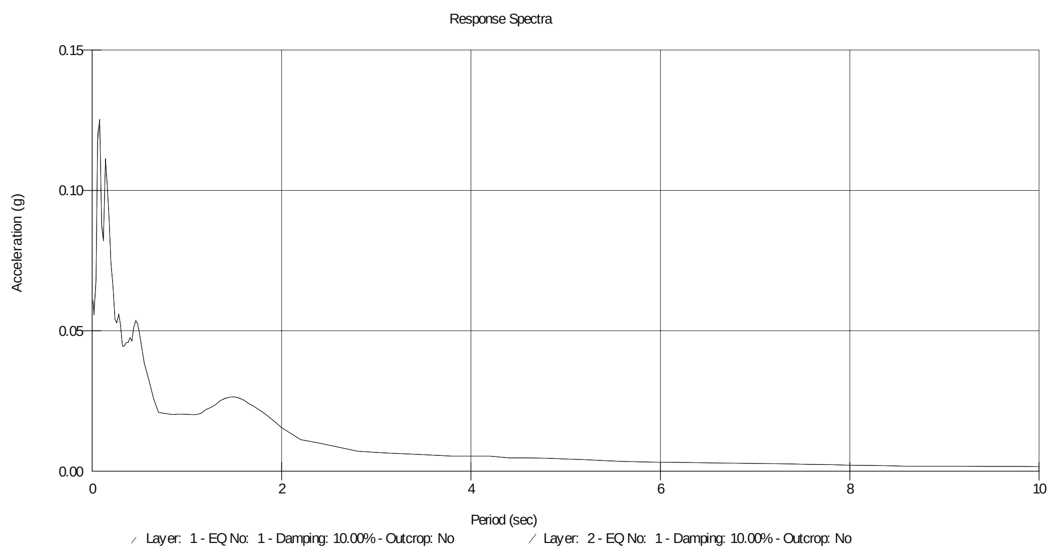
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.064 sec

b) 10% Soil Damping



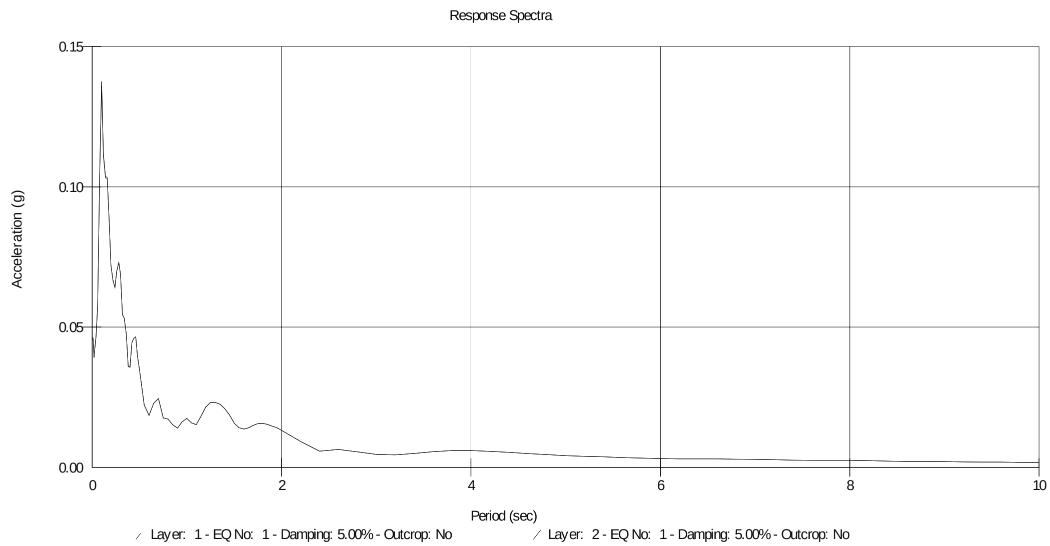
A_{max} = 0.12g at T= 0.077 sec

Input Motion

RAN330.EQ

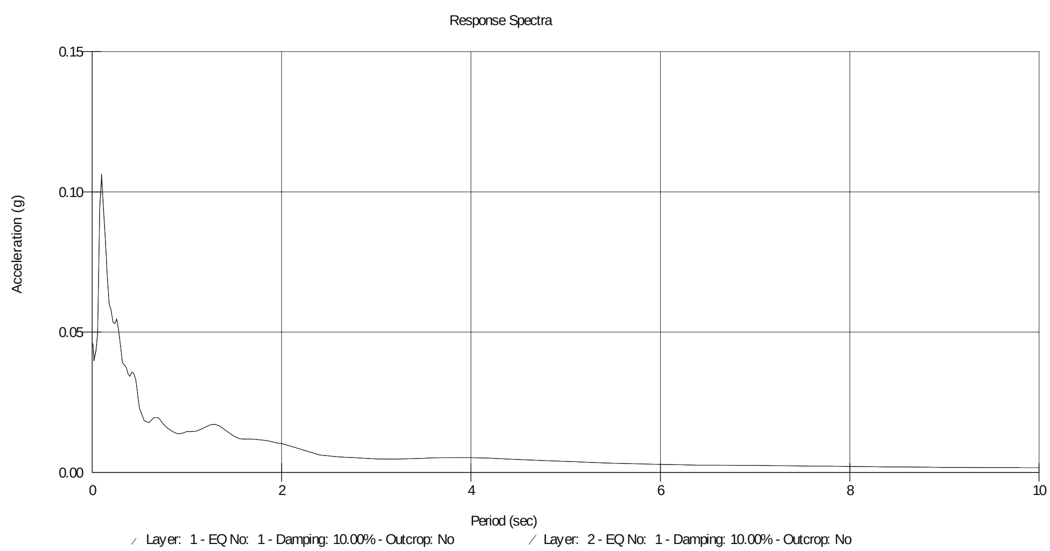
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.11sec

Soil Profile

Profile Name: D9CCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 25 m.
Number of Layers: 35

Input Motion

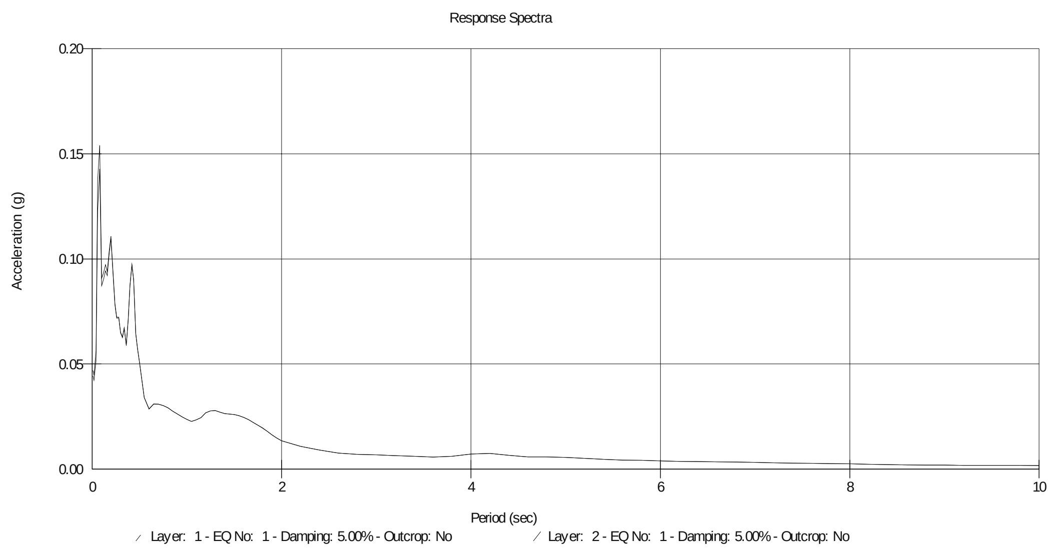
RAN230.EQ

Output Locations

Layers: 1 and 2

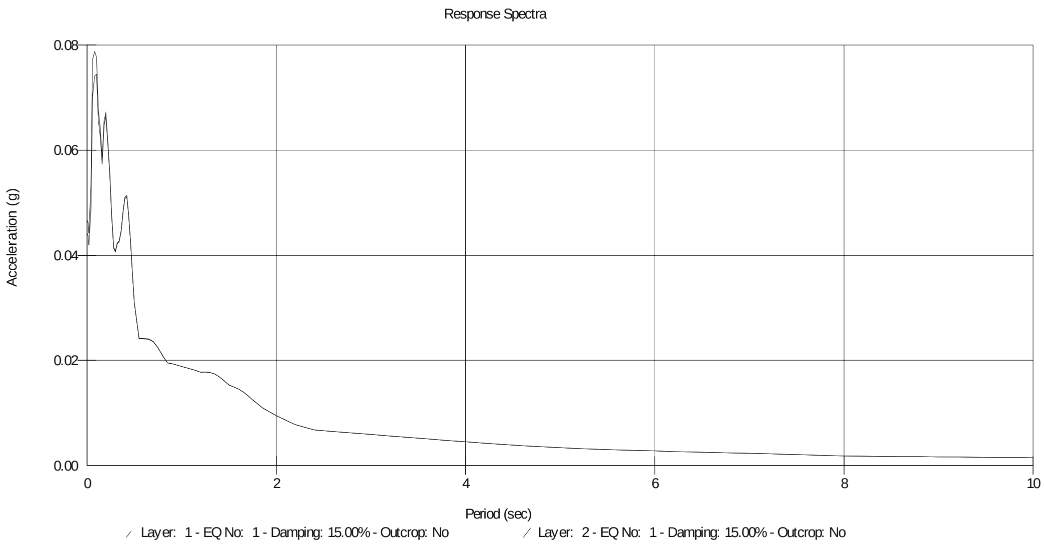
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.077 sec

b) 10% Soil Damping



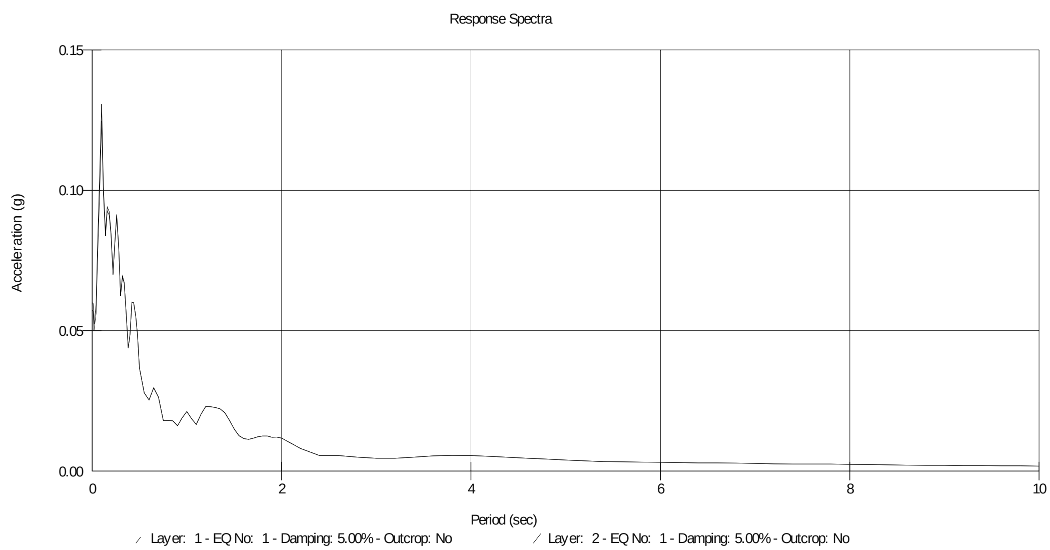
A_{max} = 0.08g at T= 0.064 sec

Input Motion

RAN330.EQ

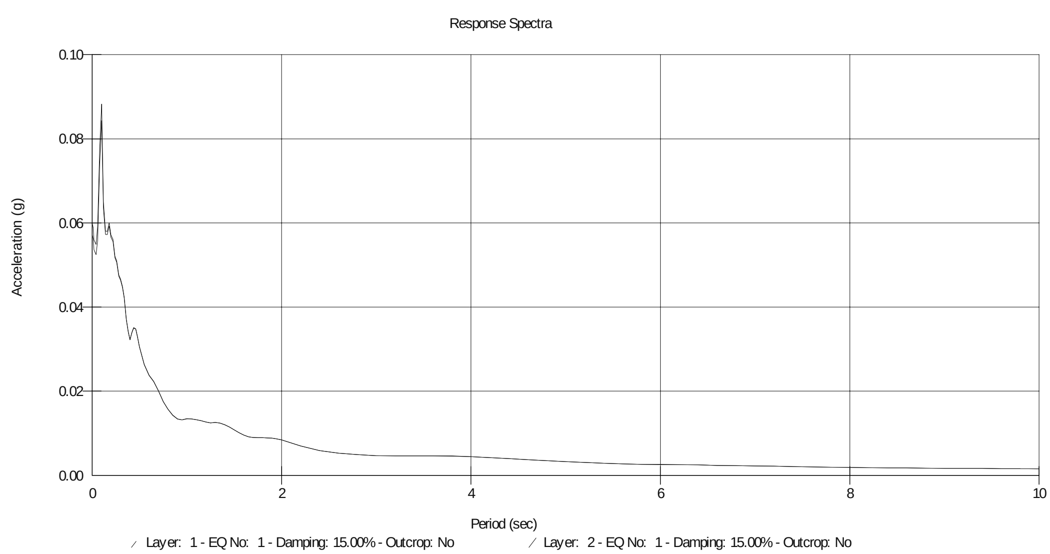
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.088g at T= 0.098 sec

Soil Profile

Profile Name: D11C(CXW)
Tests Types and Designations: SPT(30) CXW-Cross hole
Water Table Depth: 2.6m.
Number of Layers: 39

Input Motion

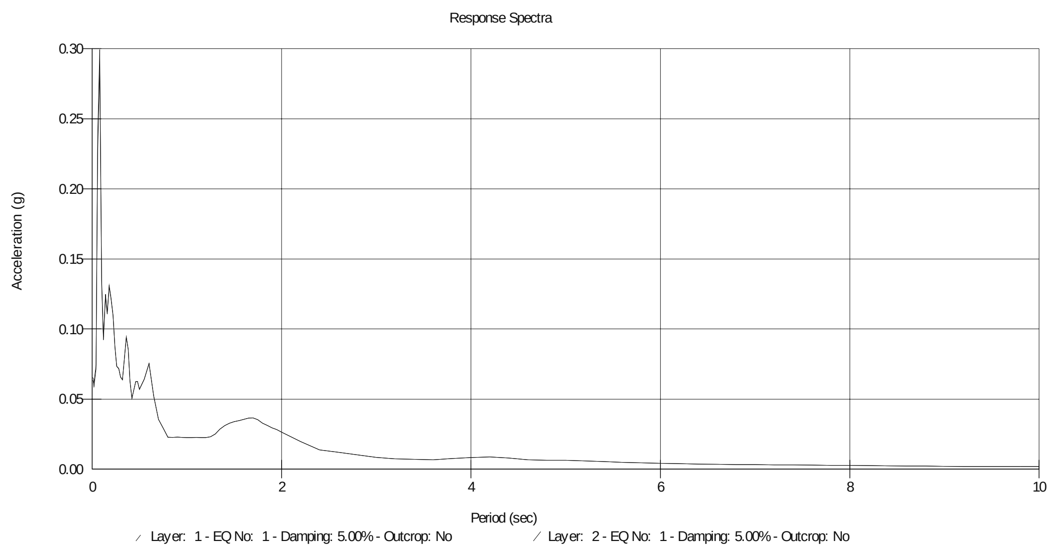
RAN230.EQ

Output Locations

Layers: 1 and 2

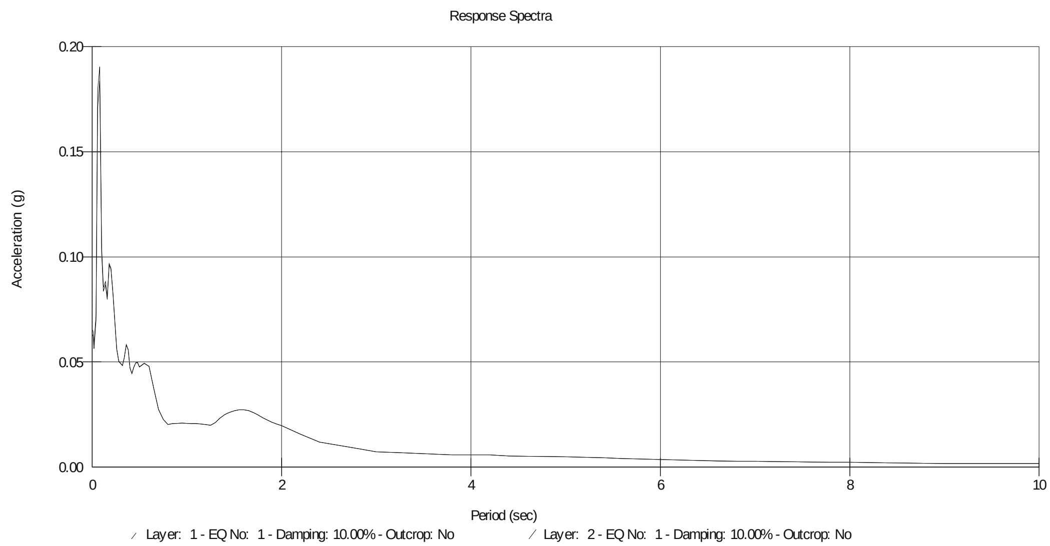
Response Spectra

a) 5% Soil Damping



A_{max} = 0.30g at T= 0.064 sec

b) 10% Soil Damping



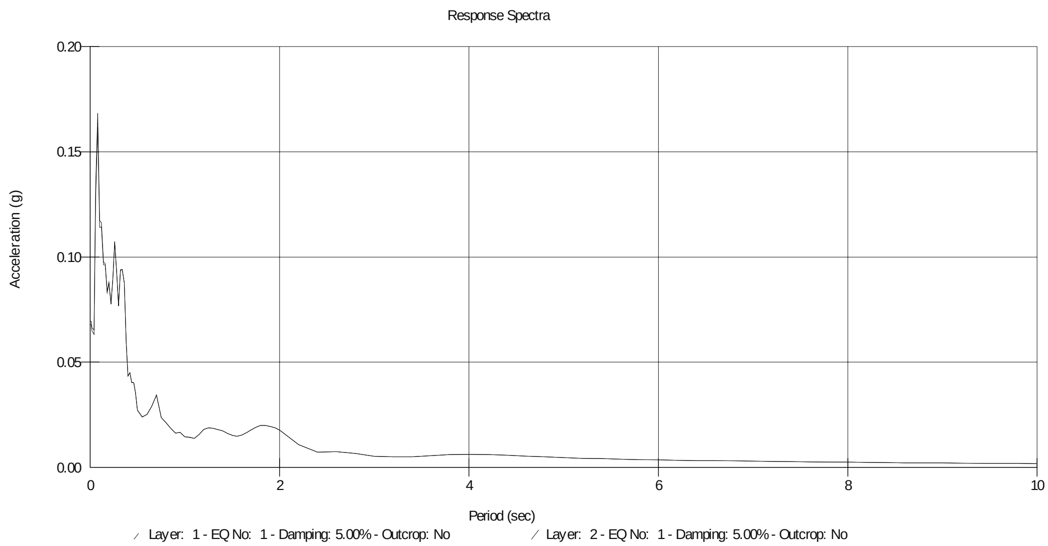
A_{max} = 0.19g at T= 0.077 sec

Input Motion

RAN330.EQ

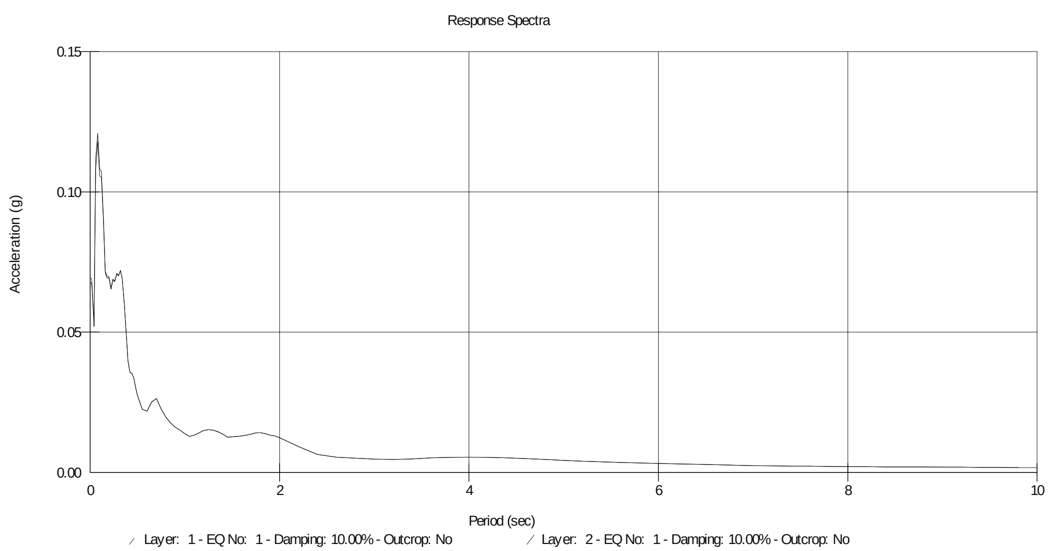
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.17g$ at $T = 0.077$ sec

b) 10% Soil Damping



$A_{max} = 0.12g$ at $T = 0.077$ sec

Soil Profile

Profile Name: D11C (CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6 m.
Number of Layers: 48

Input Motion

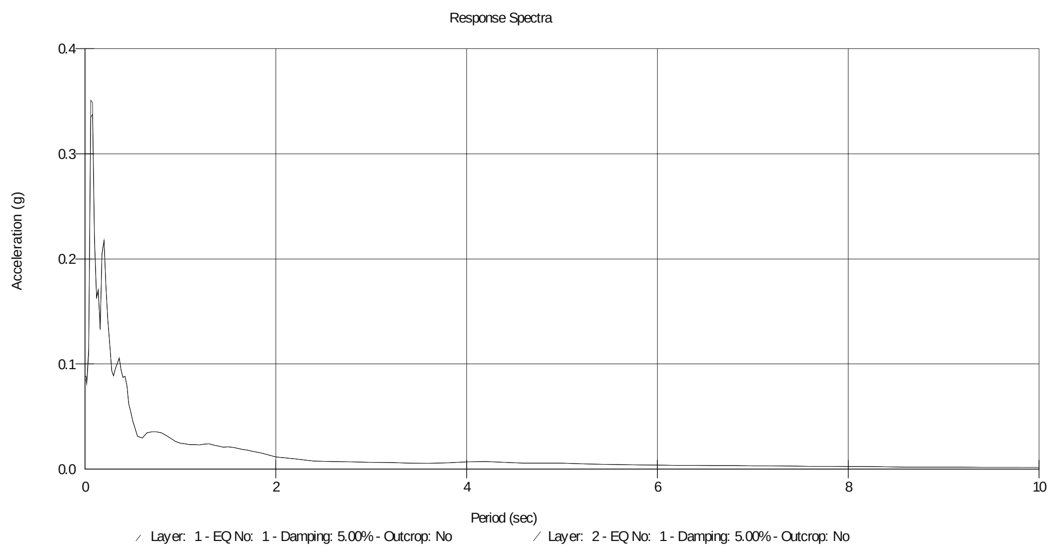
RAN230.EQ

Output Locations

Layers: 1 and 2

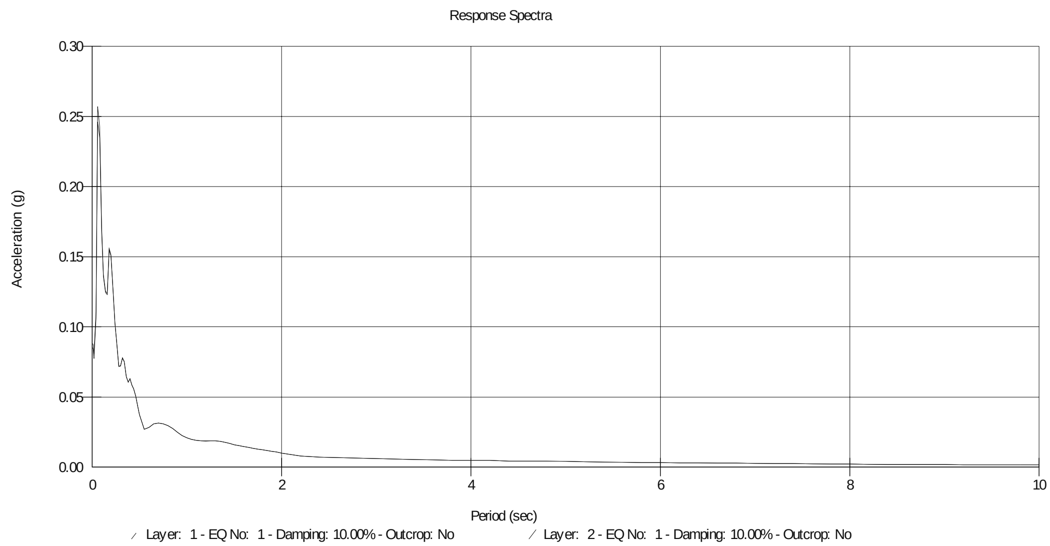
Response Spectra

a) 5% Soil Damping



A_{max} = 0.35g at T= 0.064 sec

b) 10% Soil Damping



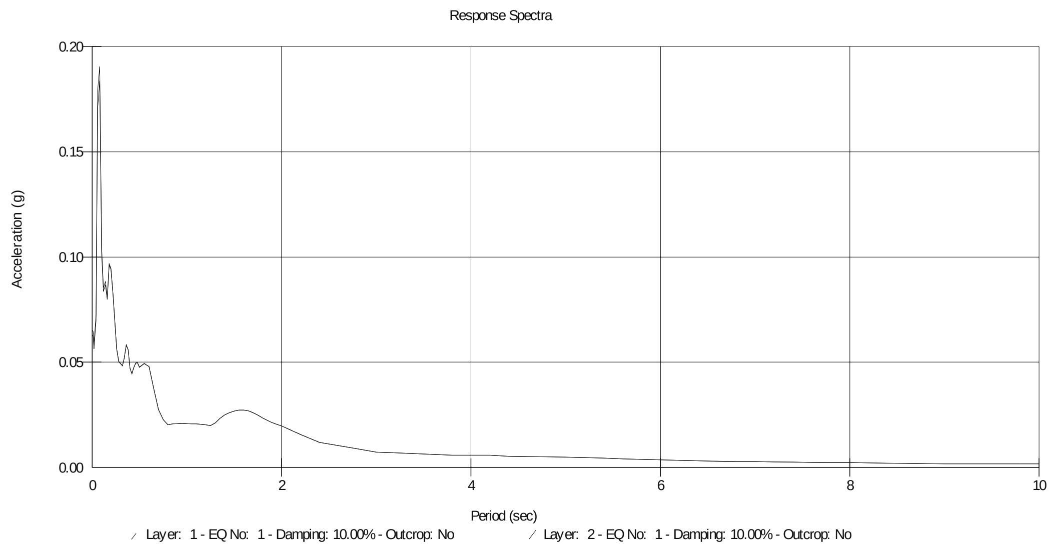
A_{max} = 0.26g at T= 0.054 sec

<u>**Input Motion**</u>

RAN330.EQ

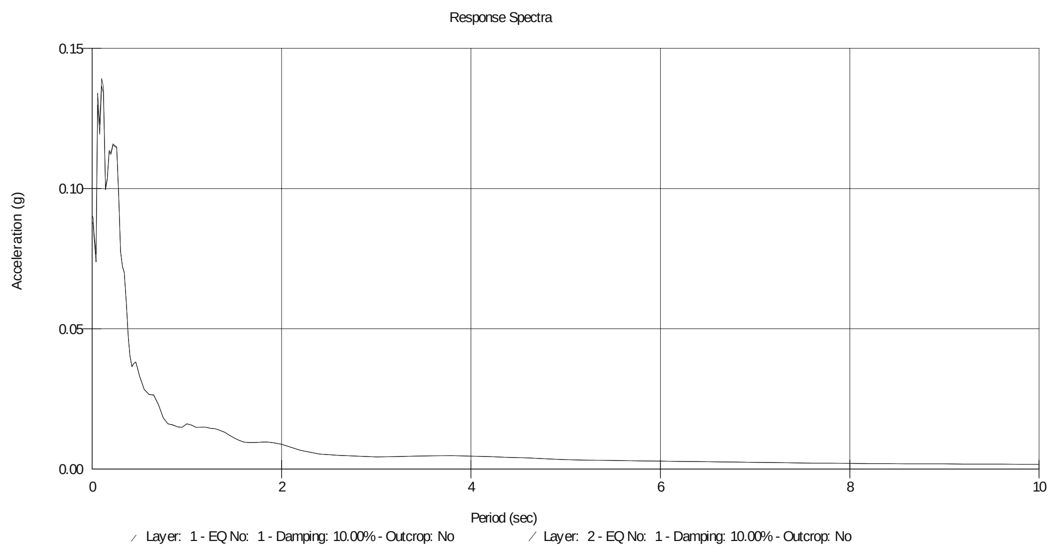
<u>**Response Spectra**</u>

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.077sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.09 sec

Soil Profile

Profile Name: D12C(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 33

Input Motion

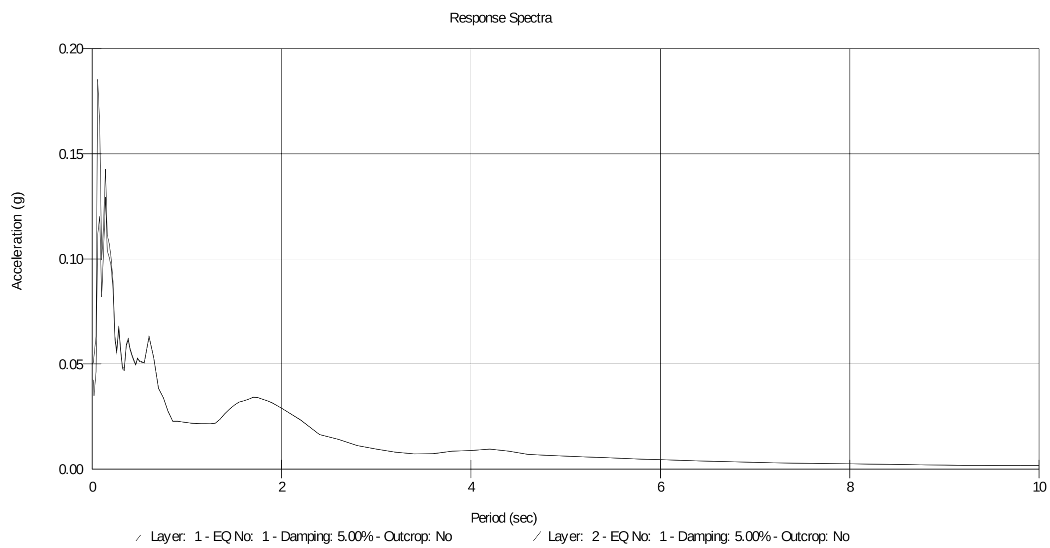
RAN230.EQ

Output Locations

Layers: 1 and 2

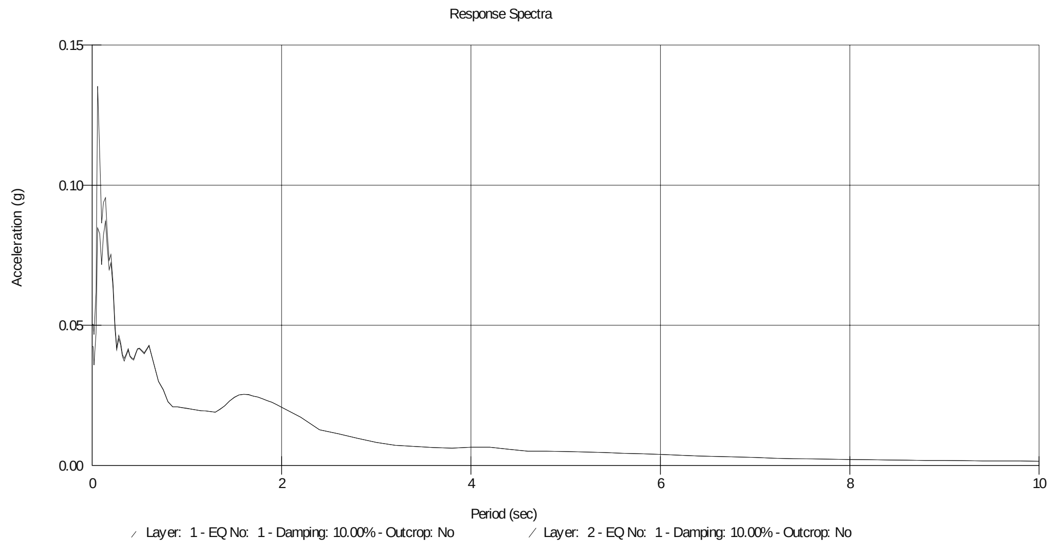
Response Spectra

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.054 sec

b) 10% Soil Damping



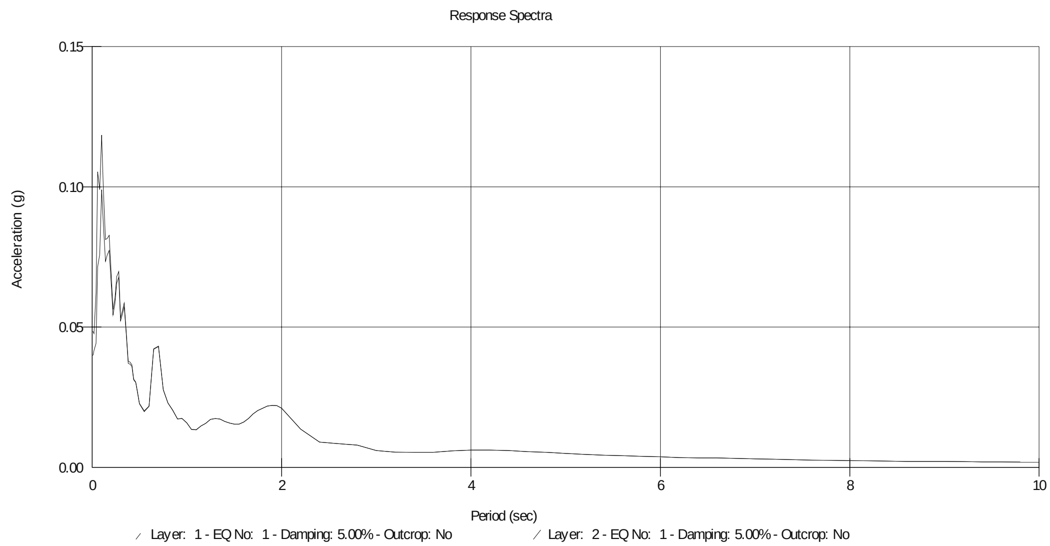
$A_{max} = 0.14g$ at $T = 0.054$ sec

Input Motion

RAN330.EQ

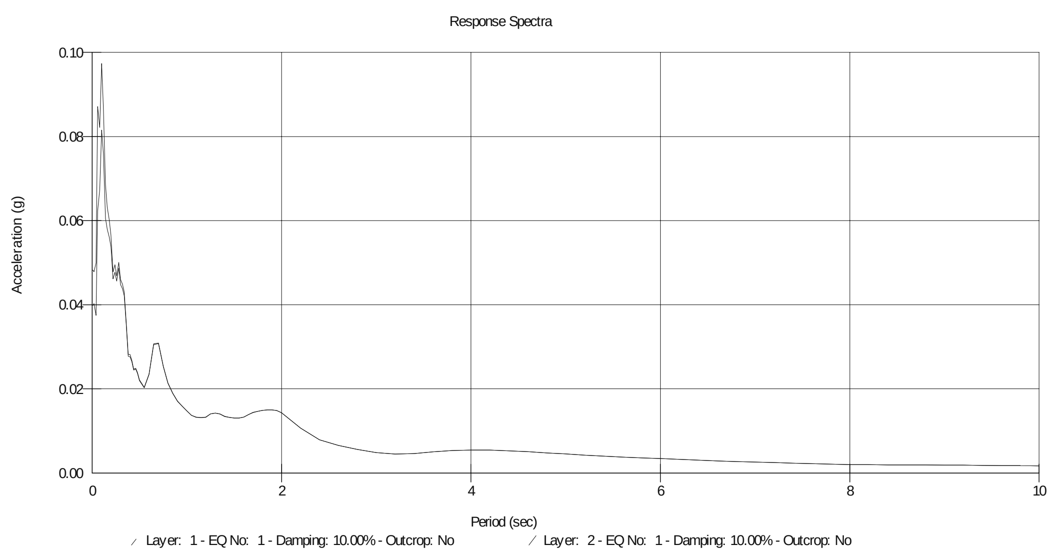
Response Spectra

a) 5% Soil Damping



A_{max} = 0.12g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.11 sec

Soil Profile

Profile Name: D12C(CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 45

Input Motion

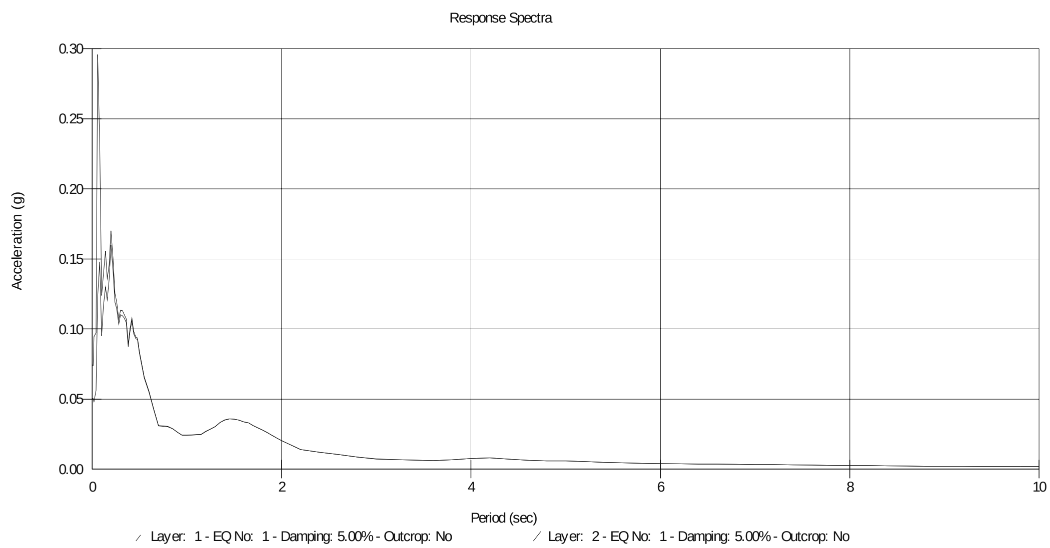
RAN230.EQ

Output Locations

Layers: 1 and 2

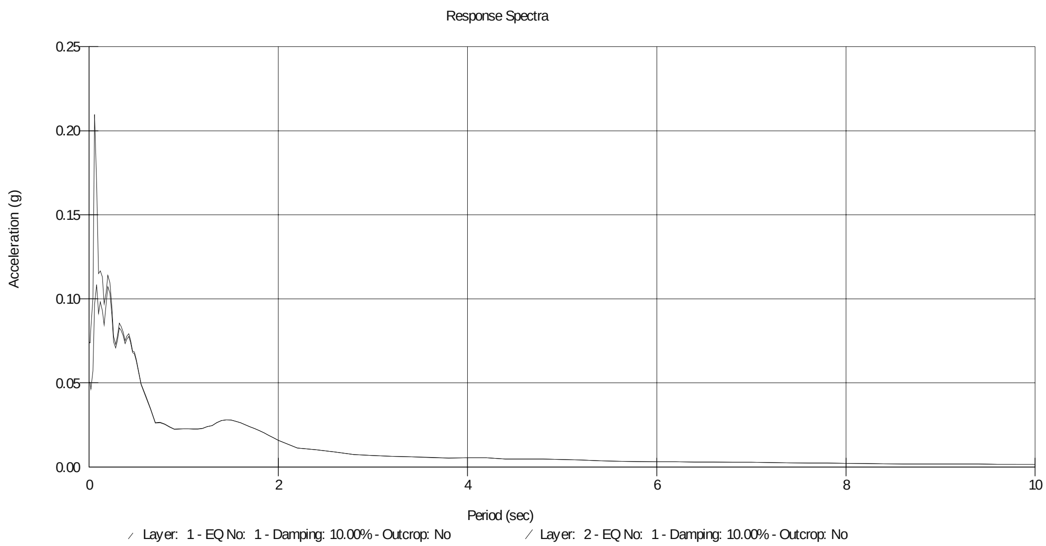
Response Spectra

a) 5% Soil Damping



A_{max} = 0.29g at T= 0.054 sec

b) 10% Soil Damping



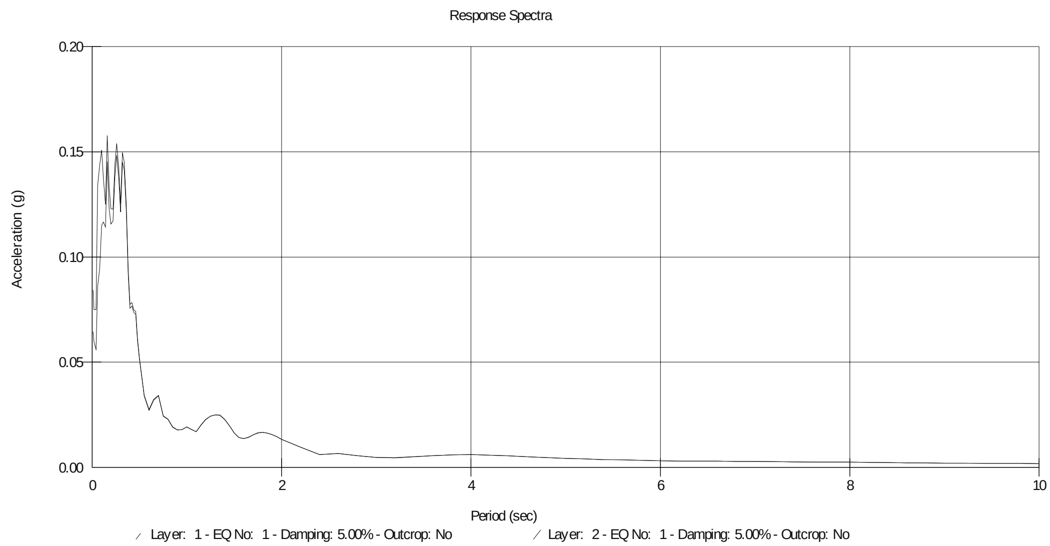
A_{max} = 0.21g at T= 0.054 sec

Input Motion

RAN330.EQ

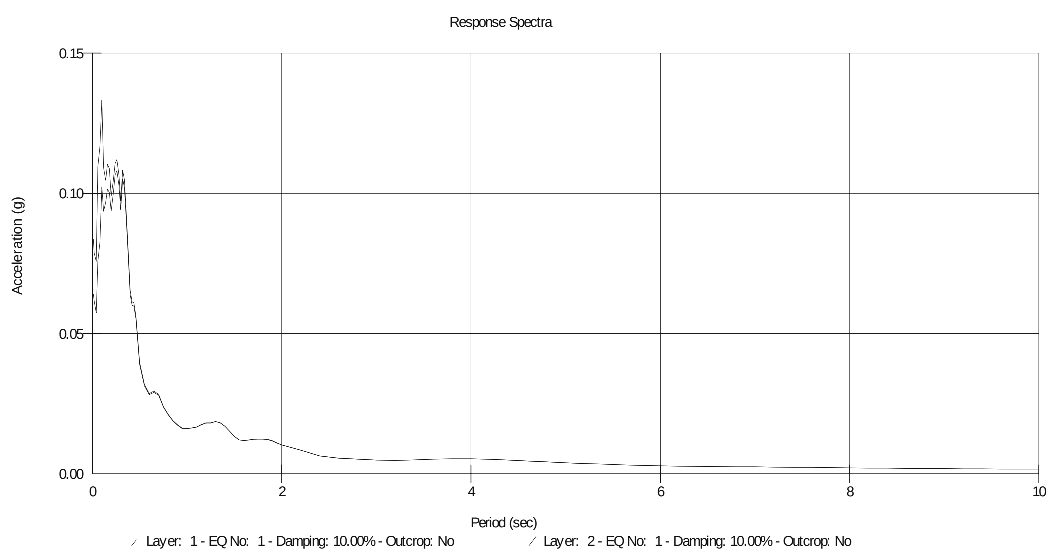
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.16 sec

b) 10% Soil Damping



A_{max} = 0.13g at T= 0.11 sec

ProShake Report (D)

Bedrock at (T_D =300m)depth

Soil Profile

Profile Name: D1DCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 8 m.
Number of Layers: 52

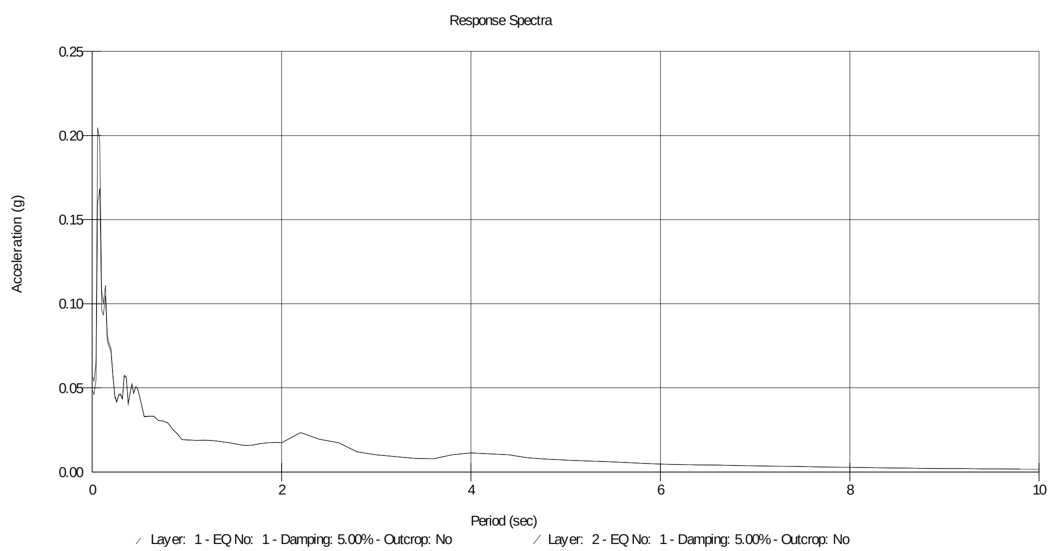
Input Motion

RAN230.EQ

Output Locations

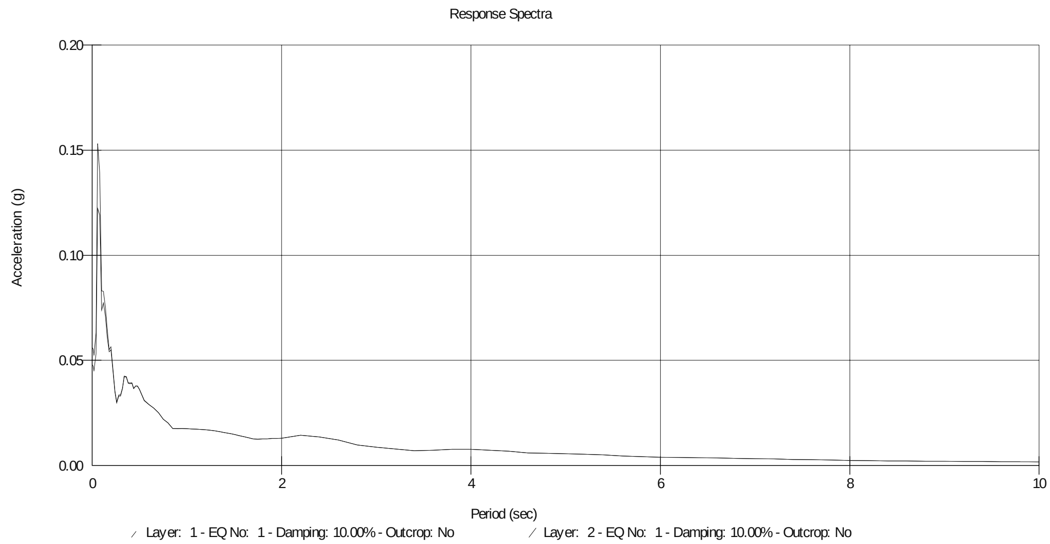
Layers: 1 and 2
Response Spectra

a) 5% Soil Damping



A_{max} = 0.21 g at T= 0.054 sec.

b) 10% Soil Damping



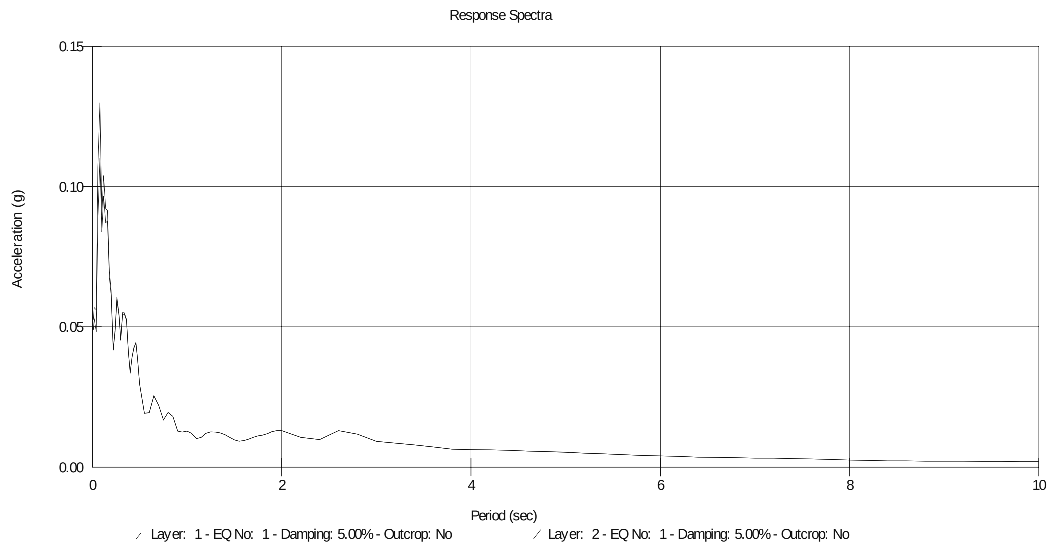
A_{max} =0.15g at T= 0.064 sec.

Input Motion

RAN330.EQ

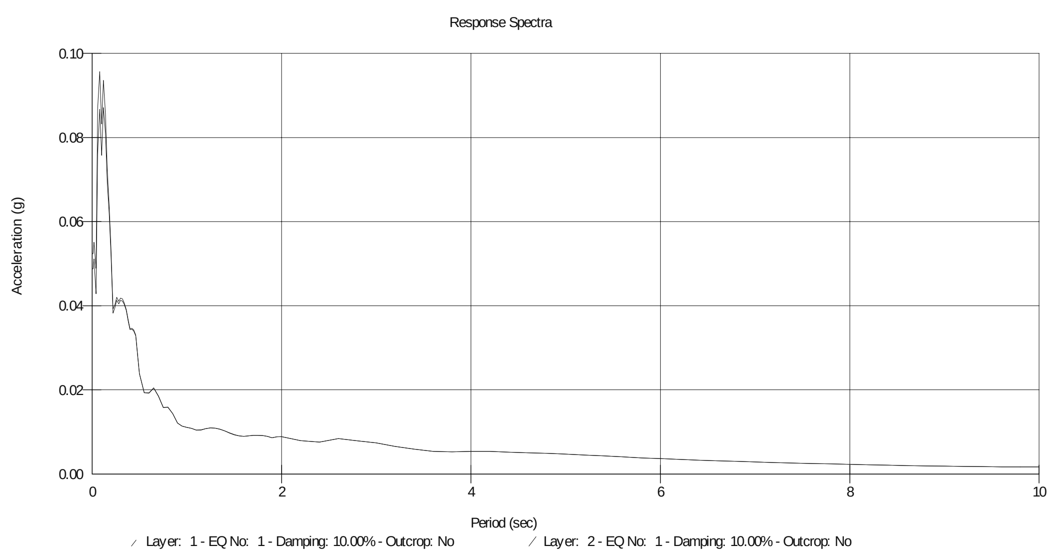
Response Spectra)

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.077 sec.

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.077 sec.

Soil Profile

Profile Name: D2DCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 28 m.
Number of Layers: 48

Input Motion

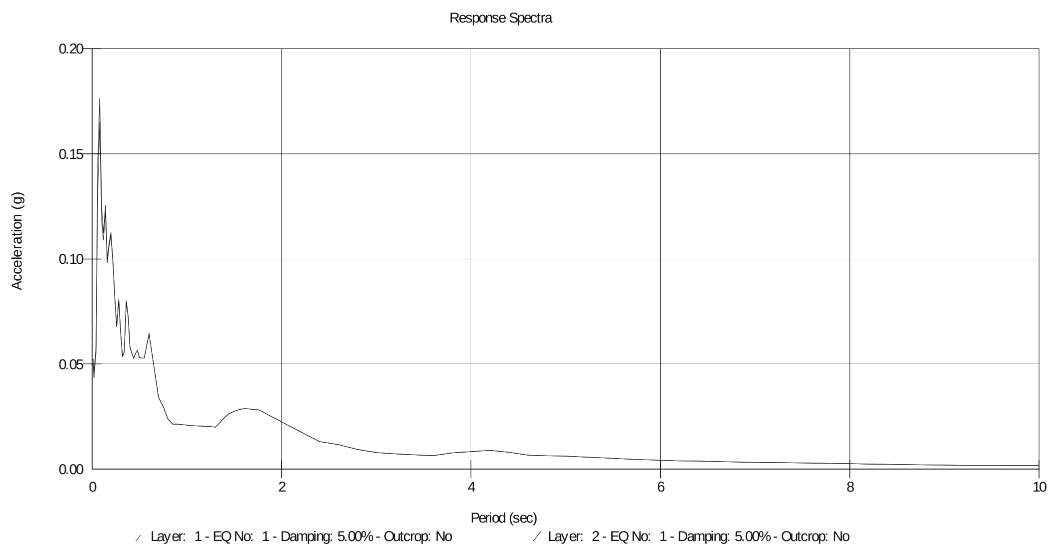
RAN230.EQ

Output Locations

Layers: 1 and 2

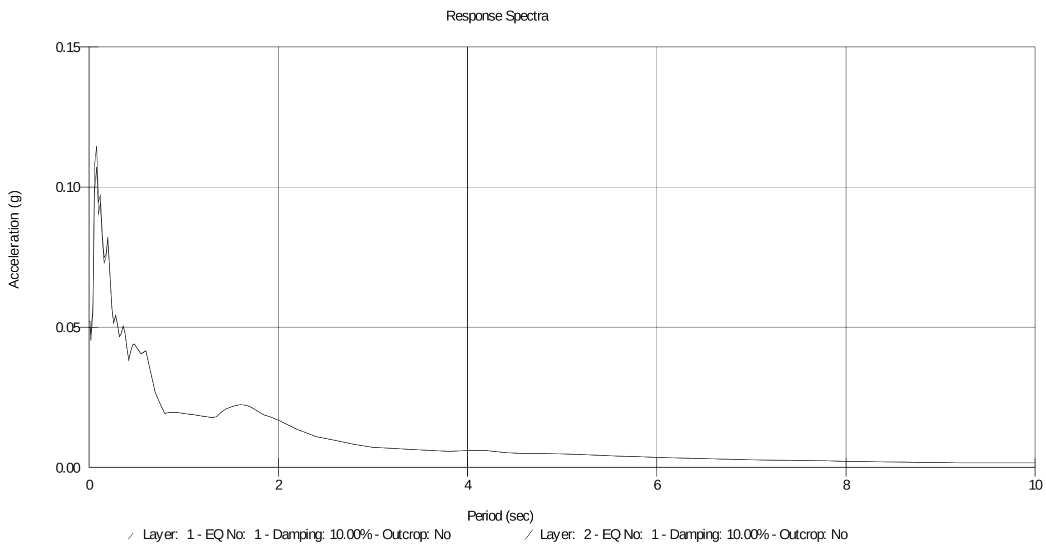
Response Spectra

a) 5% Soil Damping



A_{max} = 0.18g at T= 0.077 sec

b) 10% Soil Damping



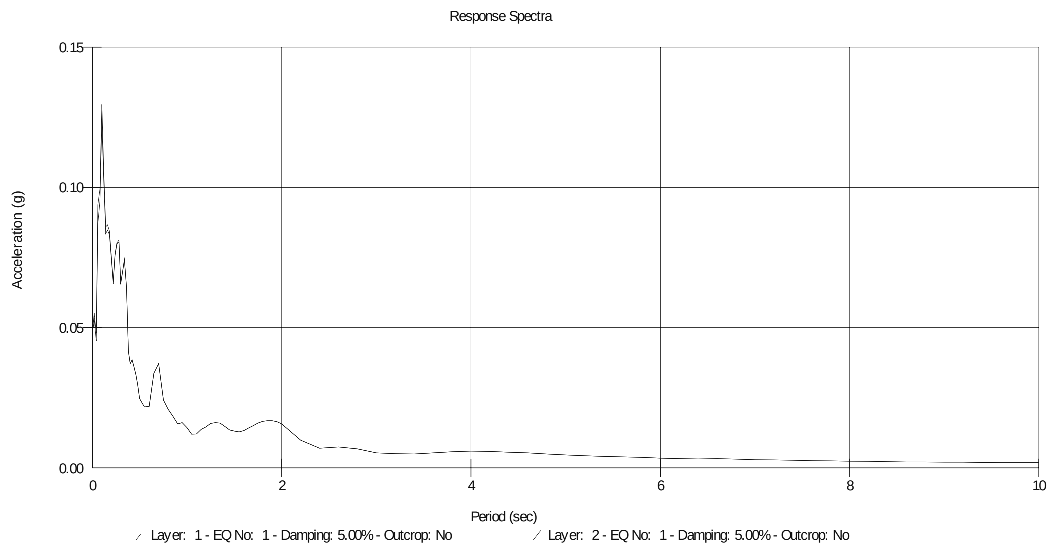
$A_{max} = 0.12g$ at $T = 0.077$ sec

Input Motion

RAN330.EQ

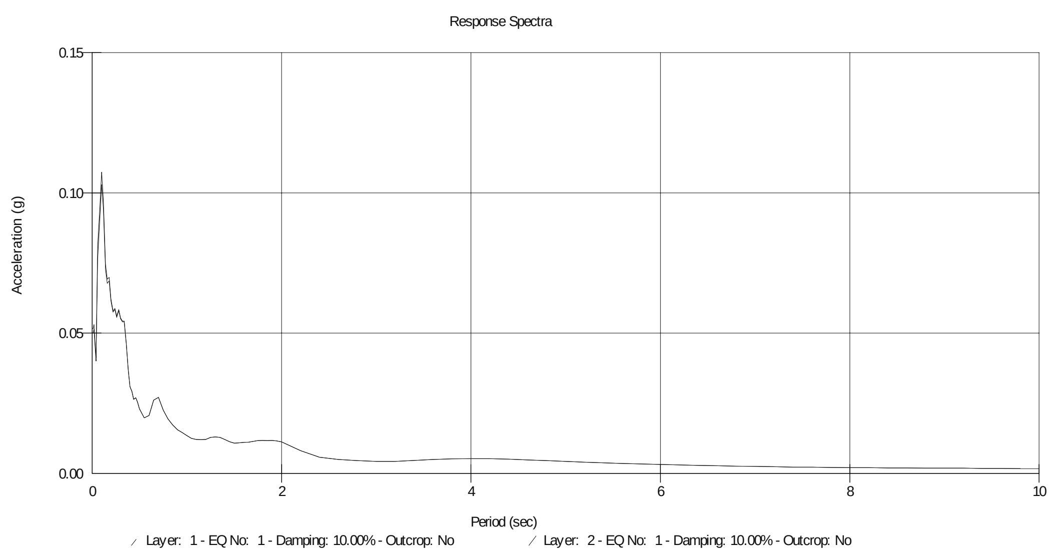
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.10 sec

Soil Profile

Profile Name: D3DCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 29 m.
Number of Layers: 58

Input Motion

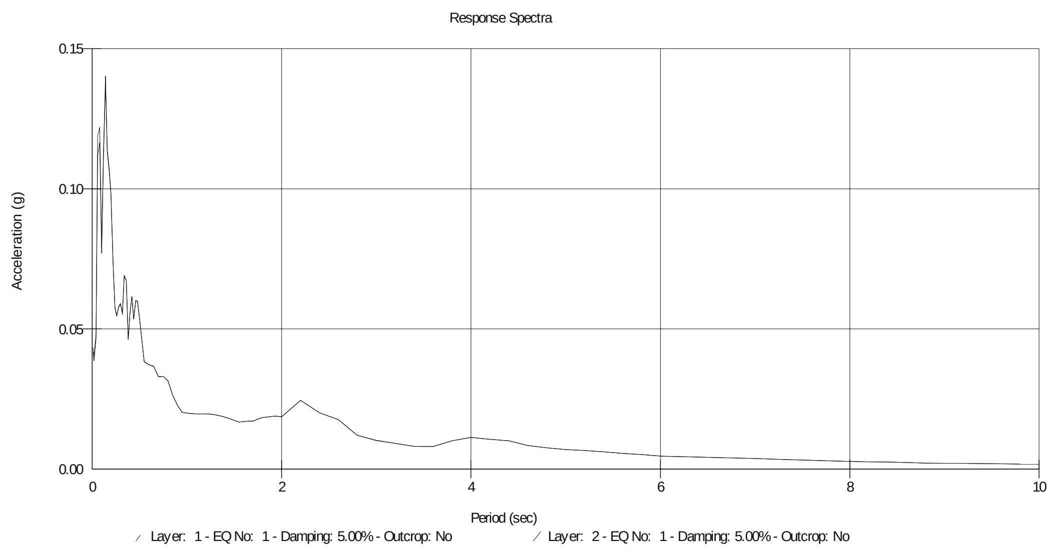
RAN230.EQ

Output Locations

Layers: 1 and 2

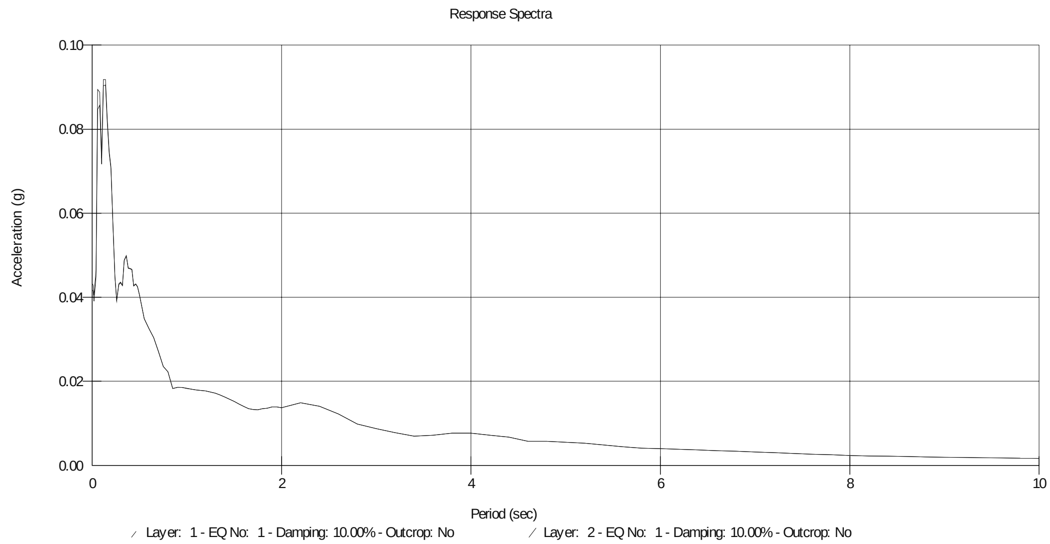
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.14 sec

b) 10% Soil Damping



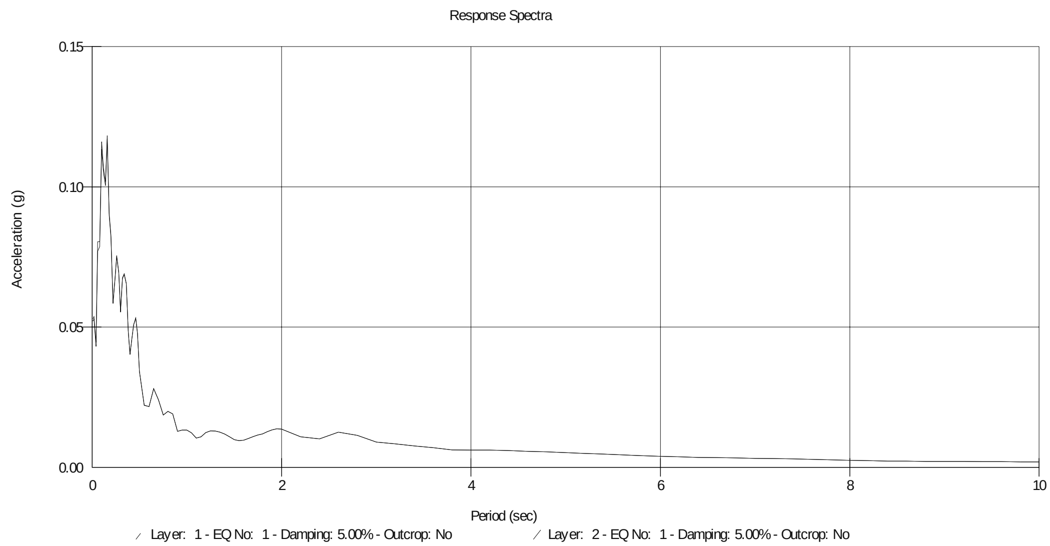
A_{max} = 0.14g at T= 0.09 sec

Input Motion

RAN330.EQ

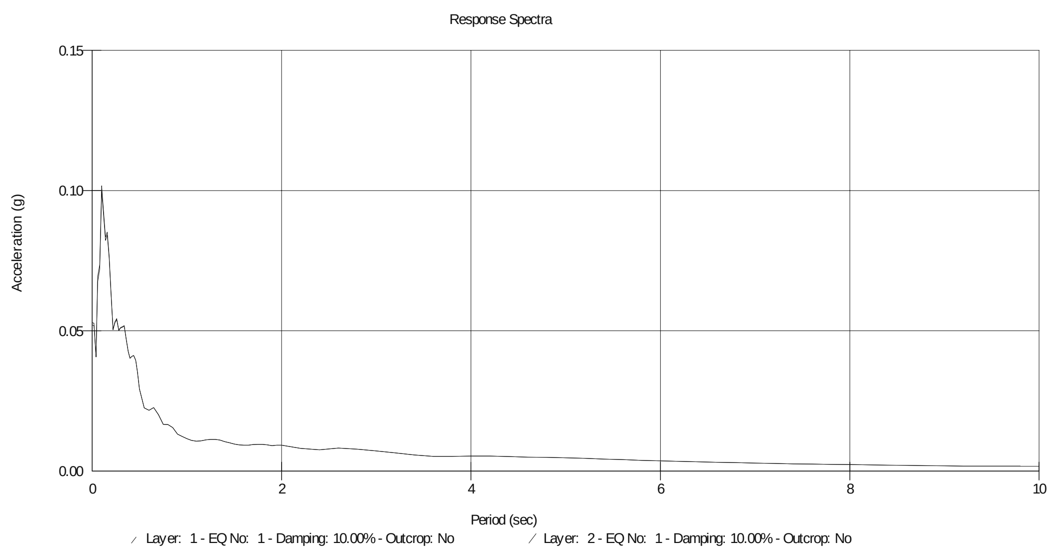
Response Spectra

a) 5% Soil Damping



A_{max} = 0.12g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.10 sec

Soil Profile

Profile Name: D4DCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 2.5 m.
Number of Layers: 47

Input Motion

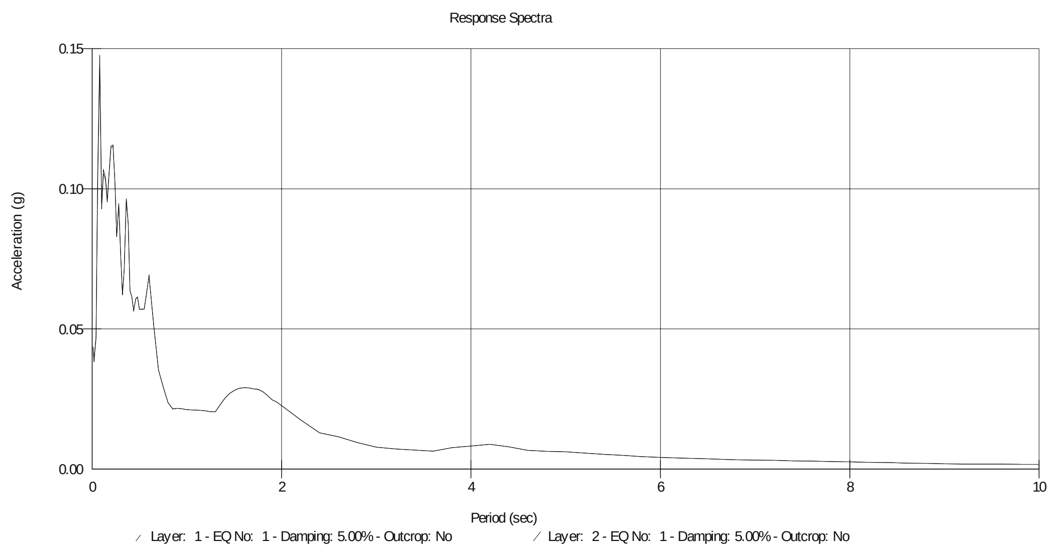
RAN230.EQ

Output Locations

Layers: 1 and 2

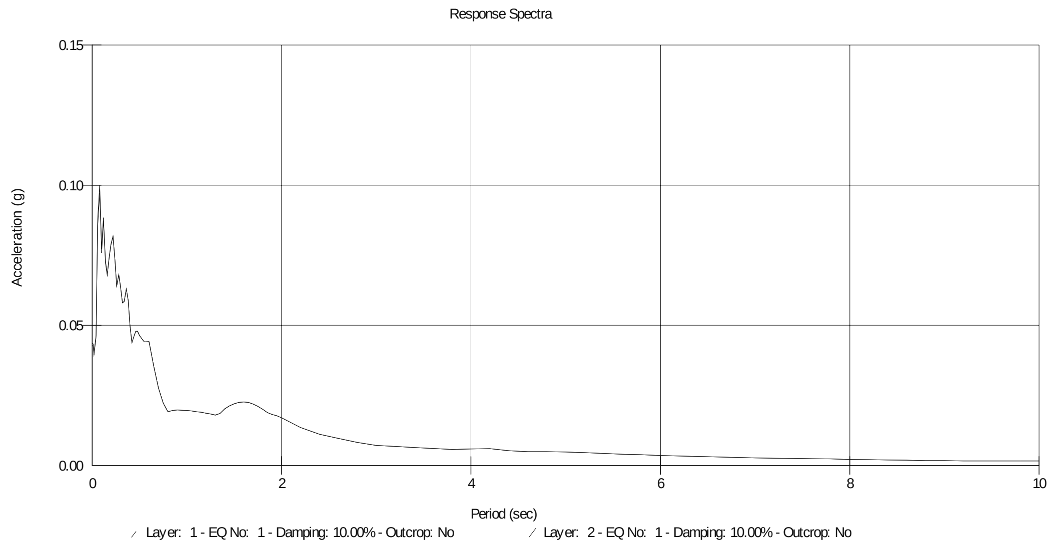
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.077 sec

b) 10% Soil Damping



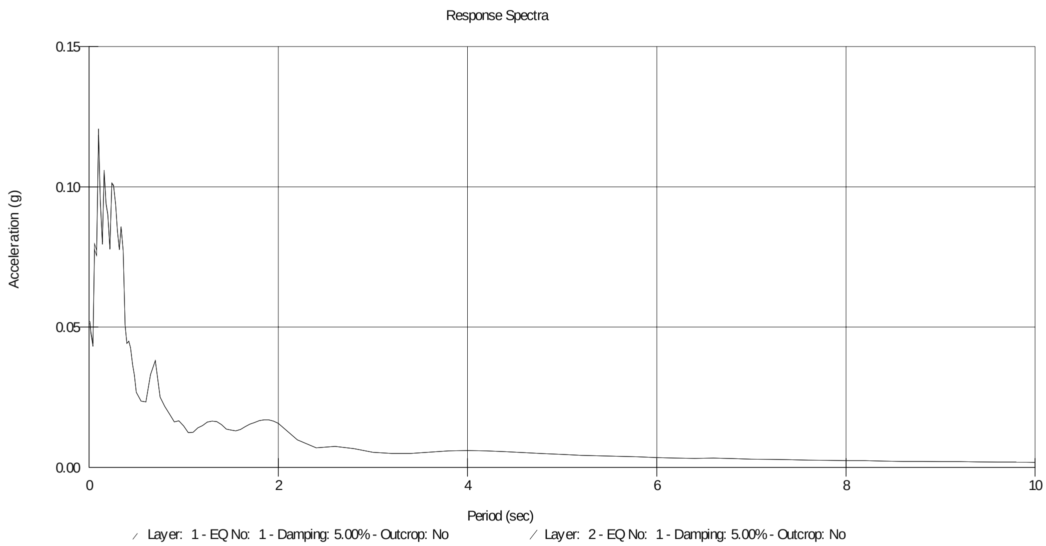
A_{max} = 0.10g at T= 0.077 sec

Input Motion

RAN330.EQ

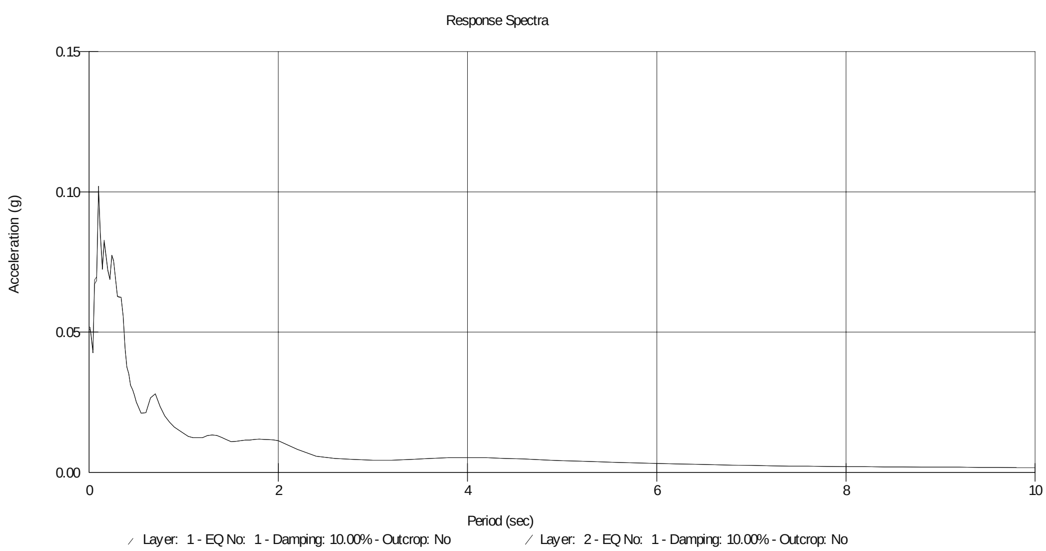
Response Spectra

a) 5% Soil Damping



A_{max} = 0.12g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.10g at T= 0.10 sec

Soil Profile

Profile Name: D5AD(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 50

Input Motion

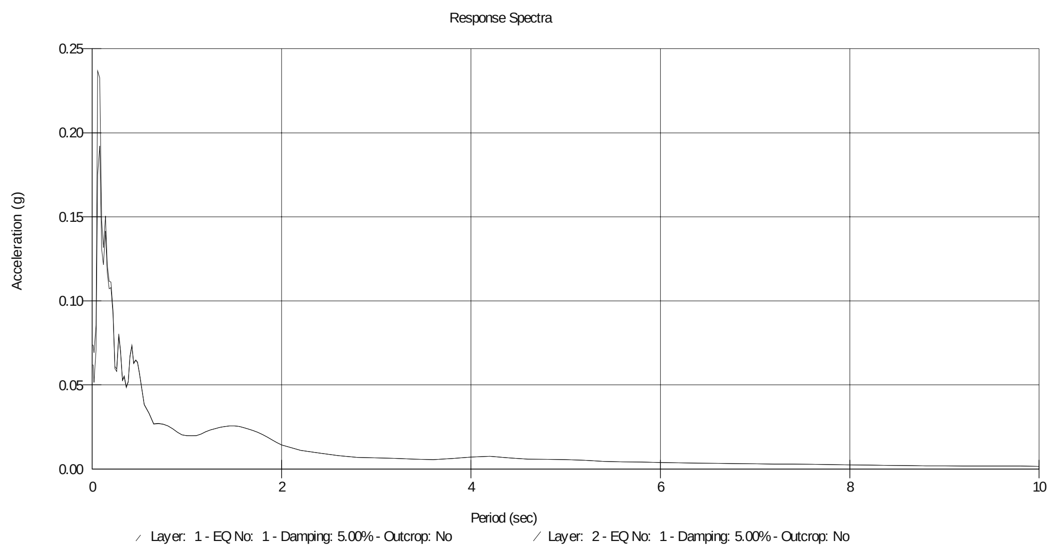
RAN230.EQ

Output Locations

Layers: 1 and 2

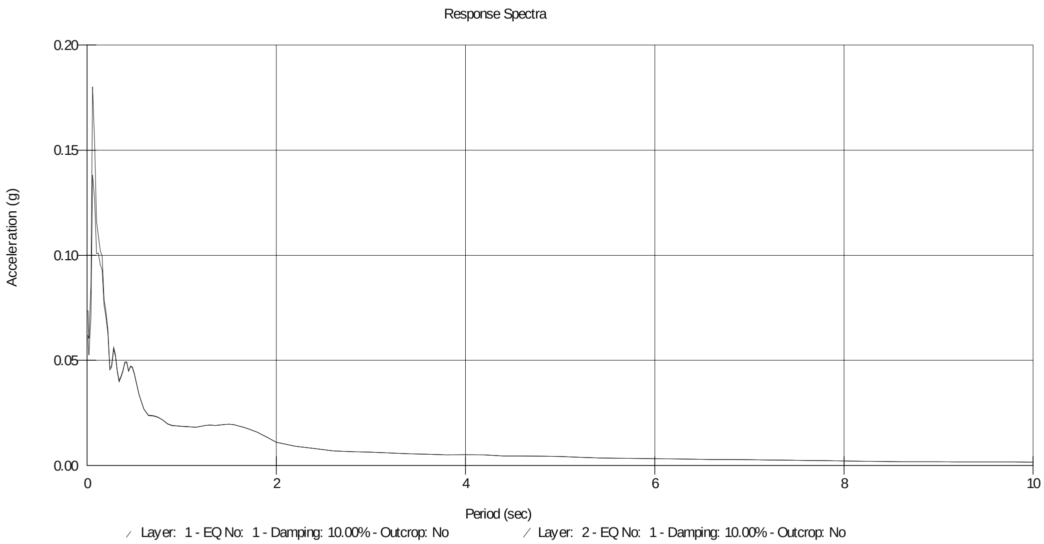
Response Spectra

a) 5% Soil Damping



A_{max} = 0.25g at T= 0.054 sec

b) 10% Soil Damping



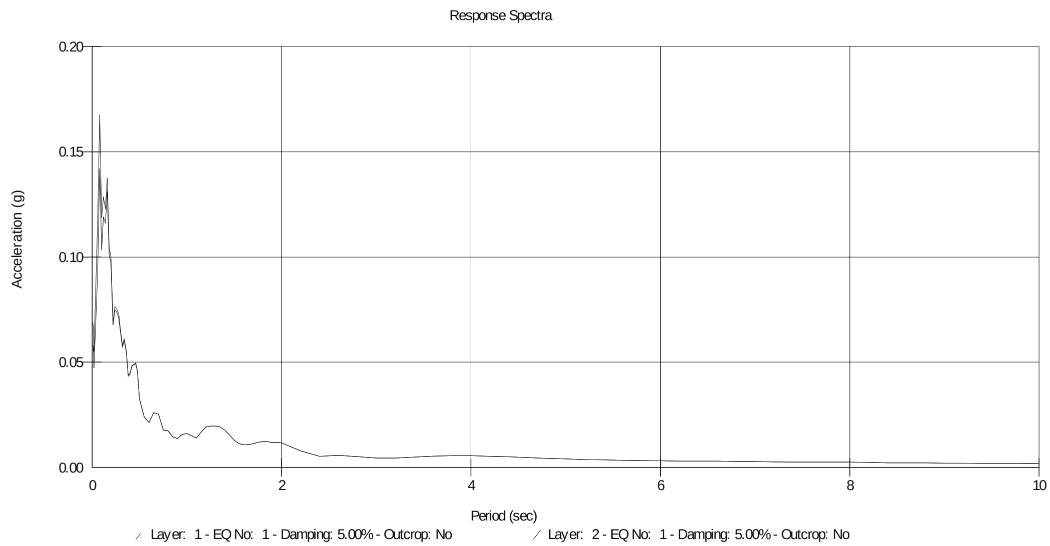
A_{max} = 0.18g at T= 0.054 sec

Input Motion

RAN330.EQ

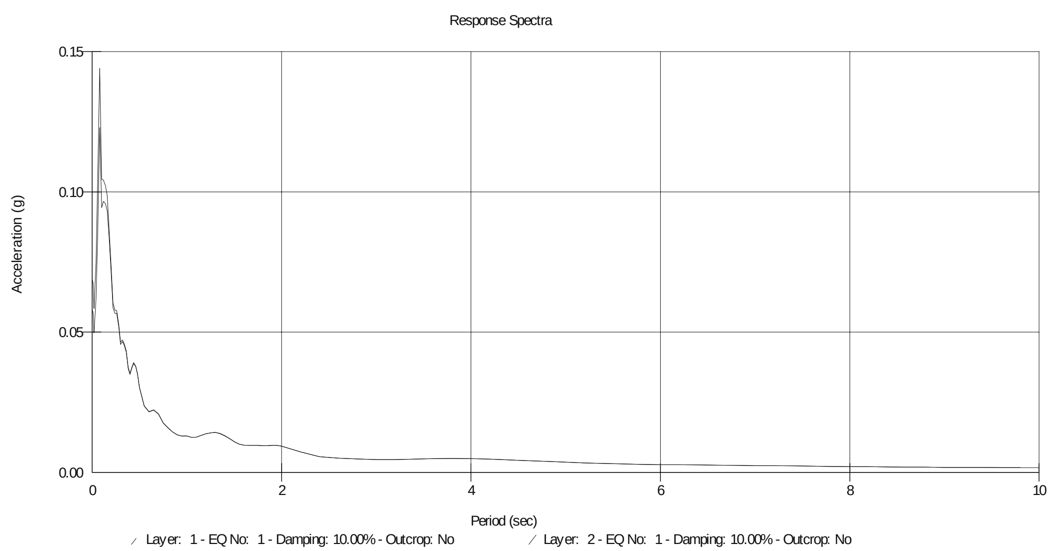
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.077 sec

Soil Profile

Profile Name: D5D2(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 52

Input Motion

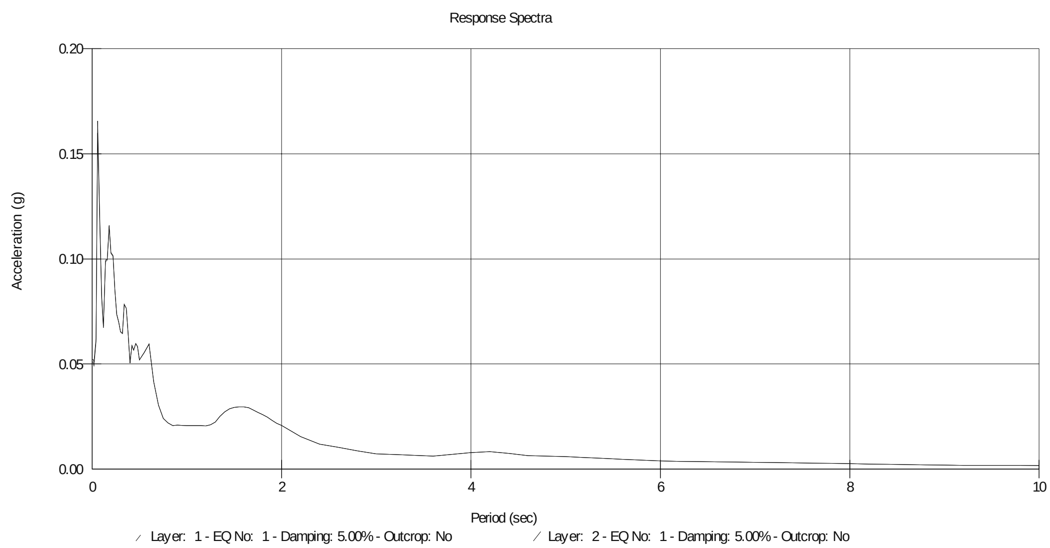
RAN230.EQ

Output Locations

Layers: 1 and 2

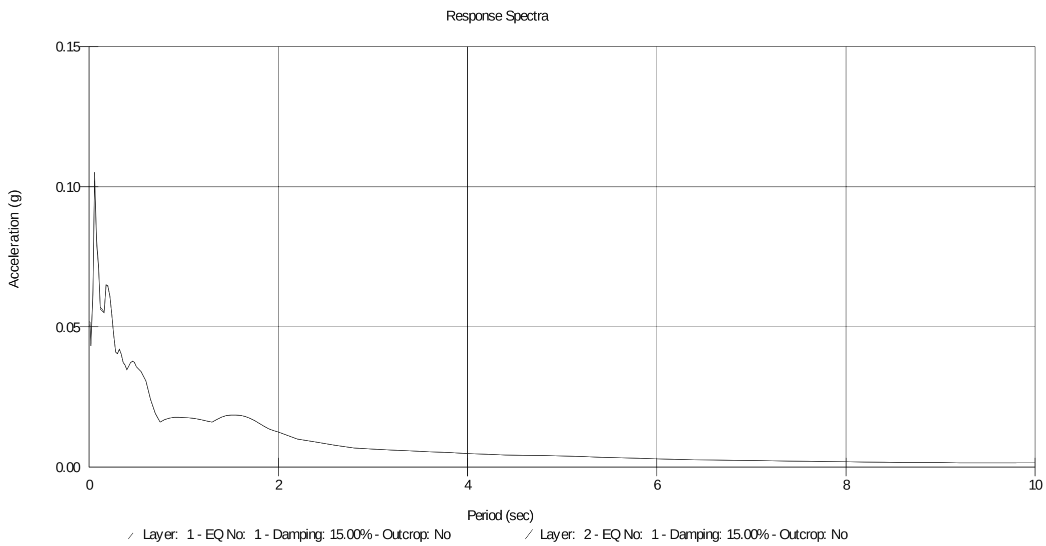
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.054 sec

b) 10% Soil Damping



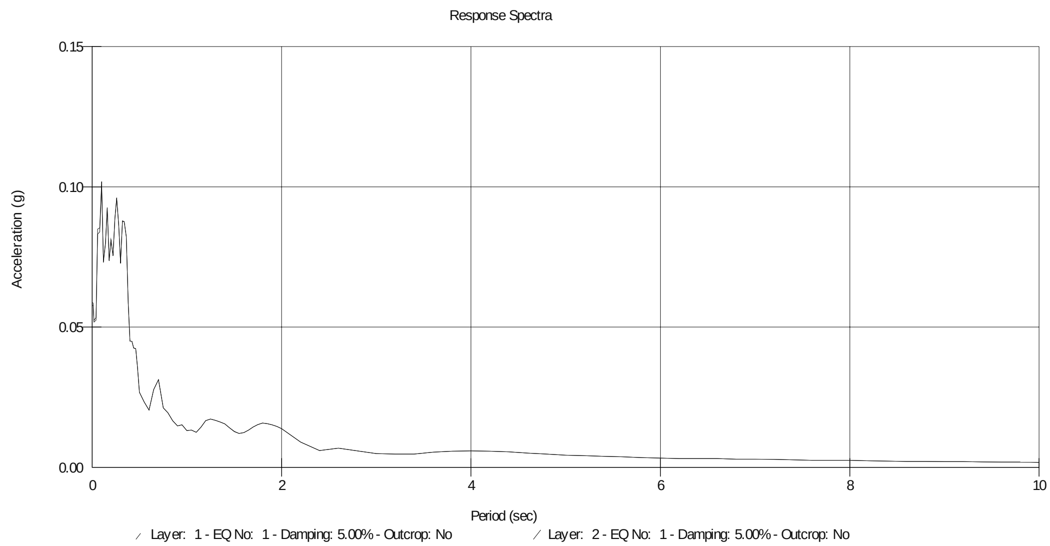
$A_{max} = 0.11g$ at $T = 0.054$ sec

Input Motion

RAN330.EQ

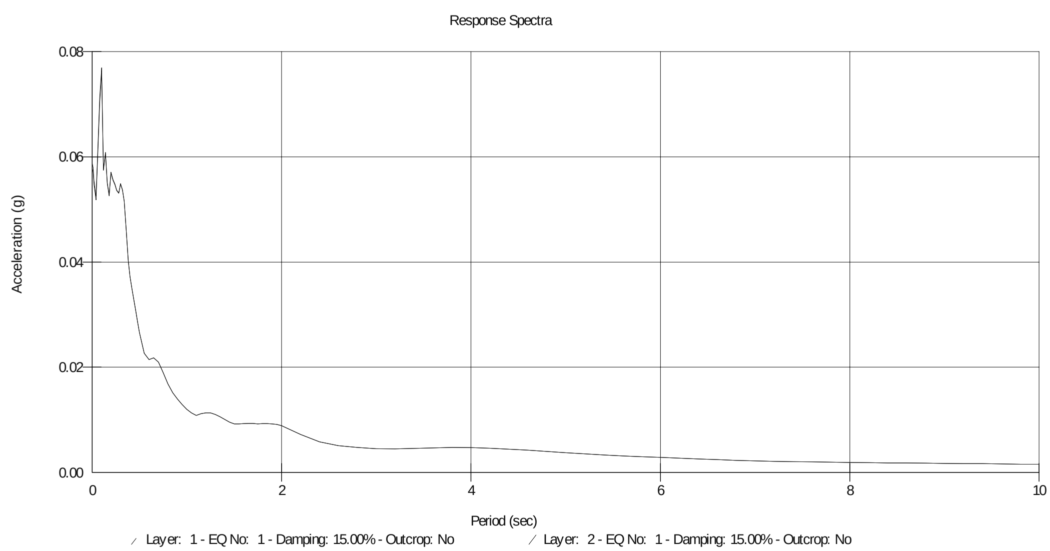
Response Spectra

a) 5% Soil Damping



A_{max} = 0.10g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.075g at T= 0.10 sec

Soil Profile

Profile Name: D5DCHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 58

Input Motion

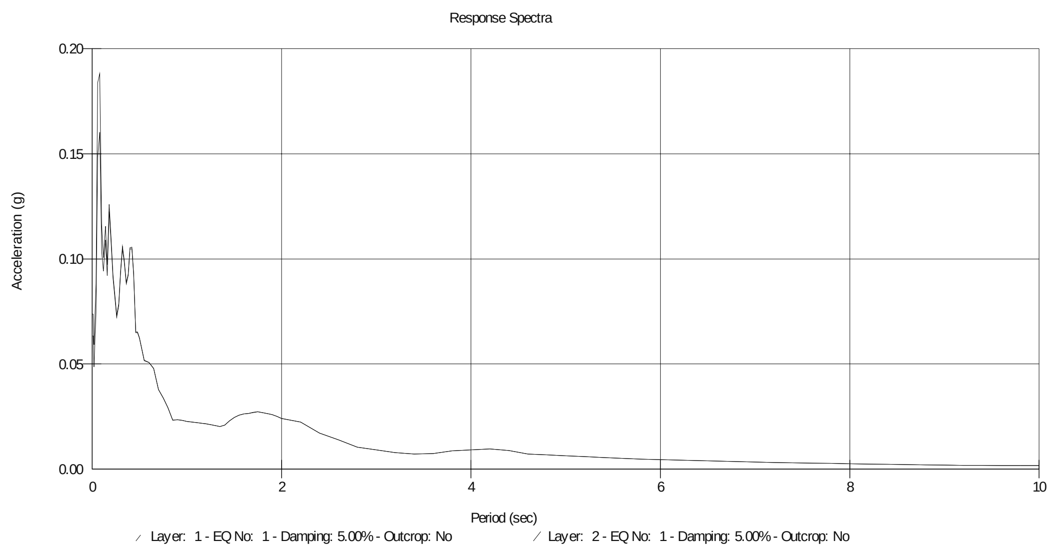
RAN230.EQ

Output Locations

Layers: 1 and 2

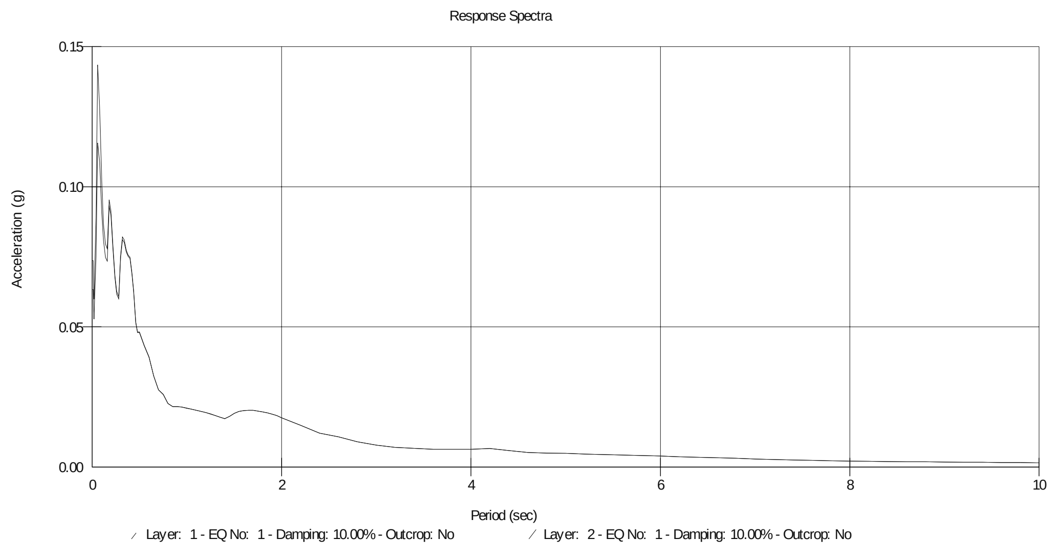
Response Spectra

a) 5% Soil Damping



A_{max} = 0.19g at T= 0.077 sec

b) 10% Soil Damping



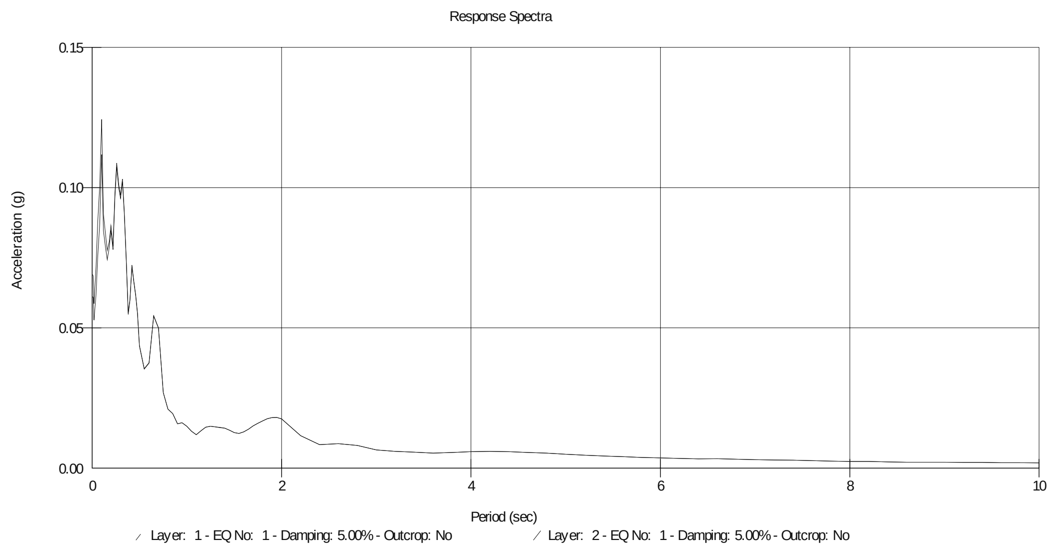
A_{max} = 0.14g at T= 0.054sec

Input Motion

RAN330.EQ

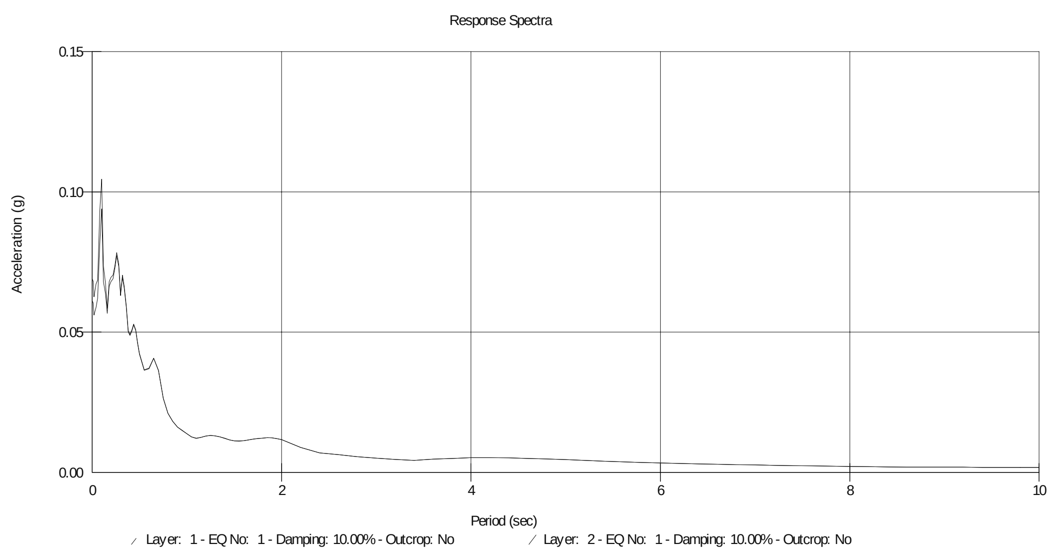
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.10 sec

Soil Profile

Profile Name: D6D(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 52

Input Motion

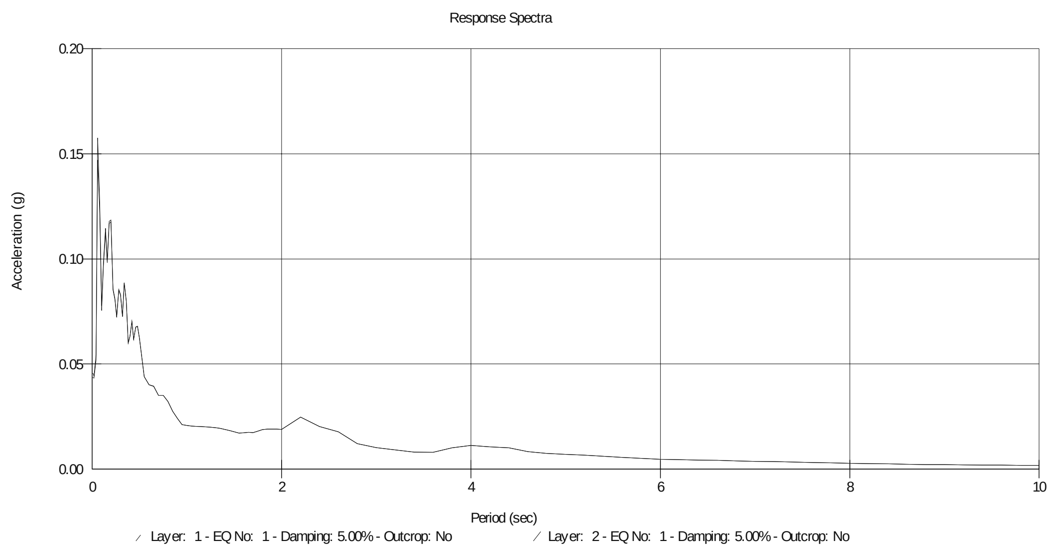
RAN230.EQ

Output Locations

Layers: 1 and 2

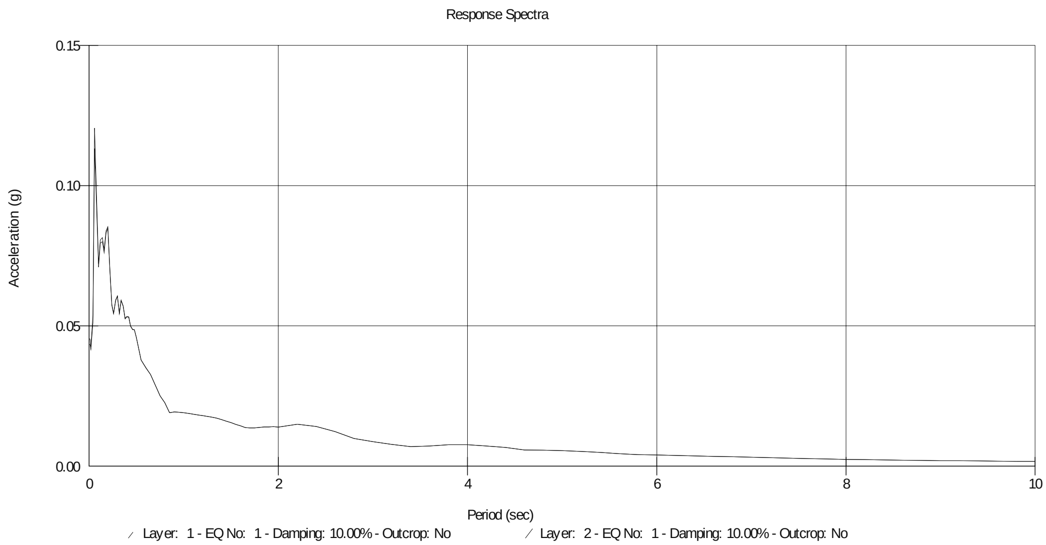
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.,054 sec

b) 10% Soil Damping



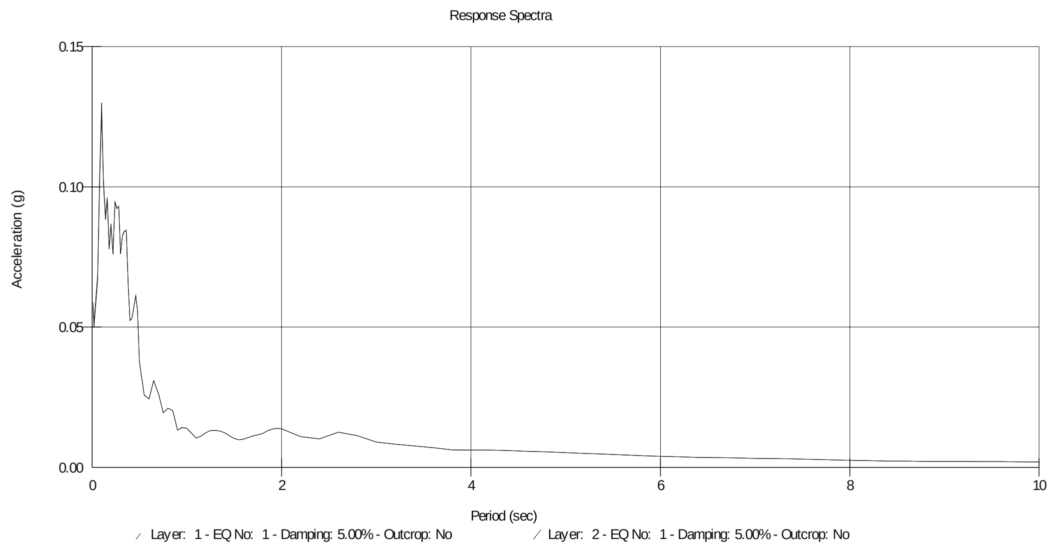
A_{max} = 0.12g at T= 0.054 sec

Input Motion

RAN330.EQ

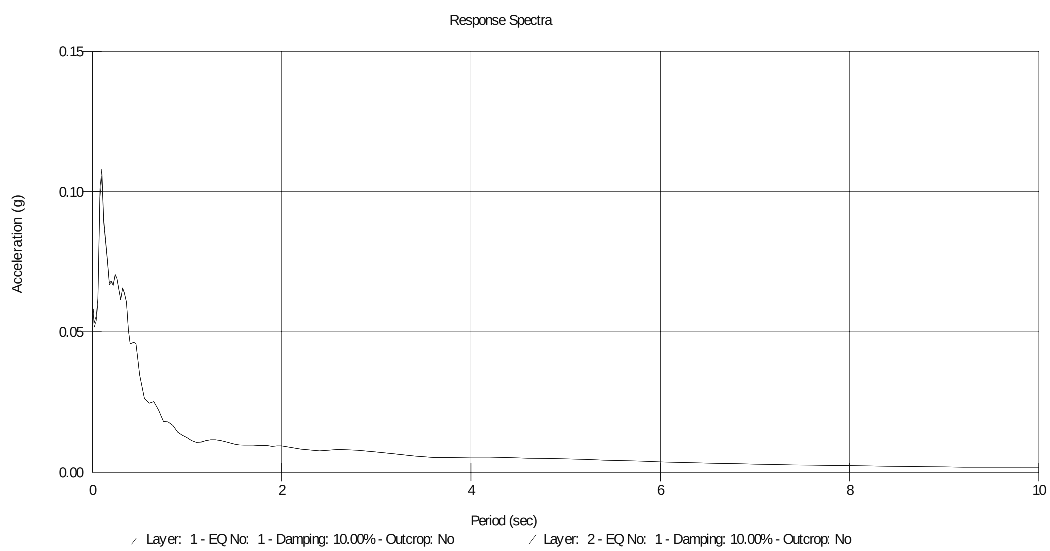
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.11g at T= 0.10 sec

Soil Profile

Profile Name: D6DCHC
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 54

Input Motion

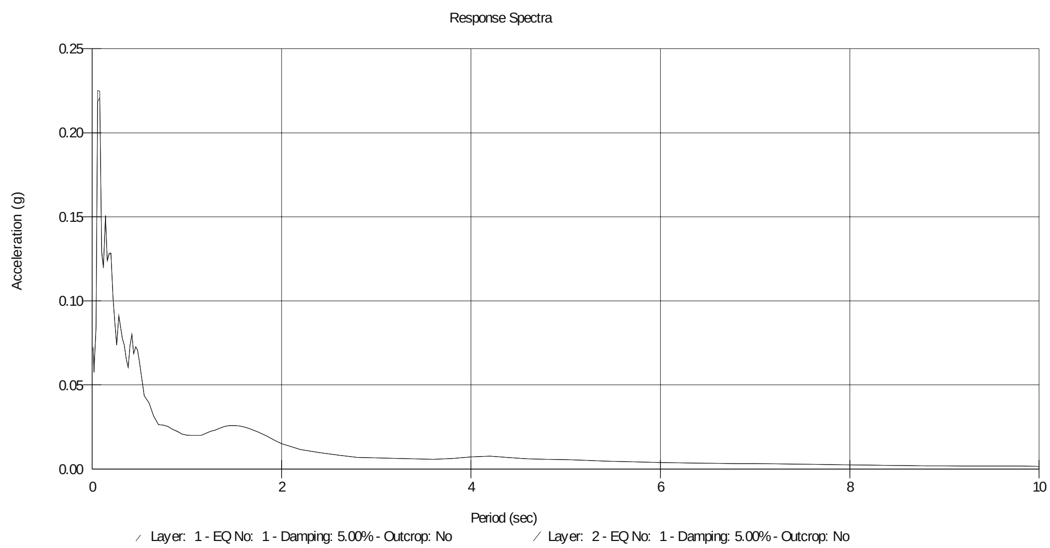
RAN230.EQ

Output Locations

Layers: 1 and 2

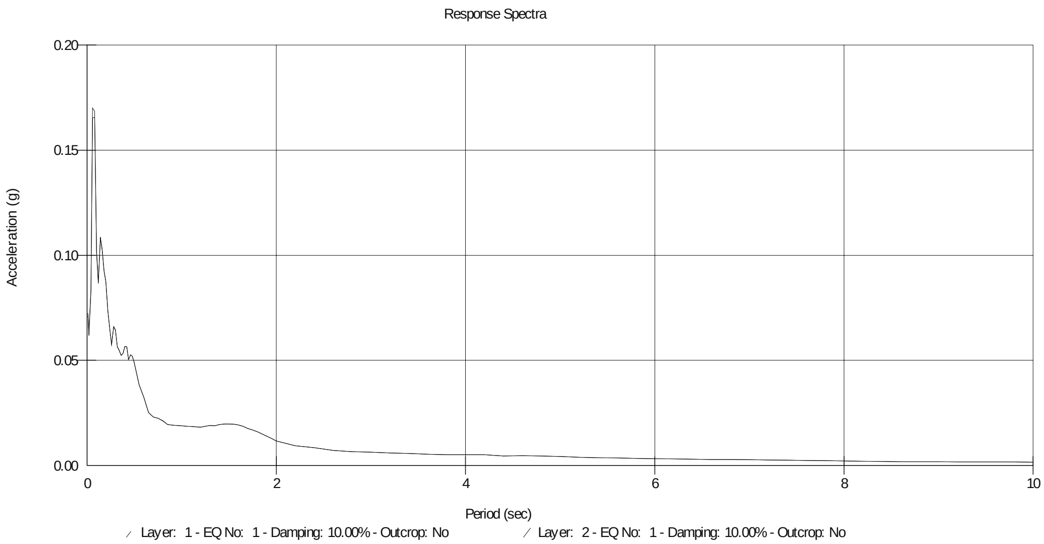
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.077 sec

b) 10% Soil Damping



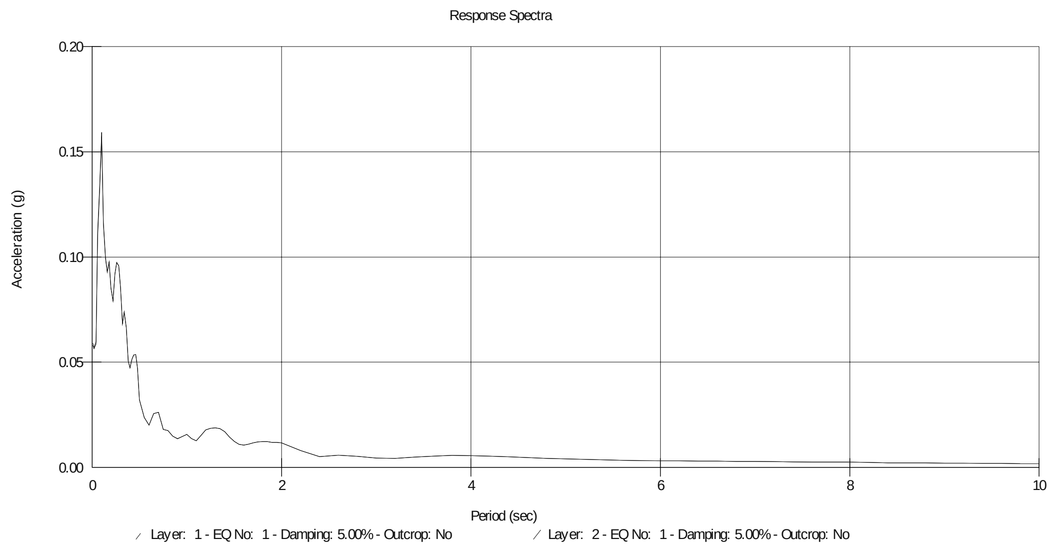
$A_{max} = 0.17g$ at $T = 0.064$ sec

Input Motion

RAN330.EQ

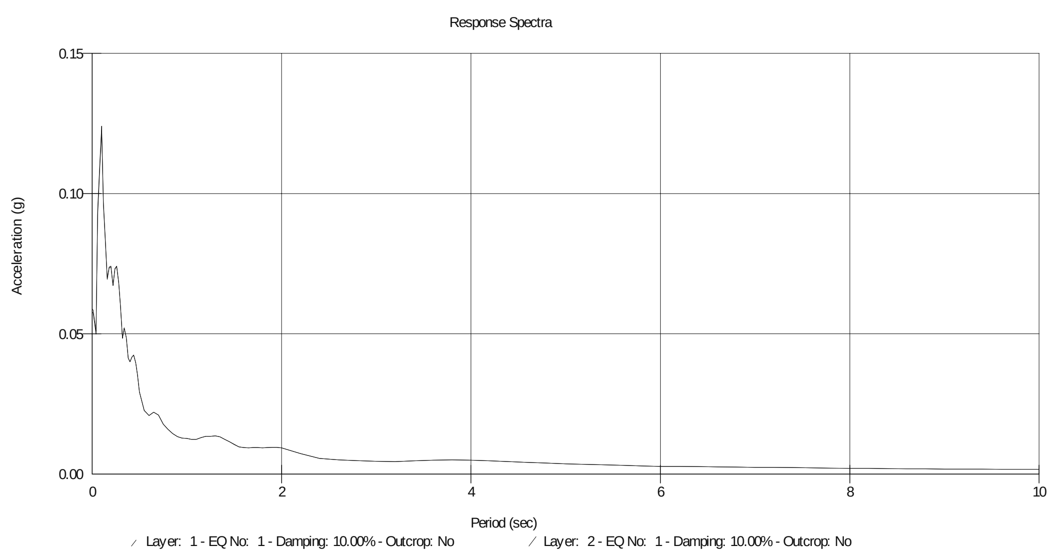
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.10 sec

Soil Profile

Profile Name: D7DCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 26 m.
Number of Layers: 47

Input Motion

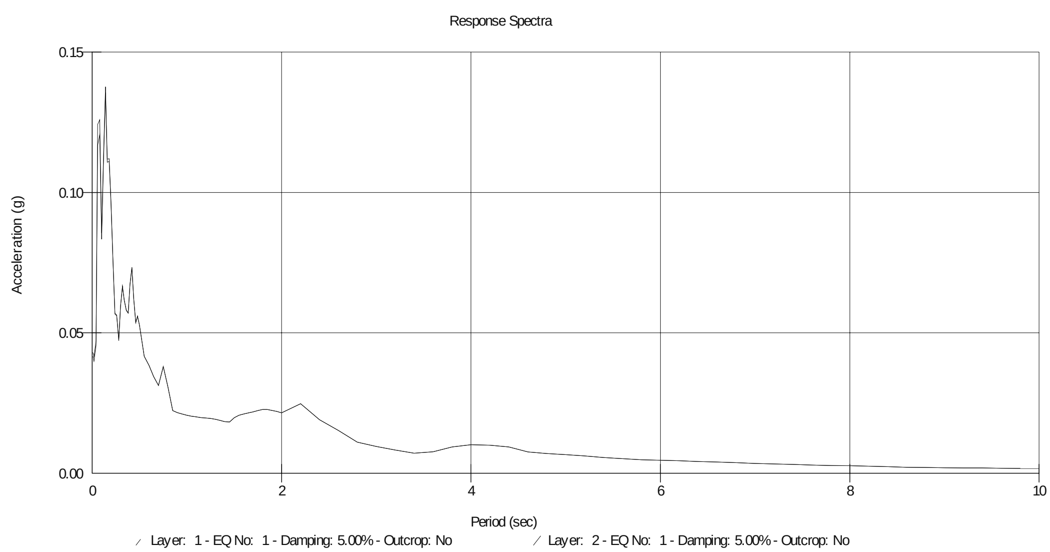
RAN230.EQ

Output Locations

Layers: 1 and 2

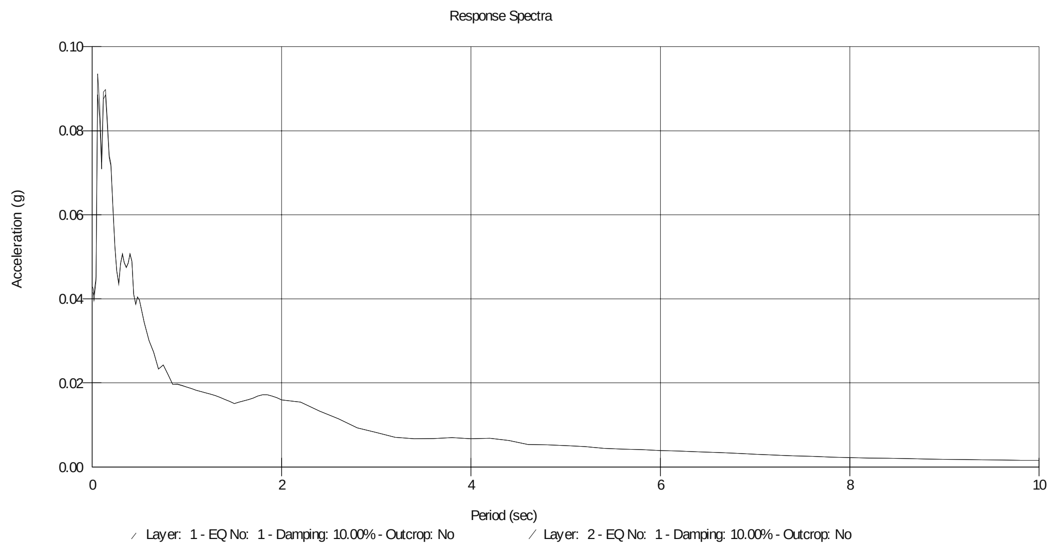
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.14 sec

b) 10% Soil Damping



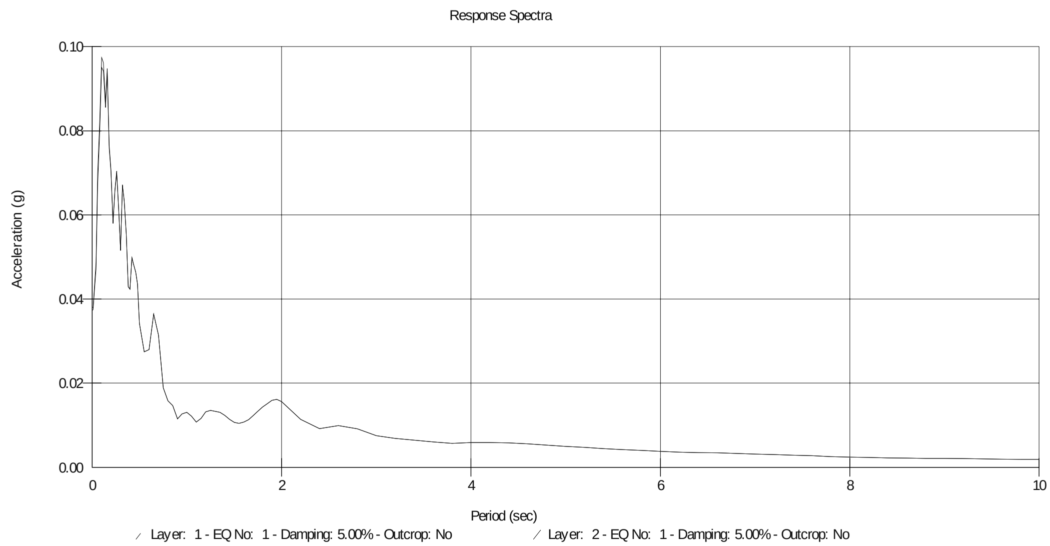
A_{max} = 0.095g at T= 0.054 sec

Input Motion

RAN330.EQ

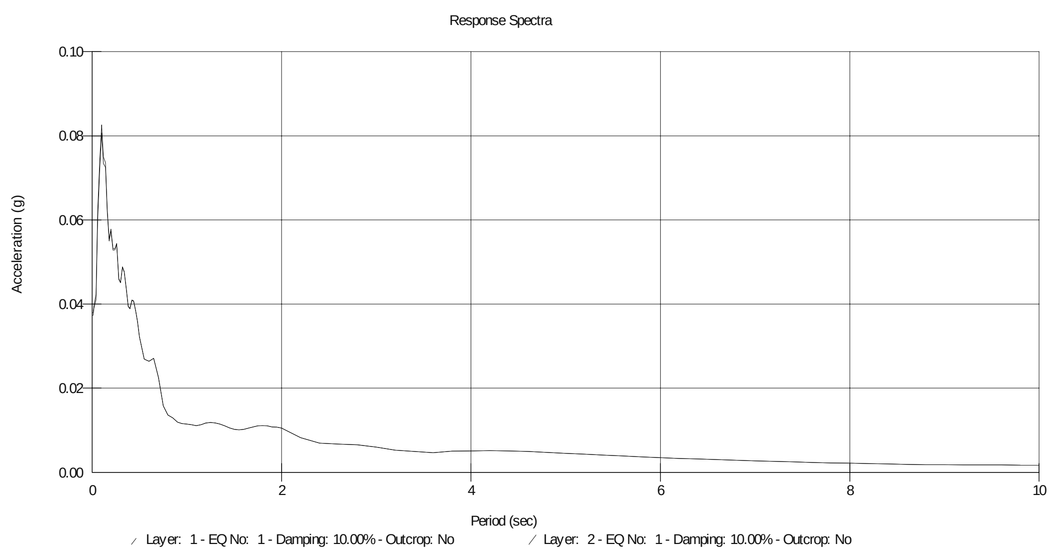
Response Spectra

a) 5% Soil Damping



A_{max} = 0.097g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.08g at T= 0.10 sec

Soil Profile

Profile Name: D8DCXW
Tests Types and Designations: SPT(30)-CXW
Water Table Depth: 25 m.
Number of Layers: 45

Input Motion

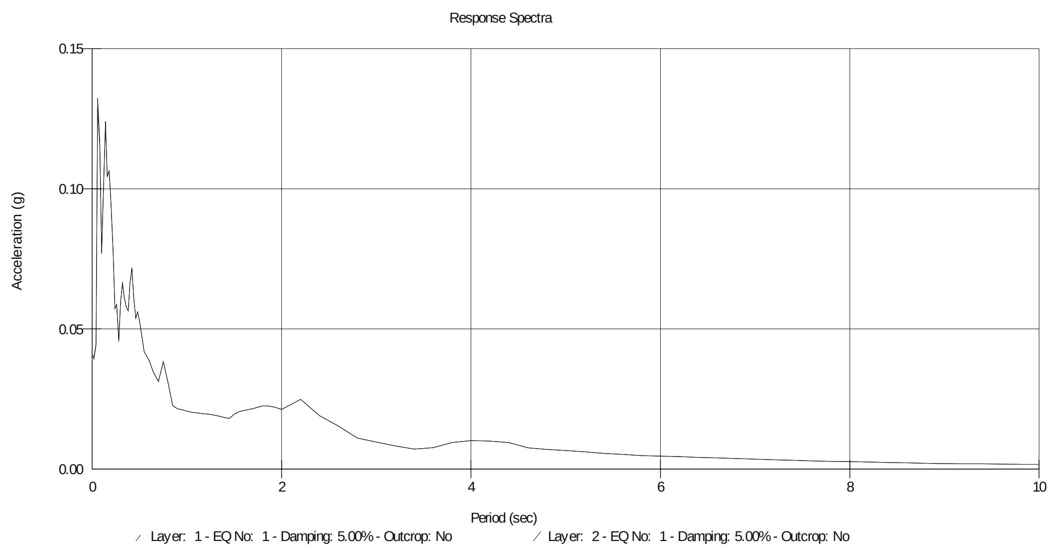
RAN230.EQ

Output Locations

Layers: 1 and 2

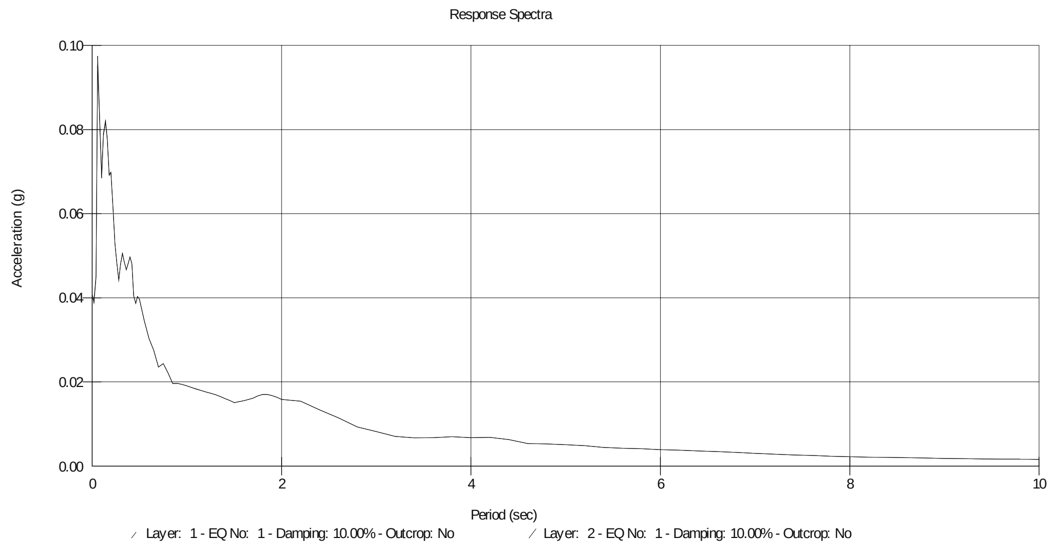
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.054 sec

b) 10% Soil Damping



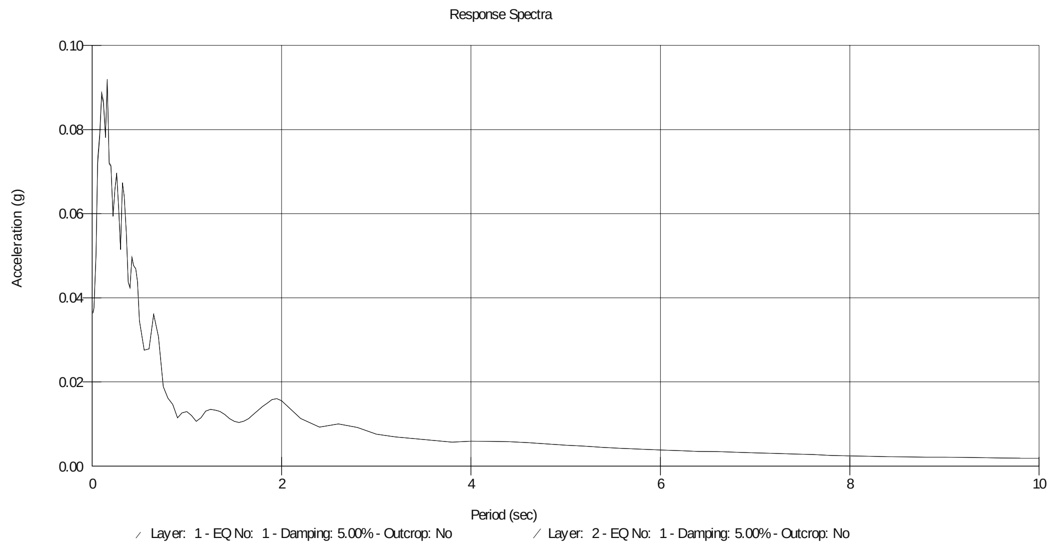
A_{max} = 0.0984g at T= 0.054 sec

Input Motion

RAN330.EQ

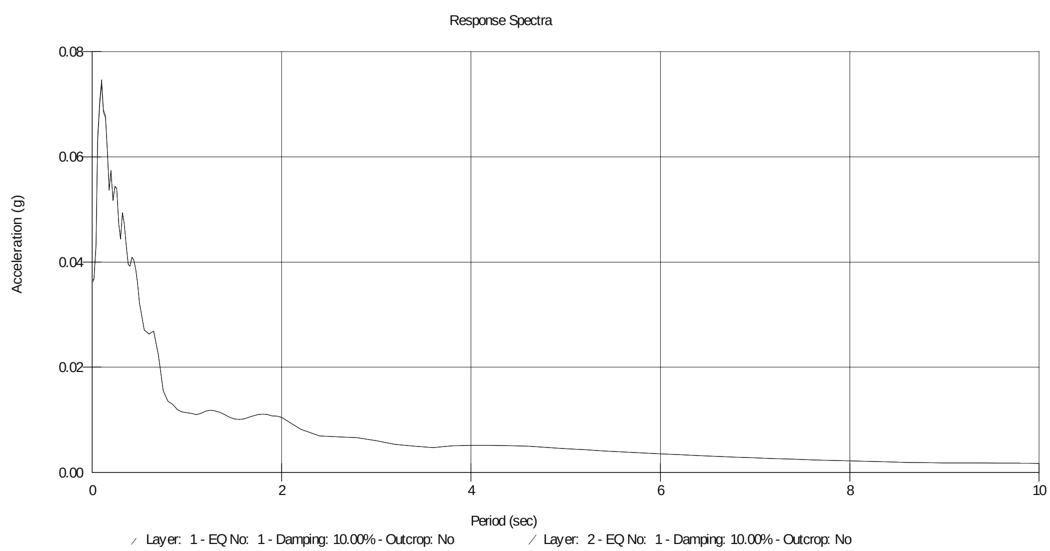
Response Spectra

a) 5% Soil Damping



A_{max} = 0.09g at T= 0.17 sec

b) 10% Soil Damping



A_{max} = 0.07g at T= 0.12 sec

Soil Profile

Profile Name: D9DCXW
Tests Types and Designations: SPT(60)-CXW
Water Table Depth: 25 m.
Number of Layers: 45

Input Motion

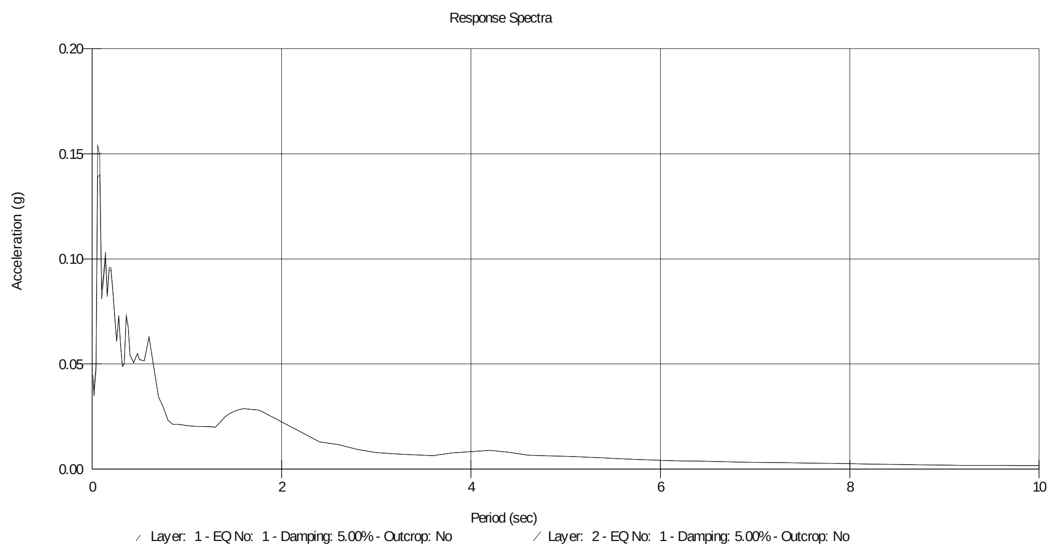
RAN230.EQ

Output Locations

Layers: 1 and 2

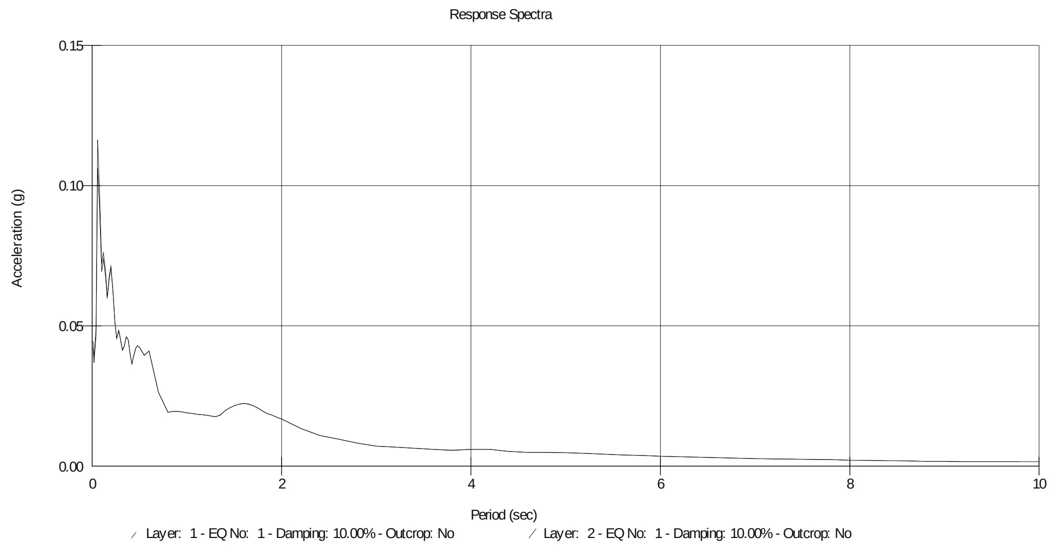
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.054 sec

b) 10% Soil Damping



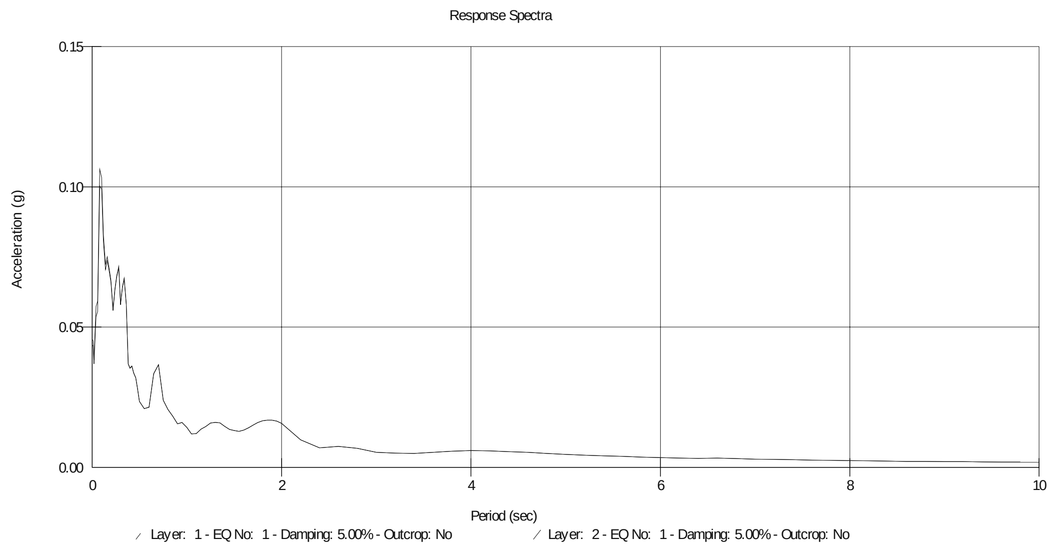
$A_{max} = 0.12g$ at $T = 0.054$ sec

Input Motion

RAN330.EQ

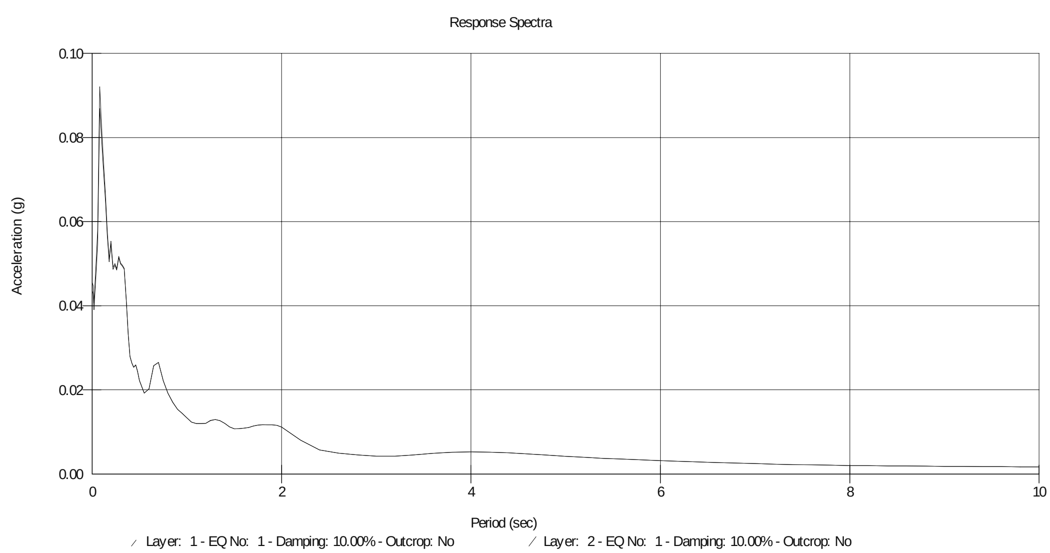
Response Spectra

a) 5% Soil Damping



A_{max} = 0.11g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.09g at T= 0.077 sec

Soil Profile

Profile Name: D11D(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6m.
Number of Layers: 49

Input Motion

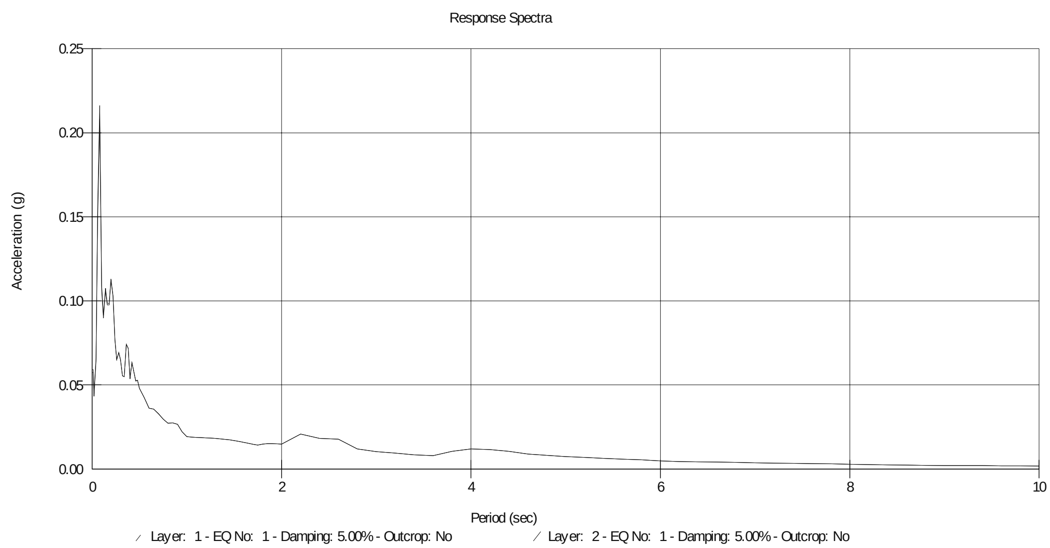
RAN230.EQ

Output Locations

Layers: 1 and 2

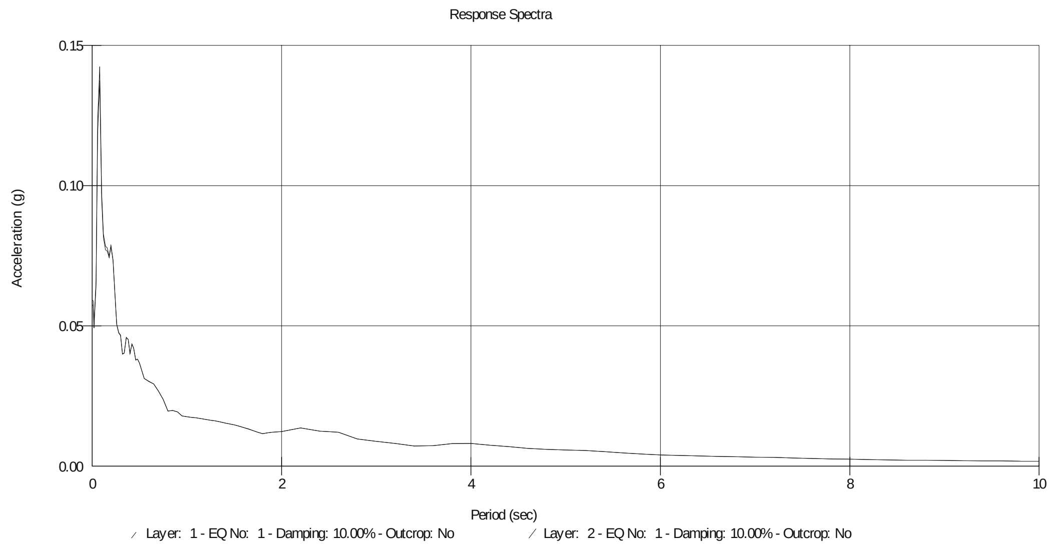
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0..077 sec

b) 10% Soil Damping



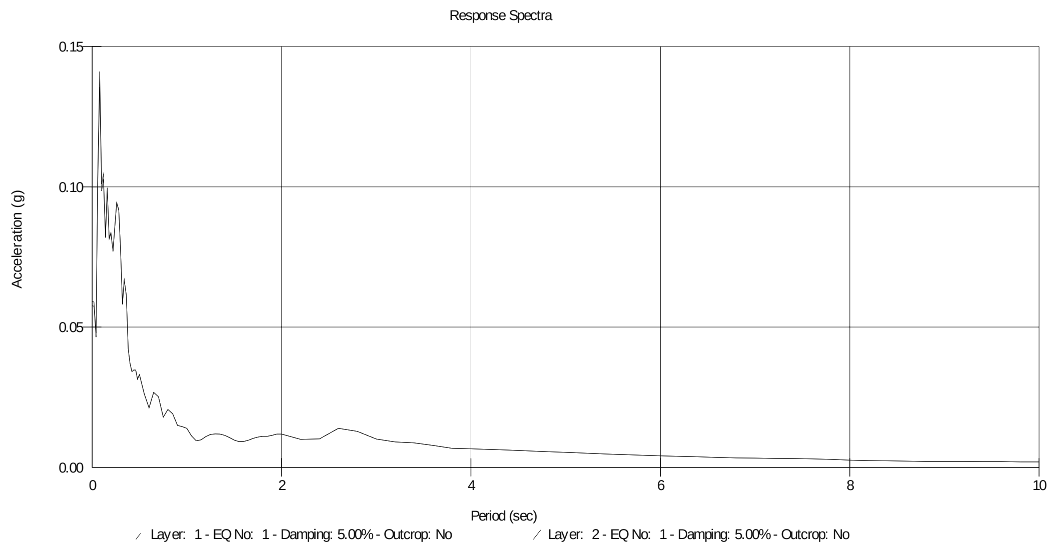
A_{max} = 0.14g at T= 0.077 sec

Input Motion

RAN330.EQ

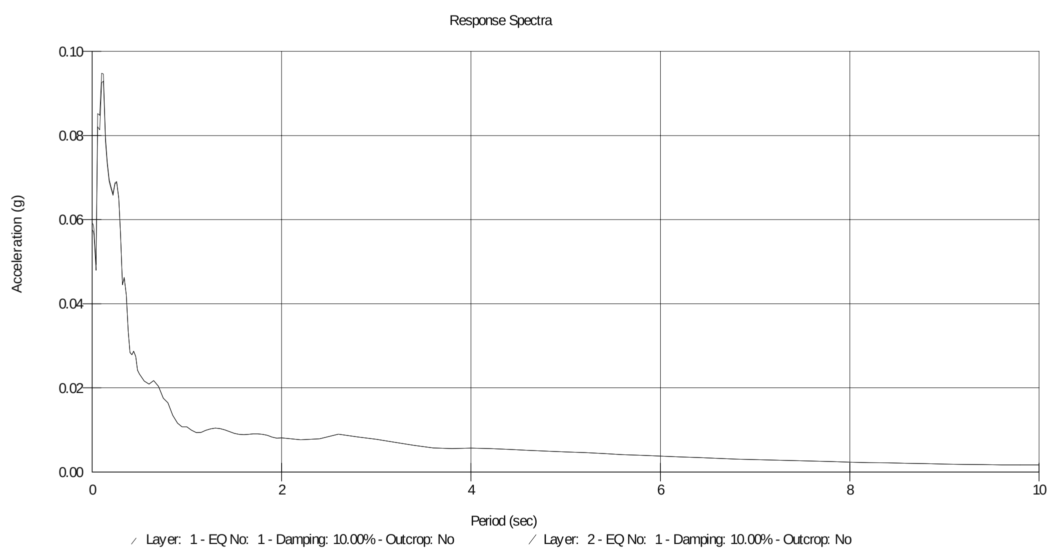
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.095g at T= 0.11 sec

Soil Profile

Profile Name: D11D (CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 2.6 m.
Number of Layers: 58

Input Motion

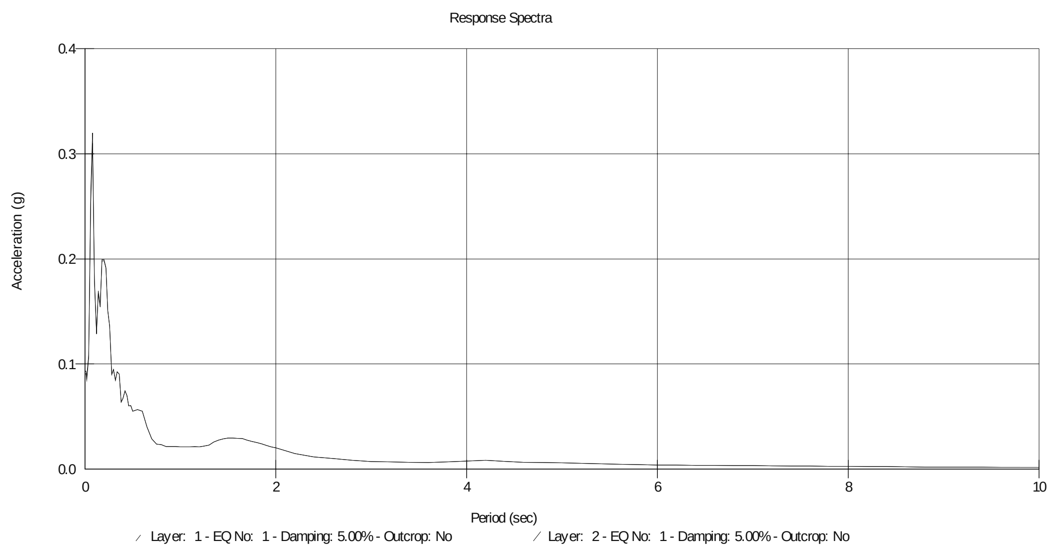
RAN230.EQ

Output Locations

Layers: 1 and 2

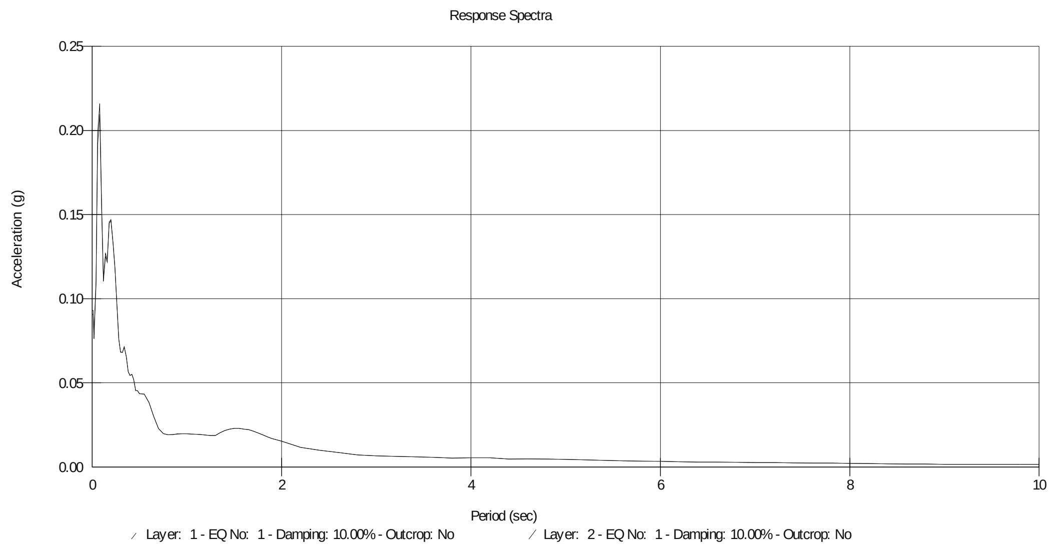
Response Spectra

a) 5% Soil Damping



A_{max} = 0.32g at T= 0.054 sec

b) 10% Soil Damping



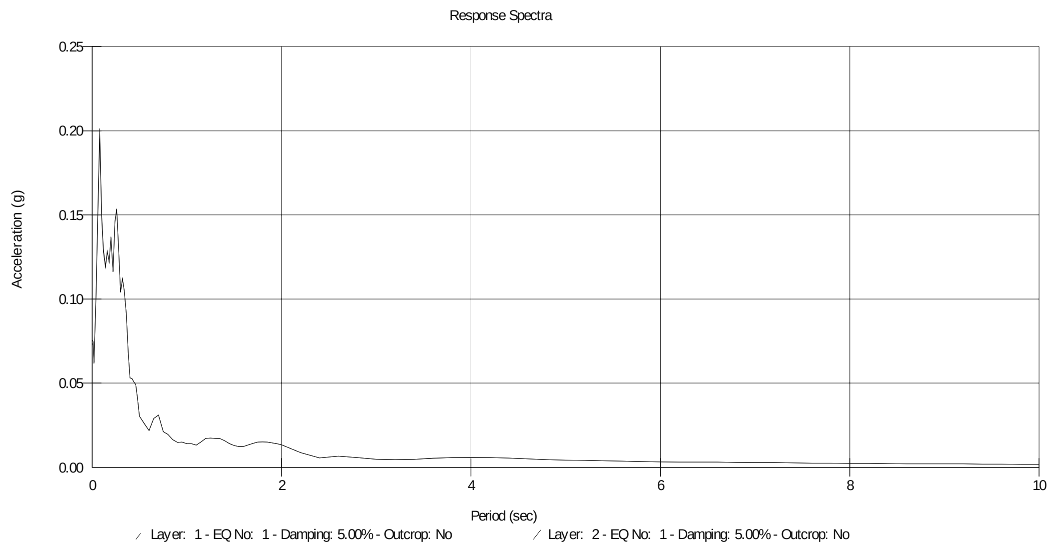
$A_{max} = 0.22$ at $T = 0.064$ sec

Input Motion

RAN330.EQ

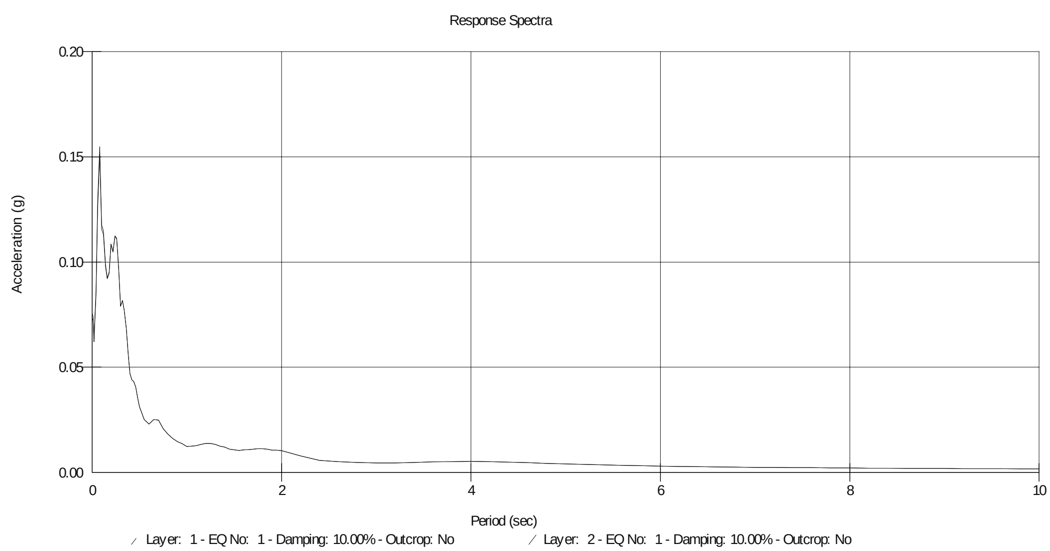
Response Spectra

a) 5% Soil Damping



A_{max} = 0.20g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.16g at T= 0.077 sec

Soil Profile

Profile Name: D12D(CXW)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 43

Input Motion

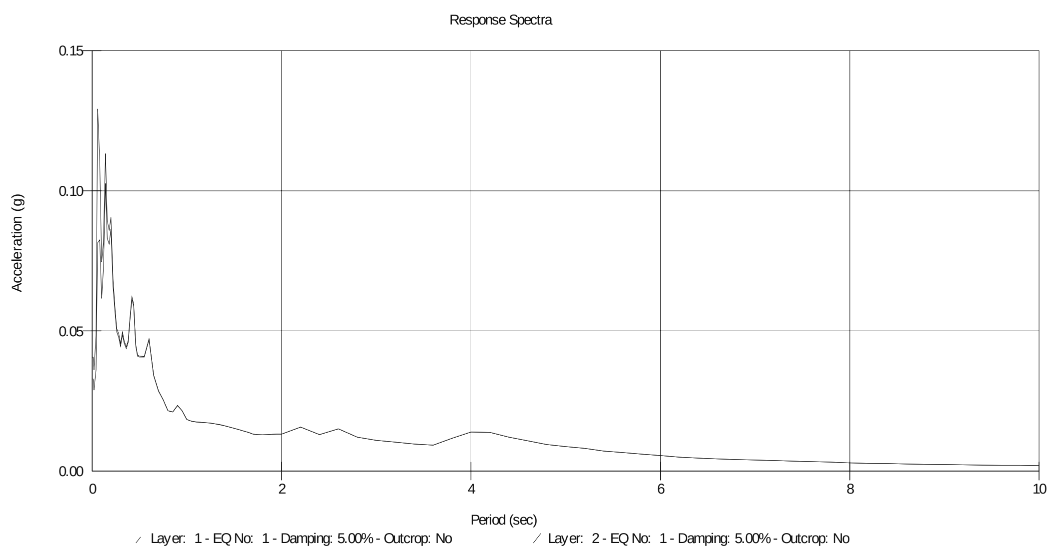
RAN230.EQ

Output Locations

Layers: 1 and 2

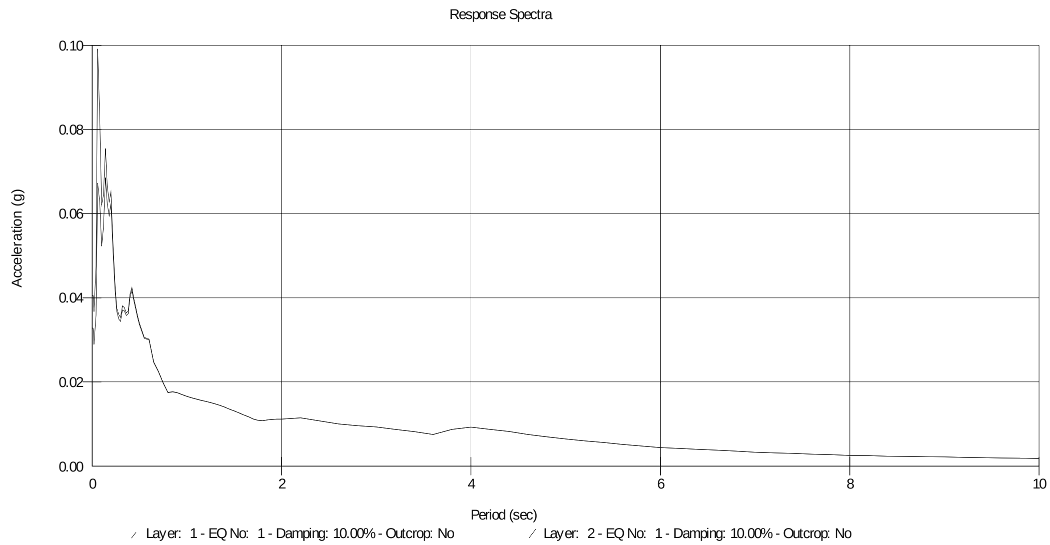
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.054 sec

b) 10% Soil Damping



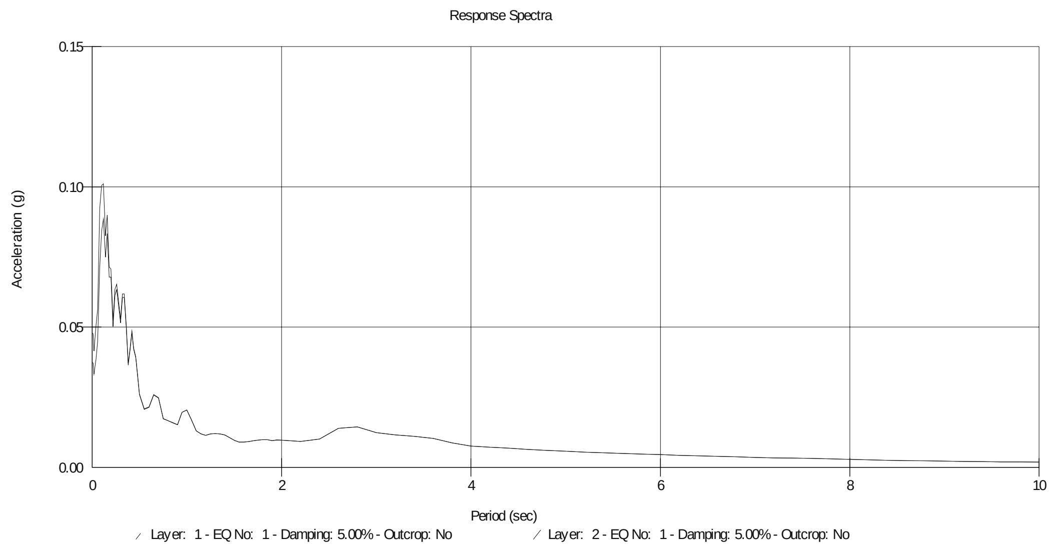
A_{max} = 0.10g at T= 0.054sec

Input Motion

RAN330.EQ

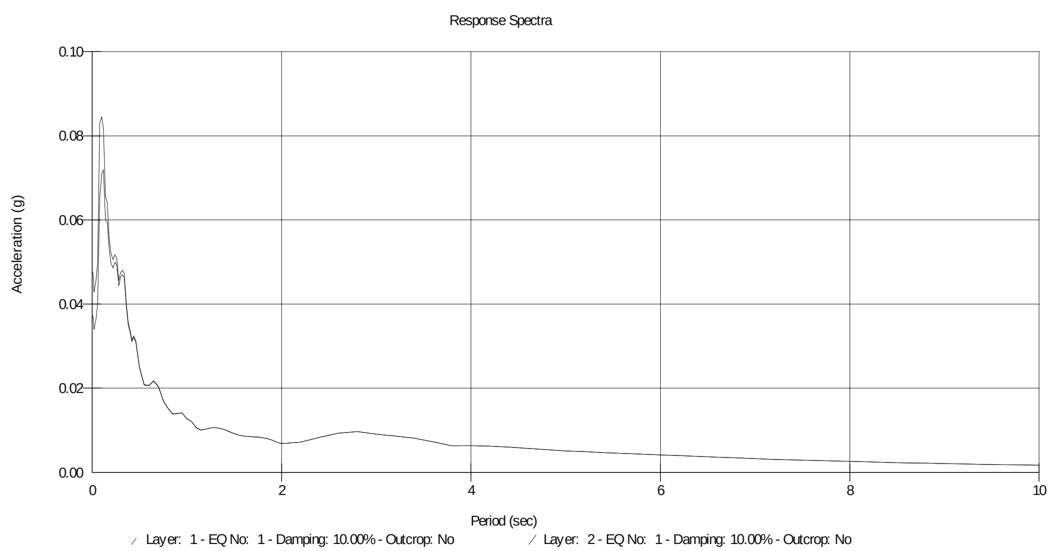
Response Spectra

a) 5% Soil Damping



A_{max} = 0.10g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.09g at T= 0.10 sec

Soil Profile

Profile Name: D12D(CHC)
Tests Types and Designations: SPT(30)-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 55

Input Motion

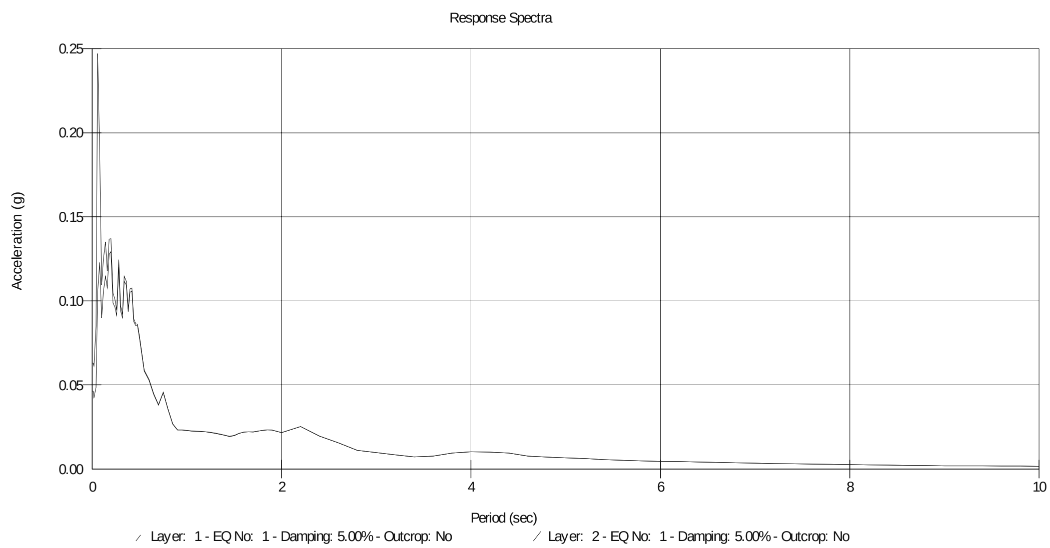
RAN230.EQ

Output Locations

Layers: 1 and 2

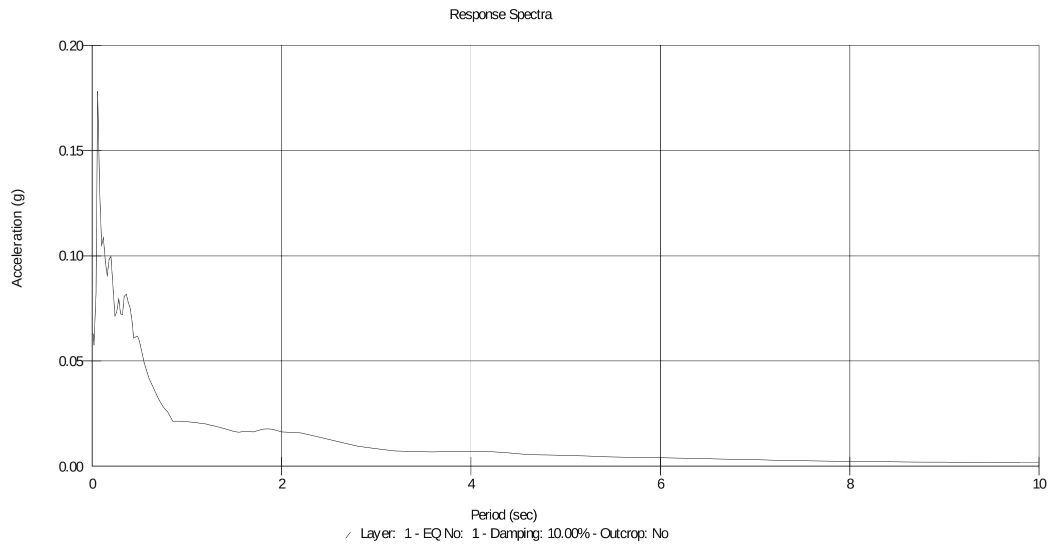
Response Spectra

a) 5% Soil Damping



A_{max} = 0.25g at T= 0.054 sec

b) 10% Soil Damping



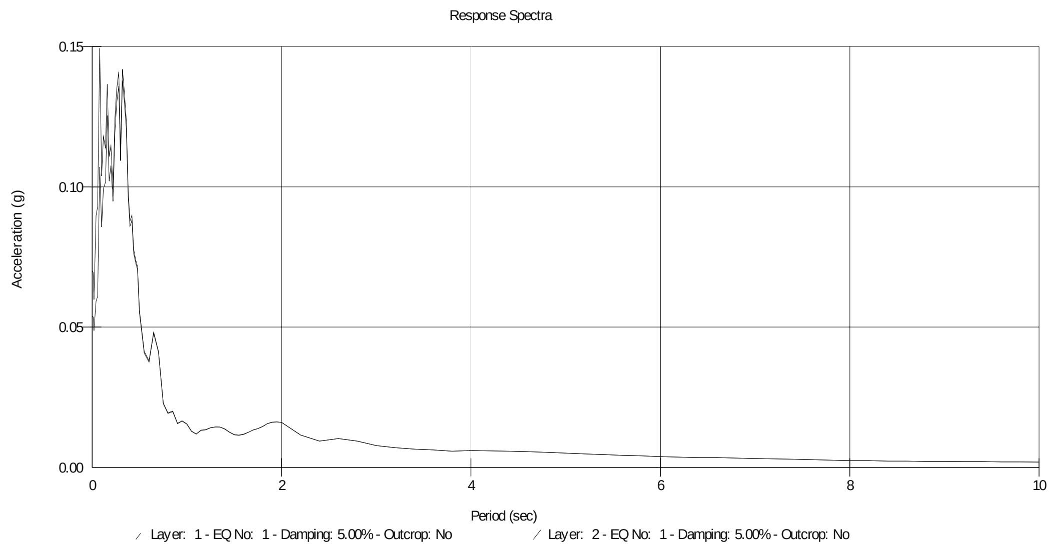
A_{max} = 0.18g at *T*= 0.054 sec

Input Motion

RAN330.EQ

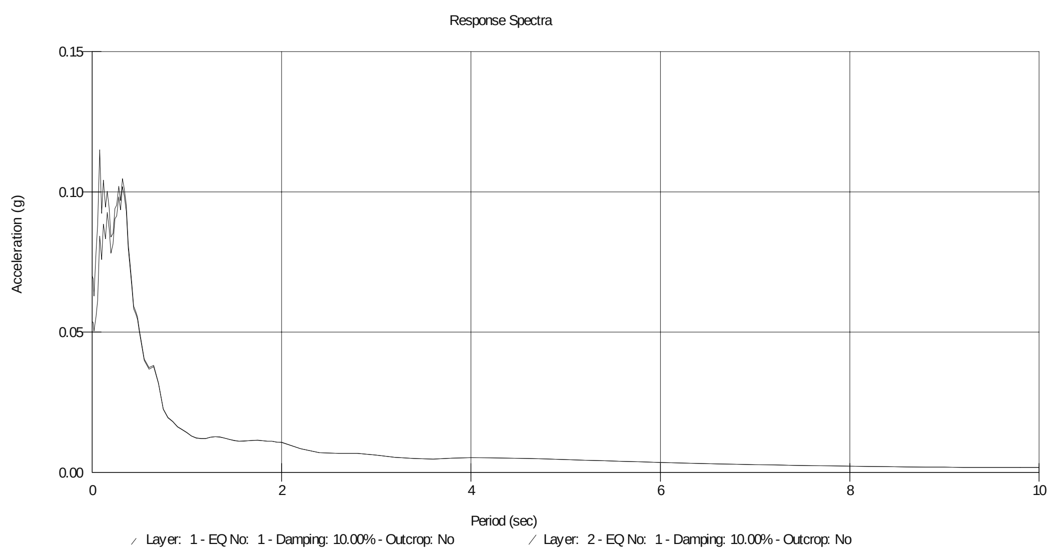
Response Spectra

a) 5% Soil Damping



A_{max} = 0.15g at T= 0.077 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.077 sec

ProShake Report T_{AC}

Bedrock Depth at Actual Depth (T_{AC}= 350 m)

Soil Profile

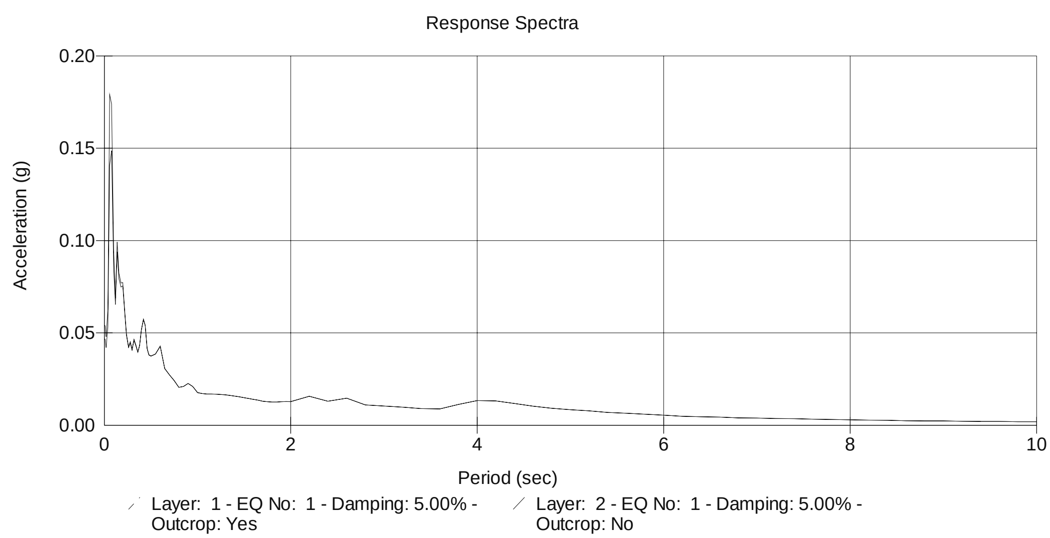
Profile Name: D1
Tests Types and Designations: SPT-CXW
Water Table Depth: 8 m.
Number of Layers: 57

Input Motion

RAN230.EQ

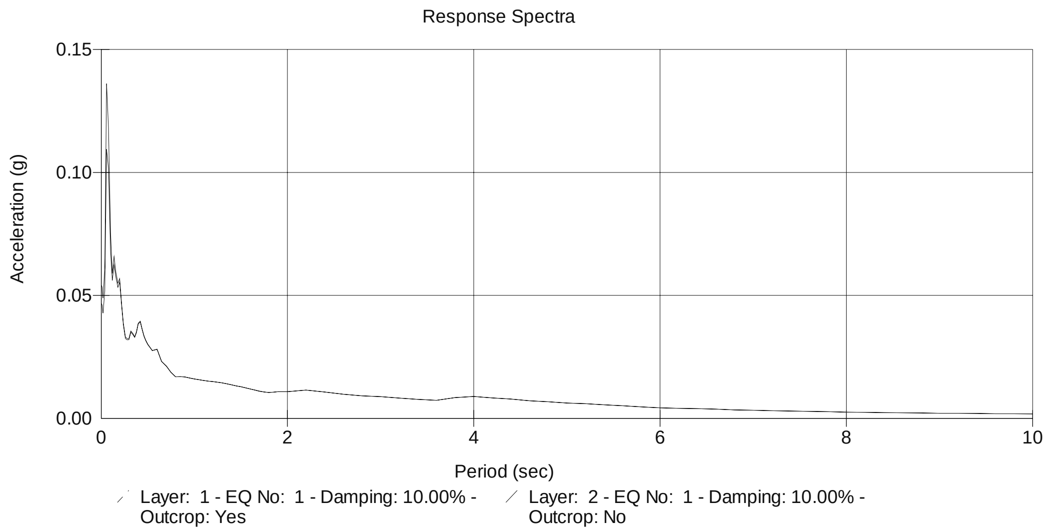
Response Spectra)

a) 5% Soil Damping



A_{max} = 0.18g at T= 0.069 sec.

b) 10% Soil Damping



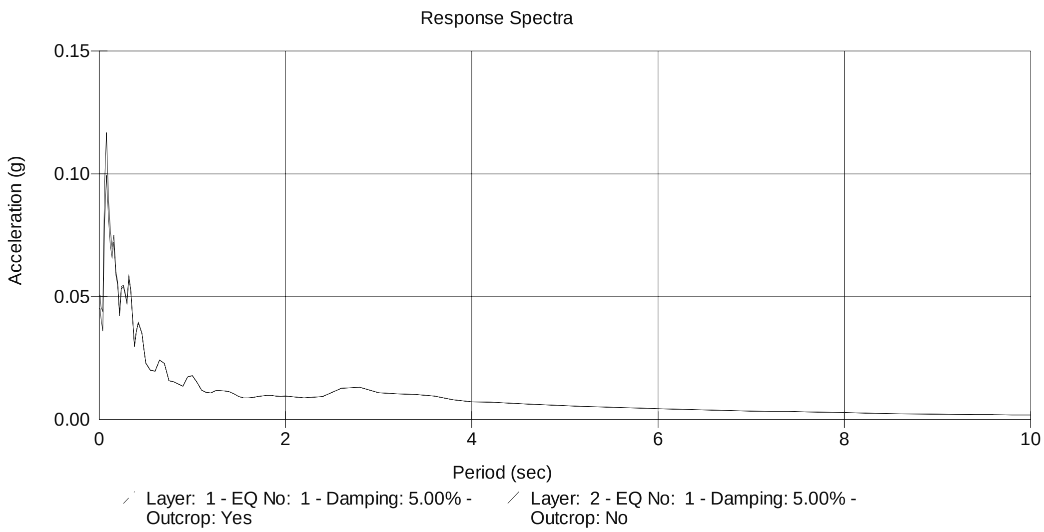
$A_{max} = 0.14g$ at $T = 0.0691$ sec.

Input Motion

RAN330.EQ

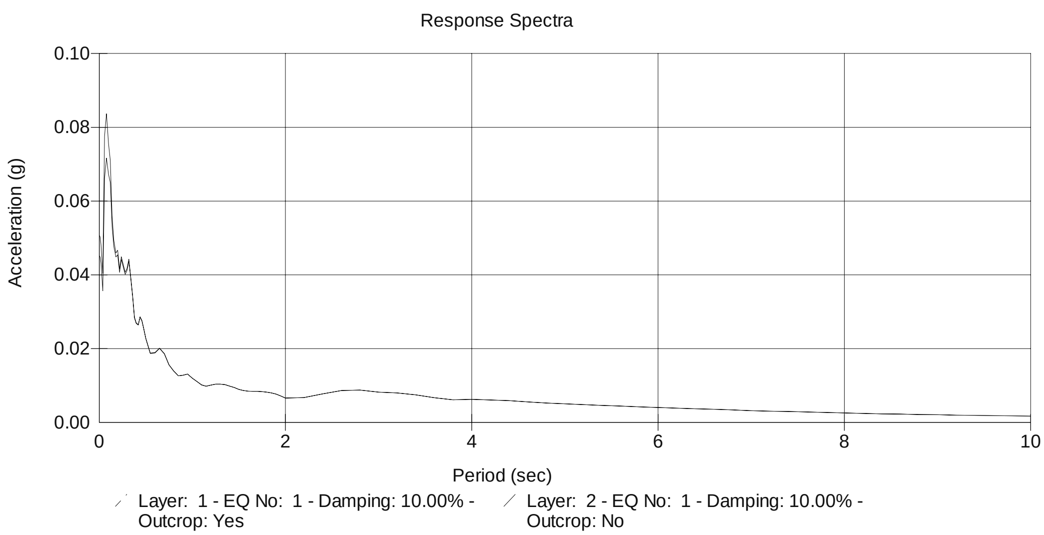
Response Spectra

a) 5% Soil Damping



A_{max} = 0.129g at T= 0.0788

b) 10% Soil Damping



A_{max} = 0.0852g at T= 0.0788 sec

Input Motion

Soil Profile

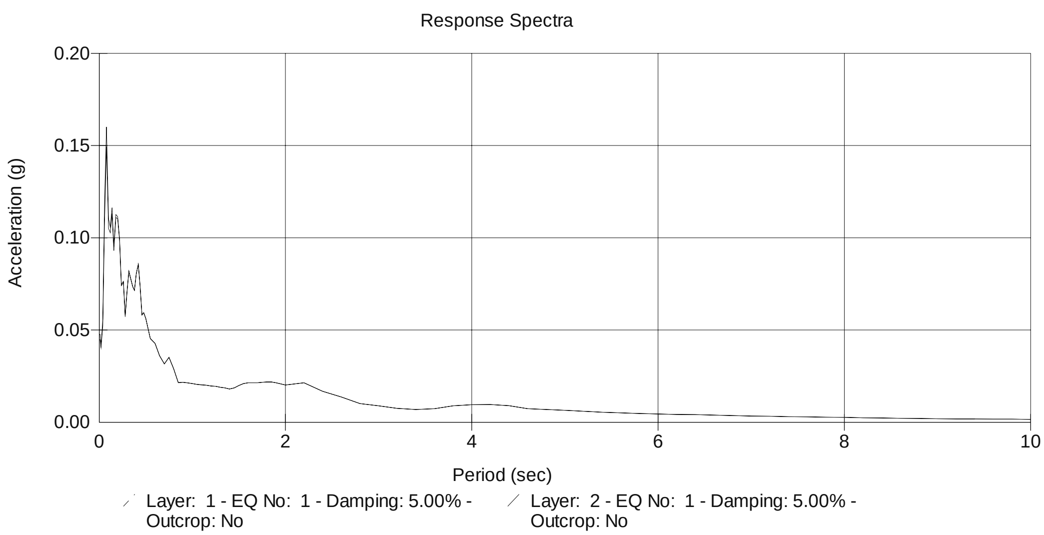
Profile Name: D2
Tests Types and Designations: SPT-CXW
Water Table Depth: 28 m.
Number of Layers: 53

Input Motion

RAN230.EQ

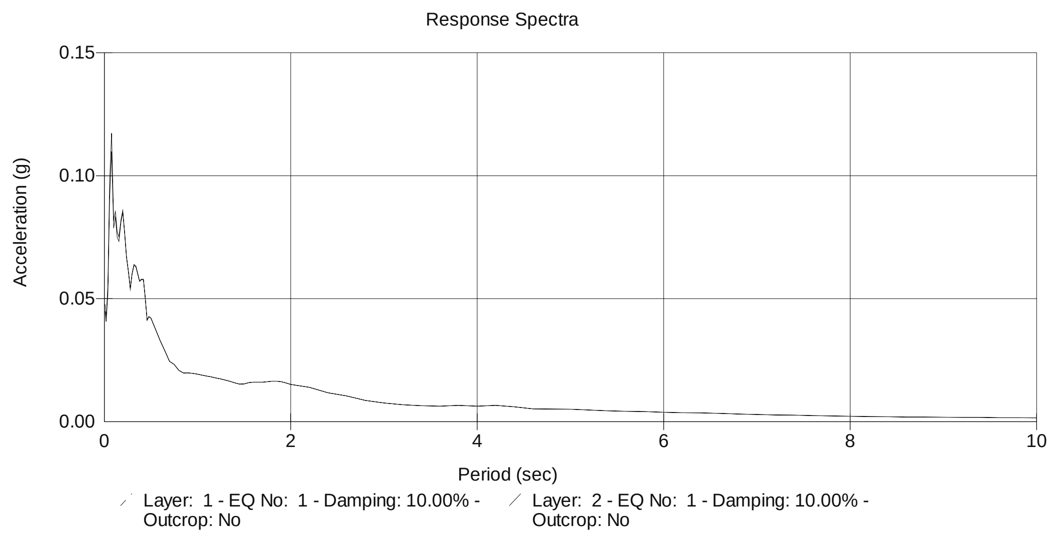
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.09 sec

b) 10% Soil Damping



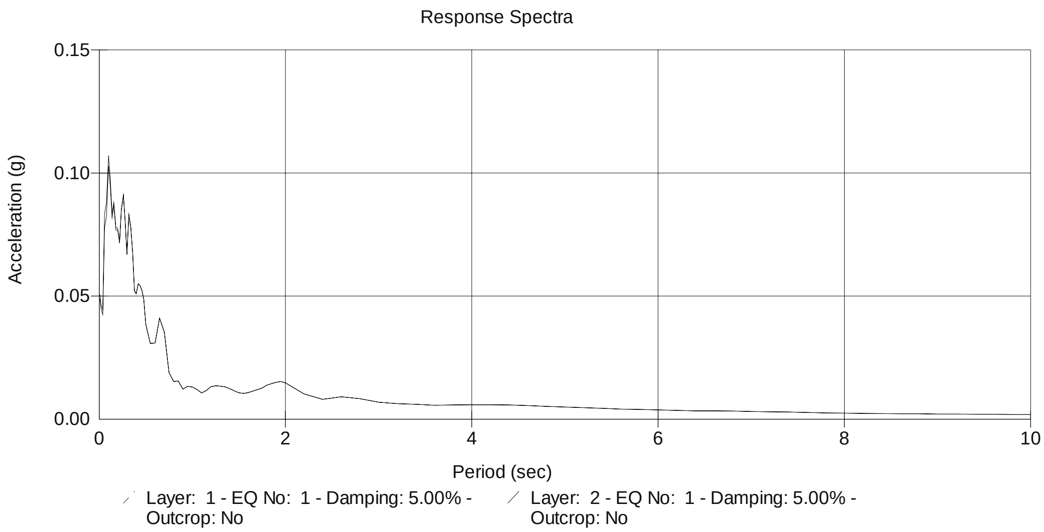
A_{max} = 0.12g at T= 0.10 sec.

Input Motion

RAN330.EQ

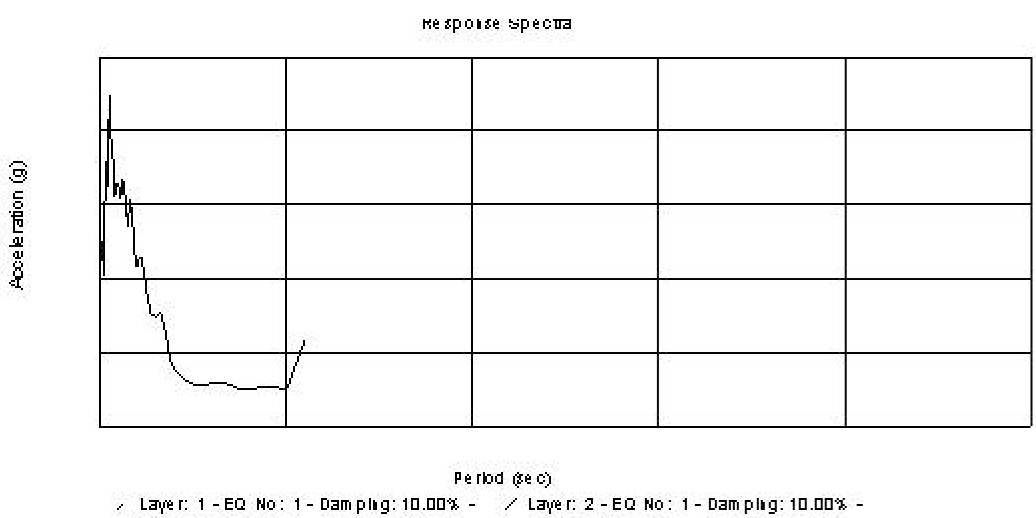
Response Spectra

a) 5% Soil Damping



A_{max} = 0.11g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.0894g at T= 0.11 sec

Soil Profile

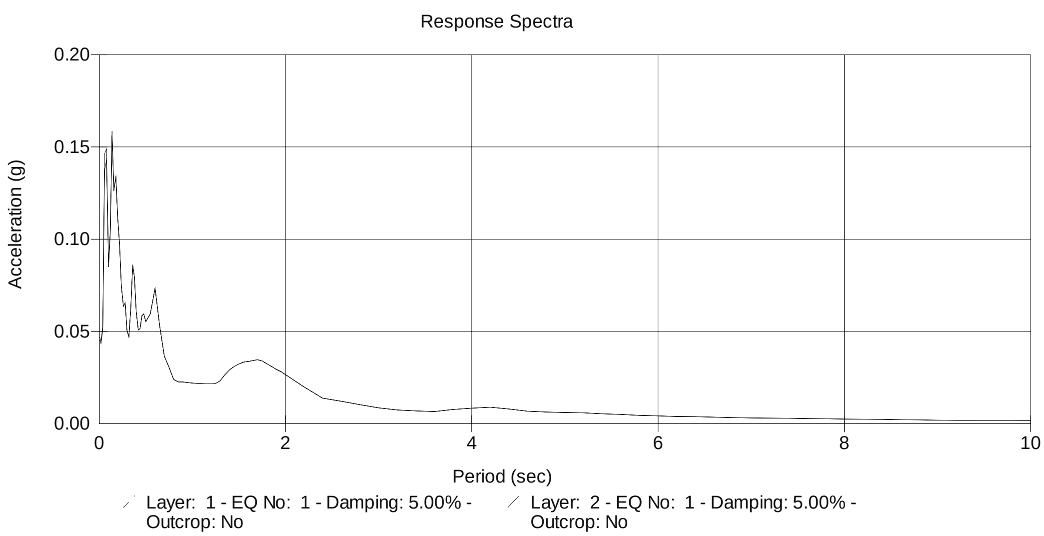
Profile Name: D3
Tests Types and Designations: SPT-CXW
Water Table Depth: 29 m.
Number of Layers: 64

Input Motion

RAN230.EQ

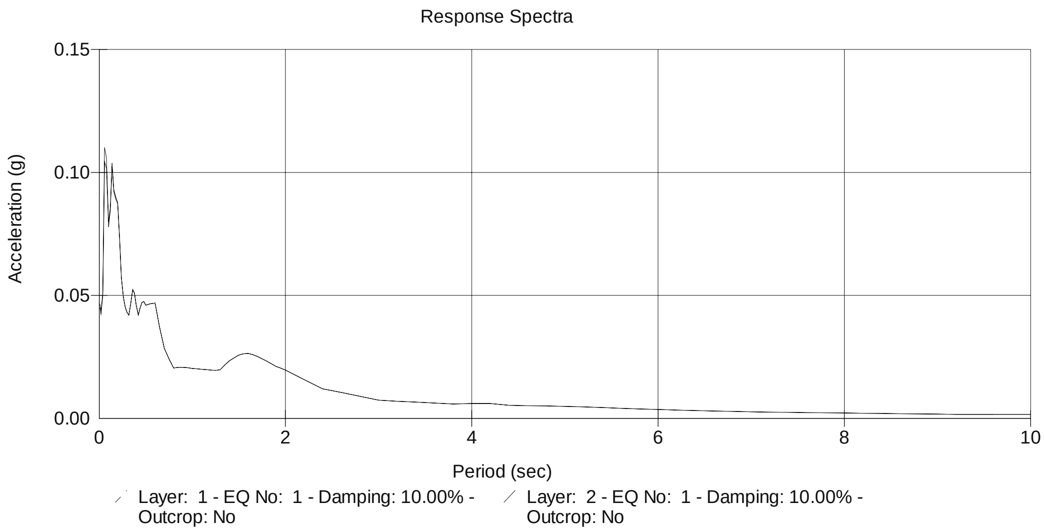
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.13 sec

b) 10% Soil Damping



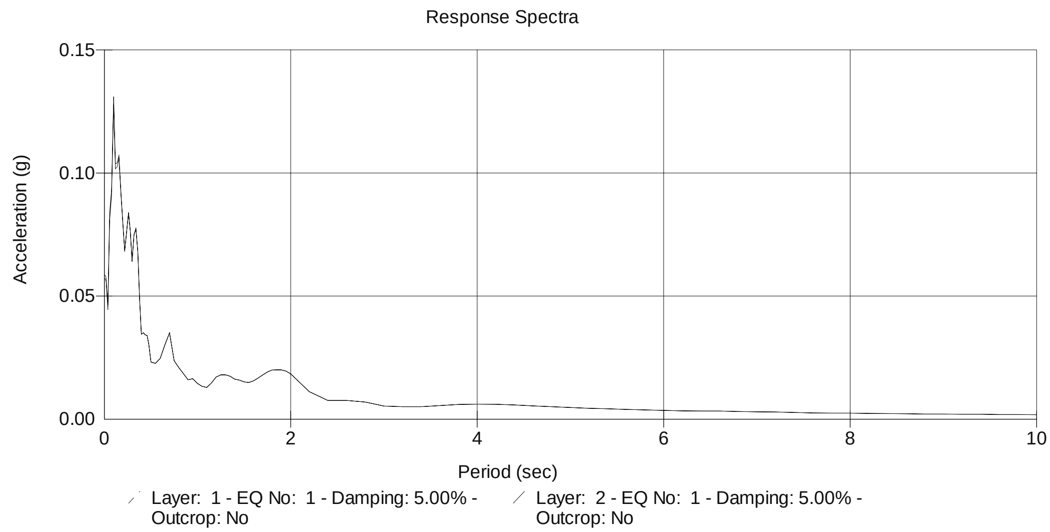
A_{max} = 0.11g at T= 0.06 sec

Input Motion

RAN330.EQ

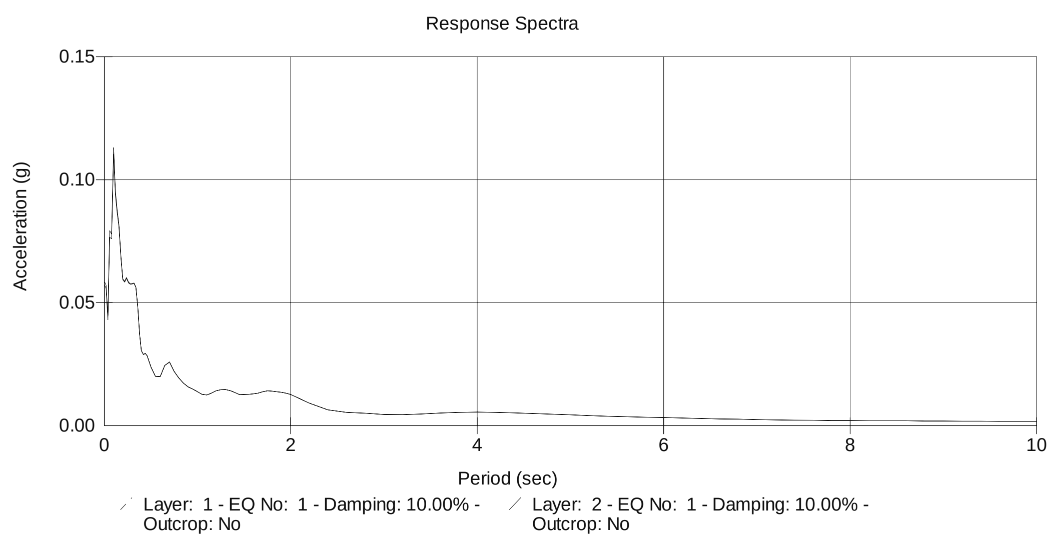
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.13g$ at $T = 0.11$ sec

b) 10% Soil Damping



$A_{max} = 0.12g$ at $T = 0.11$ sec

Soil Profile

Profile Name: D4
Tests Types and Designations: SPT-CXW
Water Table Depth: 2.5 m.
Number of Layers: 52

Input Motion

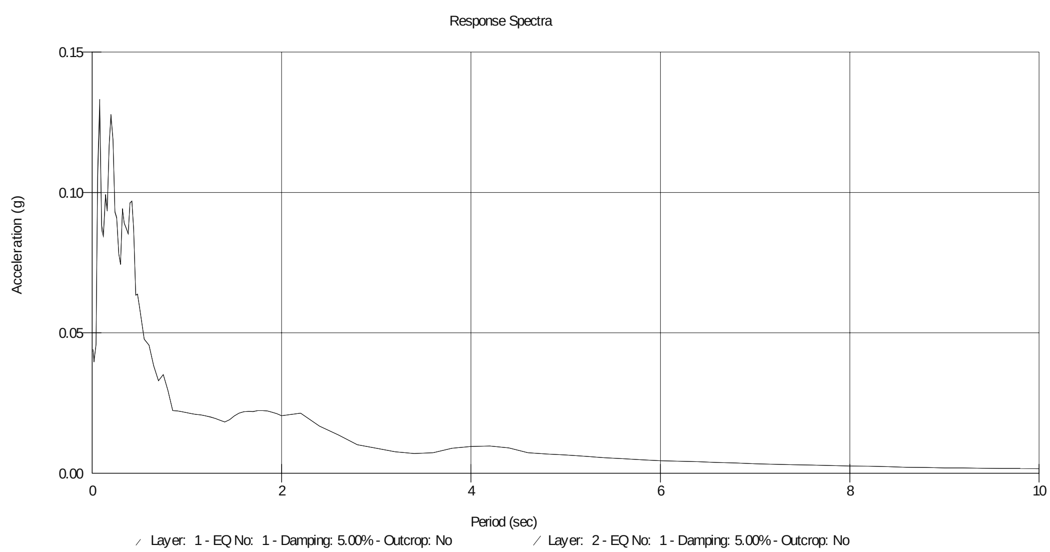
RAN30.EQ

Output Locations

Layers: 1 and 2

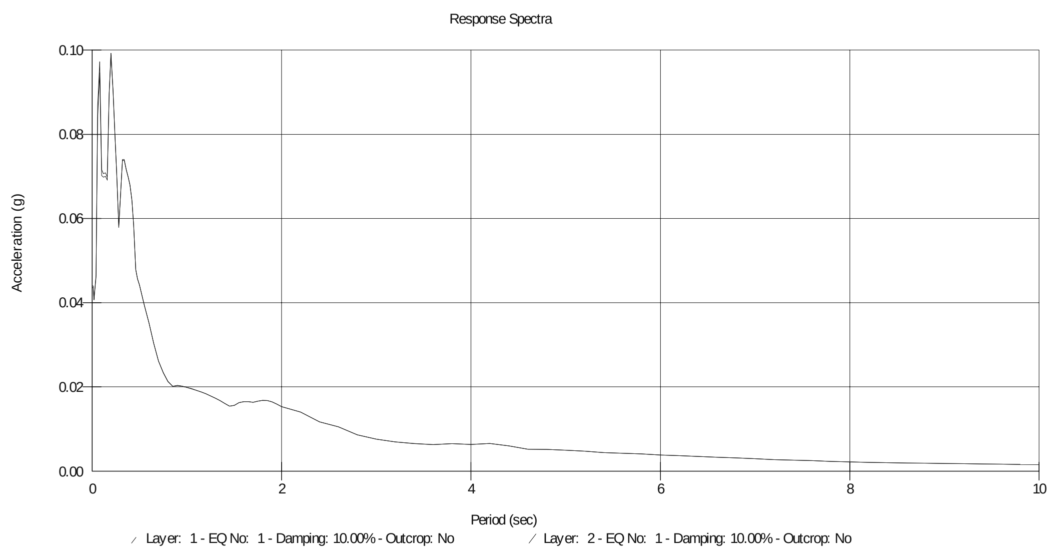
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.077 sec

b) 10% Soil Damping



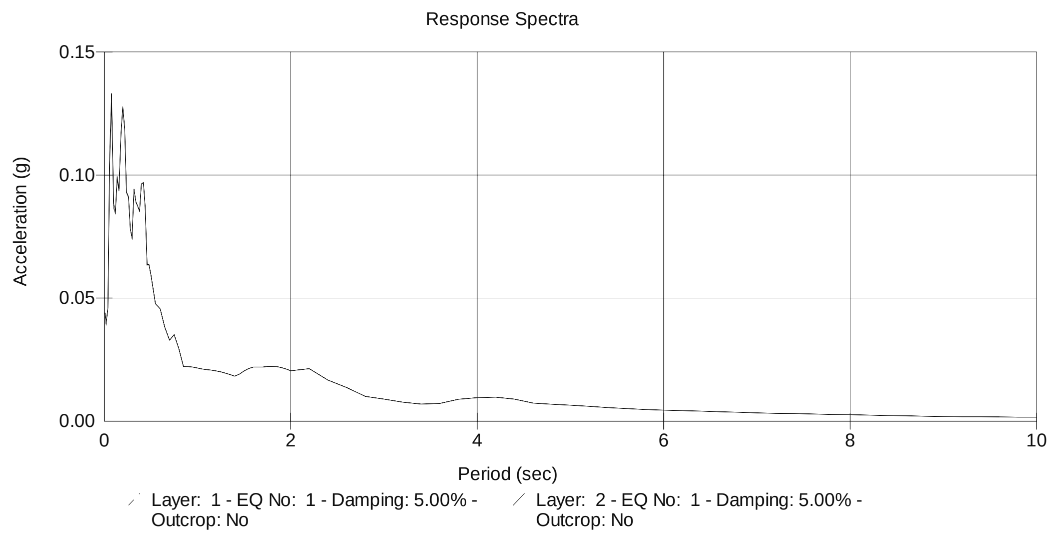
A_{max} = 0.1g at T= 0.077 sec

Input Motion

RAN230.EQ

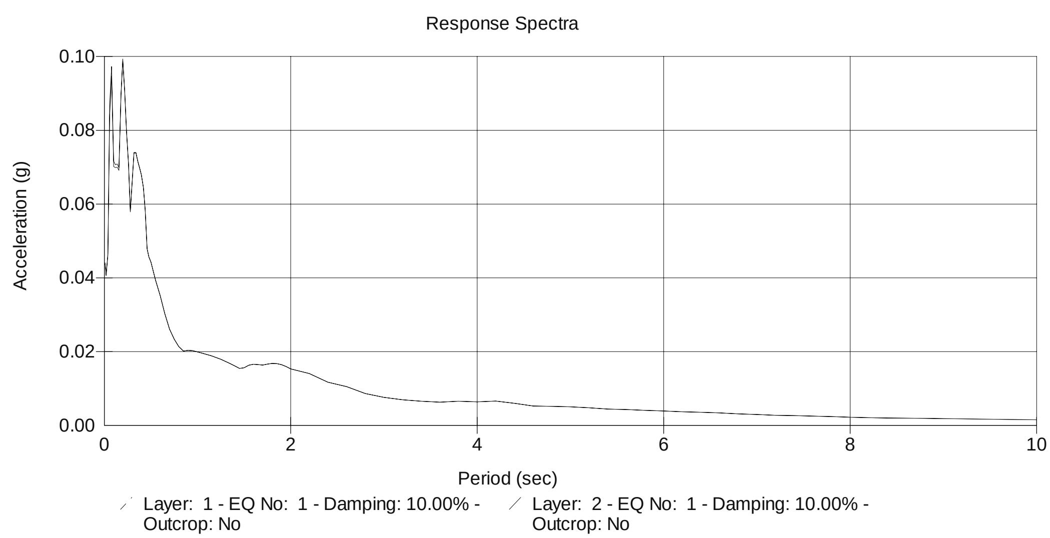
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.0788 sec

b) 10% Soil Damping



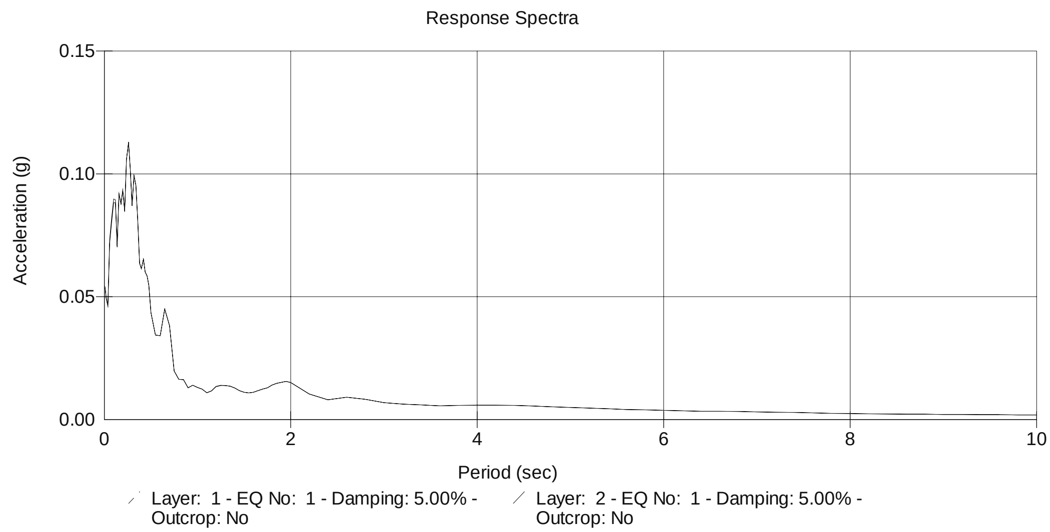
A_{max} = 0.1g at T= 0.21 sec

Input Motion

RAN330.EQ

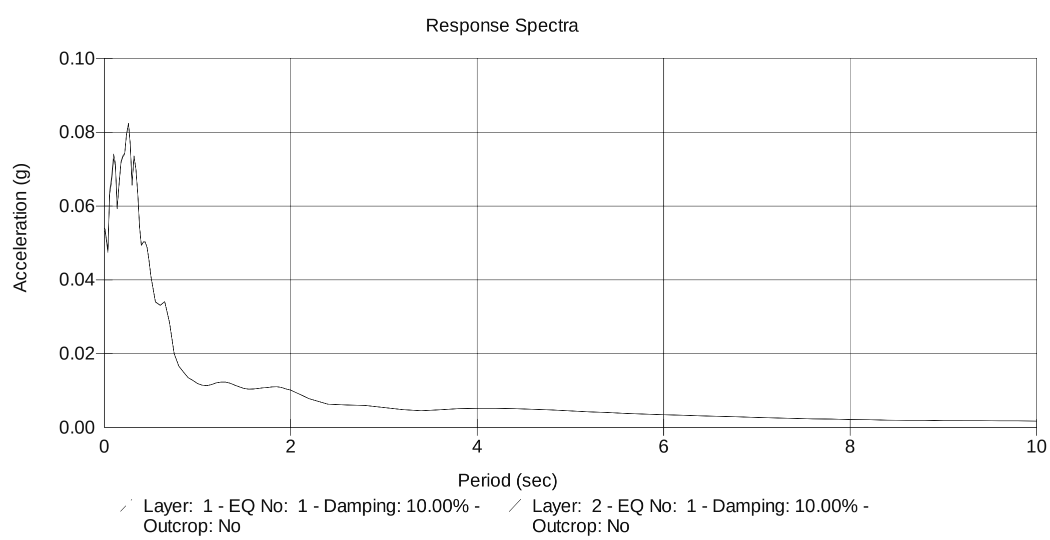
Response Spectra

a) 5% Soil Damping



A_{max} = 0.11g at T= 0.27 sec

b) 10% Soil Damping



A_{max} = 0.0838g at T= 0.27 sec

Soil Profile

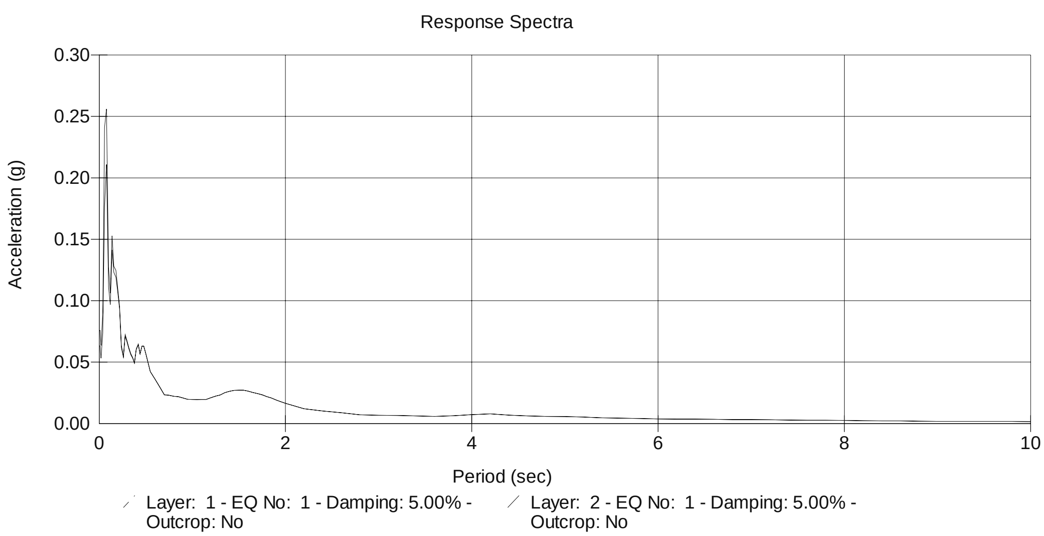
Profile Name: D5A(CXW)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 55

Input Motion

RAN230.EQ

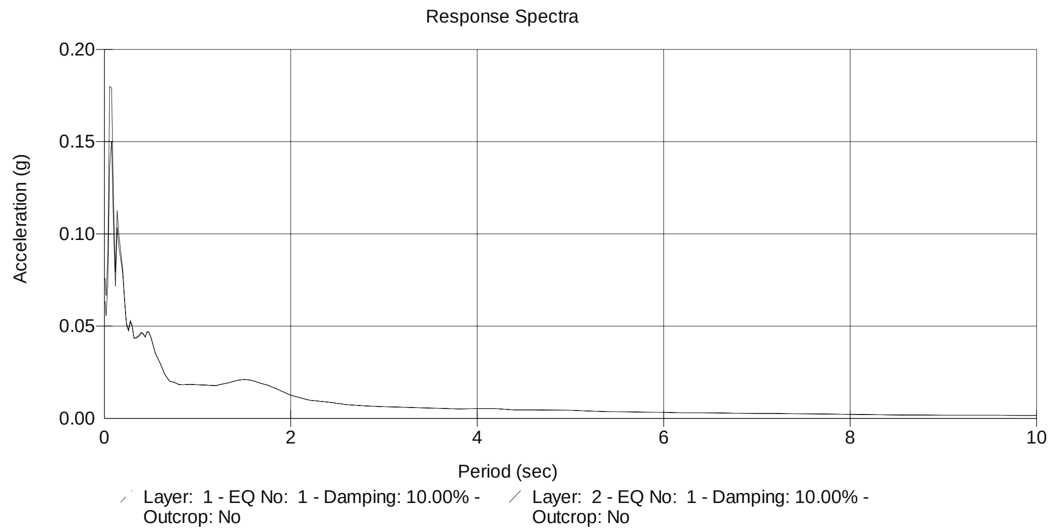
Response Spectra

a) 5% Soil Damping



A_{max} = 0.26g at T= 0.0788 sec

b) 10% Soil Damping



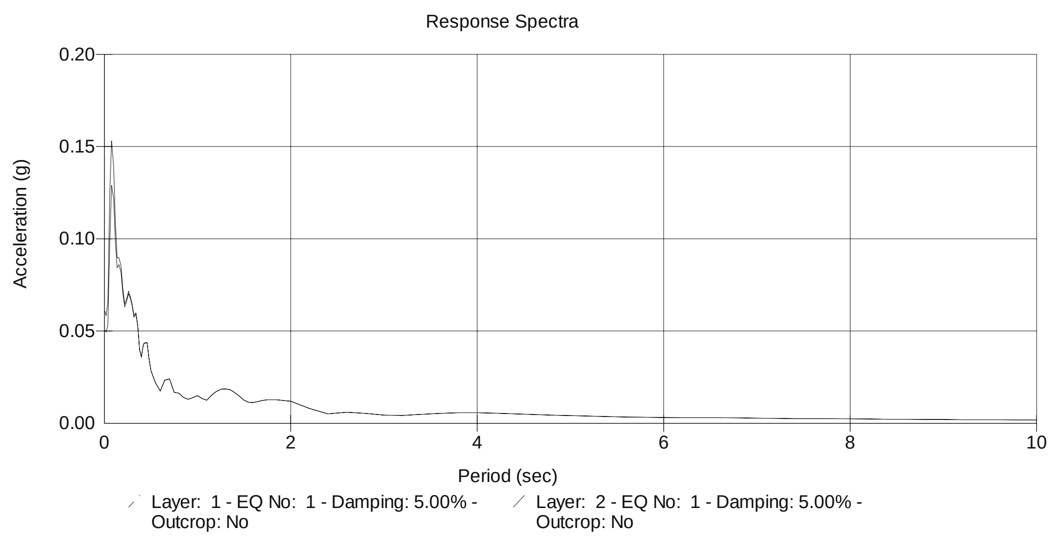
$A_{max} = 0.18g$ at $T = 0.0691$ sec

Input Motion

RAN330.EQ

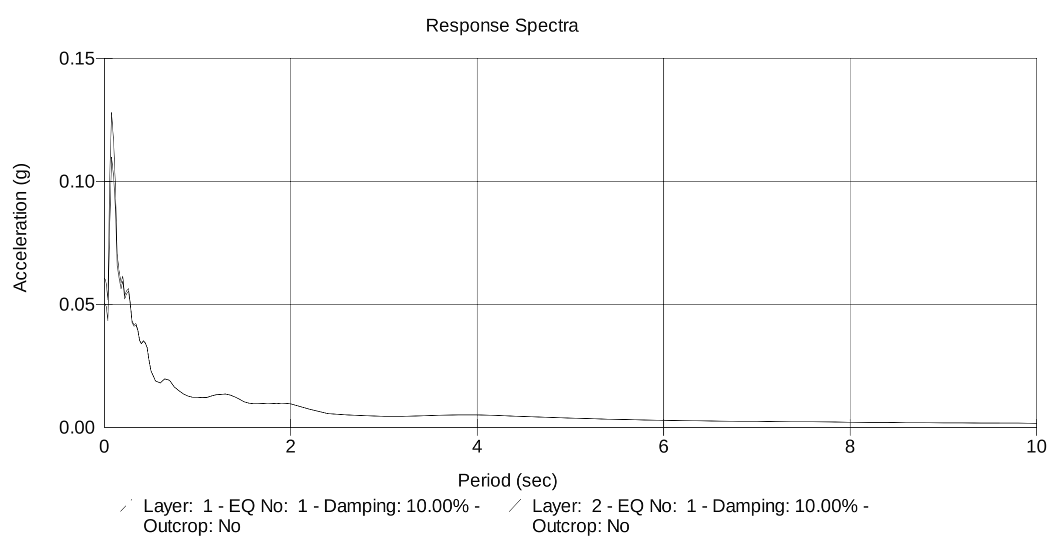
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.15g$ at $T = 0.091$ sec

b) 10% Soil Damping



$A_{max} = 0.13g$ at $T = 0.091$ sec

Soil Profile

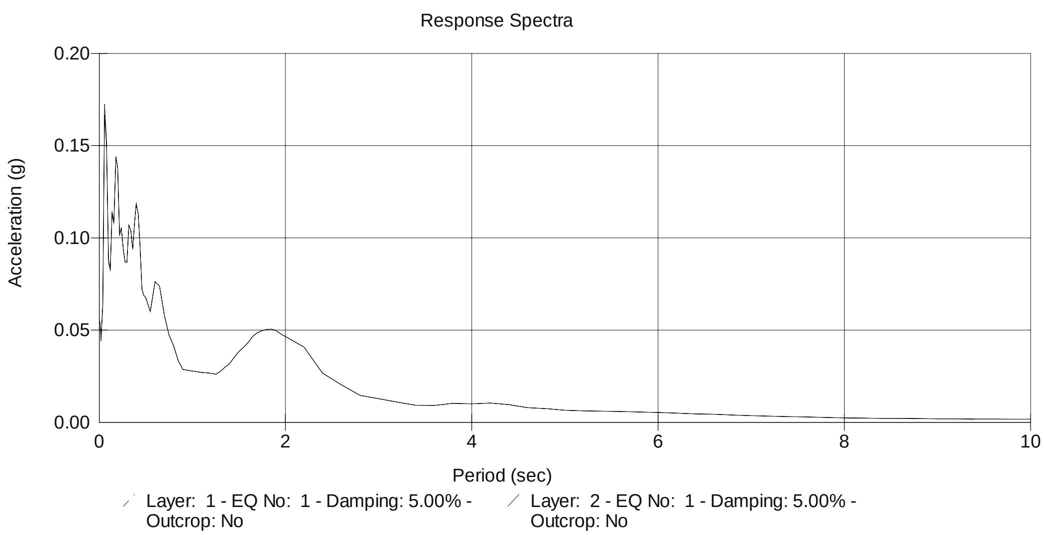
Profile Name: D5(CXW)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 57

Input Motion

RAN230.EQ

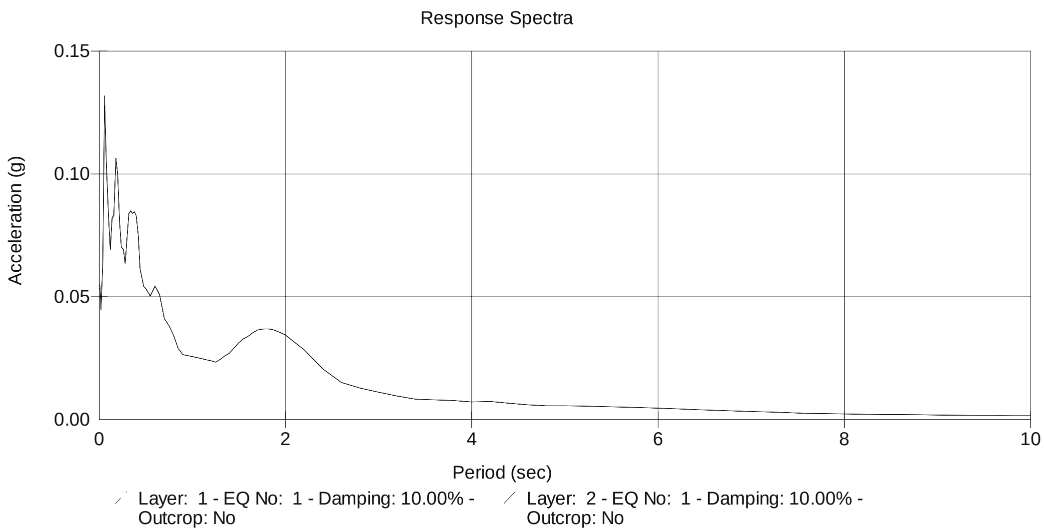
Response Spectra

a) 5% Soil Damping



A_{max} = 0.17g at T= 0.0569 sec

b) 10% Soil Damping



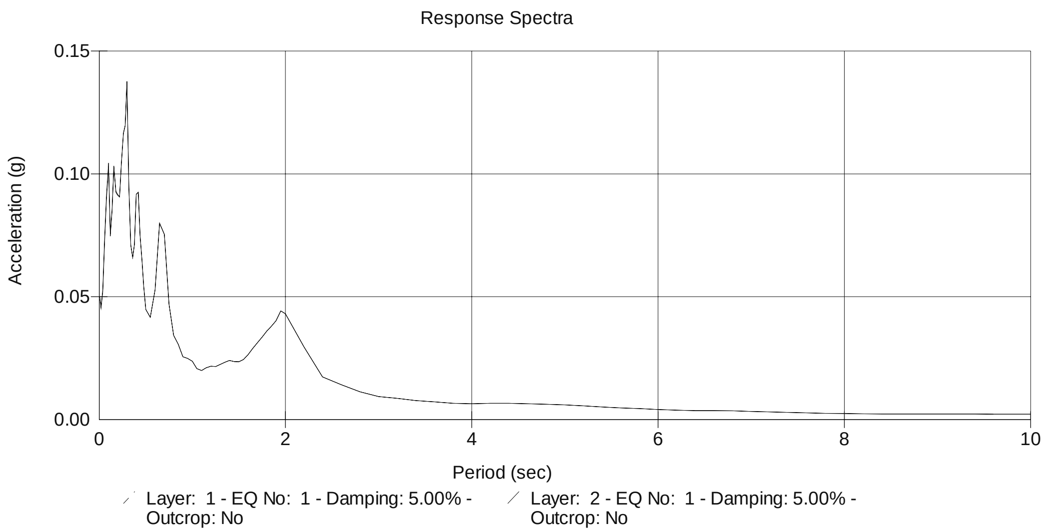
A_{max} = 0.13g at T= 0.0691 sec

Input Motion

RAN330.EQ

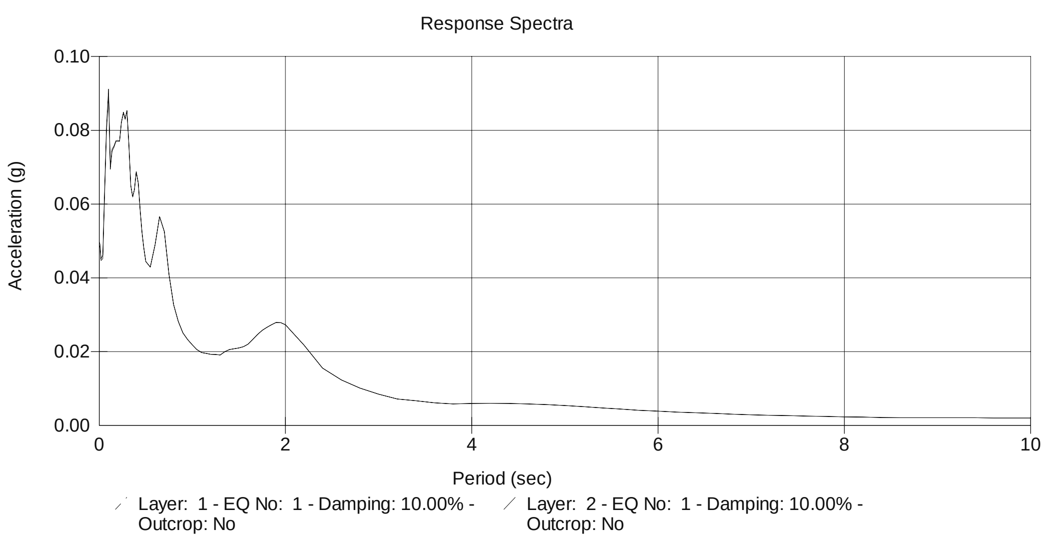
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.31 sec

b) 10% Soil Damping



A_{max} = 0.0919g at T= 0.10 sec

Soil Profile

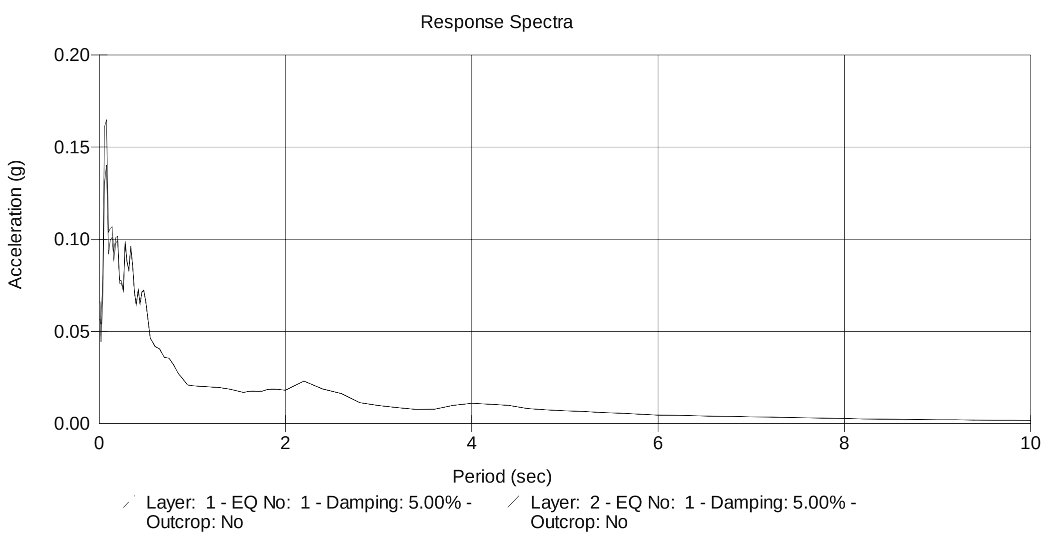
Profile Name: D5CHC
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 3 m.
Number of Layers: 63

Input Motion

RAN230.EQ

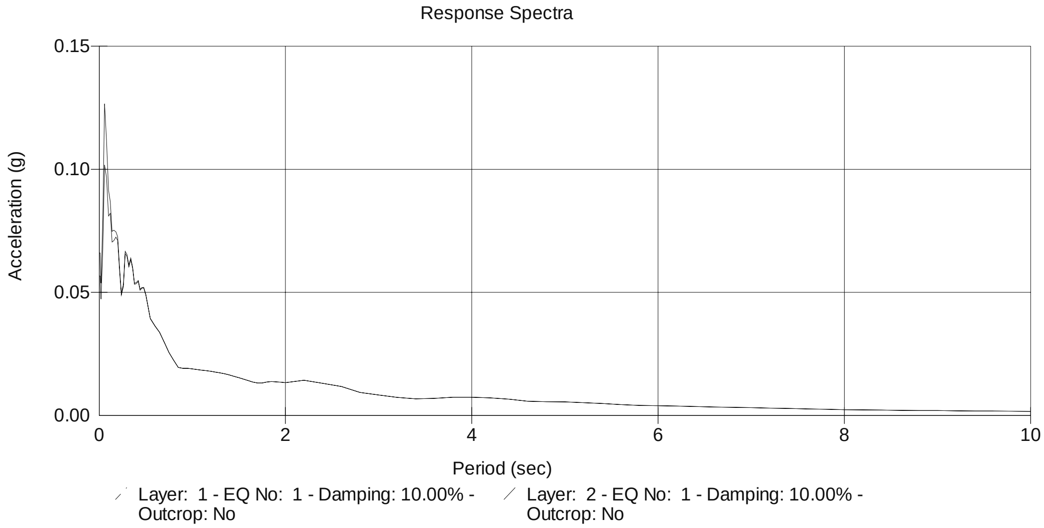
Response Spectra

a) 5% Soil Damping



A_{max} = 0.16g at T= 0.0788 sec

b) 10% Soil Damping



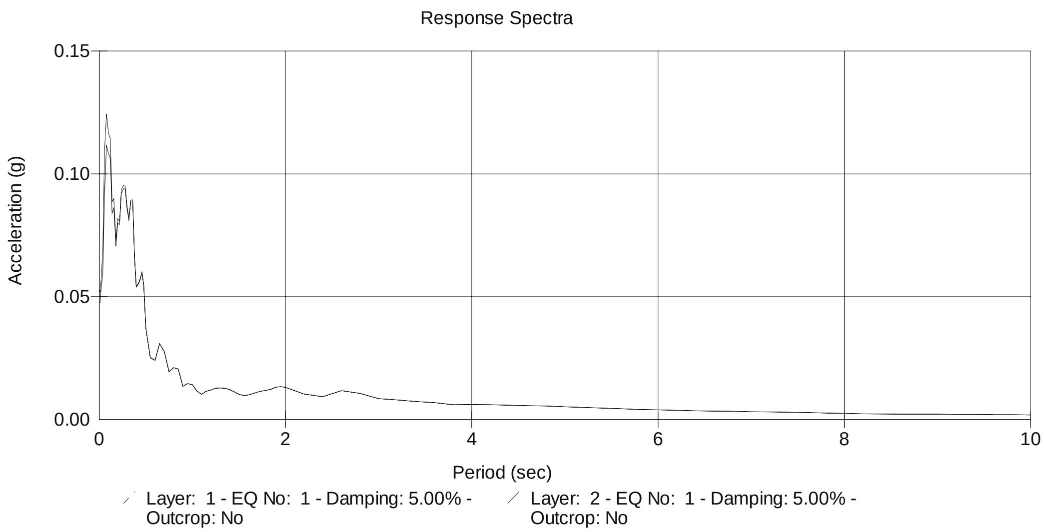
A_{max} = 0.13g at T= 0.0691 sec

Input Motion

RAN330.EQ

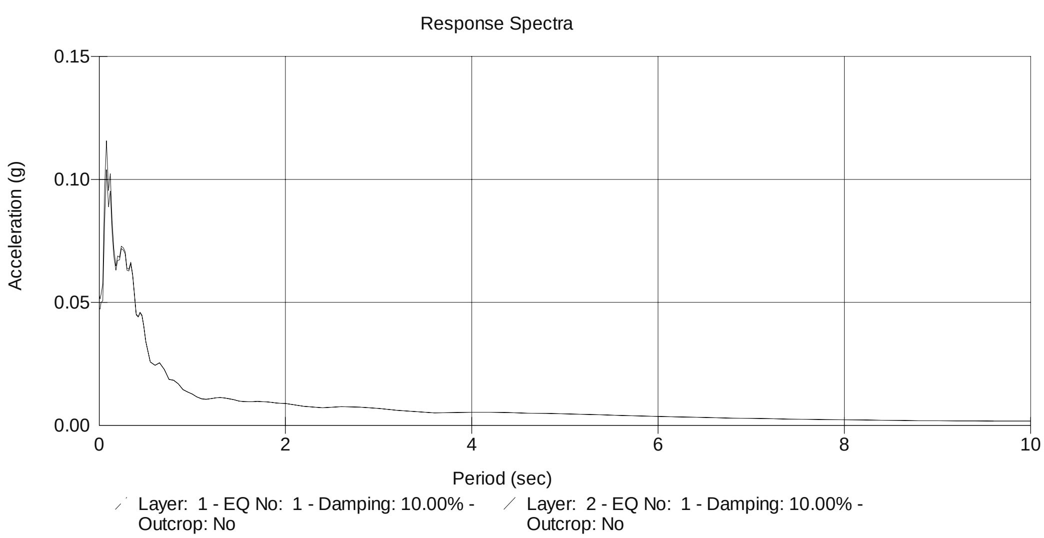
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.0788 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.0788 sec

Soil Profile

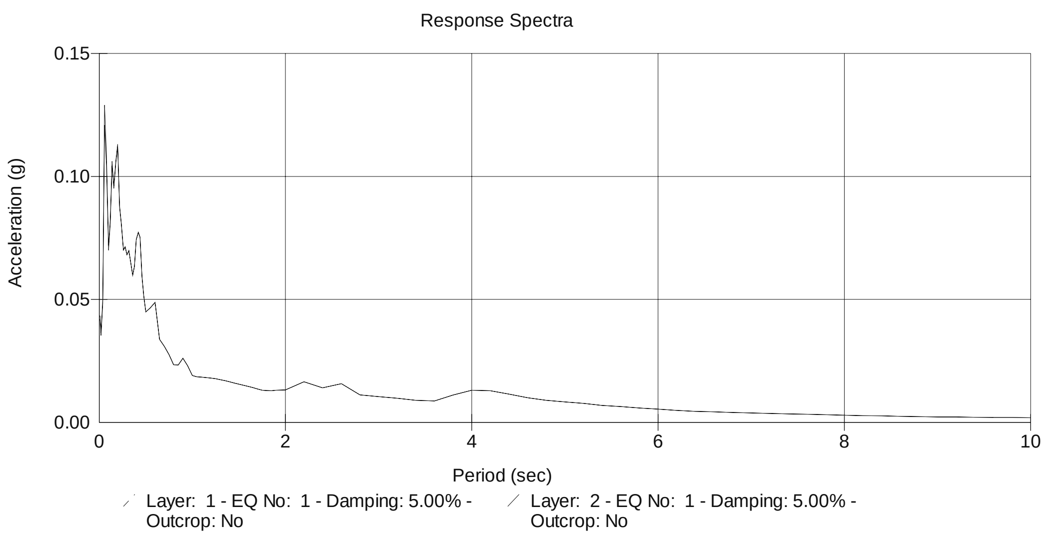
Profile Name: D6(CXW)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 57

Input Motion

RAN230.EQ

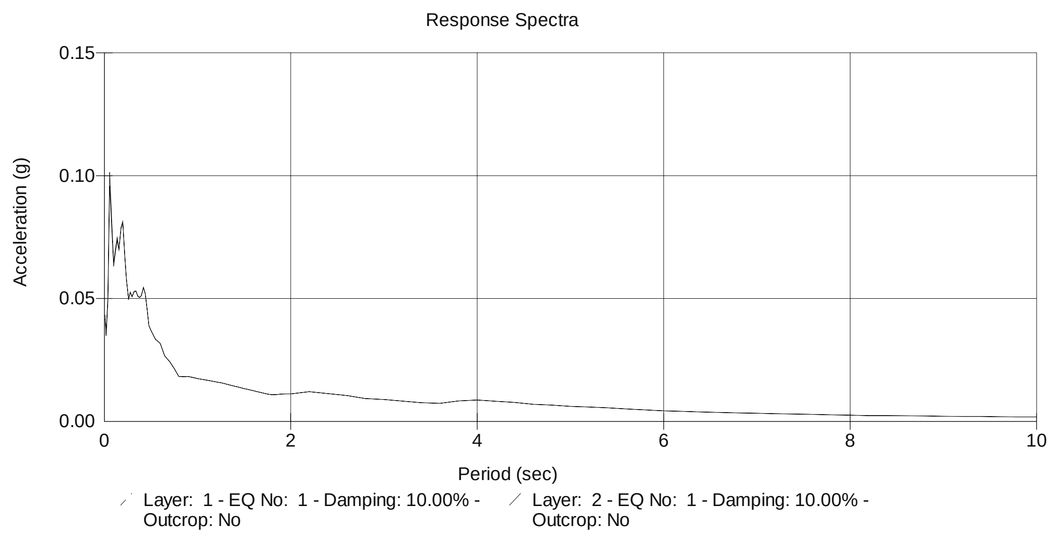
Response Spectra

a) 5% Soil Damping



A_{max} = 0.13g at T= 0.0691 sec

b) 10% Soil Damping



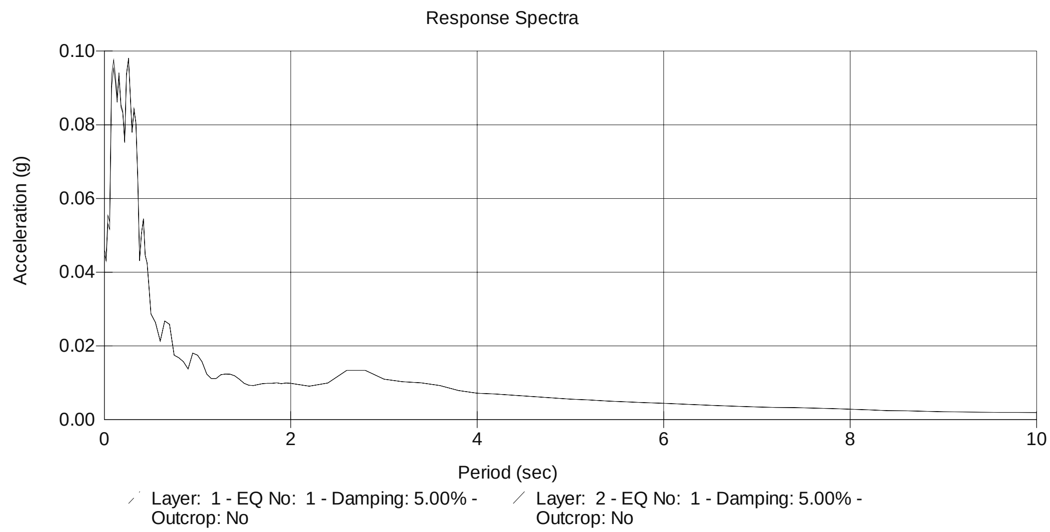
$A_{max} = 0.10g$ at $T= 0.0691$ sec

Input Motion

RAN330.EQ

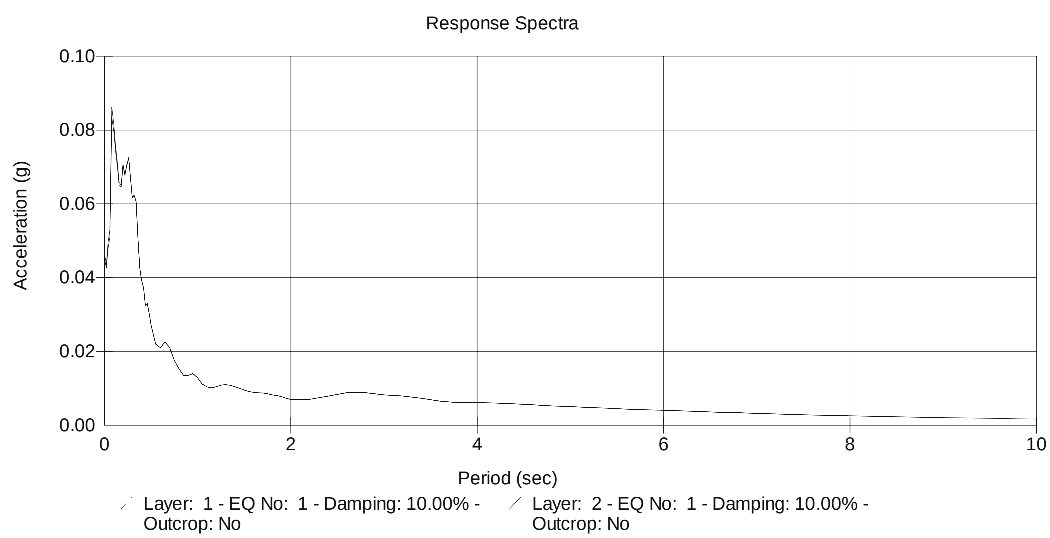
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.0978\text{g}$ at $T = 0.26$ sec

b) 10% Soil Damping



$A_{max} = 0.0869\text{g}$ at $T = 0.0788$ sec

Soil Profile

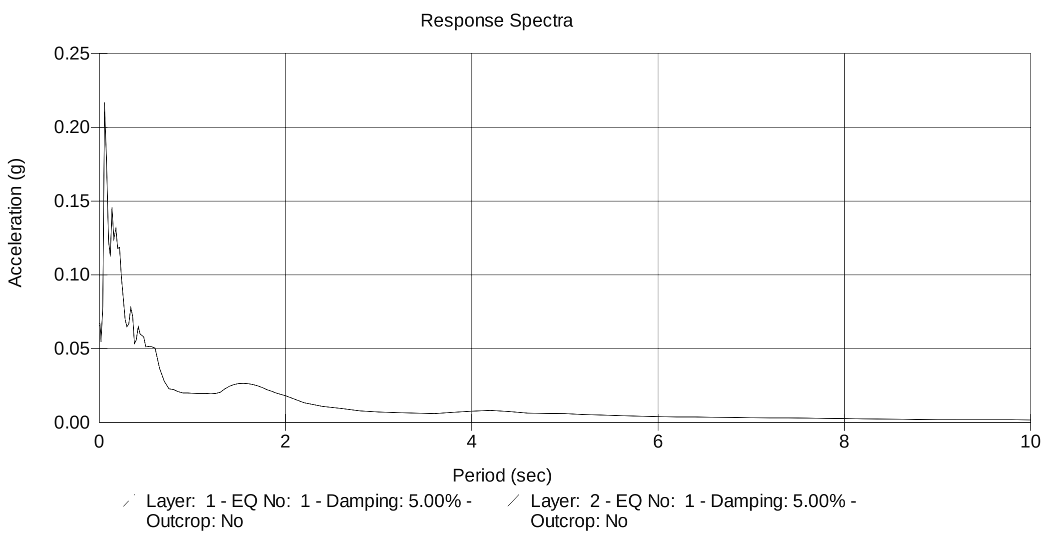
Profile Name: D6CHC
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 25 m.
Number of Layers: 59

Input Motion

RAN230.EQ

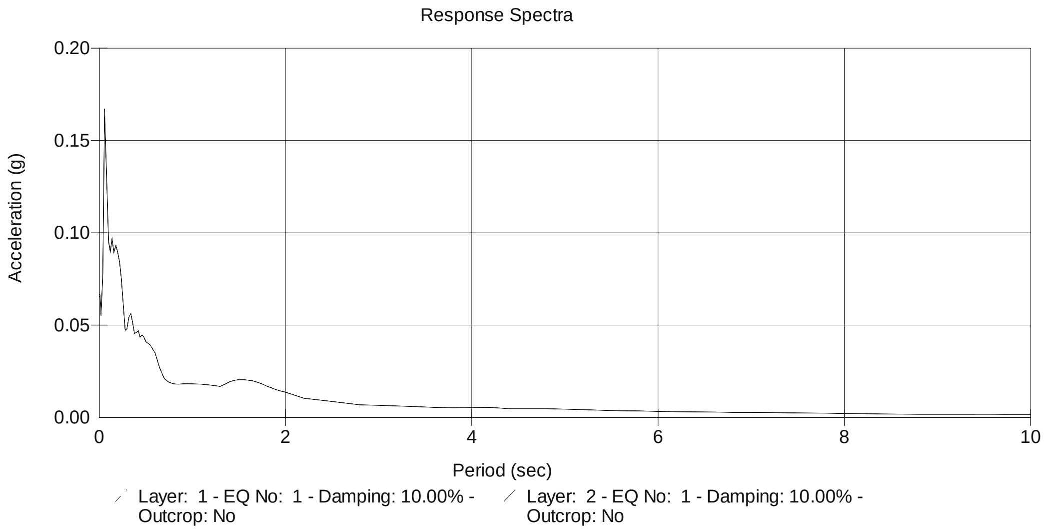
Response Spectra

a) 5% Soil Damping



A_{max} = 0.22g at T= 0.0569 sec

b) 10% Soil Damping



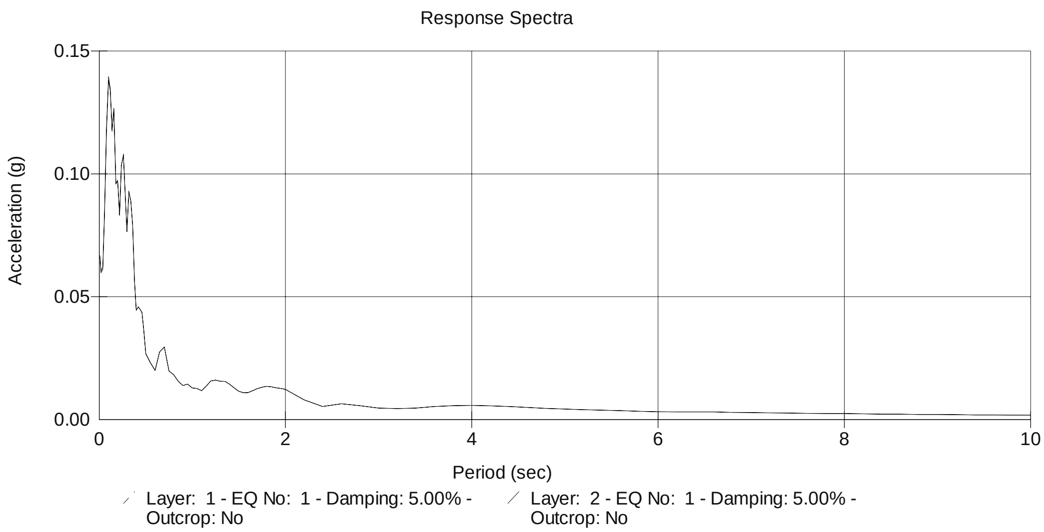
A_{max} = 0.17g at T= 0.0569 sec

Input Motion

RAN330.EQ

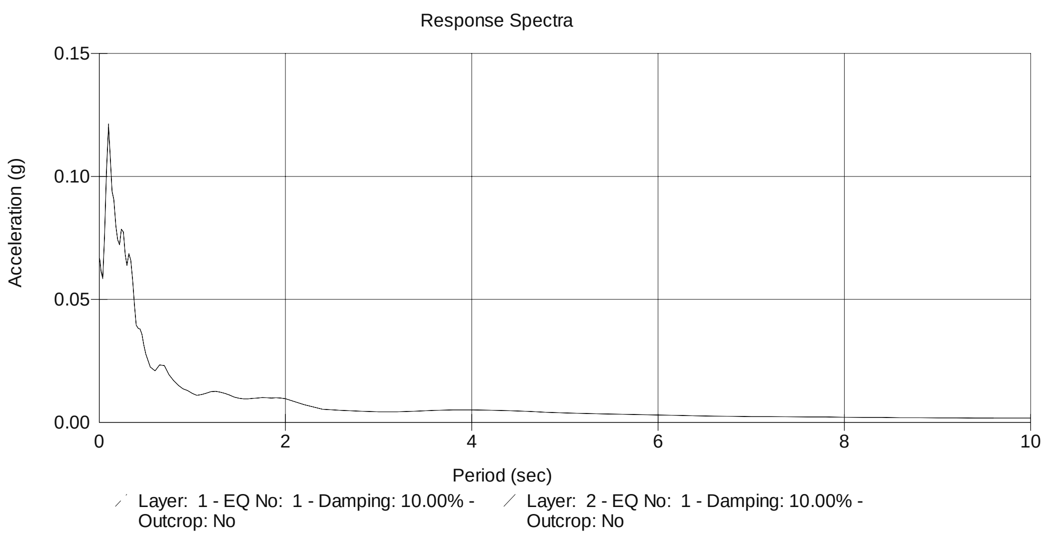
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.11 sec

b) 10% Soil Damping



A_{max} = 0.12g at T= 0.10 sec

Soil Profile

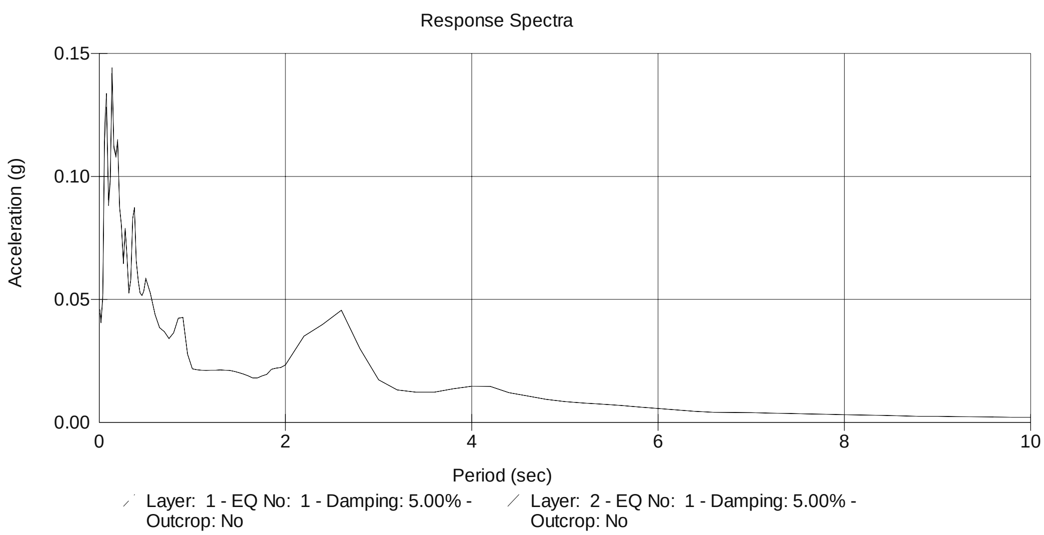
Profile Name: D7
Tests Types and Designations: SPT-CXW
Water Table Depth: 26 m.
Number of Layers: 52

Input Motion

RAN230.EQ

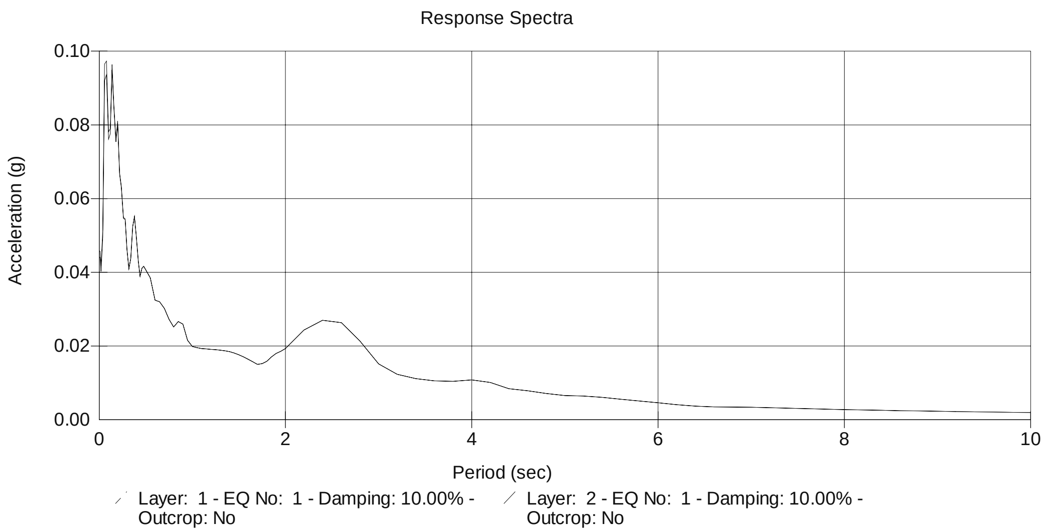
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.15 sec

b) 10% Soil Damping



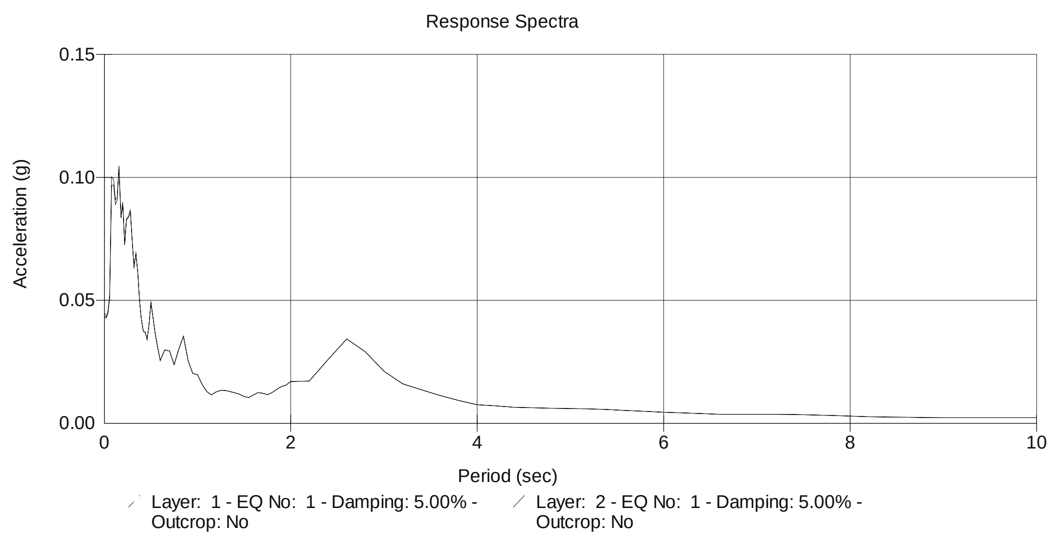
$A_{max} = 0.0933g$ at $T = 0.091$ sec

Input Motion

RAN330.EQ

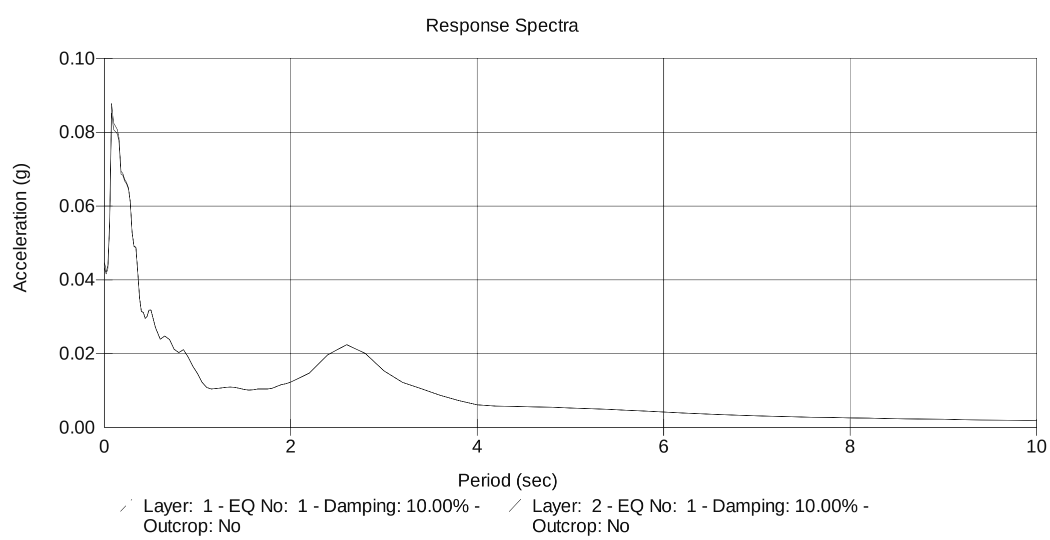
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.11g$ at $T = 0.17$ sec

b) 10% Soil Damping



$A_{max} = 0.0877g$ at $T = 0.091$ sec

Soil Profile

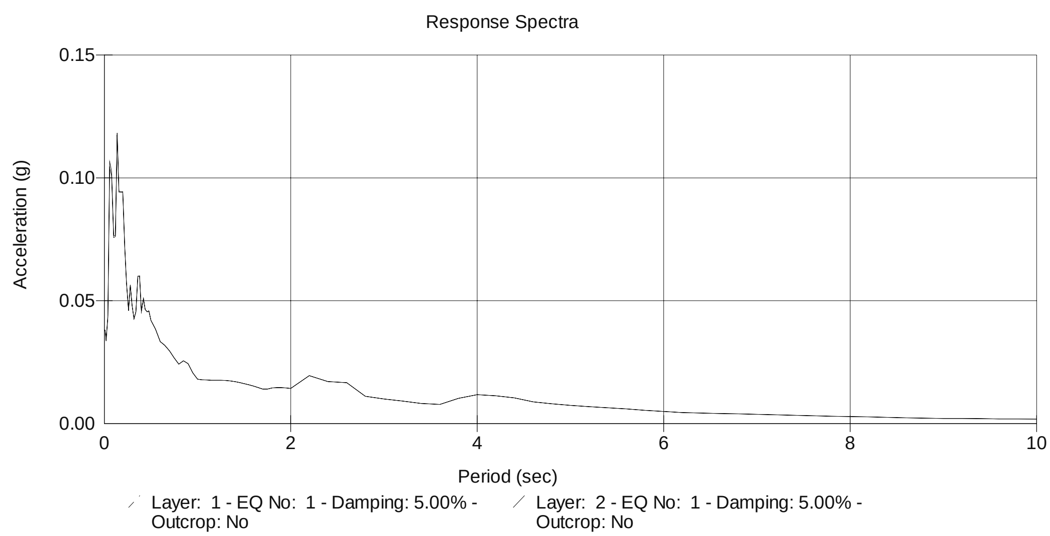
Profile Name: D8
Tests Types and Designations: SPT-CXW
Water Table Depth: 25 m.
Number of Layers: 50

Input Motion

RAN230.EQ

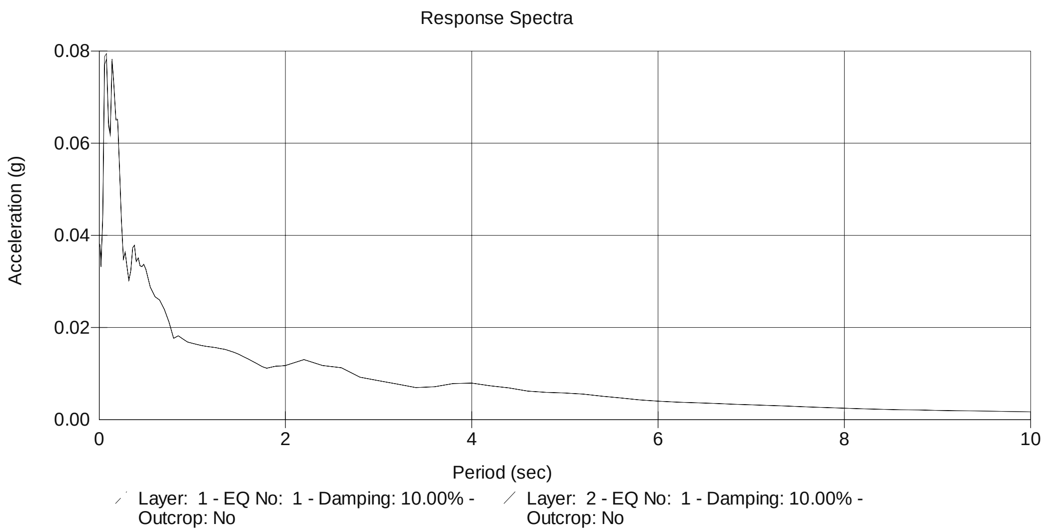
Response Spectra

a) 5% Soil Damping



A_{max} = 0.12g at T= 0.13 sec

b) 10% Soil Damping



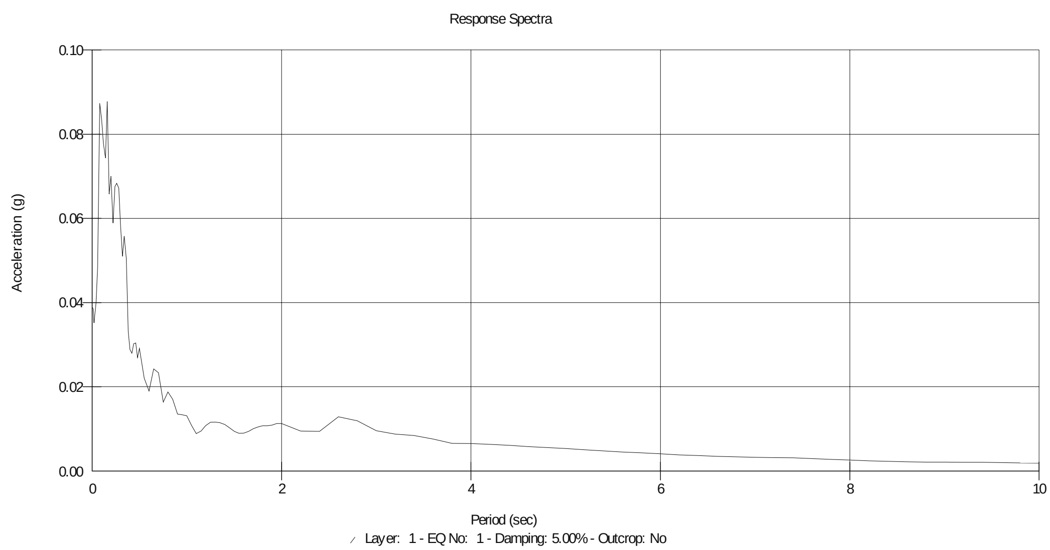
$A_{max} = 0.0791g$ at $T = 0.0788$ sec

Input Motion

RAN330.EQ

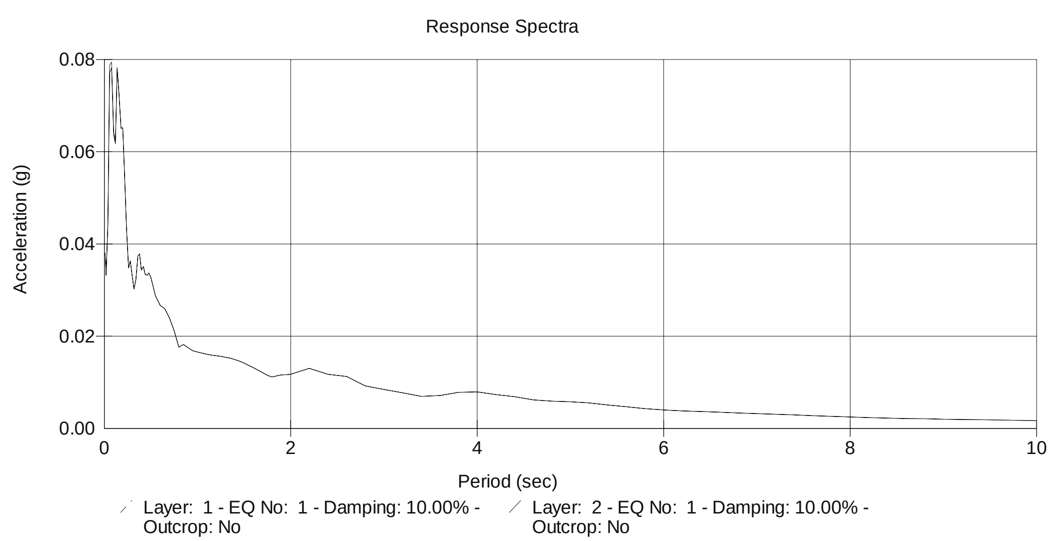
Response Spectra

a) 5% Soil Damping



A_{max} = 0.0833g at T= 0.17 sec

b) 10% Soil Damping



A_{max} = 0.0744g at T= 0.0788 sec

Soil Profile

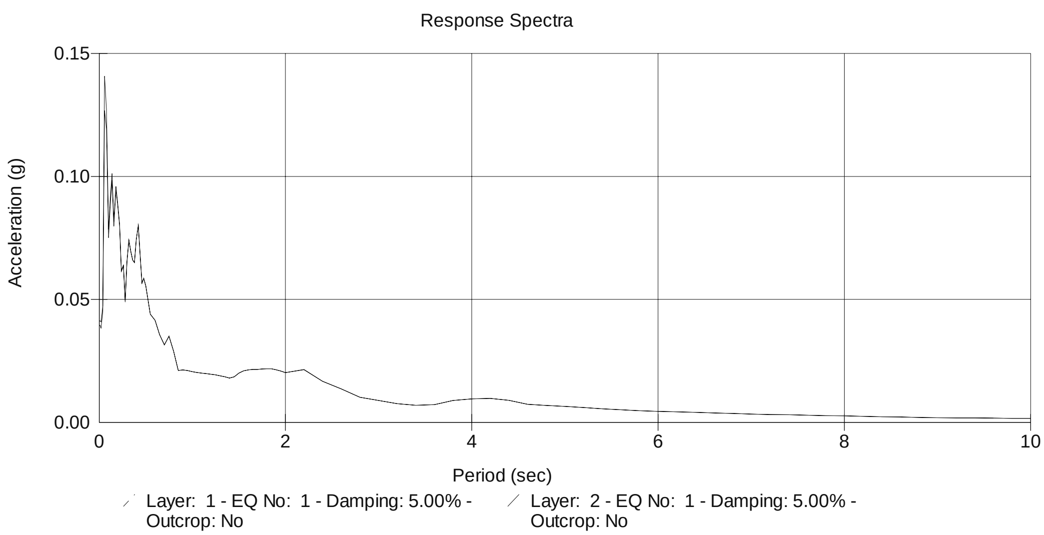
Profile Name: D9
Tests Types and Designations: SPT-CXW
Water Table Depth: 25 m.
Number of Layers: 50

Input Motion

RAN230.EQ

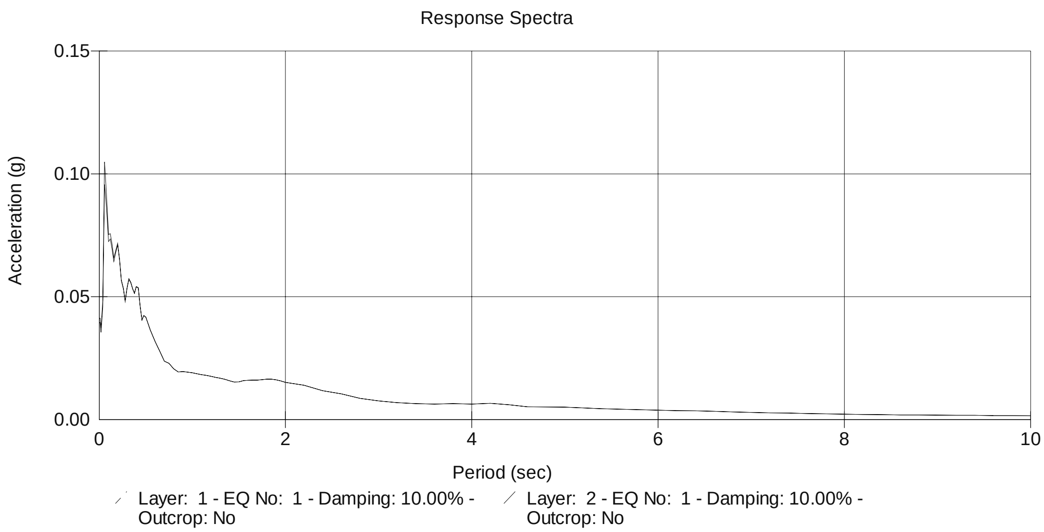
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.0691 sec

b) 10% Soil Damping



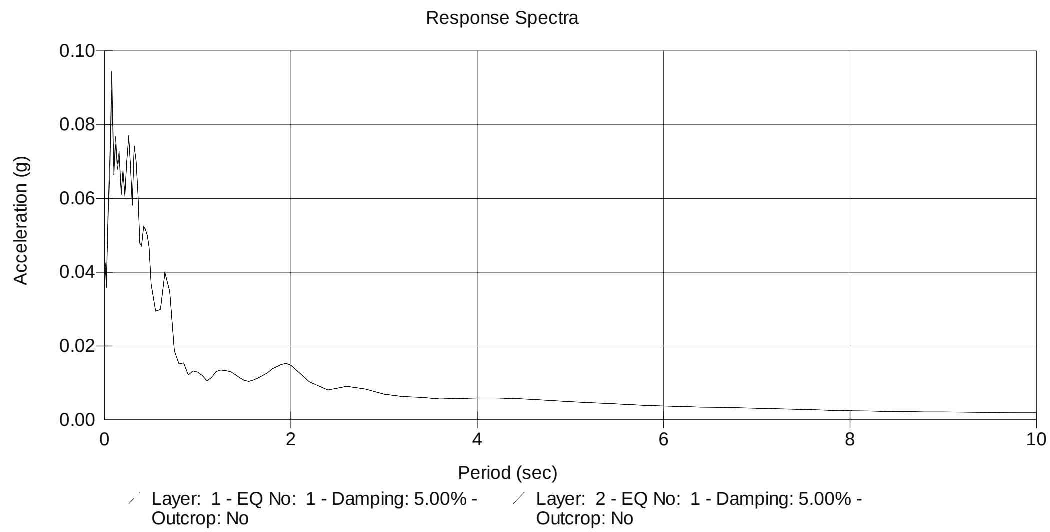
$A_{max} = 0.11g$ at $T = 0.0569$ sec

Input Motion

RAN330.EQ

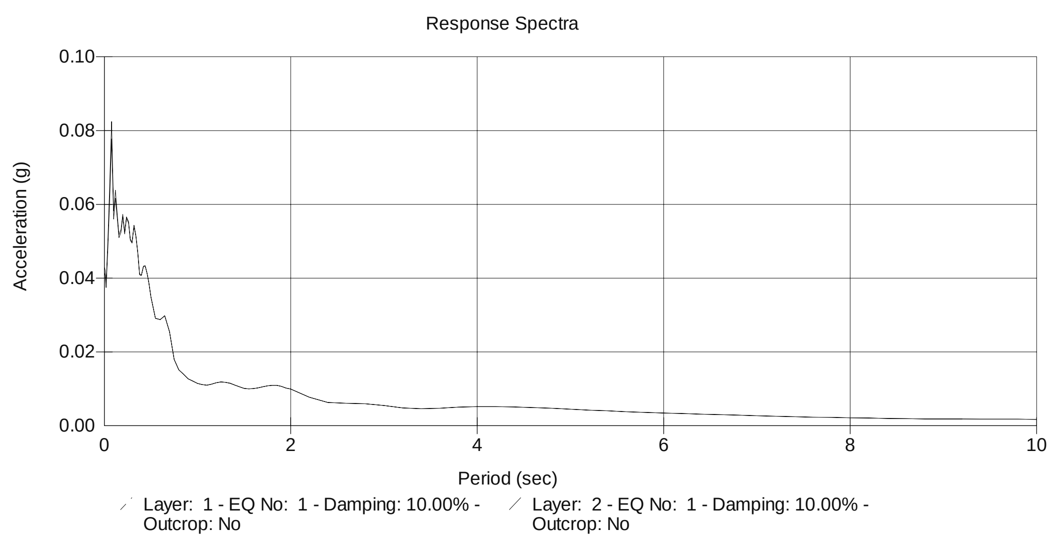
Response Spectra

a) 5% Soil Damping



A_{max} = 0.095g at T= 0.0788 sec

b) 10% Soil Damping



A_{max} = 0.0832g at T= 0.0788 sec

Soil Profile

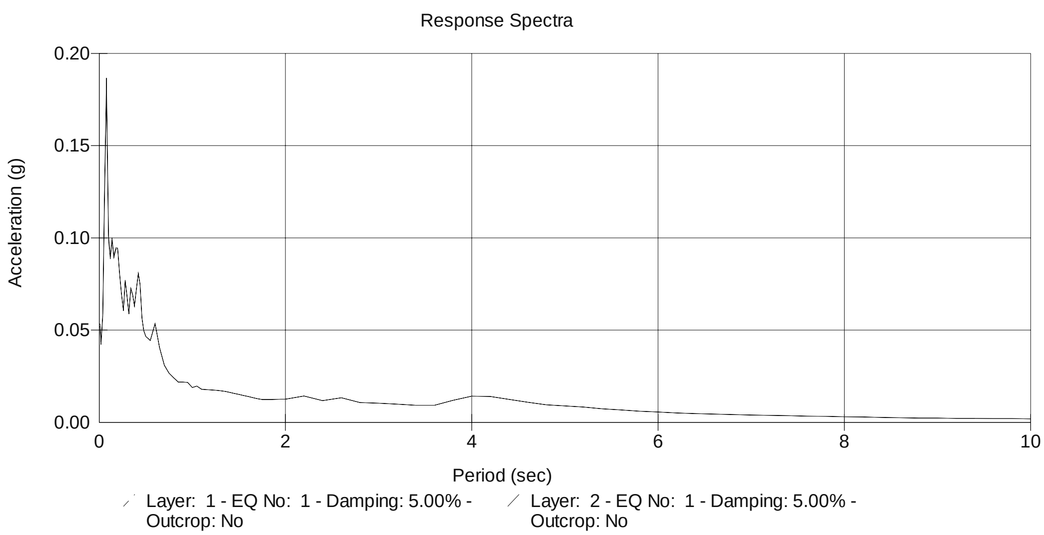
Profile Name: D11(CXW)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 2.6m.
Number of Layers: 54

Input Motion

RAN230.EQ

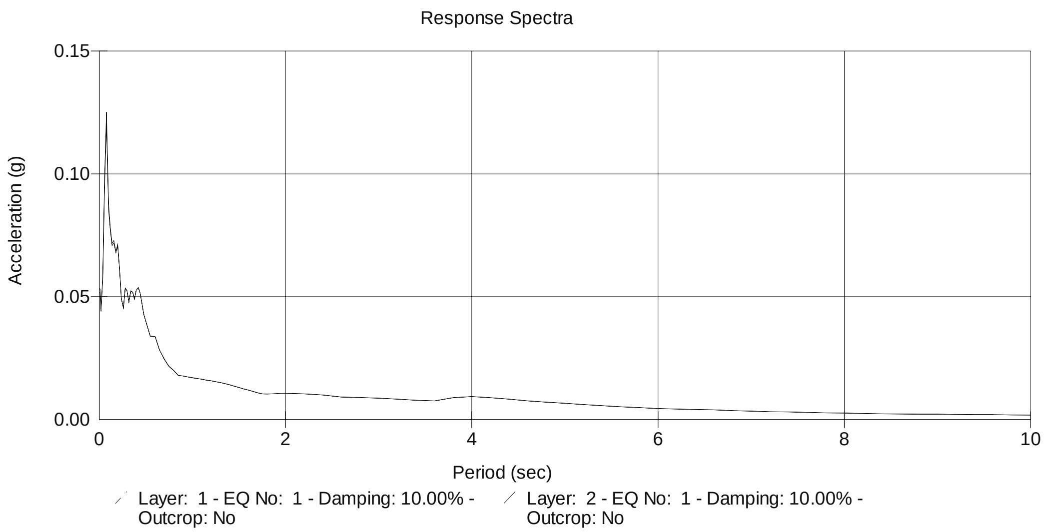
Response Spectra

a) 5% Soil Damping



A_{max} = 0.18g at T= 0.0788 sec

b) 10% Soil Damping



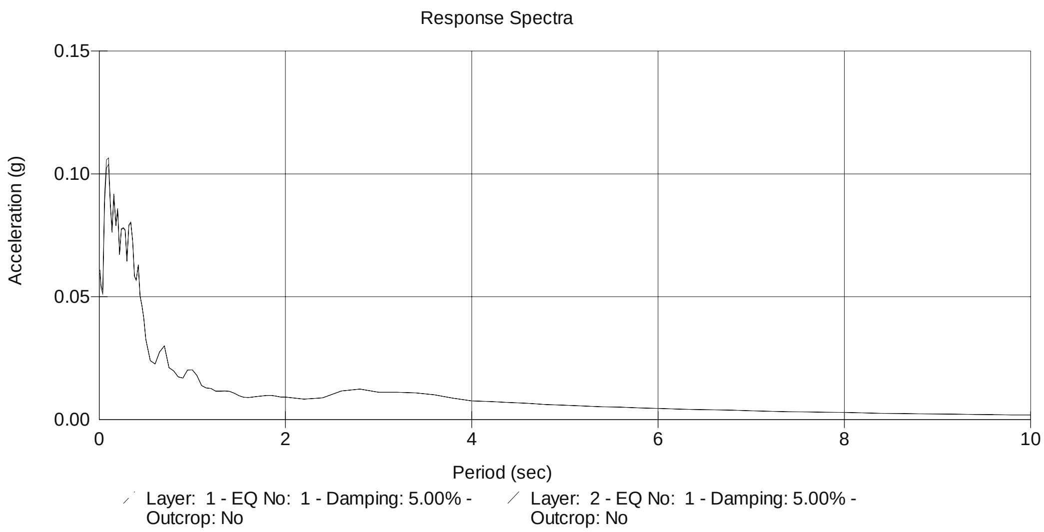
A_{max} = 0.13g at T= 0.0788 sec

Input Motion

RAN330.EQ

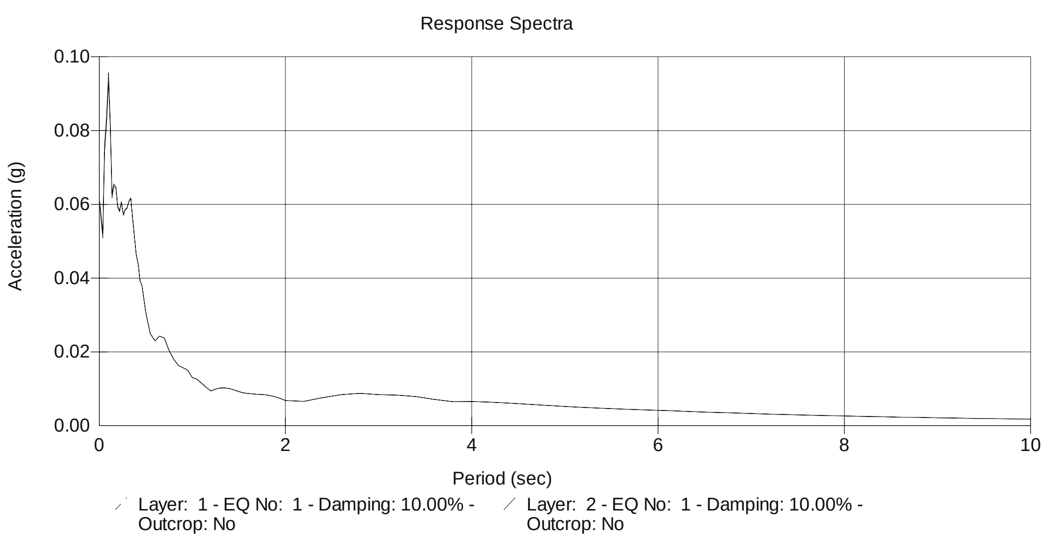
Response Spectra

a) 5% Soil Damping



A_{max} = 0.11g at T= 0.10 sec

b) 10% Soil Damping



A_{max} = 0.0956g at T= 0.10 sec

Soil Profile

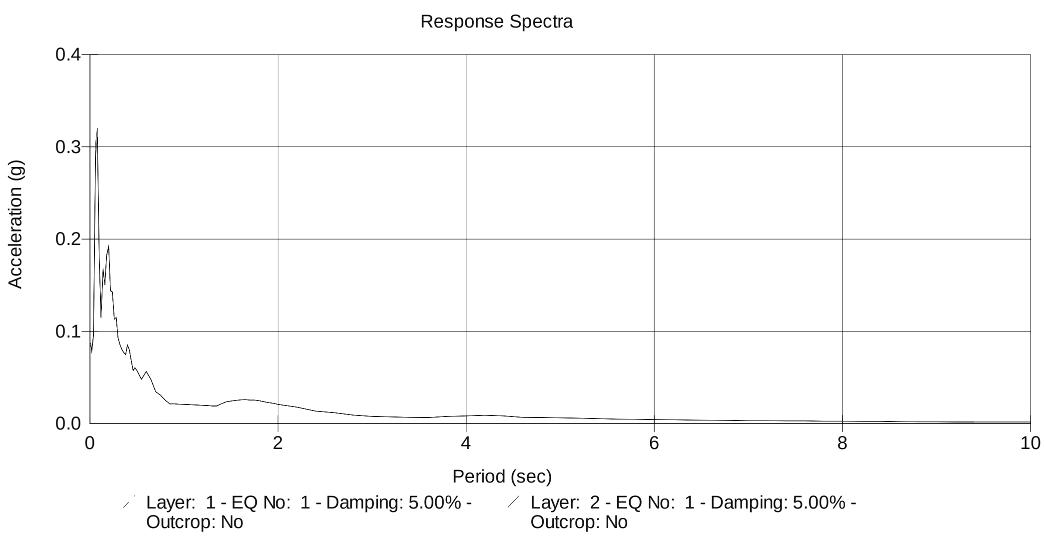
Profile Name: D11 (CH)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 2.6 m.
Number of Layers: 63

Input Motion

RAN230.EQ

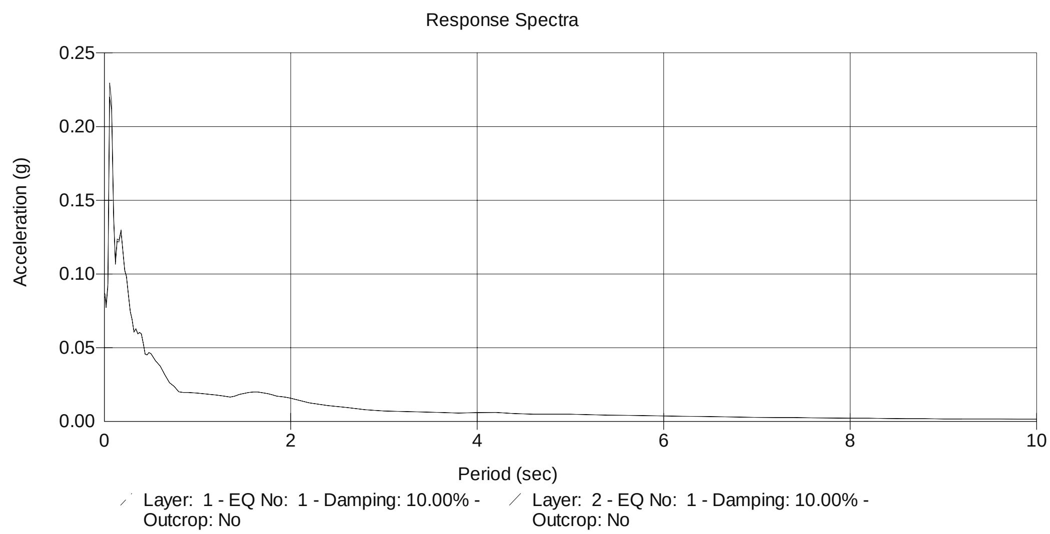
Response Spectra

a) 5% Soil Damping



A_{max} = 0.32g at T= 0.09 sec

b) 10% Soil Damping



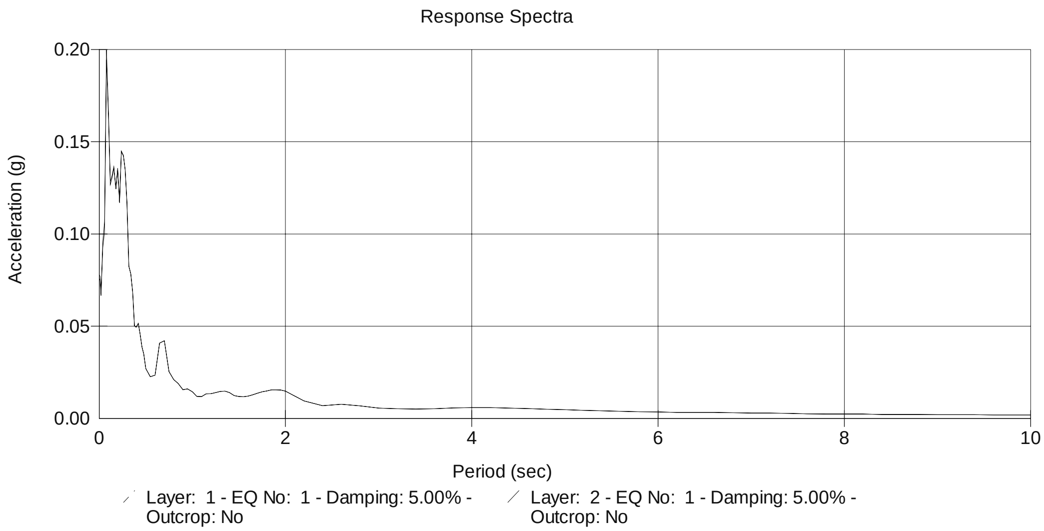
A_{max} = 0.23g at T= 0.0691 sec

Input Motion

RAN330.EQ

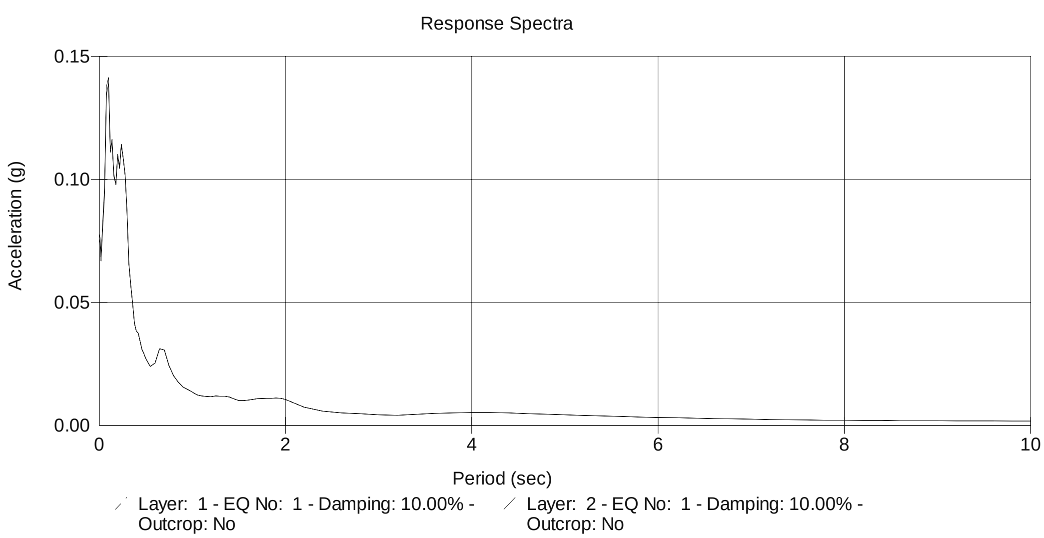
Response Spectra

a) 5% Soil Damping



A_{max} = 0.20g at T= 0.0788 sec

b) 10% Soil Damping



A_{max} = 0.14g at T= 0.11 sec

Soil Profile

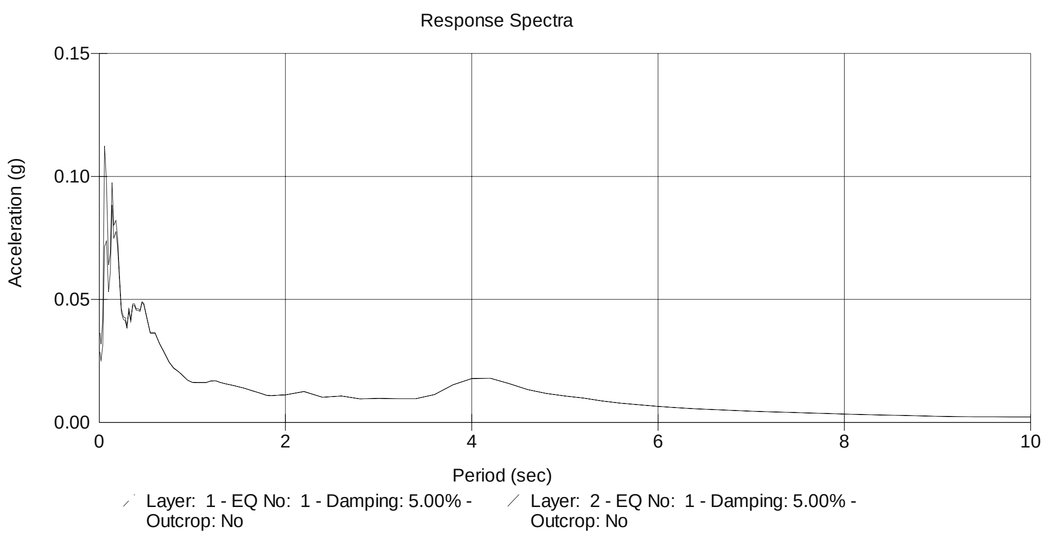
Profile Name: D12(CXW)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 48

Input Motion

RAN230.EQ

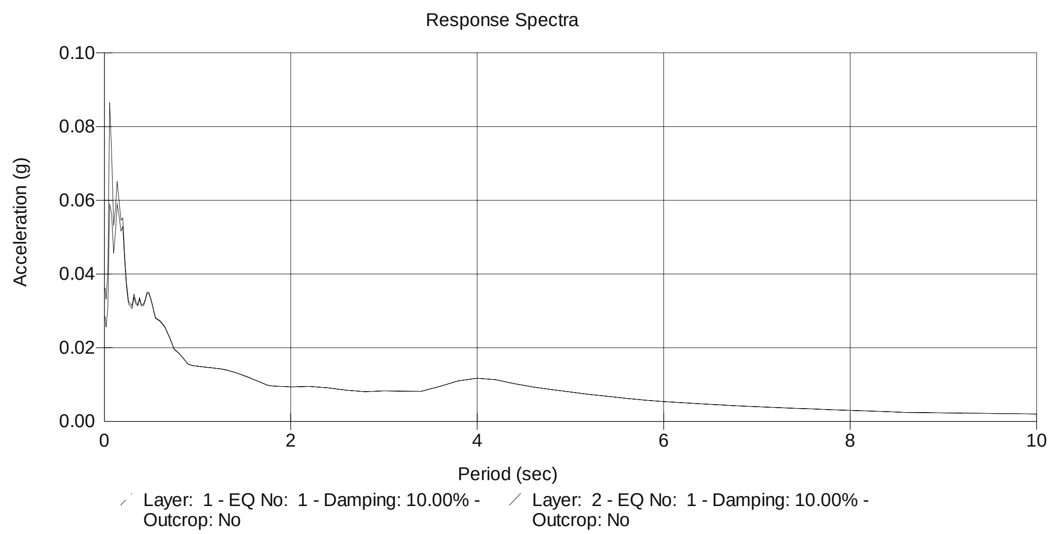
Response Spectra

a) 5% Soil Damping



A_{max} = 0.11g at T= 0.0691 sec

b) 10% Soil Damping



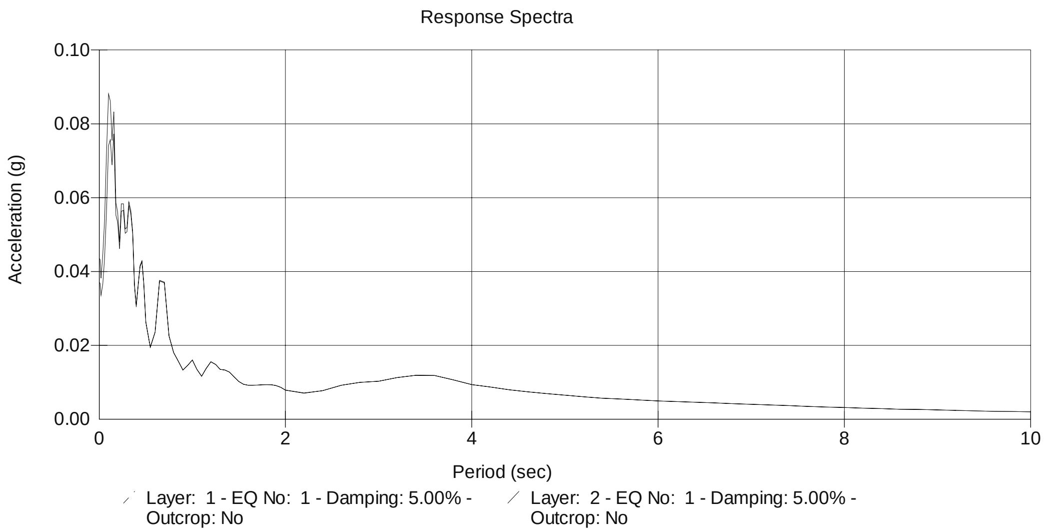
$A_{max} = 0.0869g$ at $T = 0.0569$ sec

Input Motion

RAN330.EQ

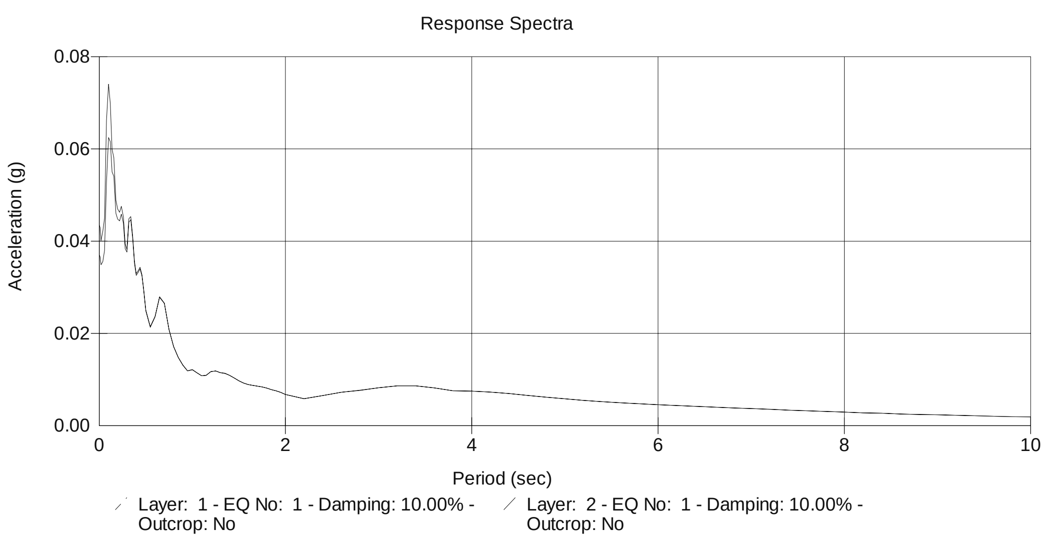
Response Spectra

a) 5% Soil Damping



$A_{max} = 0.0883g$ at $T = 0.10$ sec

b) 10% Soil Damping



$A_{max} = 0.0737g$ at $T = 0.11$ sec

Soil Profile

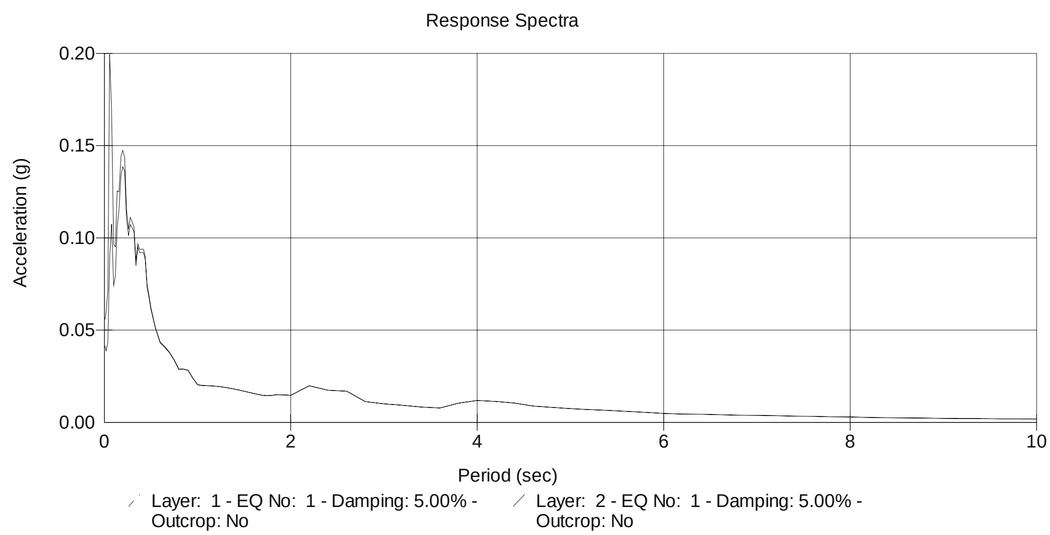
Profile Name: D12(CHC)
Tests Types and Designations: SPT-CXW-Cross hole
Water Table Depth: 12 m.
Number of Layers: 60

Input Motion

RAN230.EQ

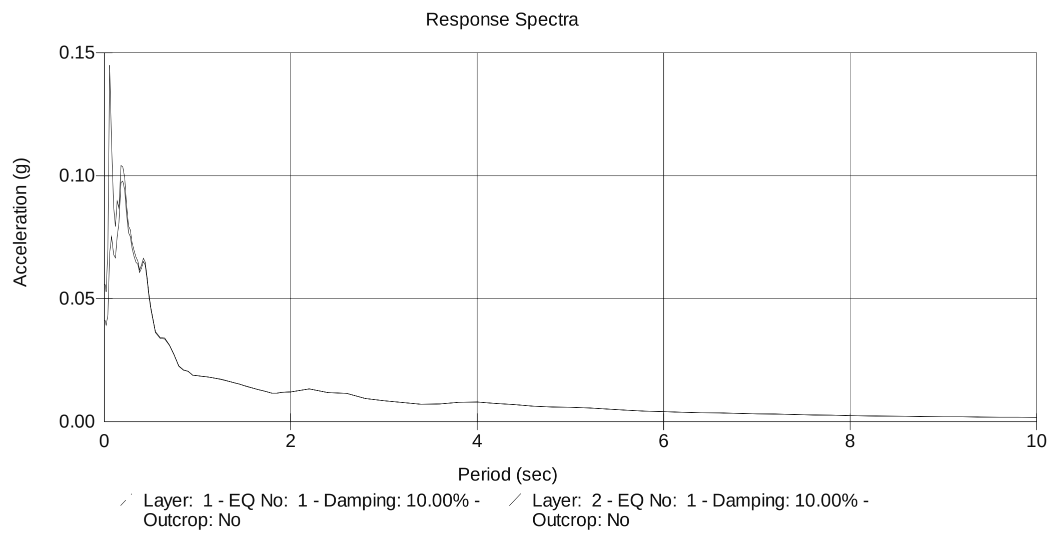
Response Spectra

a) 5% Soil Damping



A_{max} = 0.2g at T= 0.0569 sec

b) 10% Soil Damping



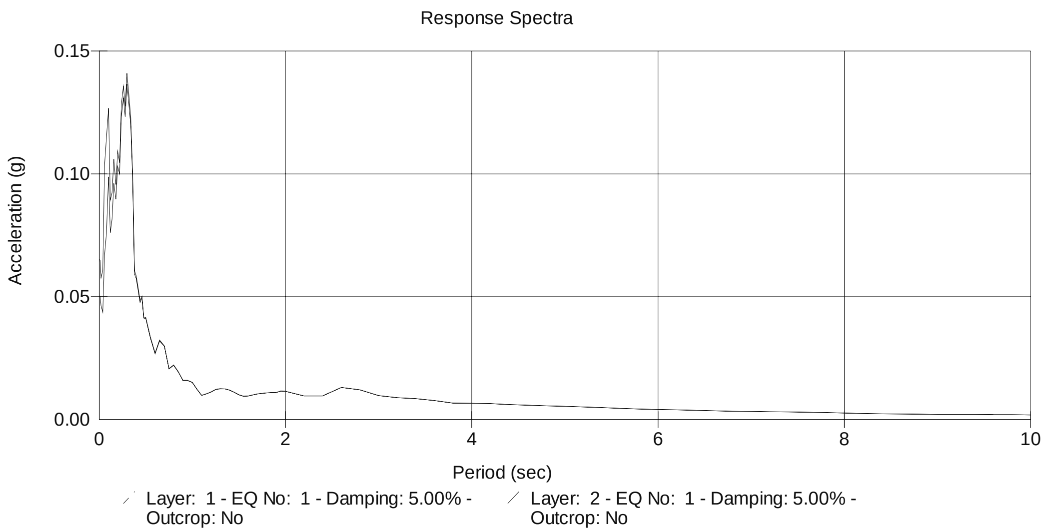
A_{max} = 0.15g at T= 0.0691 sec

Input Motion

RAN330.EQ

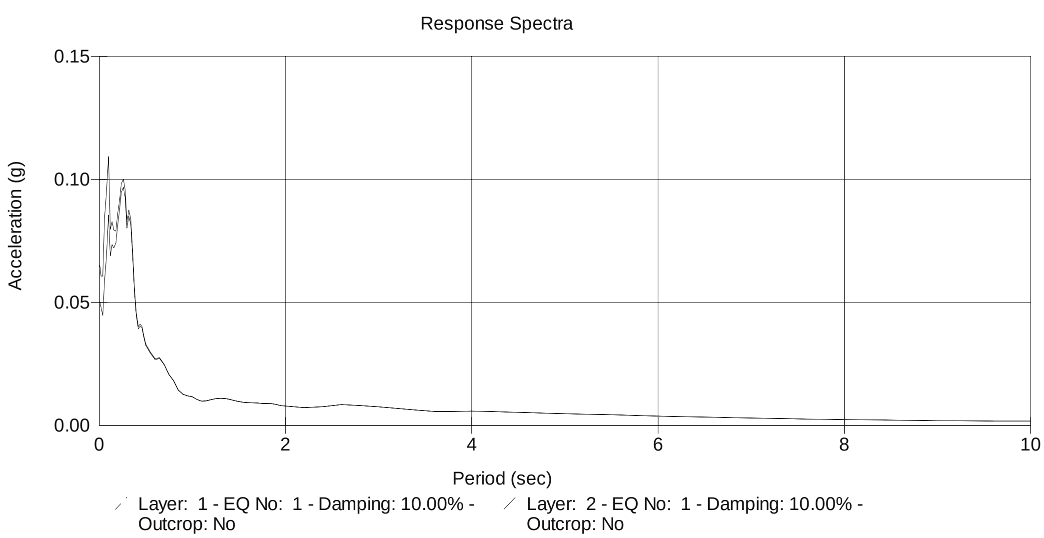
Response Spectra

a) 5% Soil Damping



A_{max} = 0.14g at T= 0.31 sec

b) 10% Soil Damping

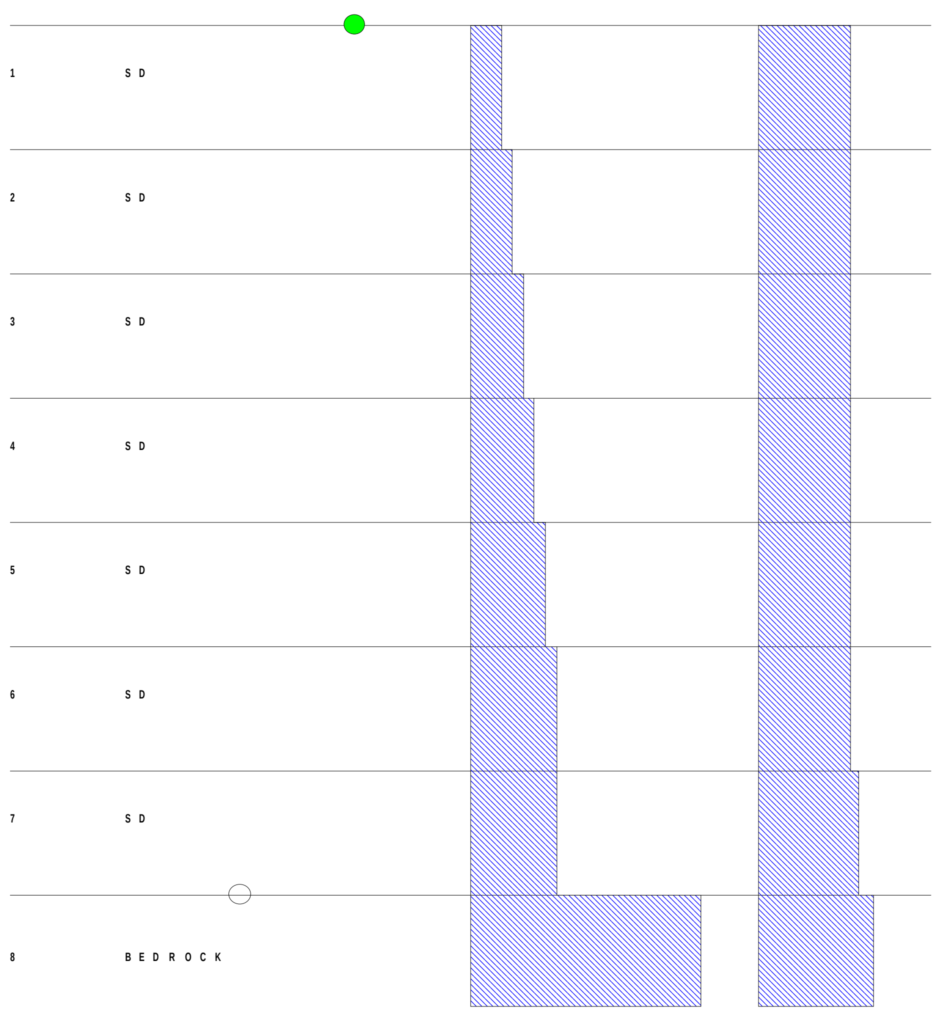


A_{max} = 0.11g at T= 0.10 sec

5. Dynamic Site Response Analysis (ProShake) for the East-west Seismic Array

5.1 Analysis Input Profiles:

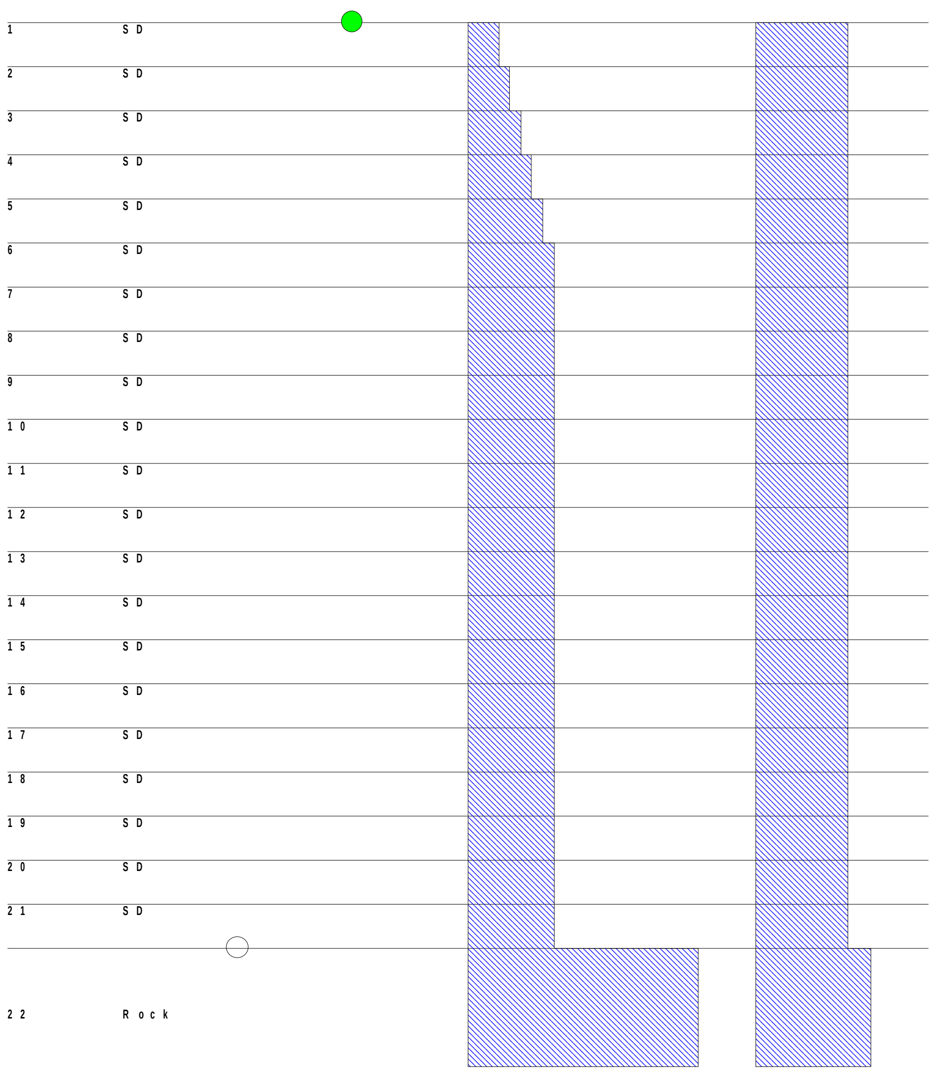
Station: RD0



Layer Thickness	Material Name	Thickness (ft)	Unit Weight (pcf)	G_{max} (ksf)	V_s (ft/sec)	Modulus Curve	Damping Curve
1	Sc/Sd	16.4	120	1606	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	Sc/Sd	16.4	120	2970	892	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	Sc/Sd	16.4	120	4750	1129	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	Sc/Sd	16.4	120	6947	1365	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	Sc/Sd	16.4	120	9560	1601	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	Rock	infinite	150	112912	4921	Rock	Rock

Station RD0 input soil profile

Station: RD2

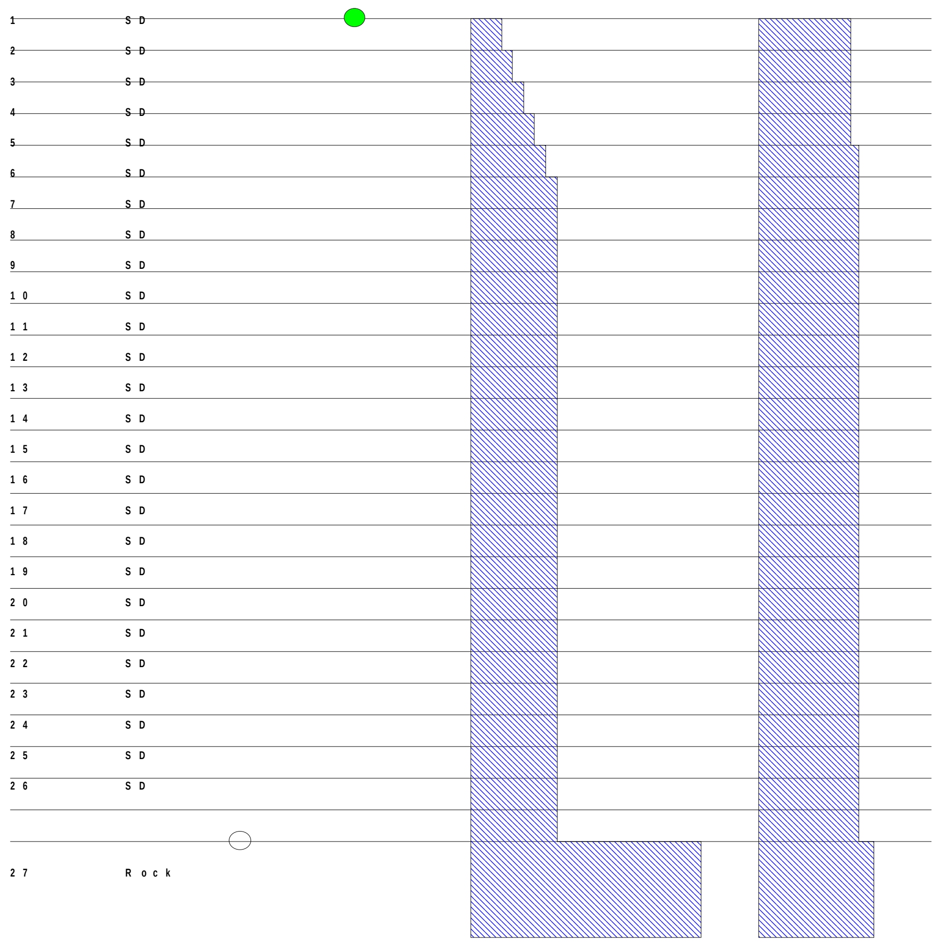


1 SD
2 SD
3 SD
4 SD
5 SD
6 SD
7 SD
8 SD
9 SD
10 SD
11 SD
12 SD
13 SD
14 SD
15 SD
16 SD
17 SD
18 SD
19 SD
20 SD
21 SD
22 Rock

Layer Thickness	Material Name	Thickness (ft)	Unit Weight (pcf)	G_{max} (ksf)	V_s (ft/sec)	Modulus Curve	Damping Curve
1	Sc/Sd	16.4	120	1606	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	Sc/Sd	16.4	120	2970	892	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	Sc/Sd	16.4	120	4750	1129	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	Sc/Sd	16.4	120	6947	1365	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	Sc/Sd	16.4	120	9560	1601	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	Rock	infinite	150	112912	4921	Rock	Rock

Station RD2 input soil profile

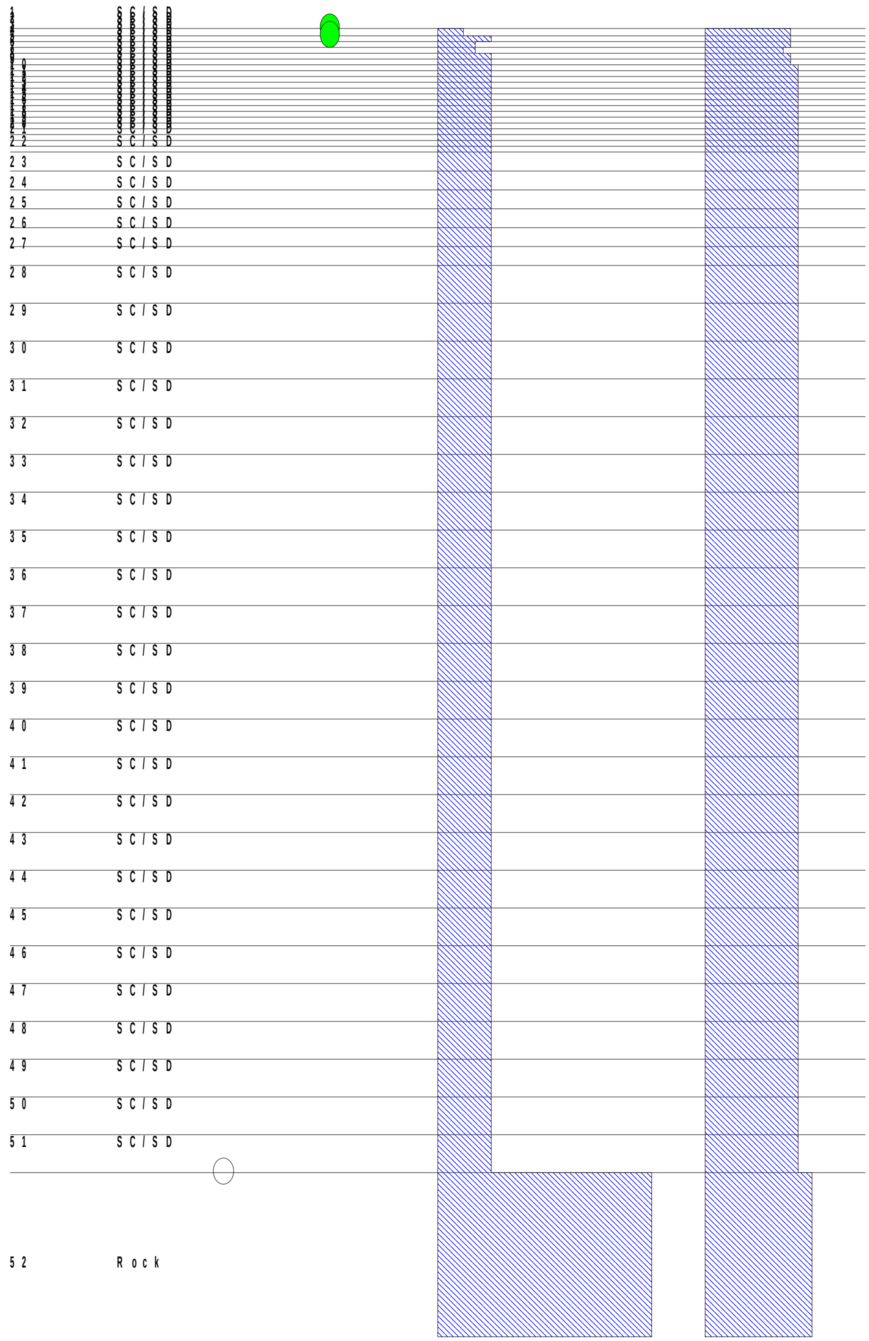
Station: RD3


1 SD
2 SD
3 SD
4 SD
5 SD
6 SD
7 SD
8 SD
9 SD
10 SD
11 SD
12 SD
13 SD
14 SD
15 SD
16 SD
17 SD
18 SD
19 SD
20 SD
21 SD
22 SD
23 SD
24 SD
25 SD
26 SD
27 Rock

Layer Thickness	Material Name	Thickness (ft)	Unit Weight (pcf)	G_{max} (ksf)	V_s (ft/sec)	Modulus Curve	Damping Curve
1	Sc/Sd	16.4	120	1606	656	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	Sc/Sd	16.4	120	2970	892	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	Sc/Sd	16.4	120	4750	1129	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	Sc/Sd	16.4	120	6947	1365	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	Sc/Sd	16.4	120	9560	1601	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	Sc/Sd	16.4	120	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	Sc/Sd	16.4	150	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	Sc/Sd	16.4	150	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	Sc/Sd	16.4	150	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	Sc/Sd	16.4	150	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	Sc/Sd	16.4	150	12590	1837	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	Rock	infinite	150	112912	4921	Rock	Rock

Station RD3 input soil profile

Station: DRA2



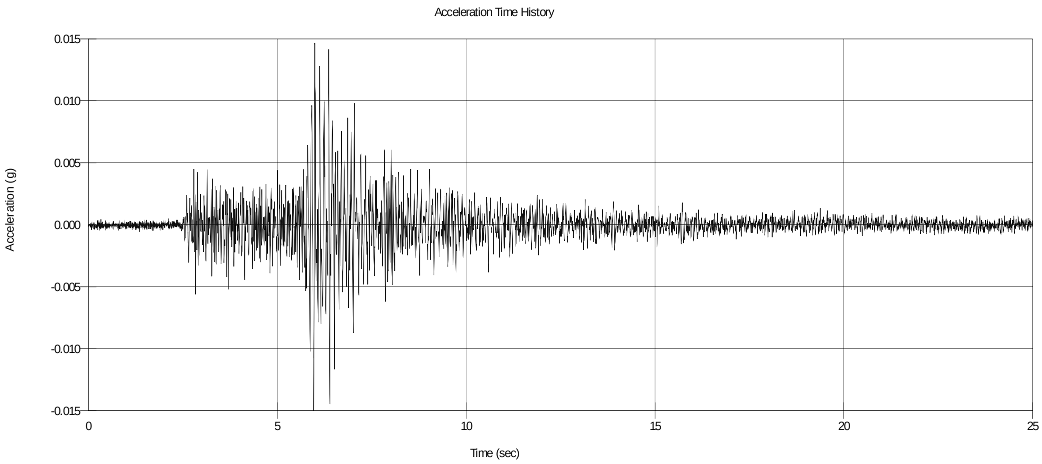
Layer Thickness	Material Name	Thickness (ft)	Unit Weight (pcf)	G_{max} (ksf)	V_s (ft/sec)	Modulus Curve	Damping Curve
1	Sc/Sd	5.74	120	2312	787	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
2	Sc/Sd	4.92	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
3	Sc/Sd	4.96	120	4918	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
4	Sc/Sd	16.4	120	4508	1148	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
5	Sc/Sd	16.4	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
6	Sc/Sd	16.4	120	10036	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
7	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
8	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
9	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
10	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
11	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
12	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
13	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
14	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
15	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
16	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
17	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
18	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
19	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
20	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
21	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
22	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
23	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
24	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
25	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
26	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
27	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
28	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
29	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
30	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
31	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
32	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
33	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)

34	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
35	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
36	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
37	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
38	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
39	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
40	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
41	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
42	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
43	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
44	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
45	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
46	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
47	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
48	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
49	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
50	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
51	Sc/Sd	16.4	130	10872	1640	Sand (Seed and Idriss 1970)	Sand (Idriss 1990)
52	Rock	infinite	150	112912	4921	Rock	Rock

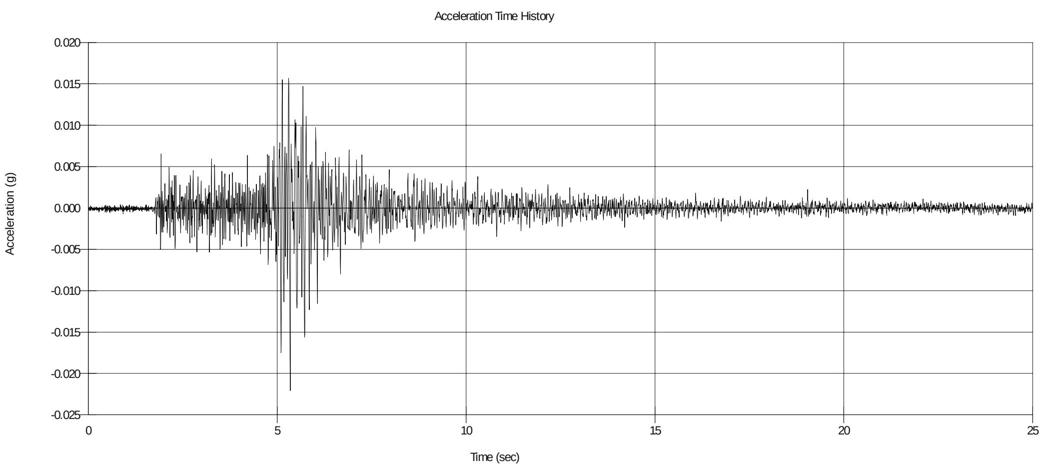
Station DRA2

5.2 Dynamic Site Response Analysis Results

- Input Earthquake: DREFF Records



DREFFEW component

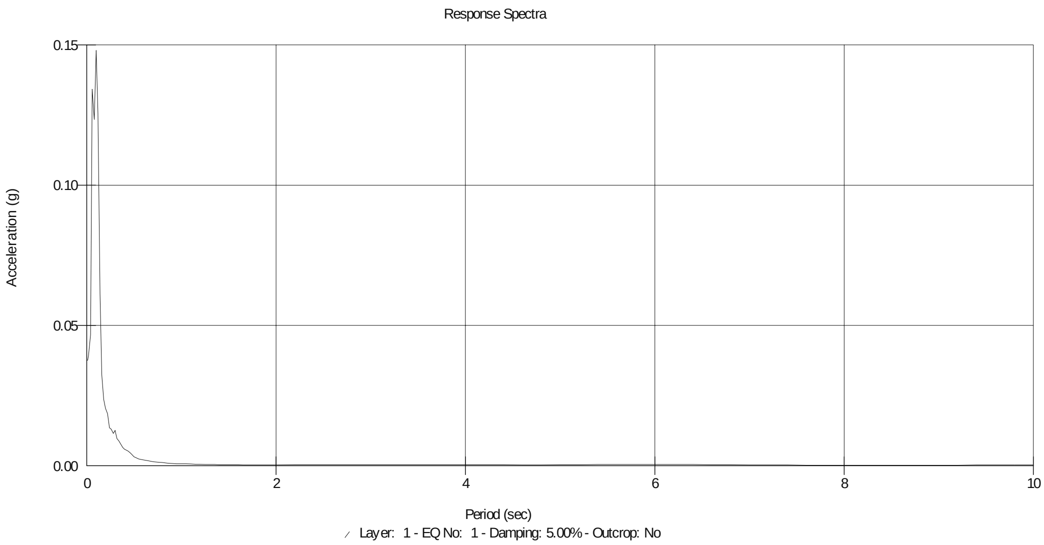


DREFFNS component

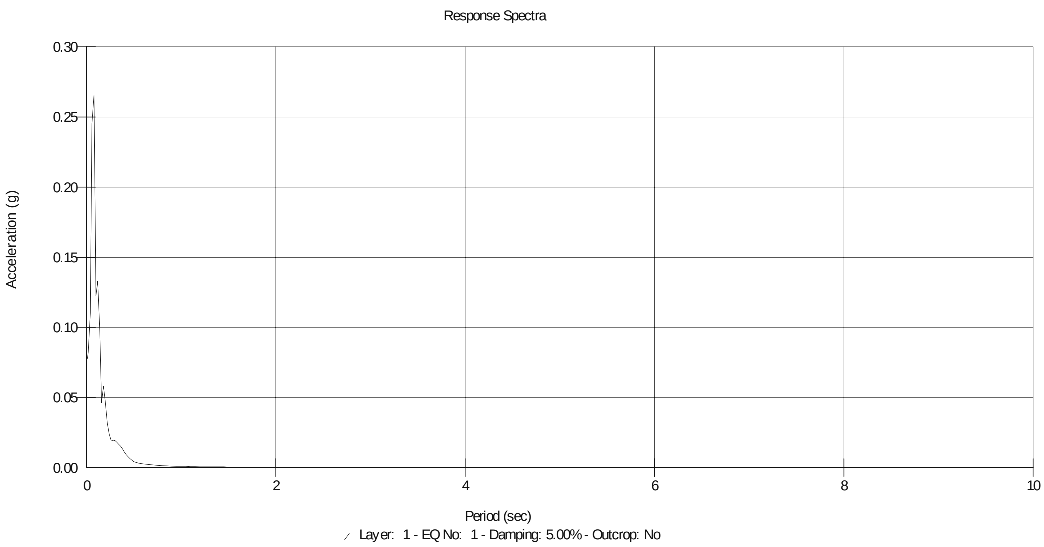
- Dynamic Site Response Analysis Results

Station RD0:

a) 5% Damping

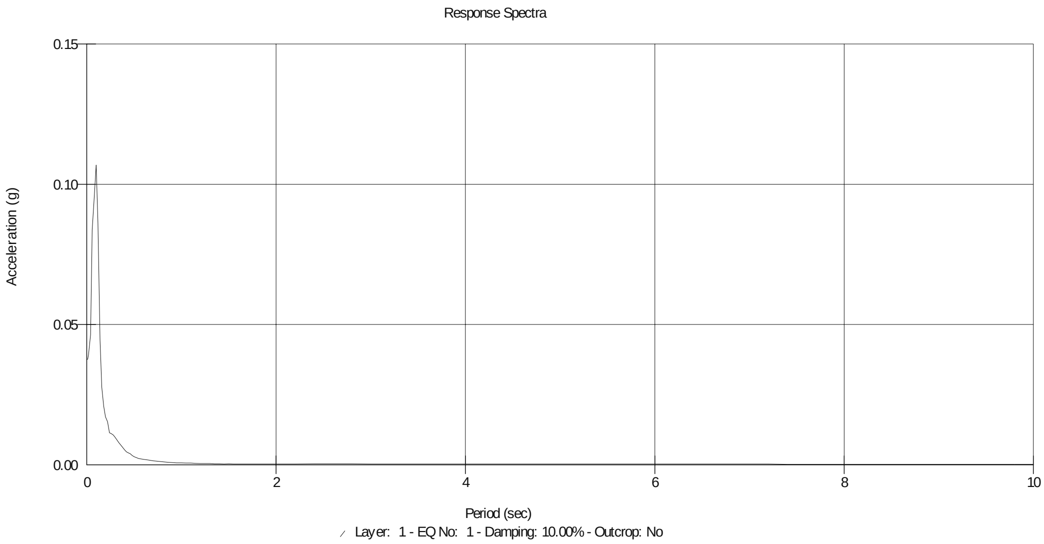


RD0-DREFFEW *T=0.098*

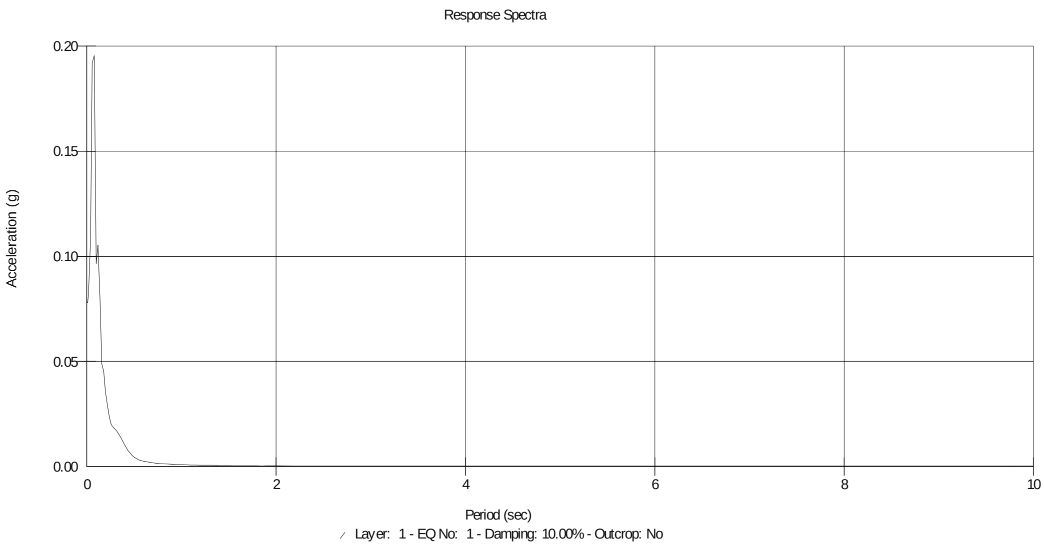


RD0-DREFFNS *T=0.077*

b) 10% Damping



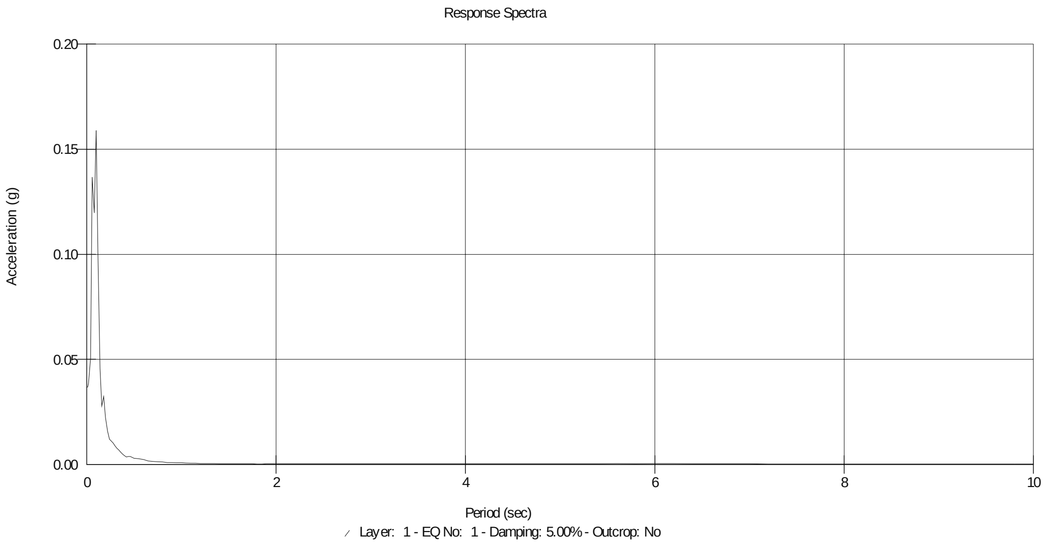
RD0-DREFFEW *T=0.11*



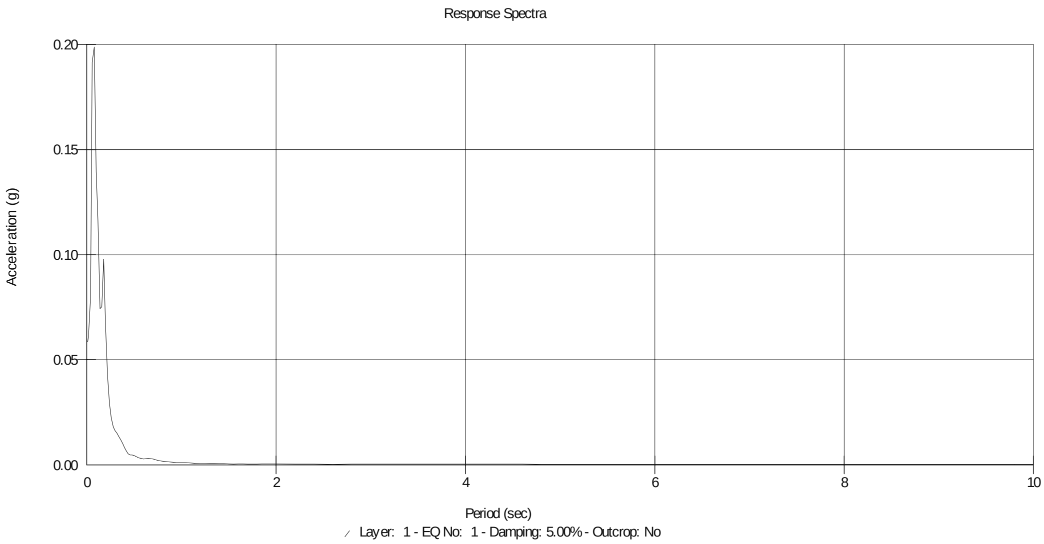
RD0-DREFFNS *T=0.077*

Station RD2:

a) 5% Damping

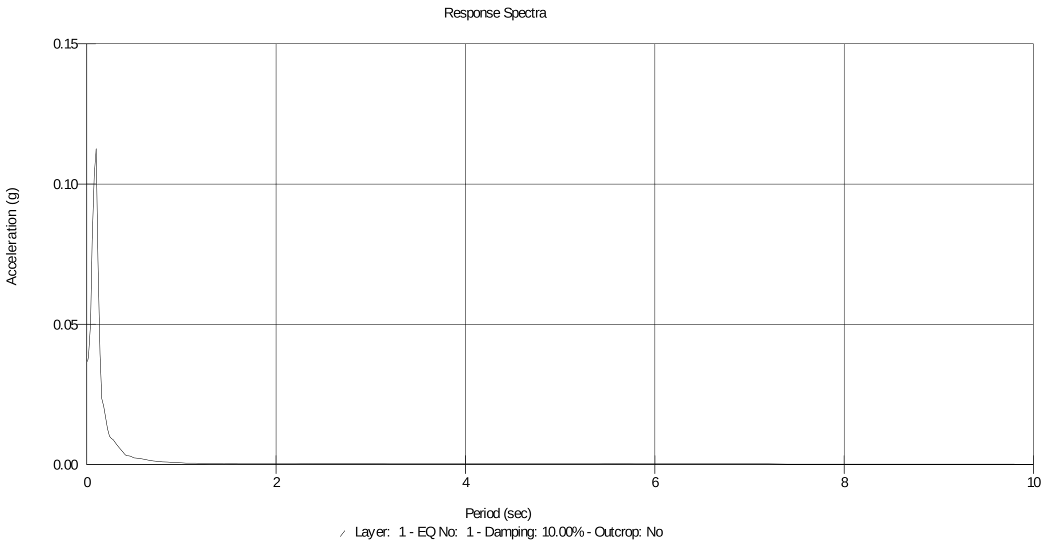


DREFFEW *T=0.098*

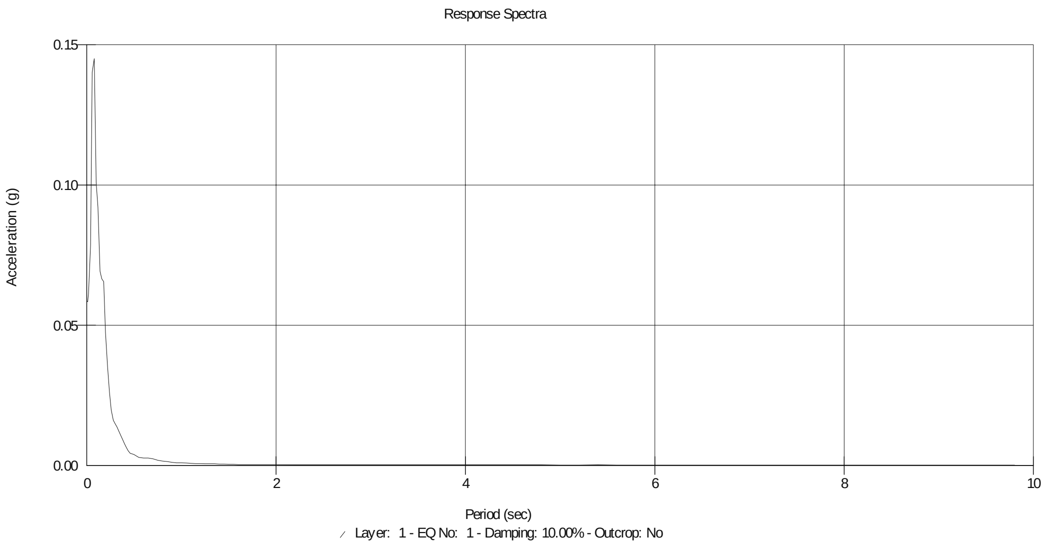


DREFFNS *T=0.077*

b) 10% Damping



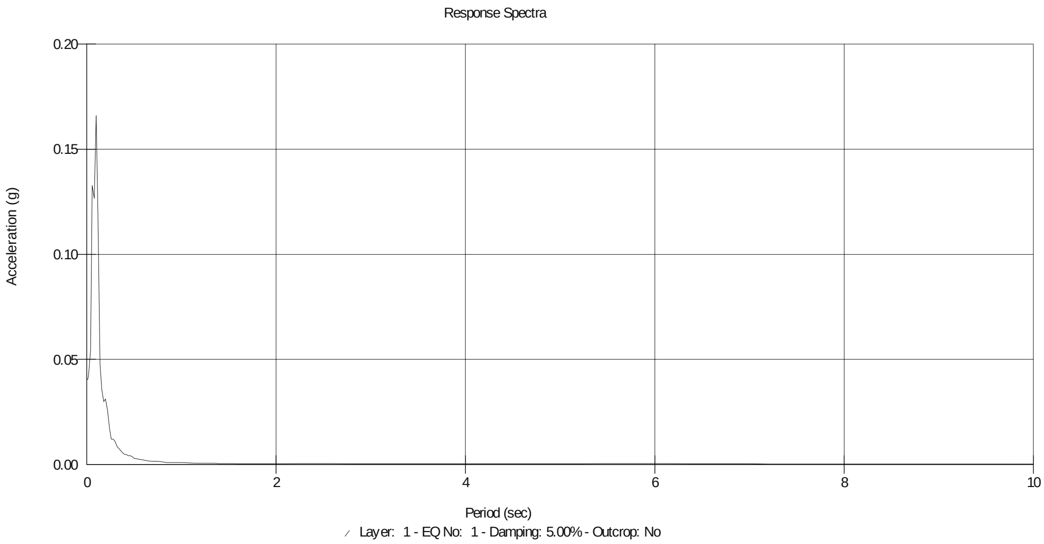
DREFFEW *T= 0.11*



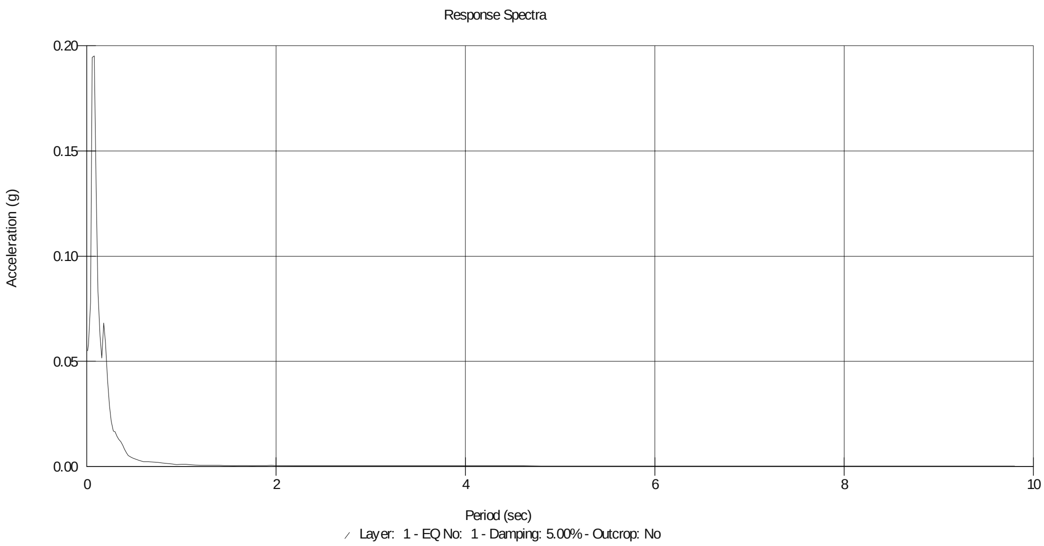
DREFFNS *T= .077*

Station RD3:

a) 5% Damping

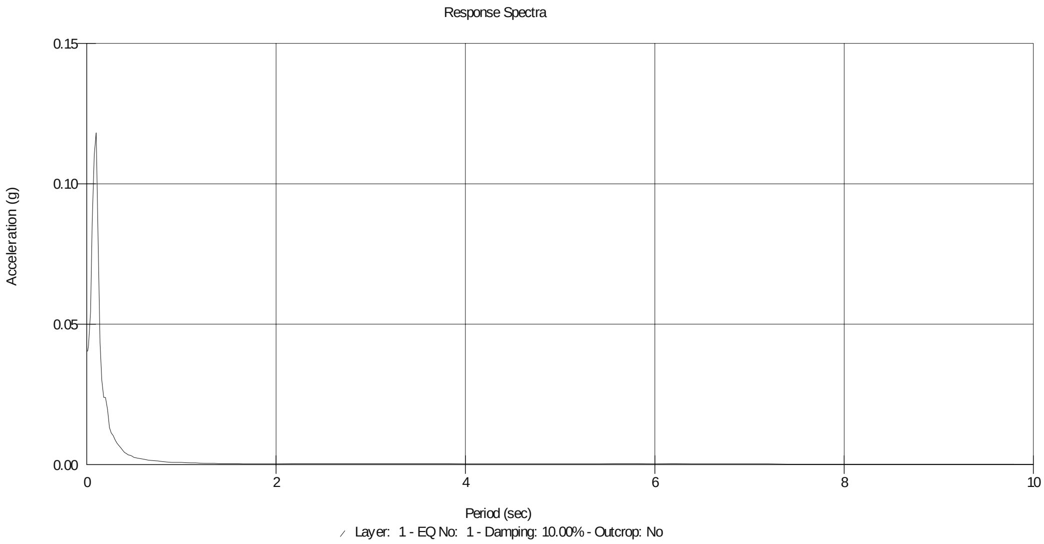


DREFFEW *T= 0.098*

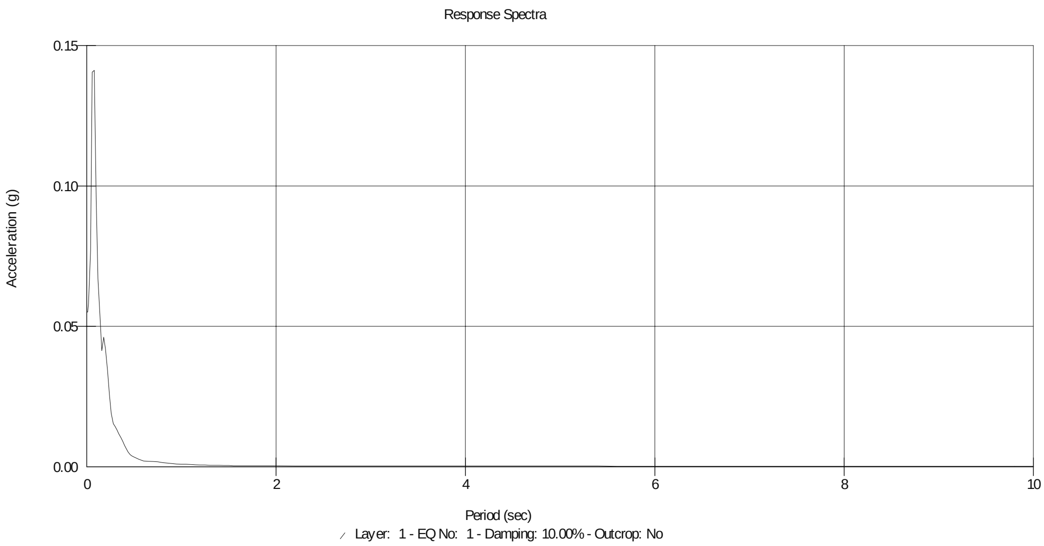


DREFFNS *T= 0.077*

b) 10% Damping



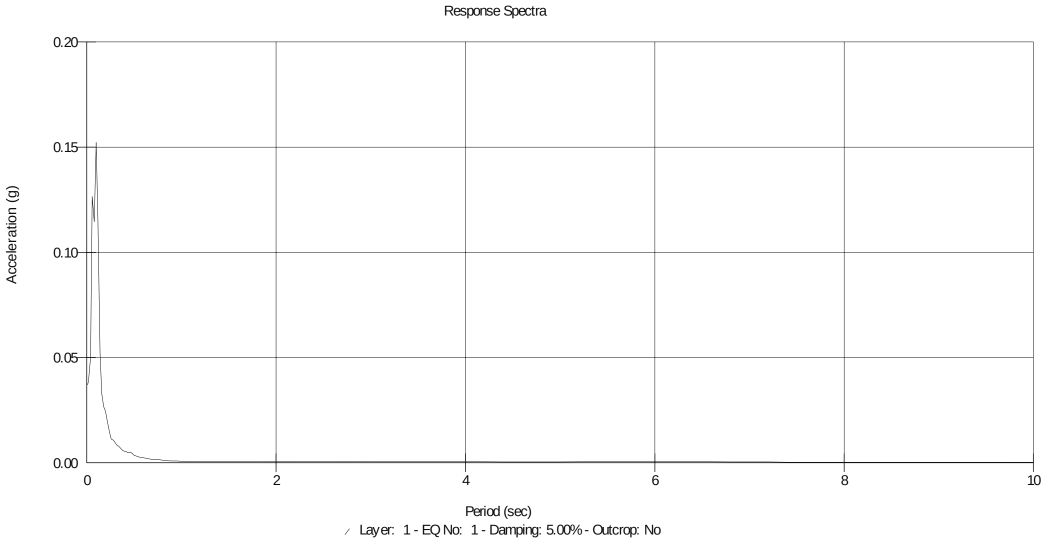
DREFFEW *T=0.11*



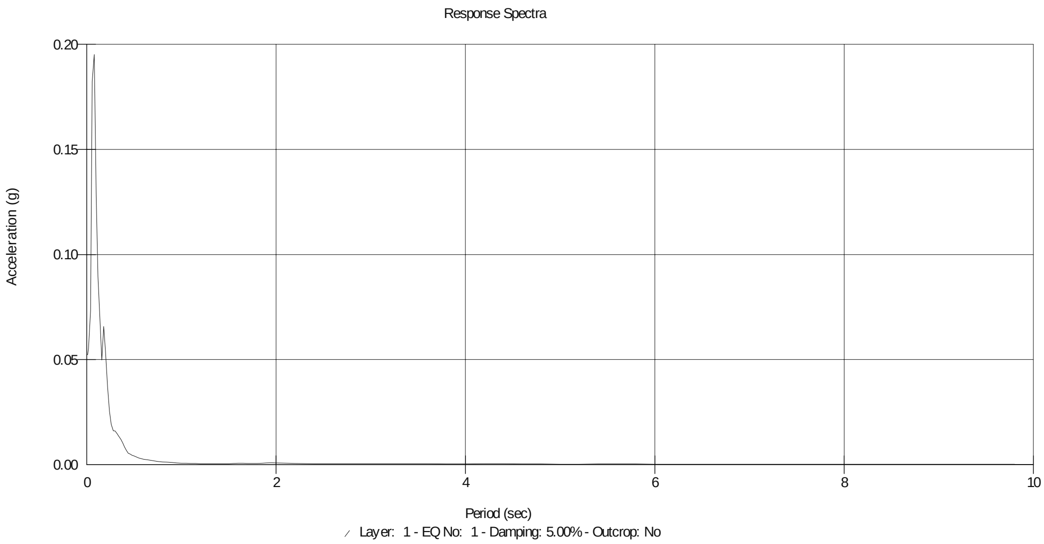
DREFFNS *T=0.077*

Station DRA2:

a) 5% Damping

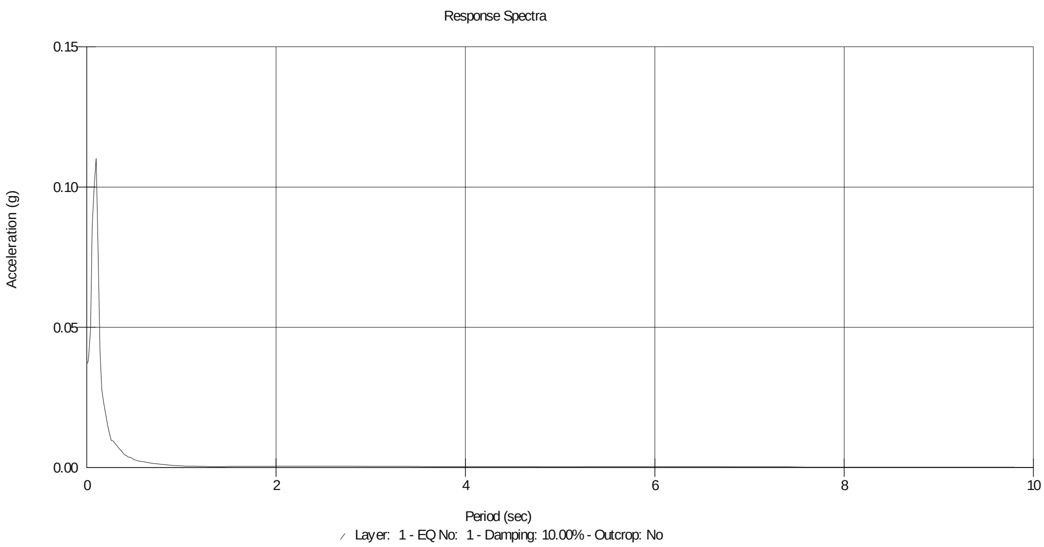


DREFFEW *T=0.098*

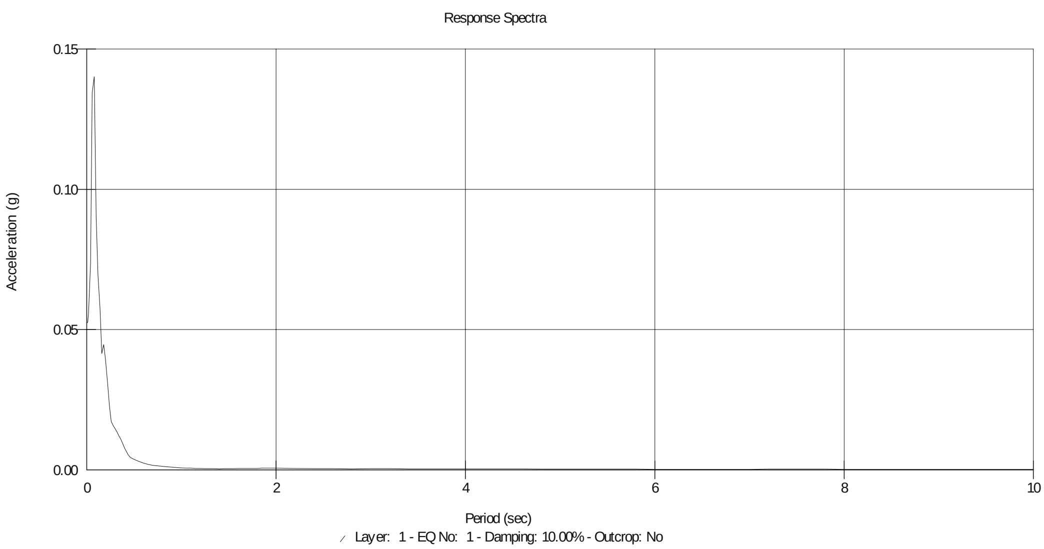


DREFFNS *T=0.077*

b) 10% Damping



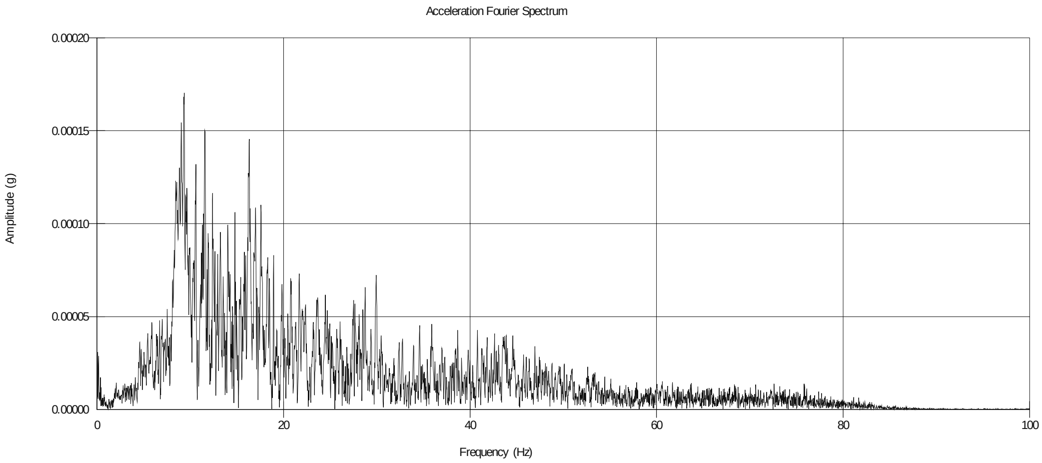
DREFFEW *T= 0.11*



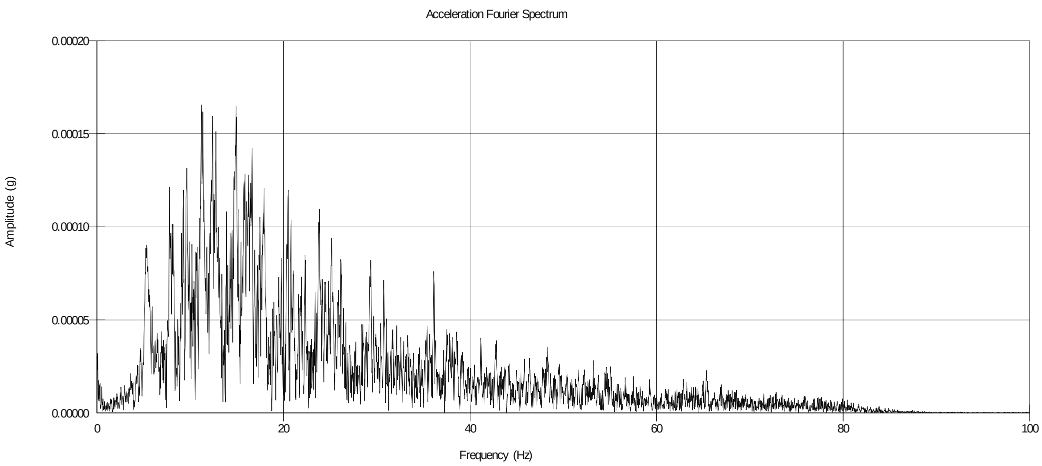
DREFFNS *T=0 .077*

5.3 Frequency Domain Fundamental Periods

Station DREFF:

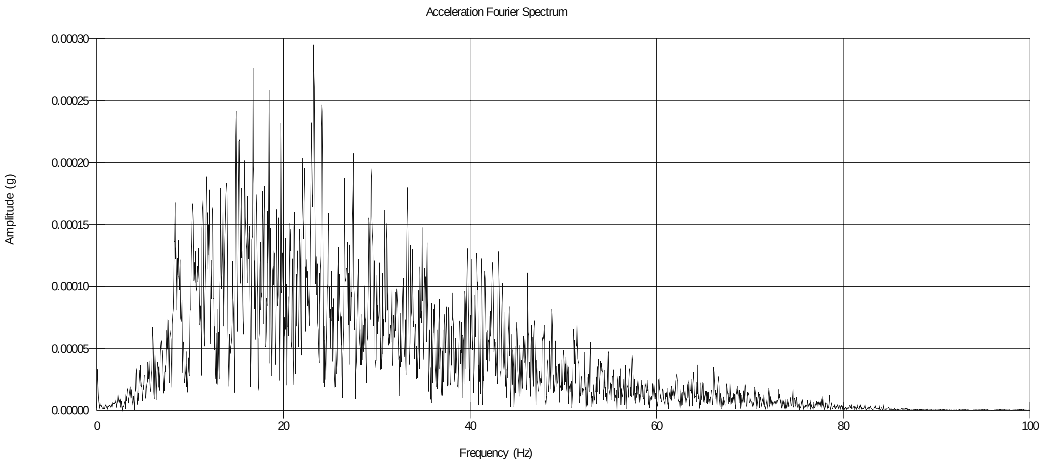


DREFFEW *f=9.37* *T=0.107*

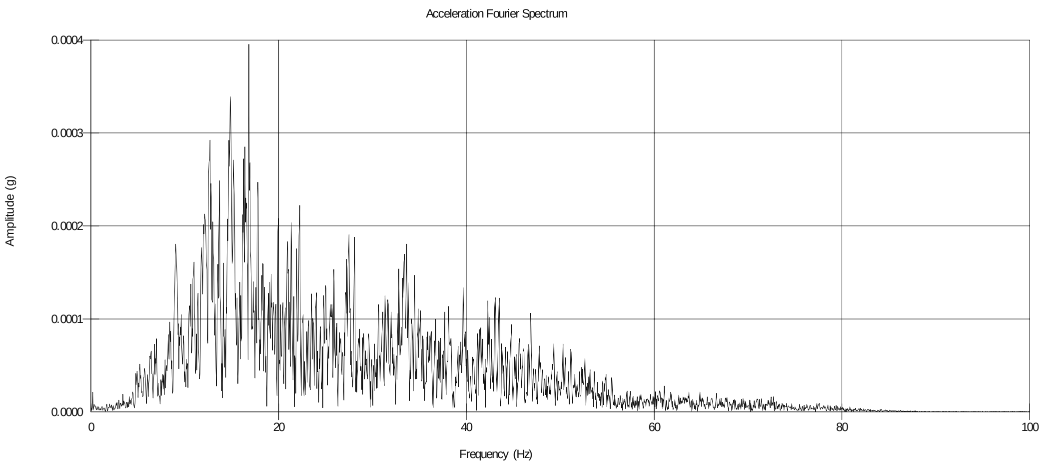


DREFFNS *f=11.22* *T=0.089*

Station RD0:

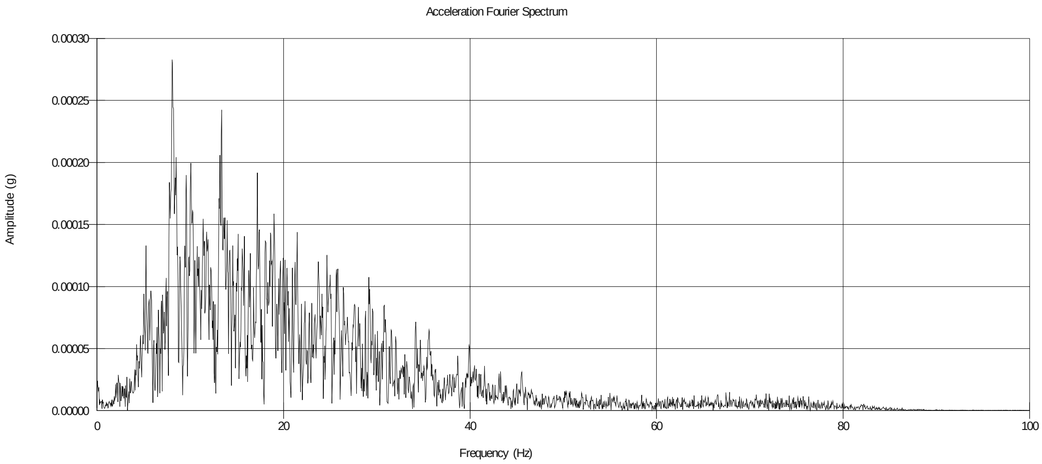


RD0EW *f=22.24* *T=0.043*

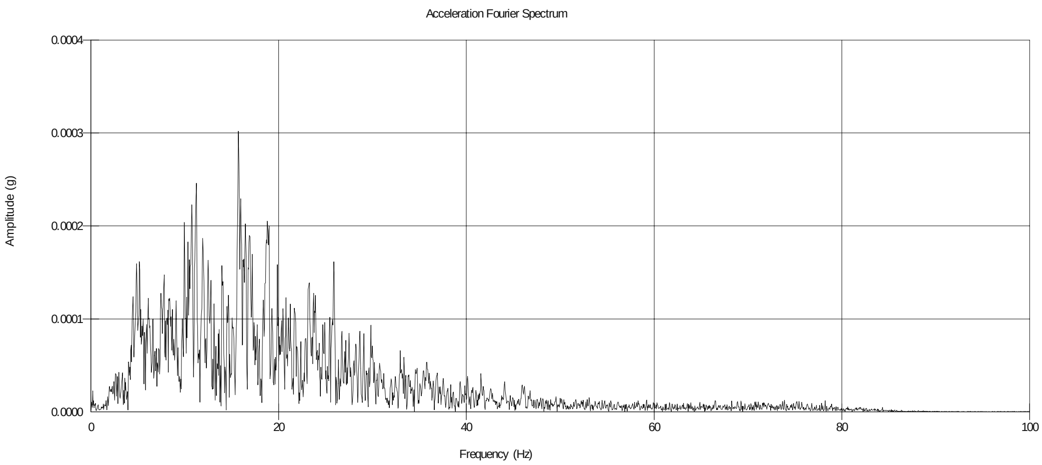


RD0NS *f=16.84* *T=0.059*

Station RD2:

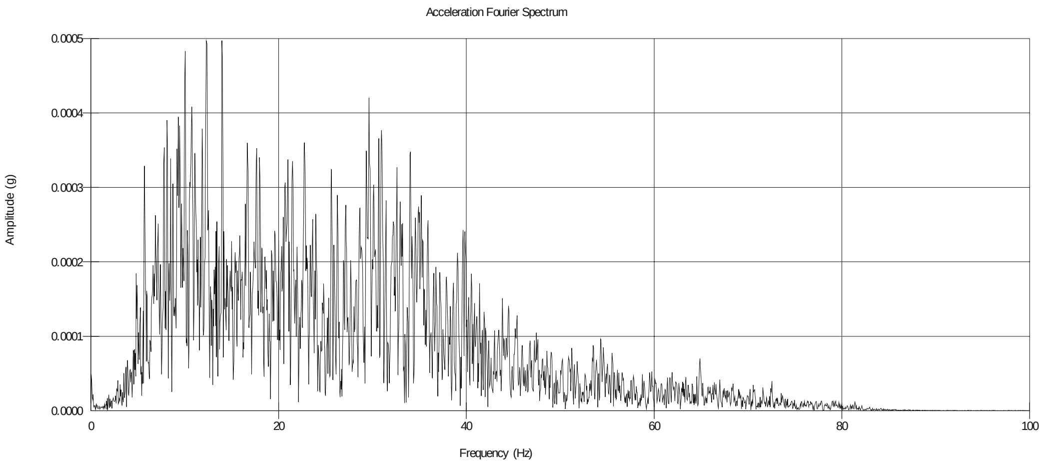


RD2EW *f=8.15* *T=0.123*

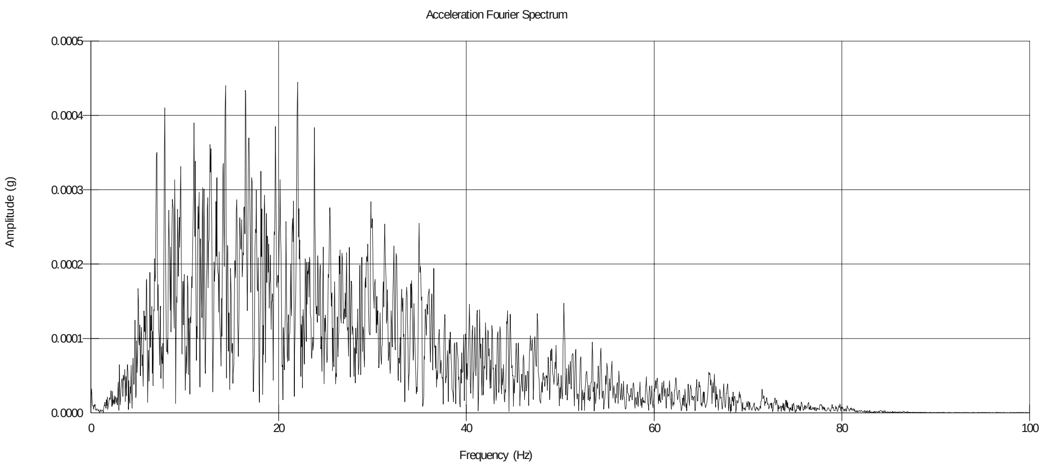


RD2NS *f= 15.71* *T=0.064*

Station RD3:

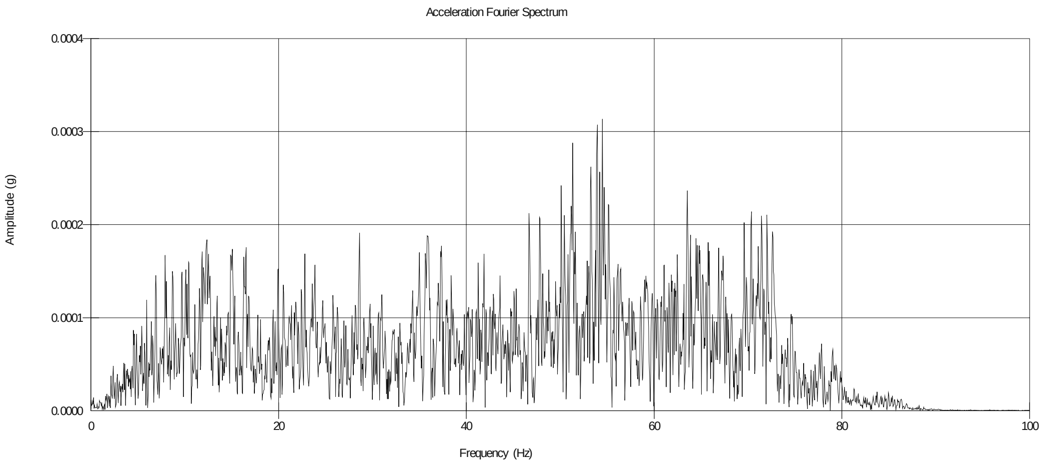


RD3EW *f=12.36* *T= 0.081*

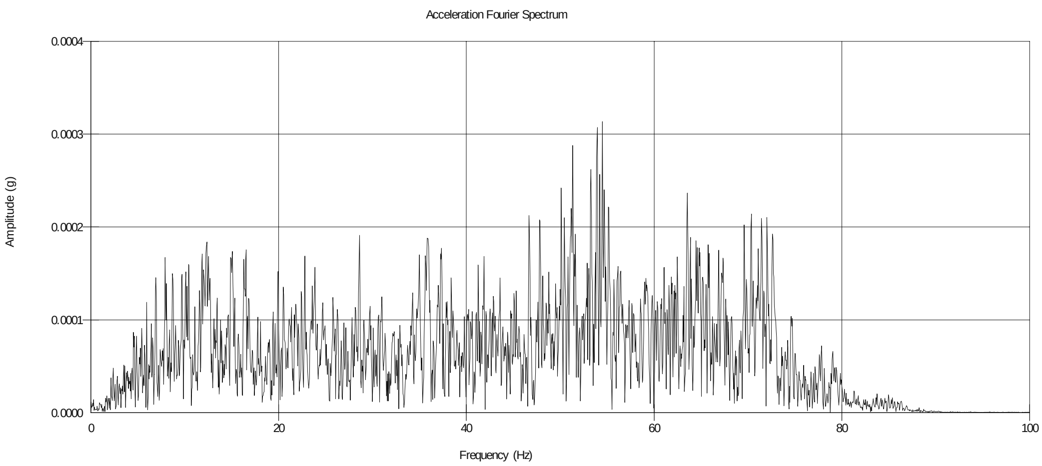


RD3NS *f=22.05* *T=0.046*

Station DRA2 :



DRA2EW *f=54.48* *T=0.018*



DRA2NS f=59.78 T=0.017

6. Effects of the Presence of an Embedded Soft Soil Layer

This section presents the variation of fundamental period of Profiles (D1N) and ($D1_{AC}$) with variations of embedded soft layer's thickness and SWV.

Profile (D1): Bedrock at actual depth (≈350m)

Profile (D1A): Bedrock at NEHRP depth (30m)

Profile ($D1_{AC}$): Bedrock at actual depth (≈350m)

Profile (D1N): Bedrock at NEHRP depth (30m)

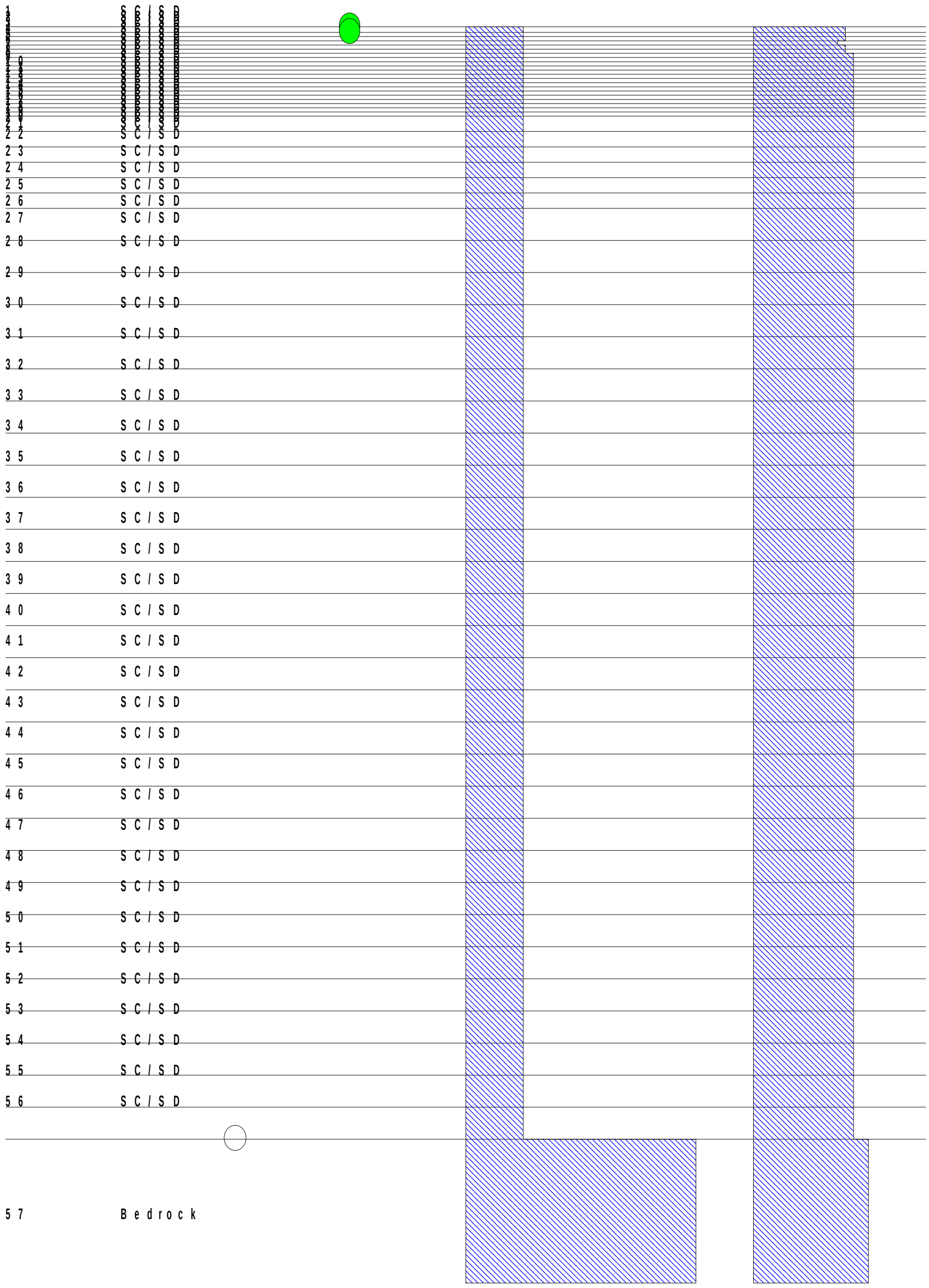
Input Motion: RAN330.EQ

Damping: 5% and 10%

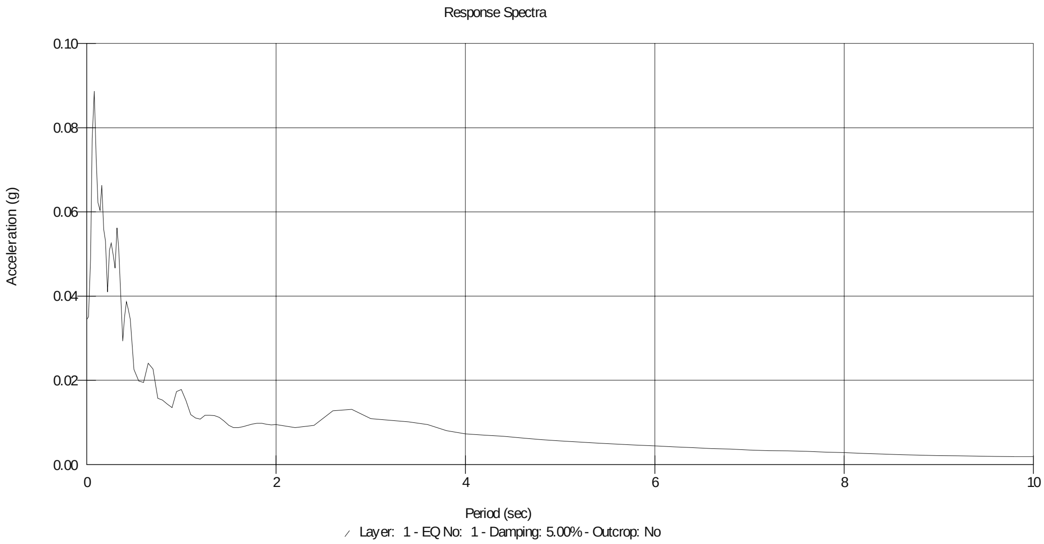
I. Soft Layer SWV=500 m/s

a. Layer Thickness =0.0 m

Profile D1$_{AC}$:

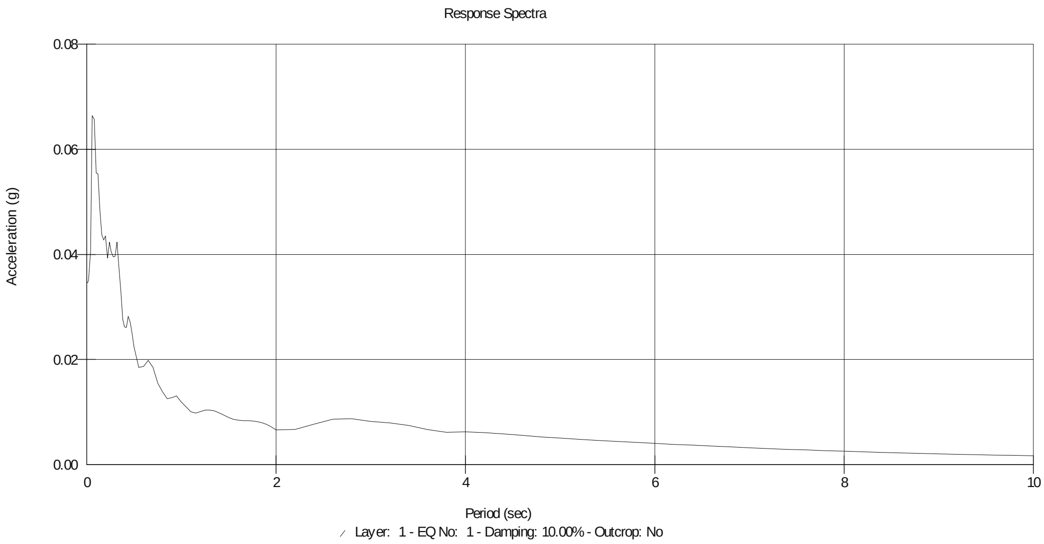


5% Damping:



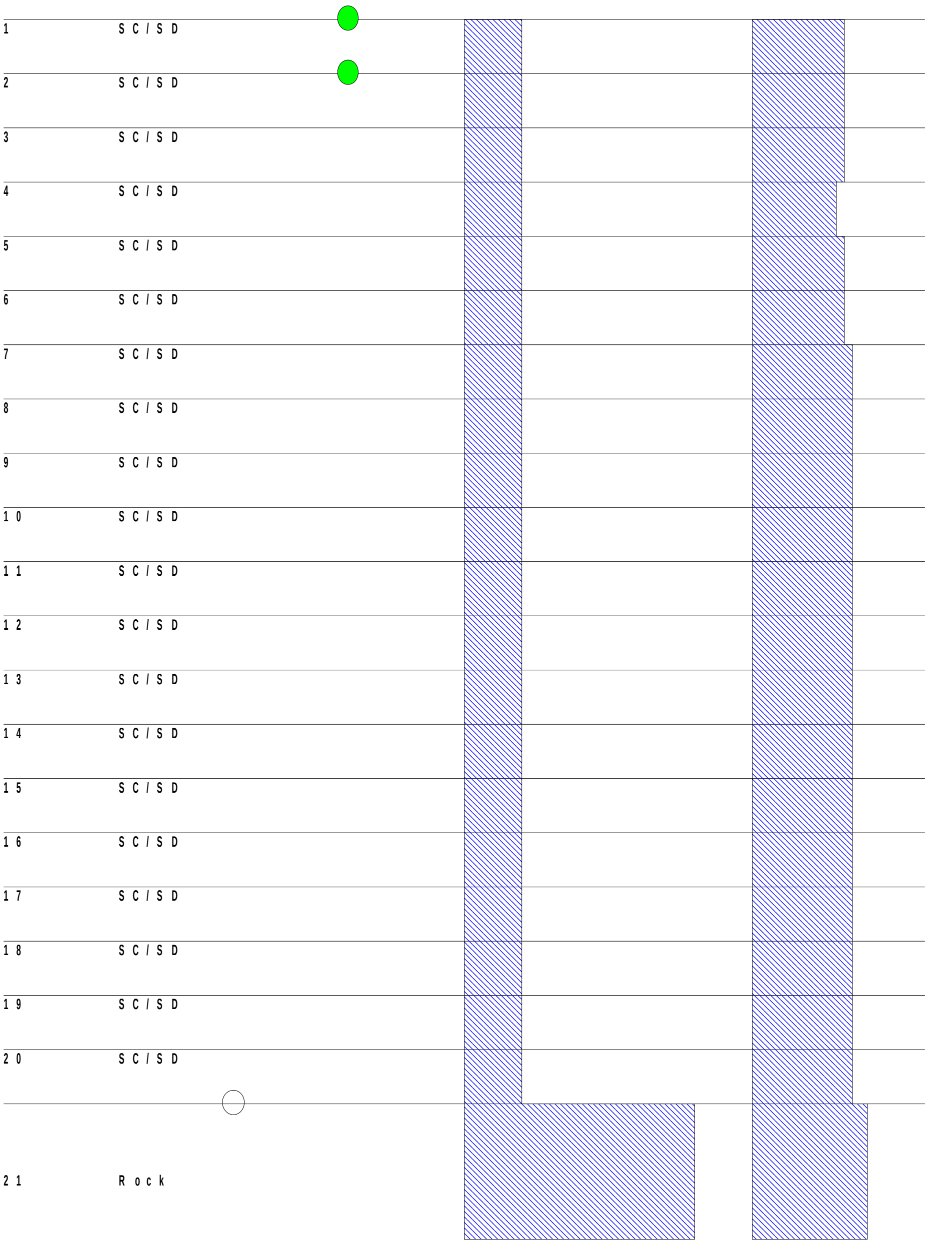
T=0.077 sec

10% Damping:

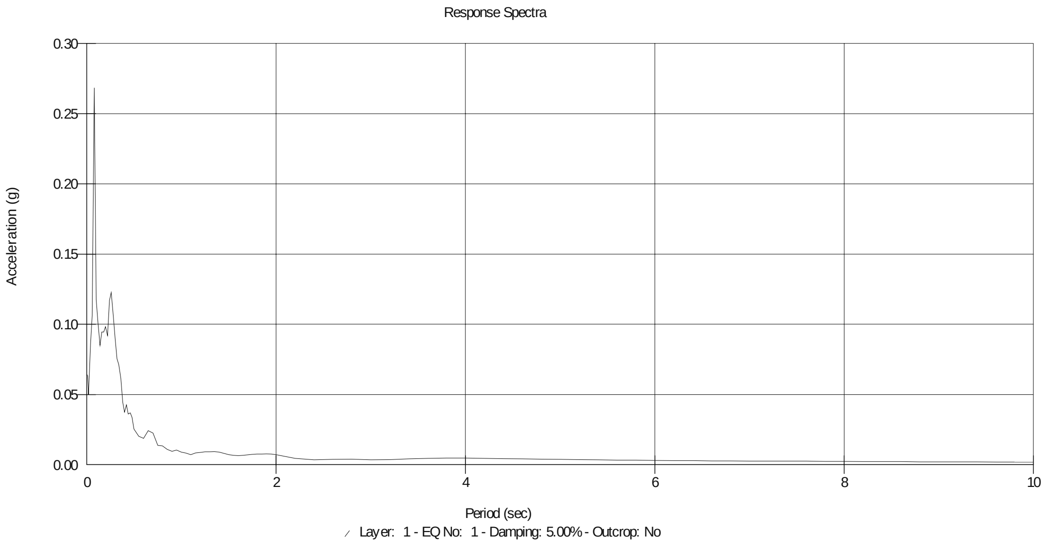


T=.054 sec

2. Profile: D1N:

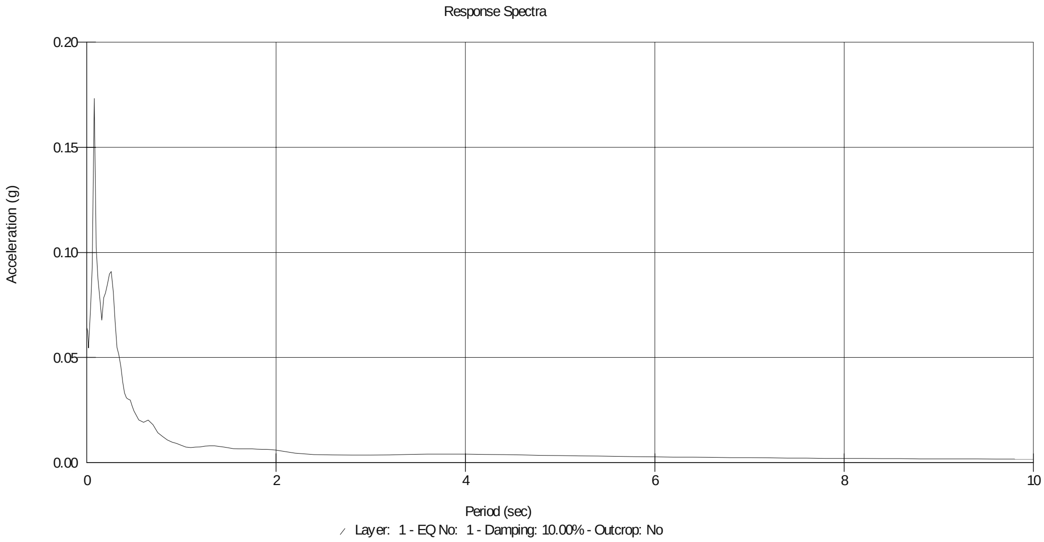


5% Damping:



T=0.077 sec

10% Damping:

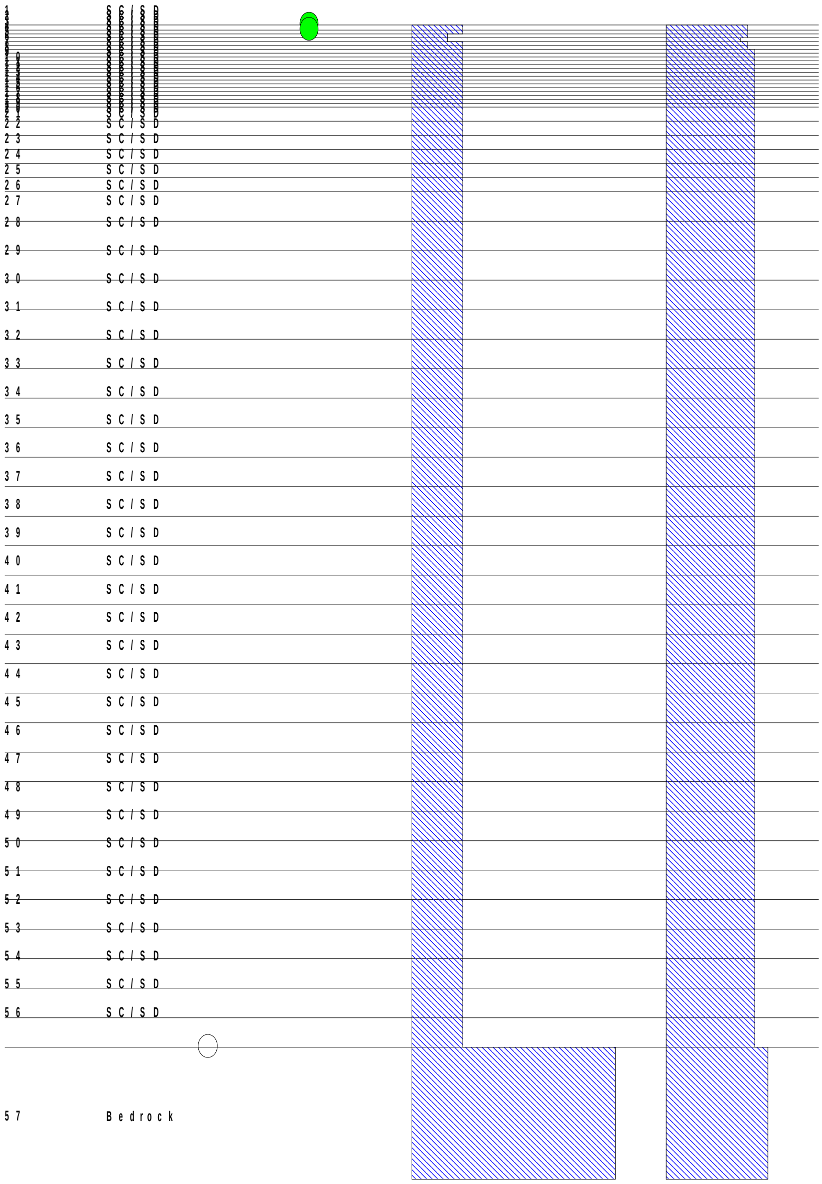


T=0.064 sec

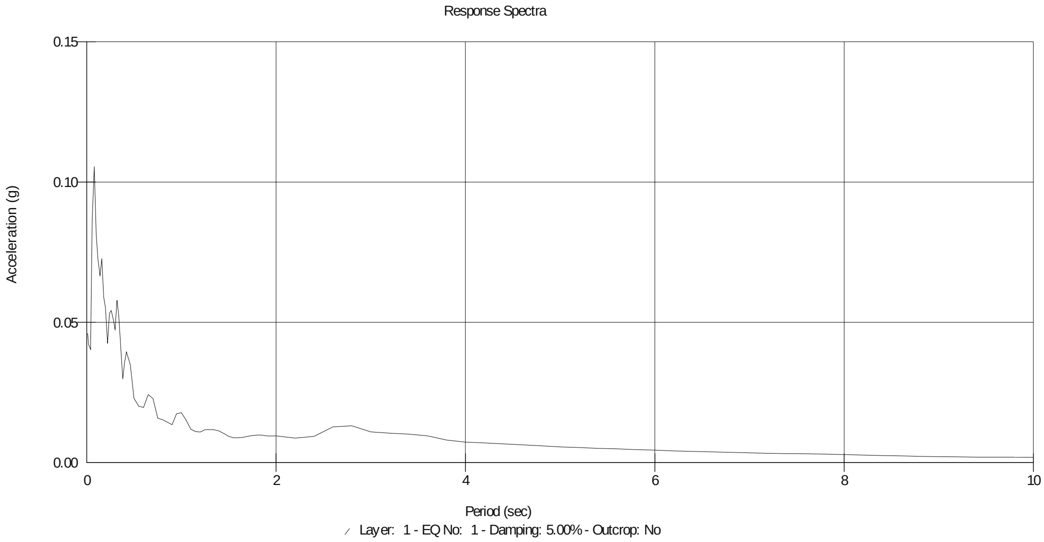
II. Soft Layer SWV=350 m/s

a. Soft layer thickness =3m

1. Profile $D1_{AC}$

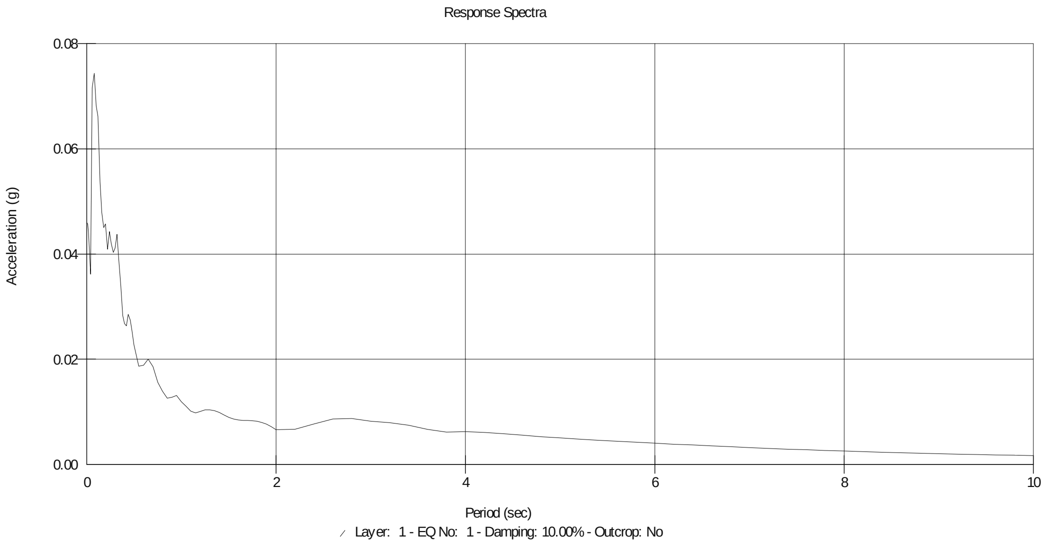


5%Damping:



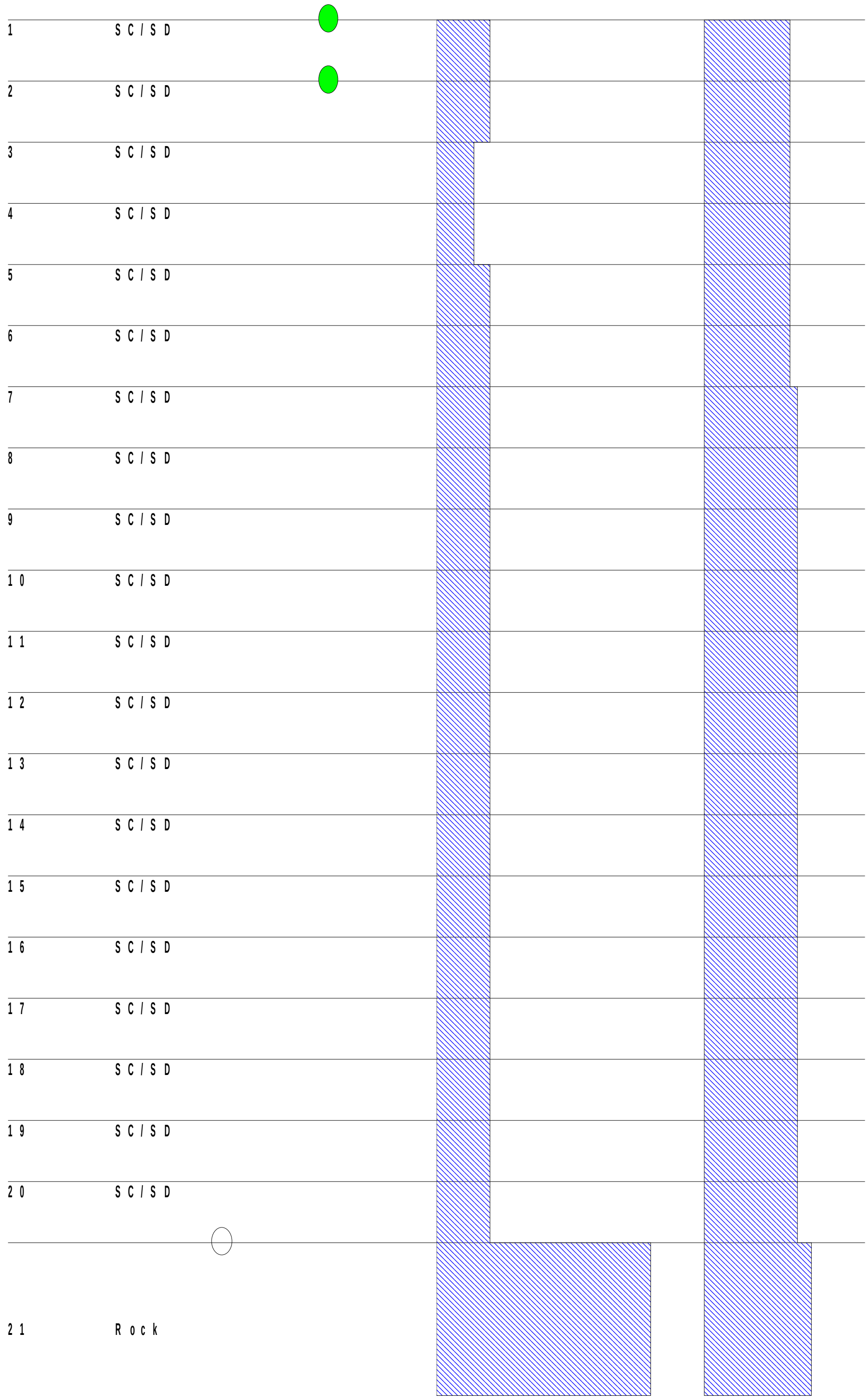
T=0.077 sec

10% Damping:

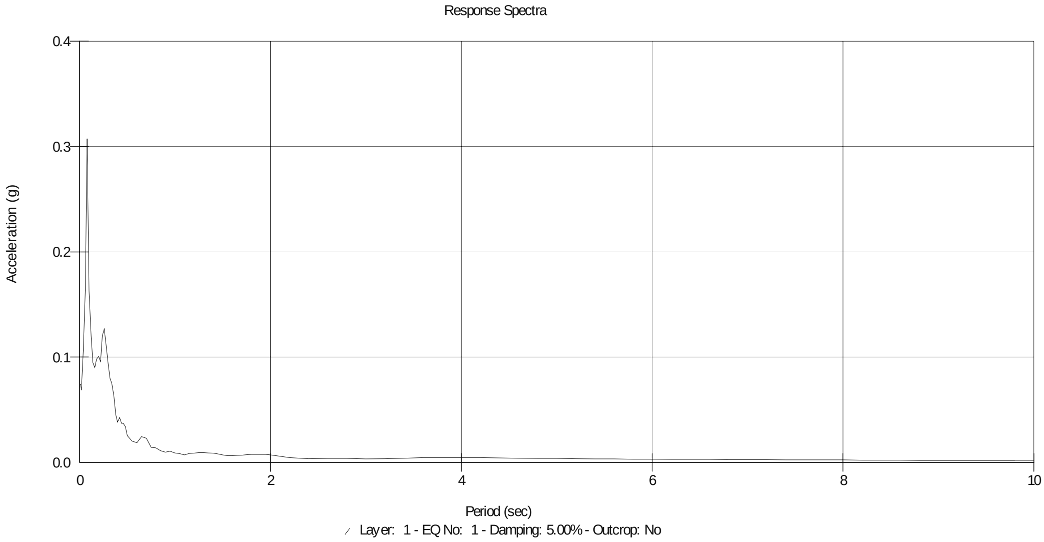


T=0.077 sec

2. Profile: D1N:

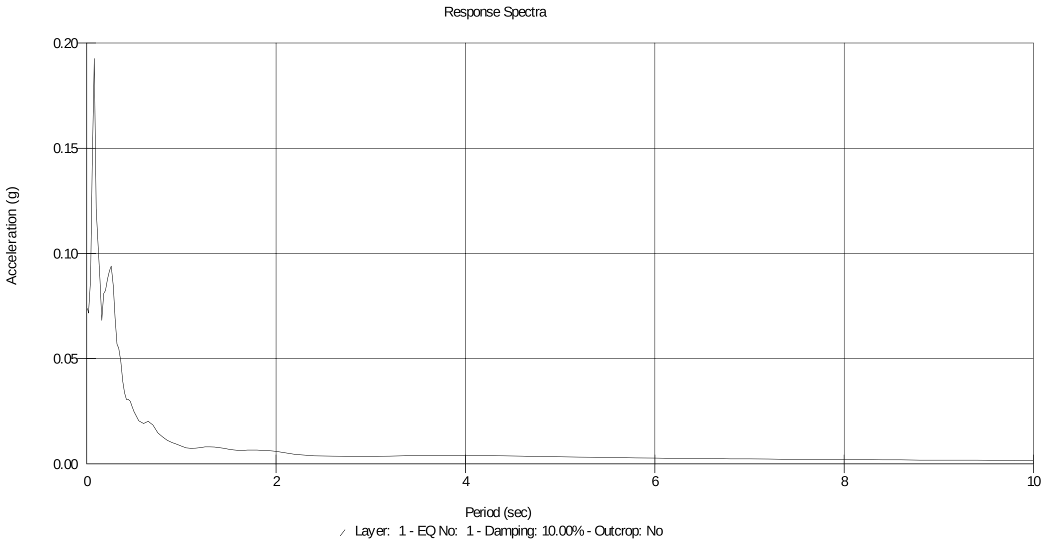


5% damping:



T=0.077 sec

10% Damping:

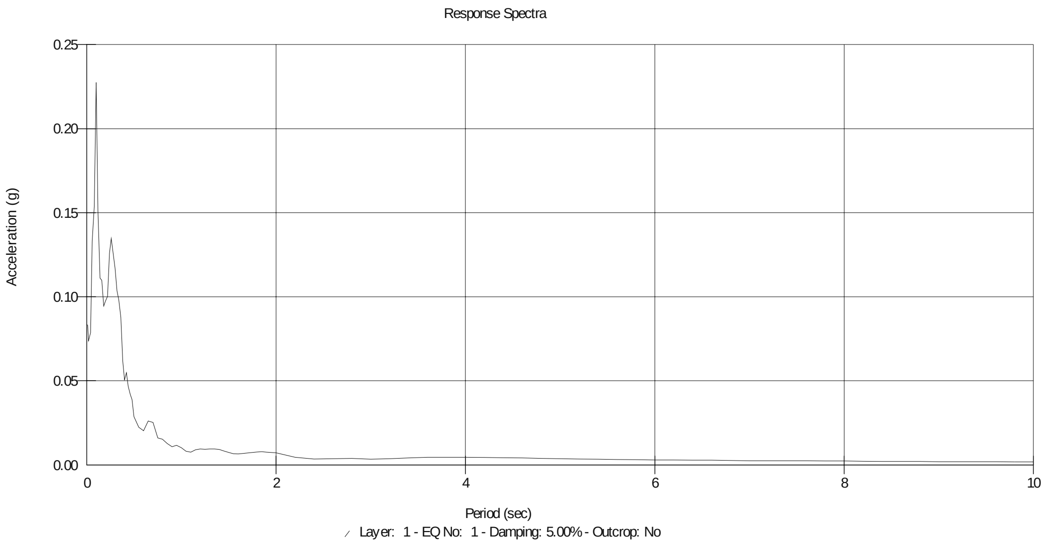


T=0.077 sec

b. Soft layer Thickness= 5m

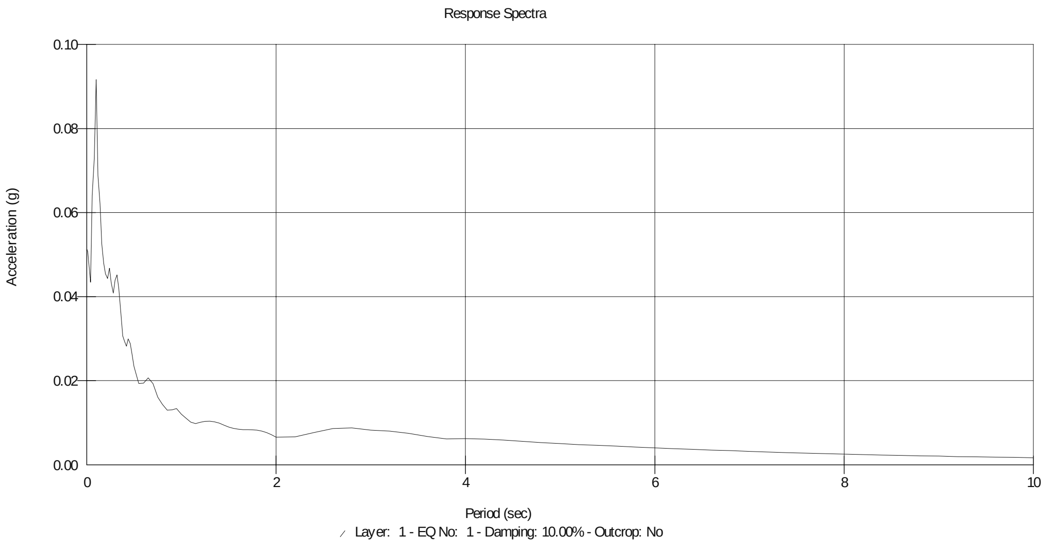
1. Profile $D1_{AC}$

5% Damping



T=0.098 sec

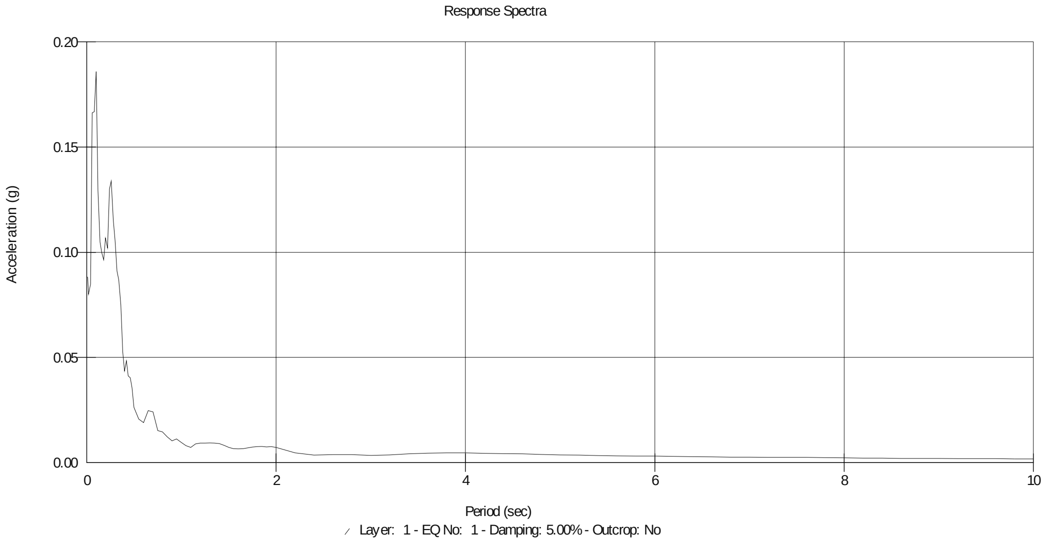
10% Damping



T=0.098 sec

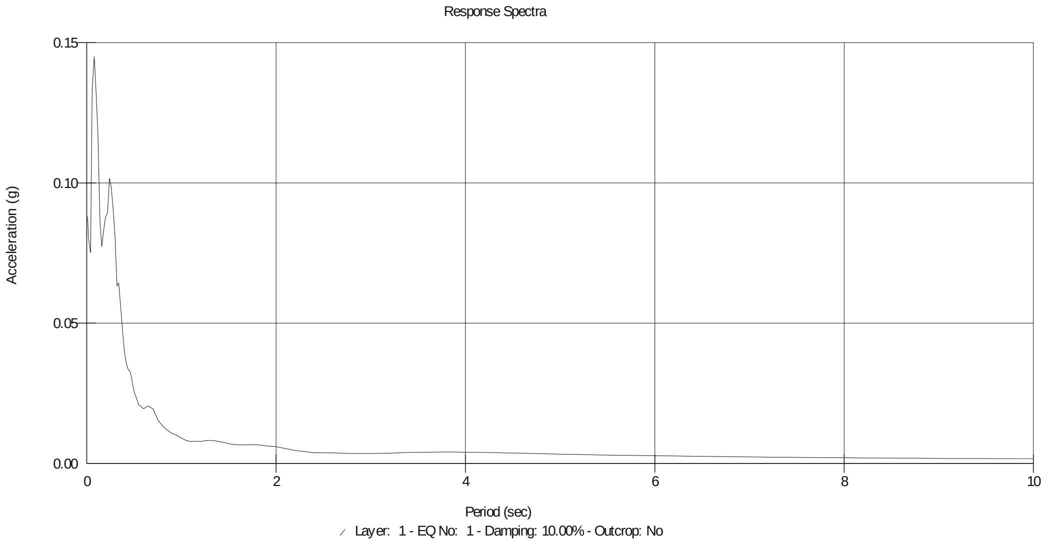
2. Profile D1N

5% Damping:



T=0.098 sec

10% Damping:

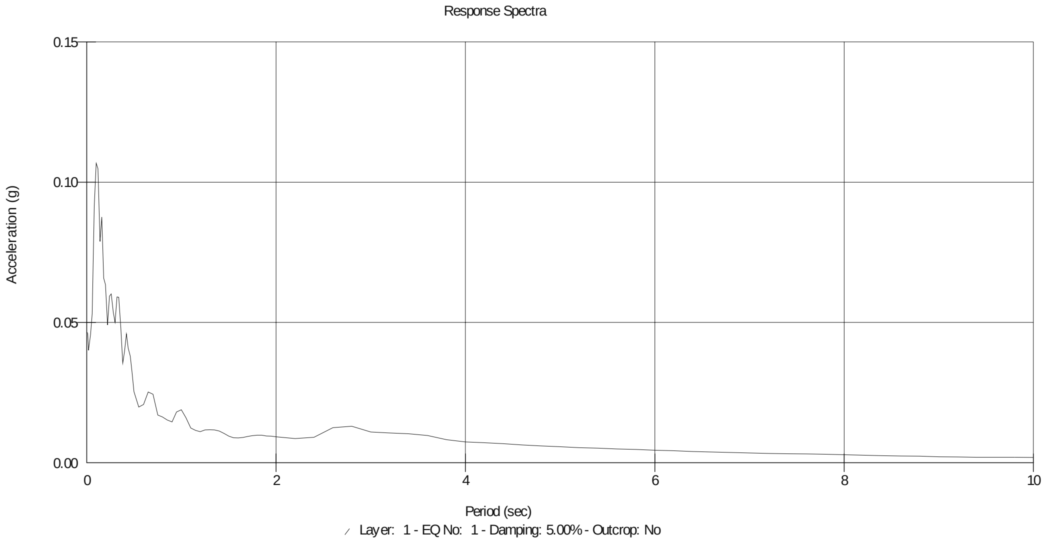


T=0.077 sec

c. Soft layer Thickness= 7m

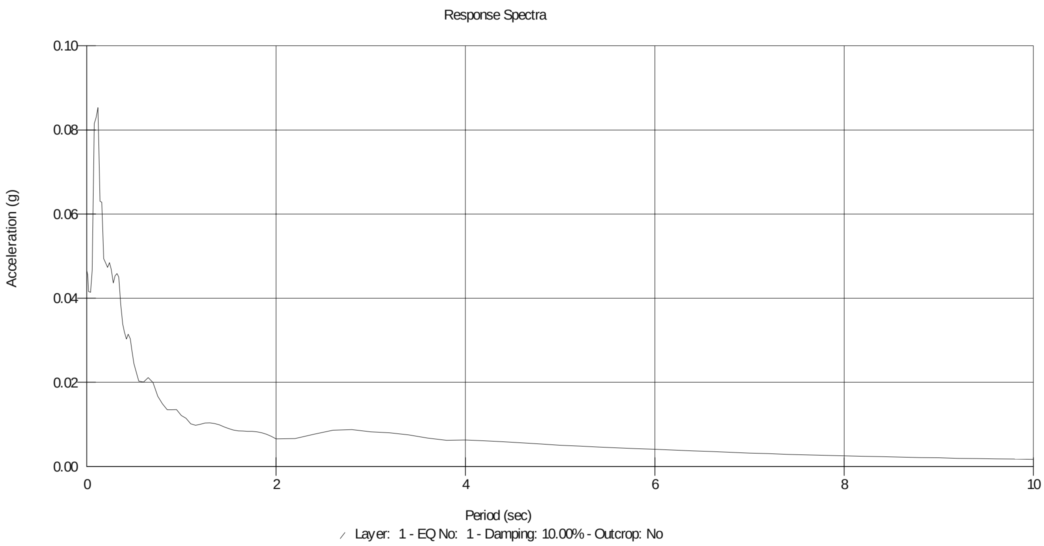
1. Profile $D1_{AC}$

5% Damping



T=0.12 sec

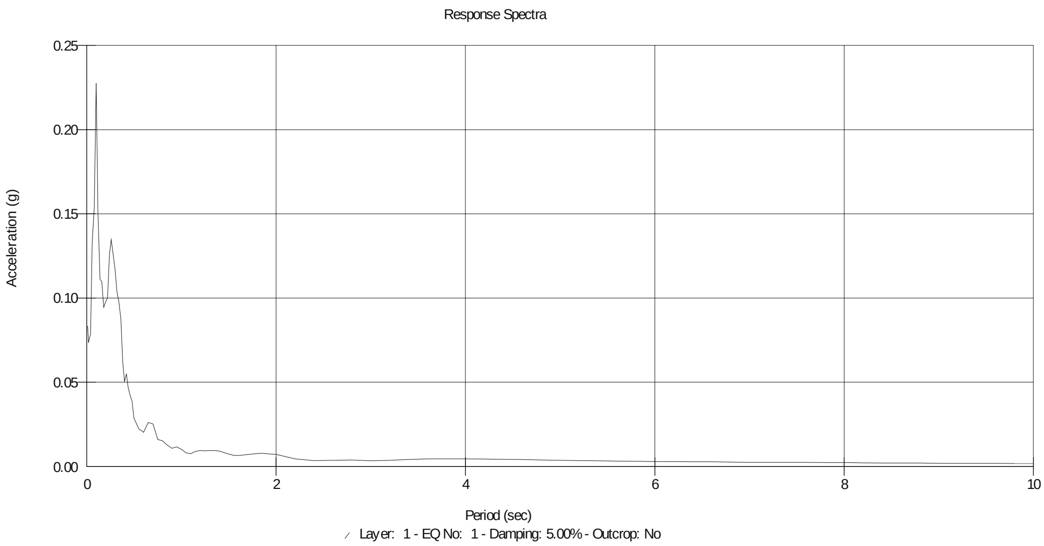
10% Damping



T=0.12 sec

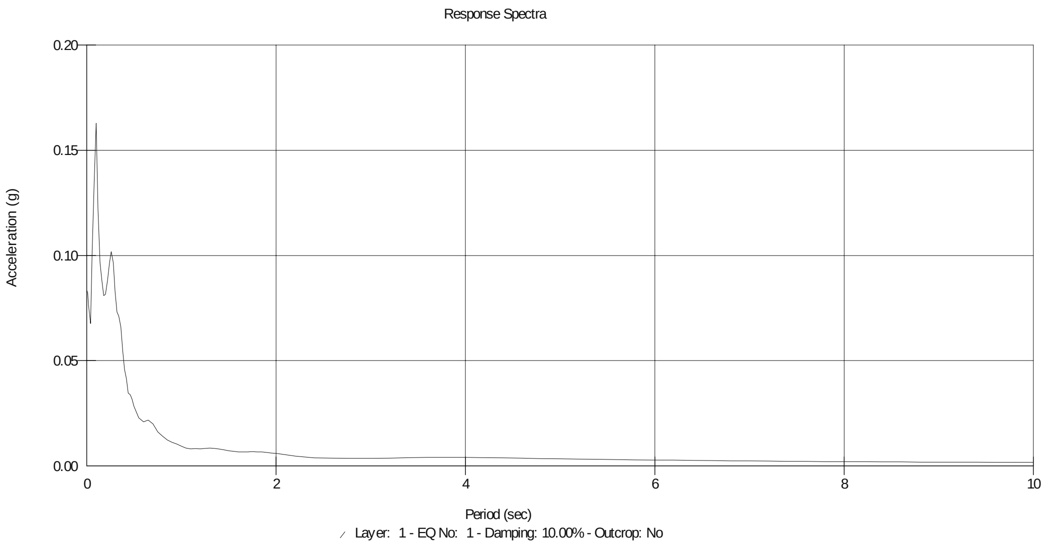
2. Profile D1N

5% Damping:



T=0.098 sec

10% Damping:

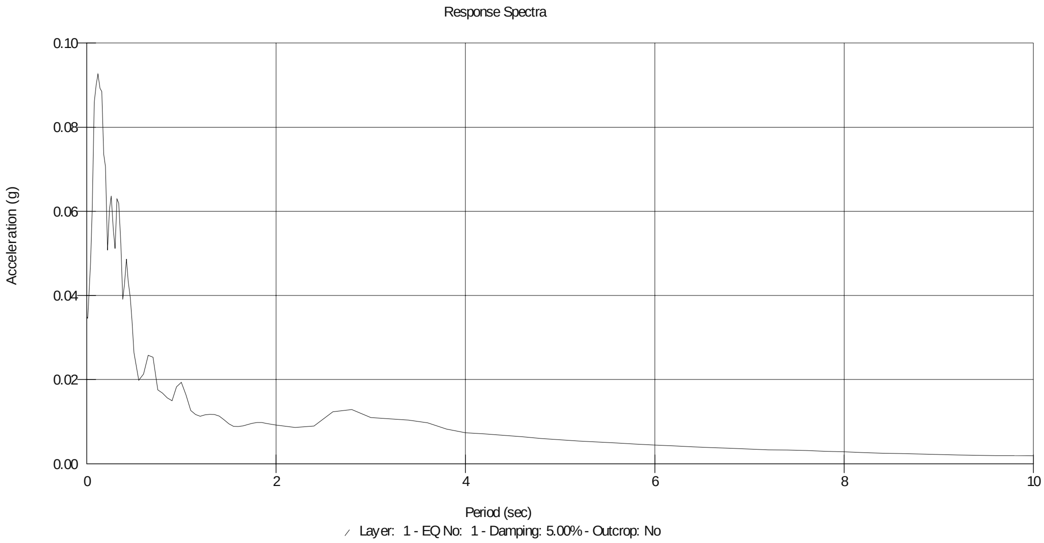


T=0.098 sec

d. Soft layer Thickness= 9m

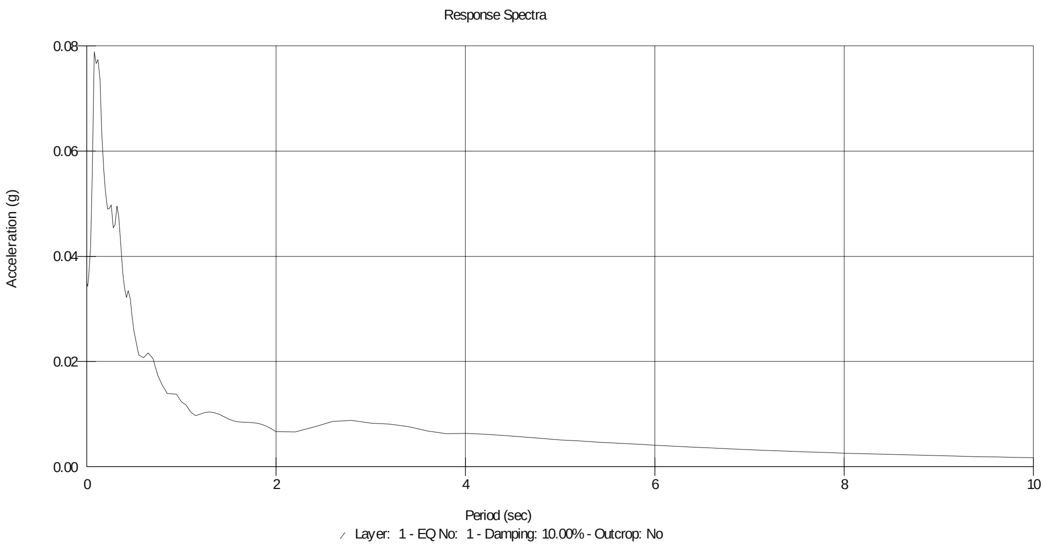
1. Profile $D1_{AC}$

5% Damping



T=0.12 sec

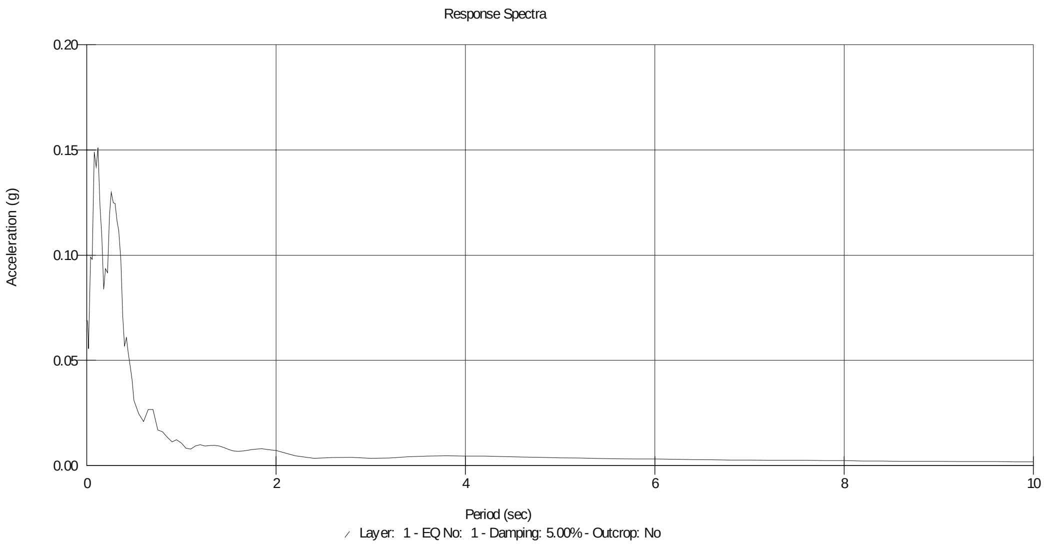
10% Damping



T=0.077 sec

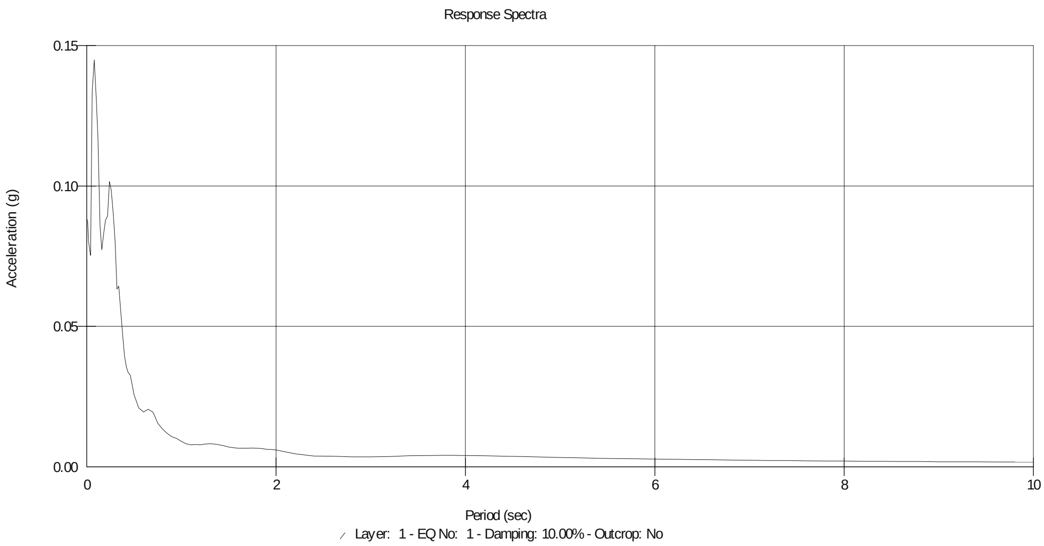
2. Profile D1N

5% Damping:



T=0.12 sec

10% Damping:

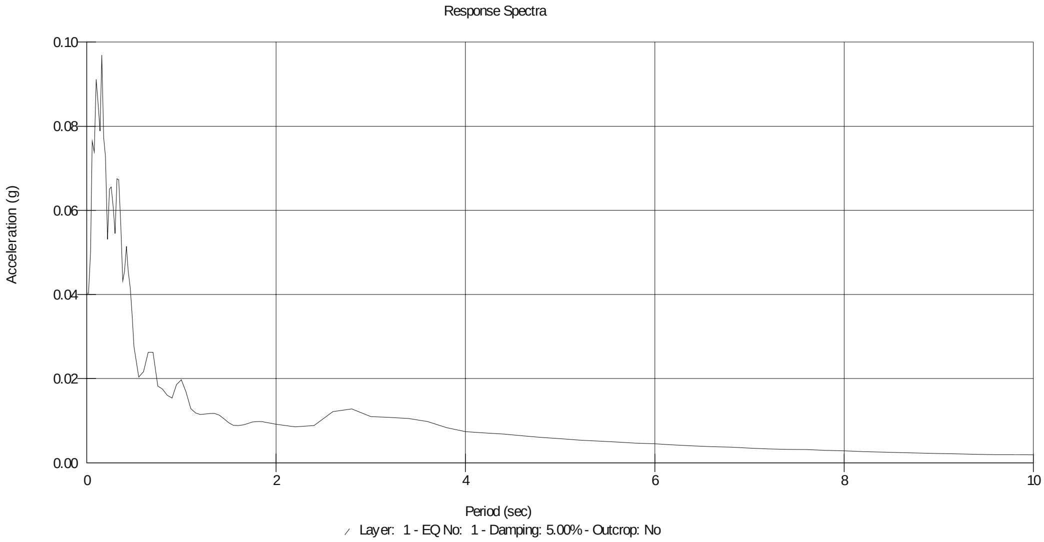


T=0.077 sec

e. Soft layer Thickness= 11m

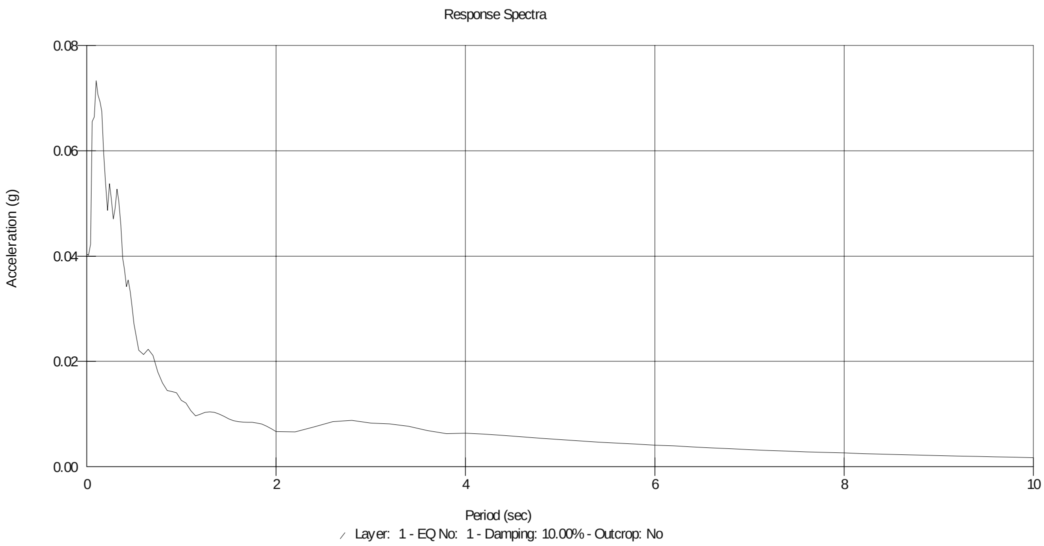
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

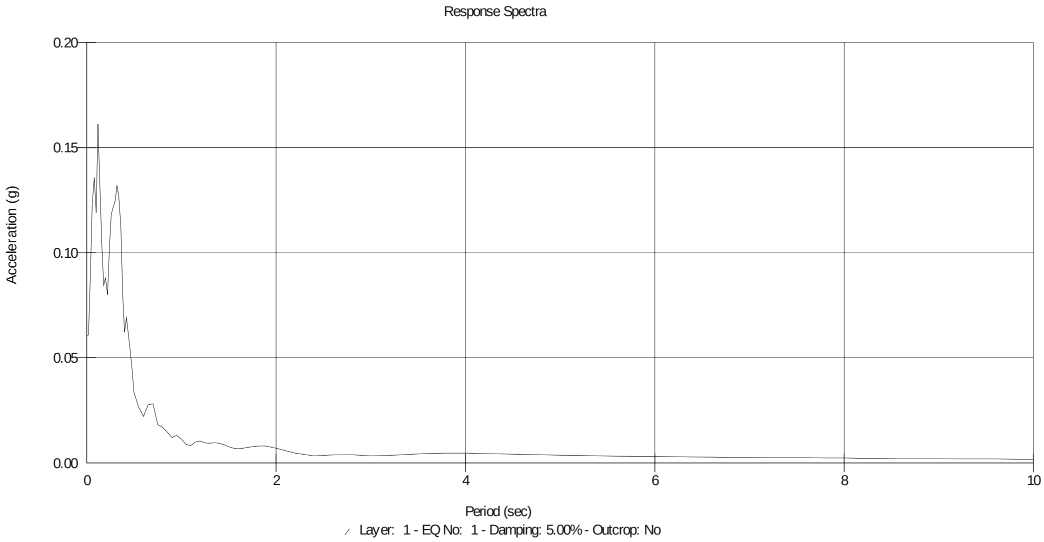
10% Damping



T=0.11 sec

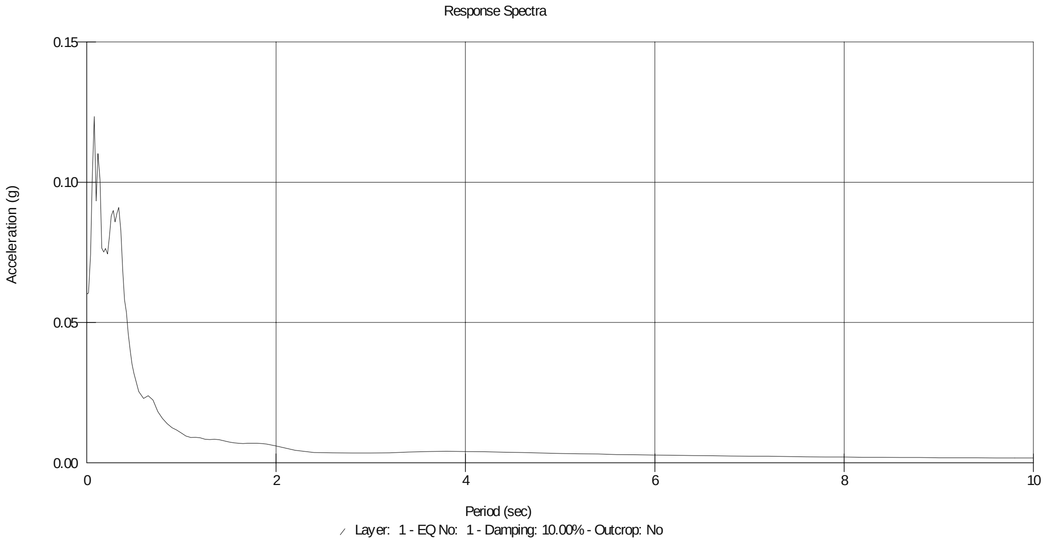
2. Profile D1N

5% Damping:



T=0.11 sec

10% Damping:

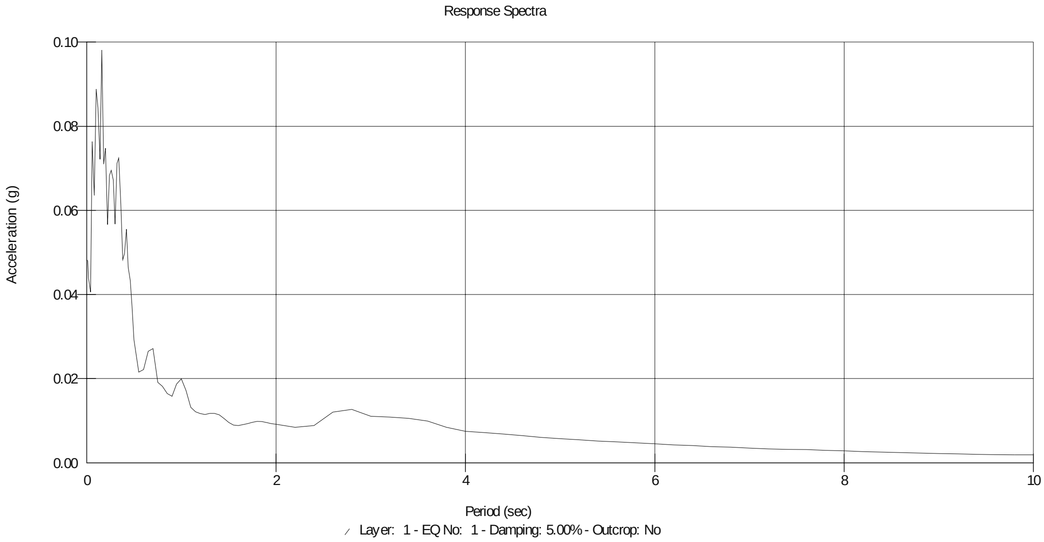


T+0.077 sec

f. Soft layer Thickness= 13m

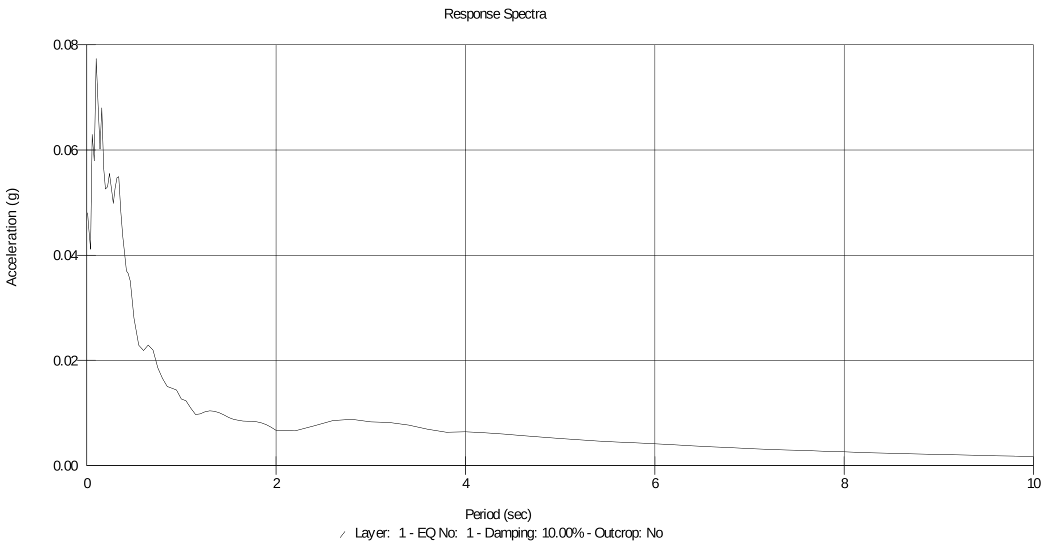
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

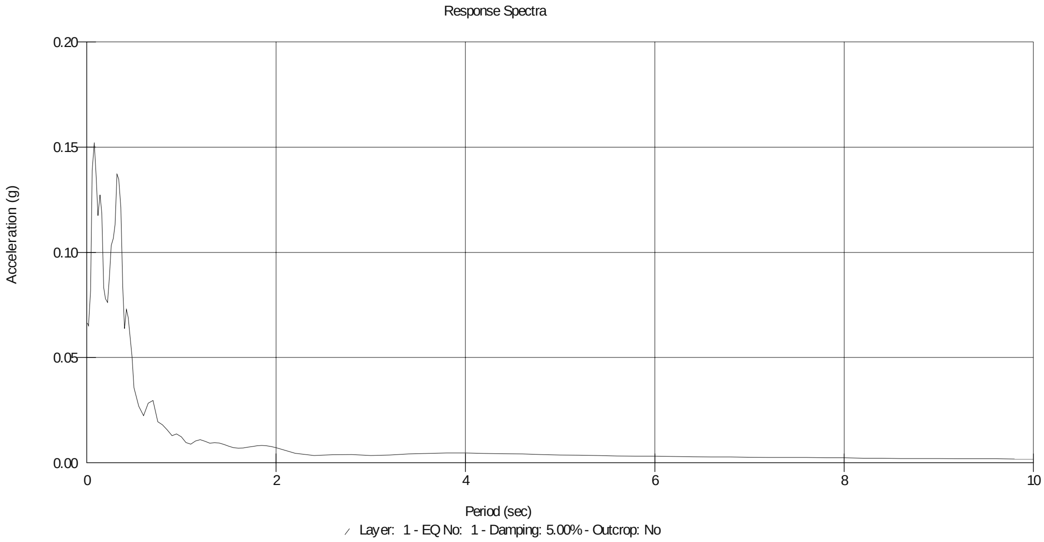
10% Damping



T=0.099 sec

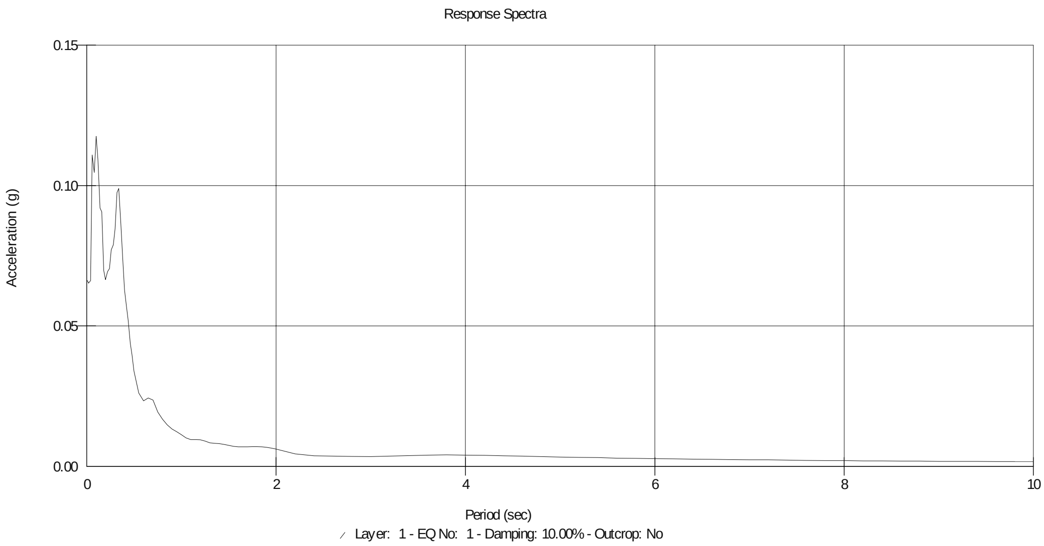
2. Profile D1N

5% Damping:



T=0.088 sec

10% Damping:

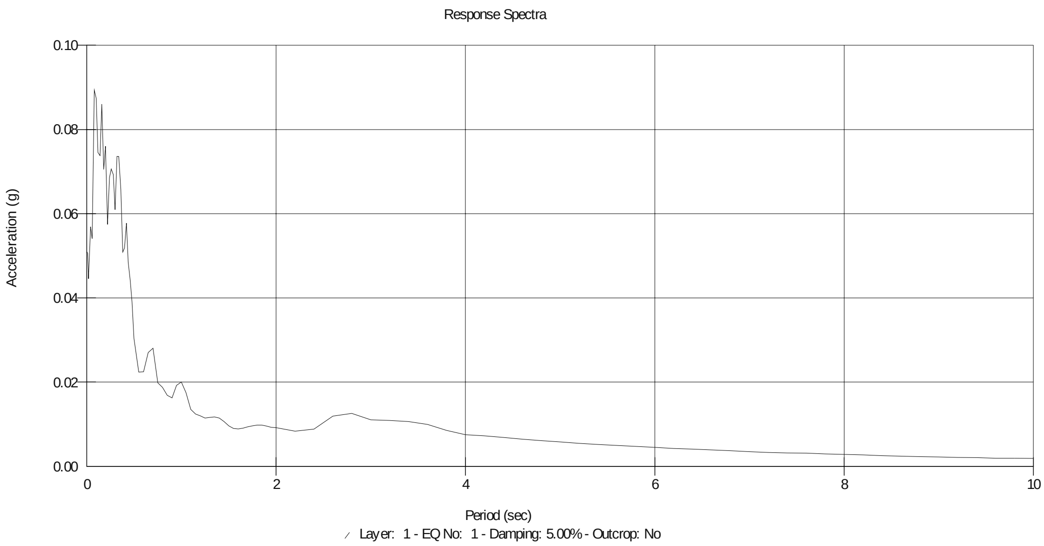


T=0.088

g. Soft layer Thickness= 15m

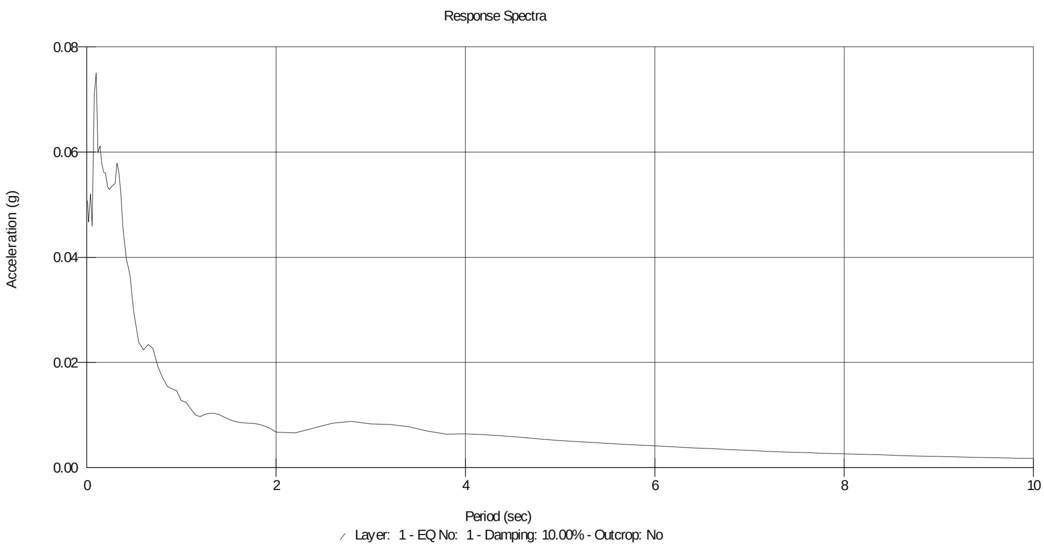
1. Profile D1$_{AC}$

5% Damping



T=0.077 sec

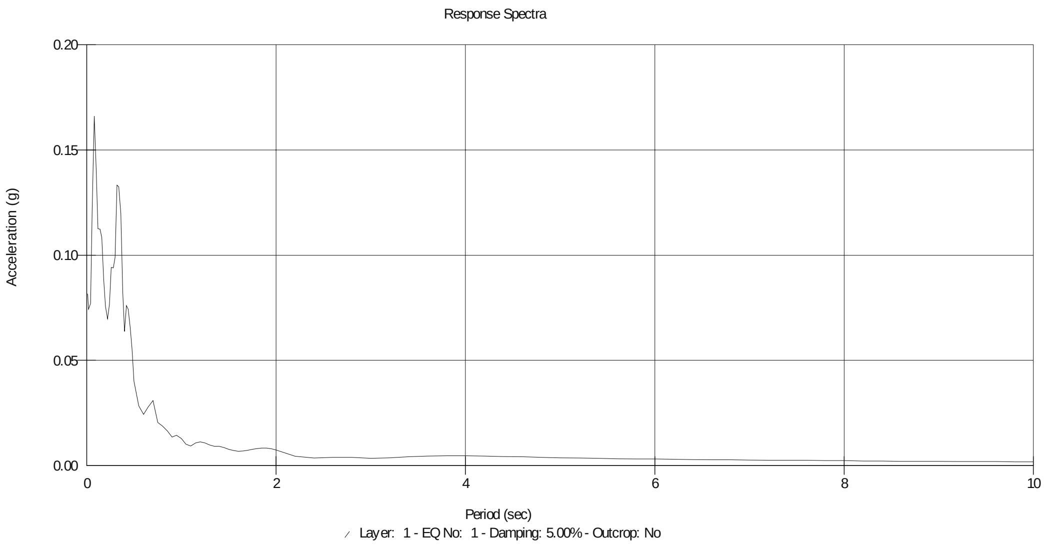
10% Damping



T=0.098 sec

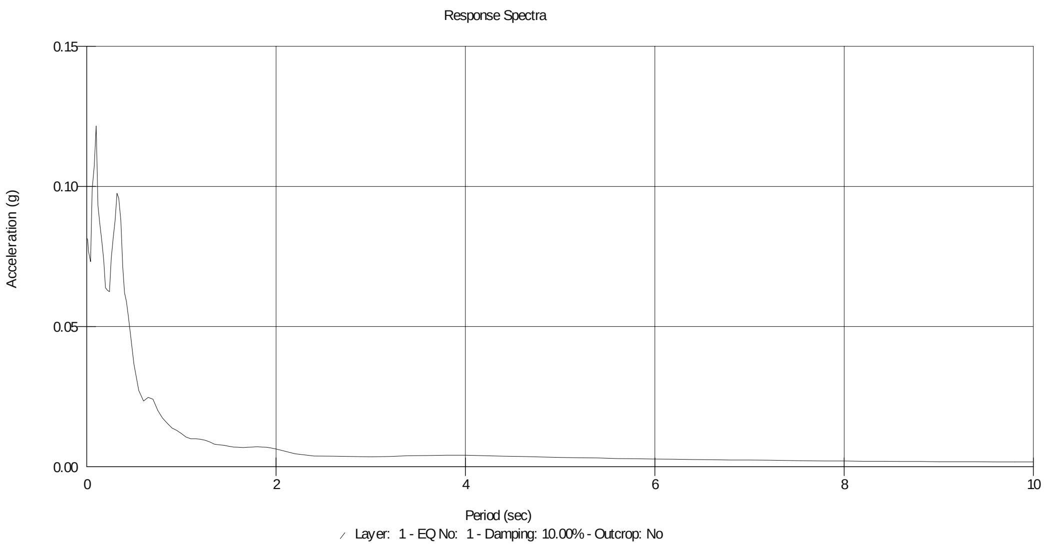
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:



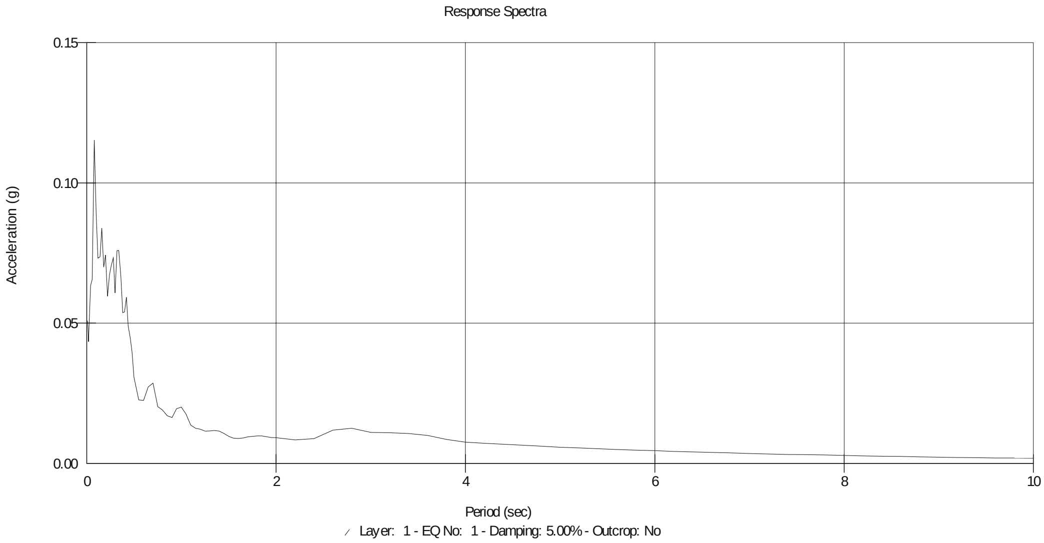
T=0.098 sec

III. Soft Layer SWV=300 m/s

a. Soft layer Thickness= 3m

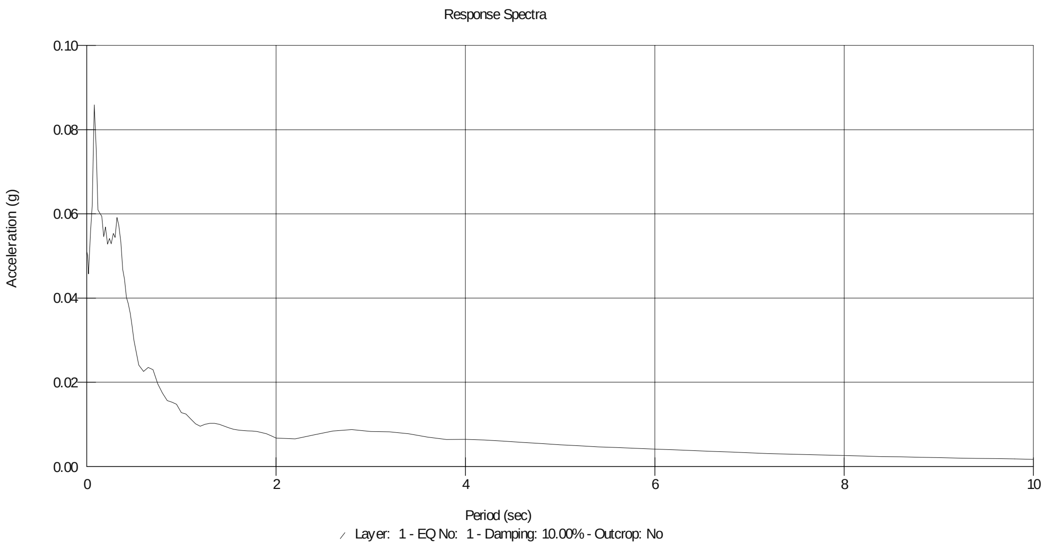
1. Profile $D1_{AC}$

5% Damping



T=0.077 sec

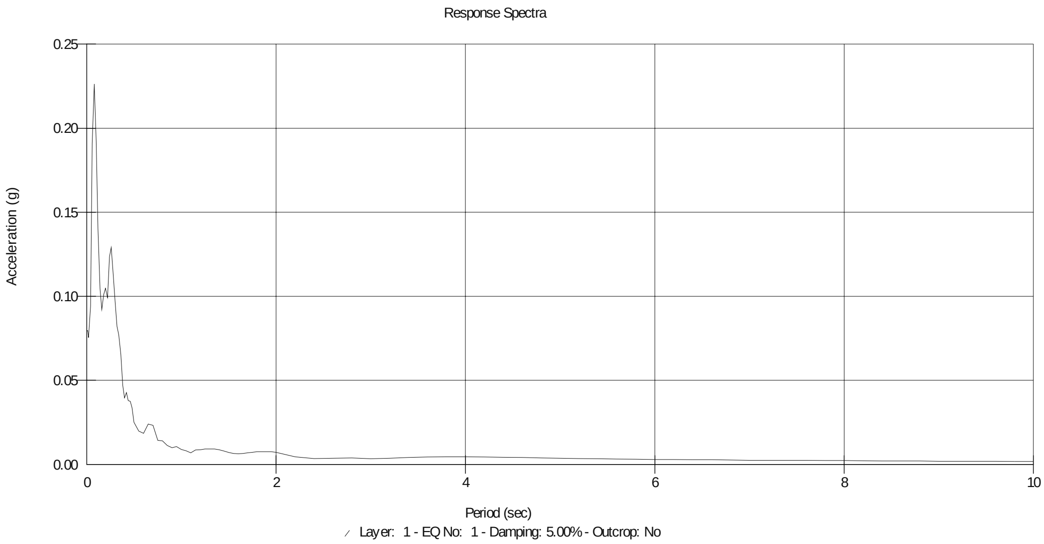
10% Damping



T=0.077 sec

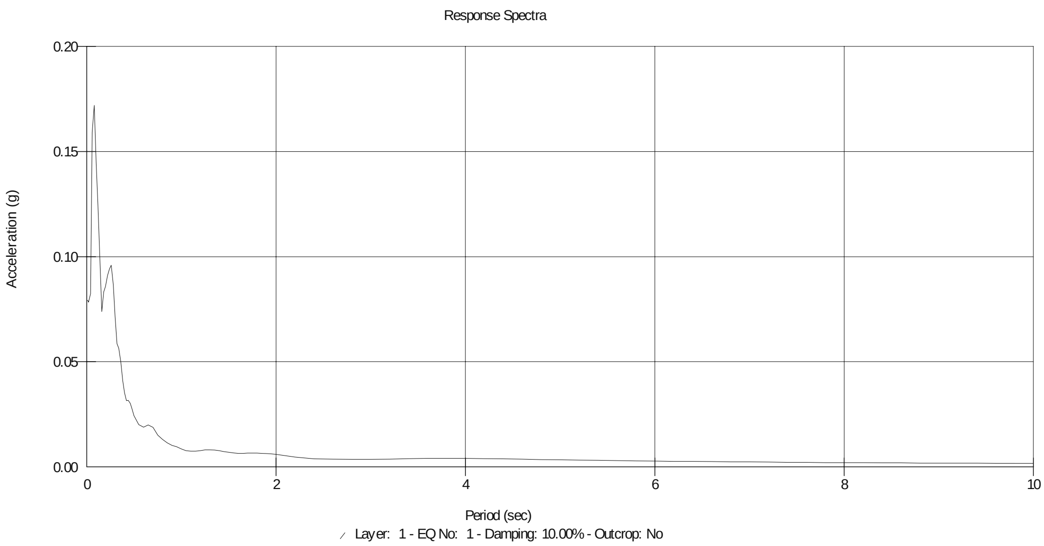
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:

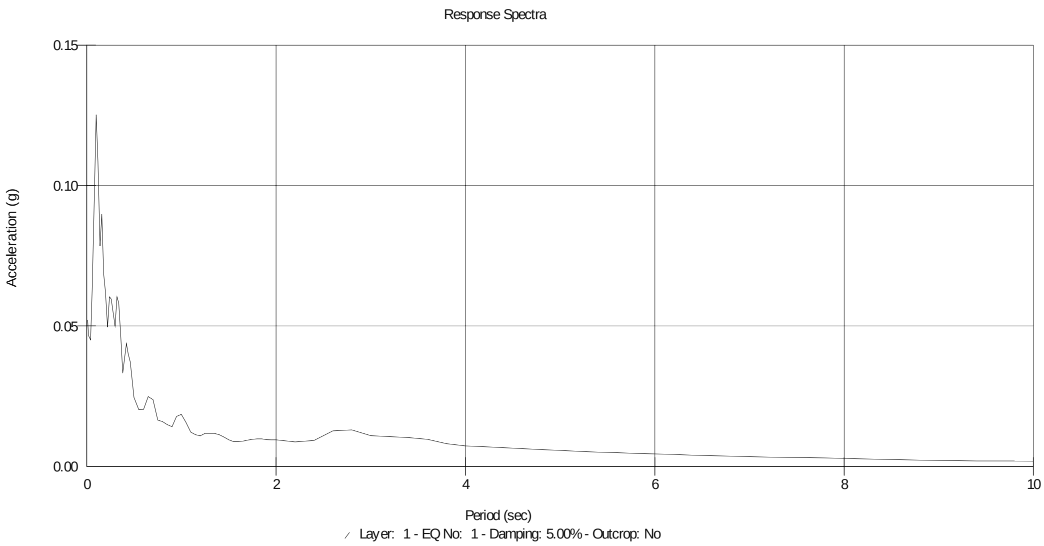


T=0.077 sec

b. Soft layer Thickness= 5

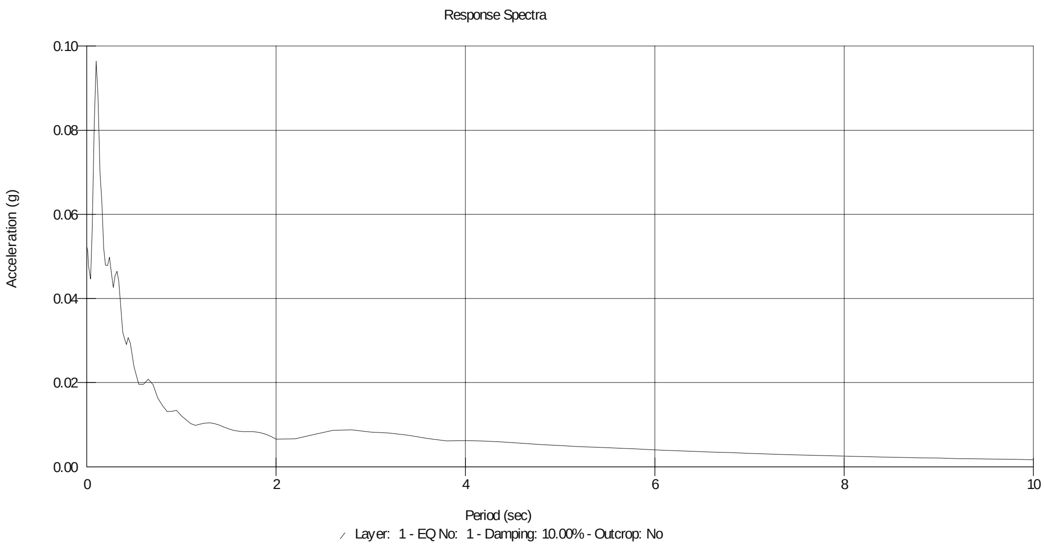
1. Profile $D1_{AC}$

5% Damping



T=0.098 sec

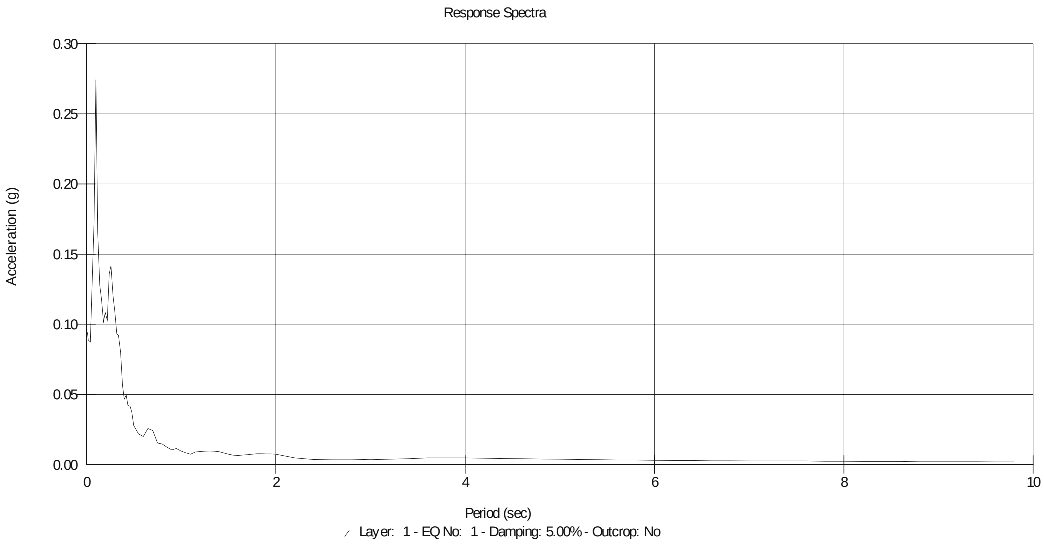
10% Damping



T=0.10 sec

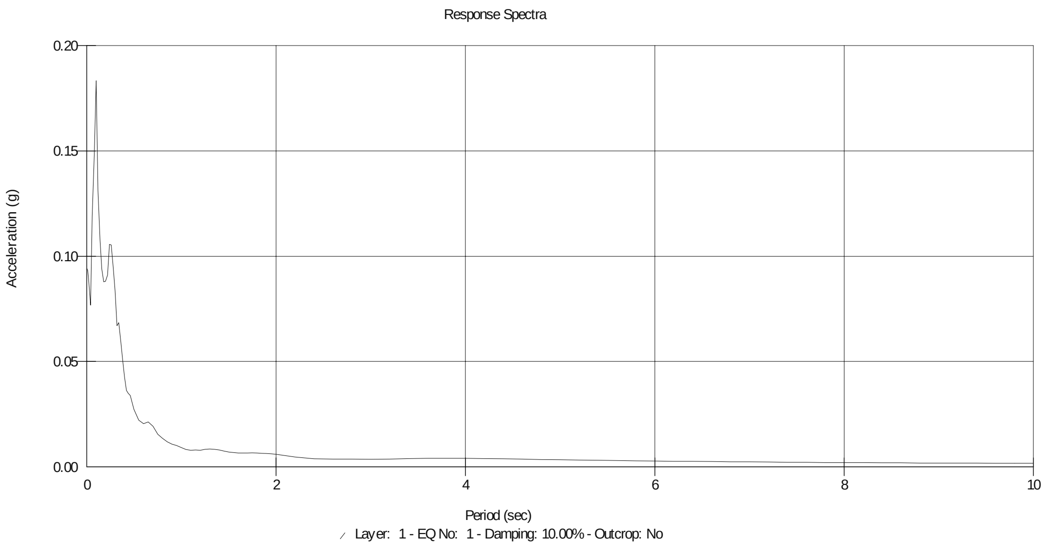
2. Profile D1N

5% Damping:



T=0.098 sec

10% Damping:

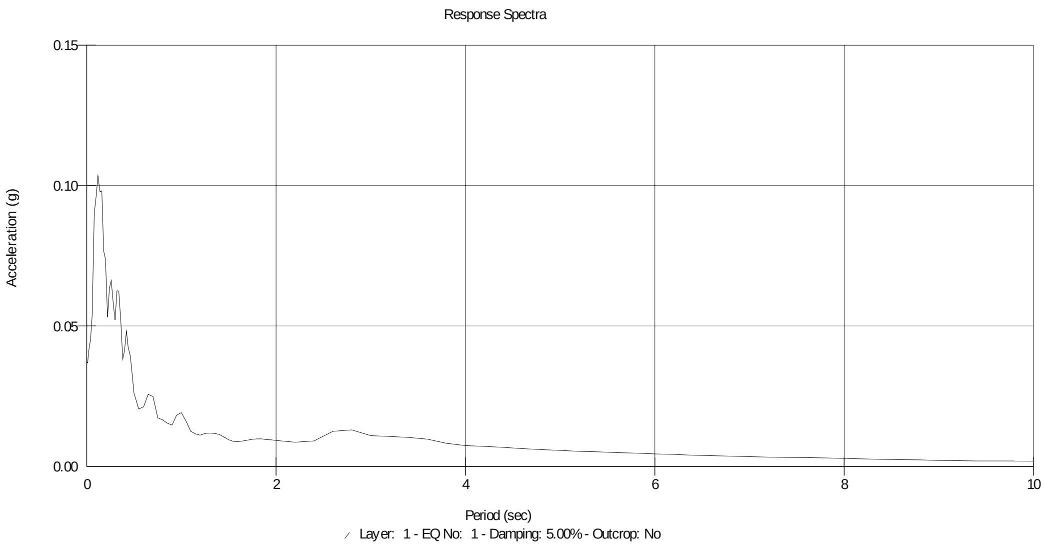


T=0.088 sec

c. Soft layer Thickness= 7m

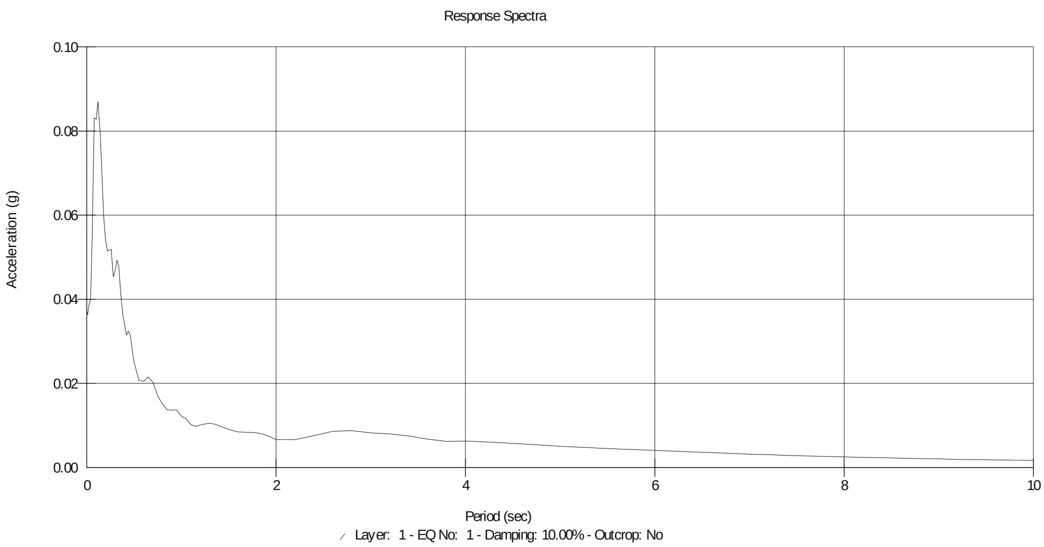
1. Profile $D1_{AC}$

5% Damping



T=0.13 sec

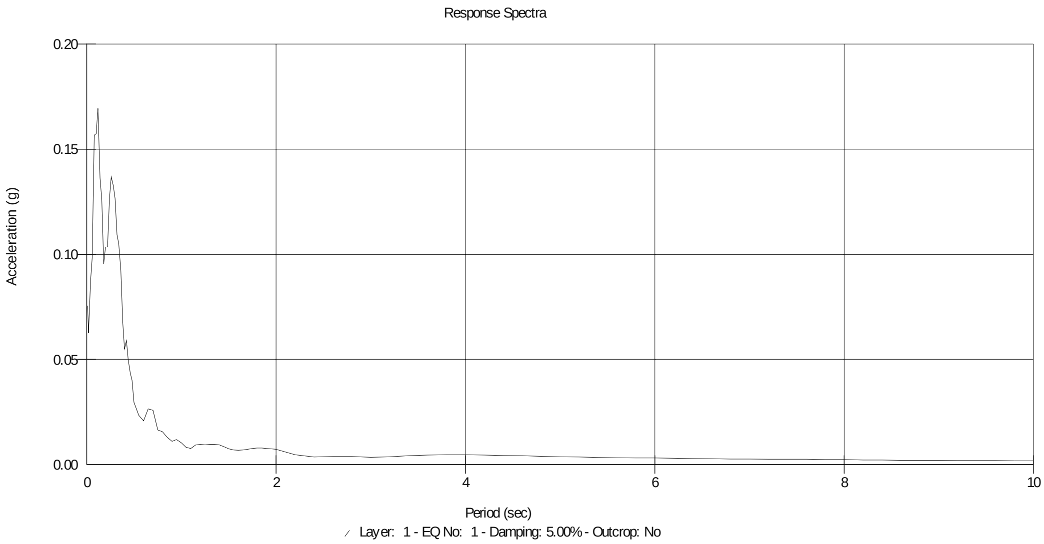
10% Damping



T=0.13 sec

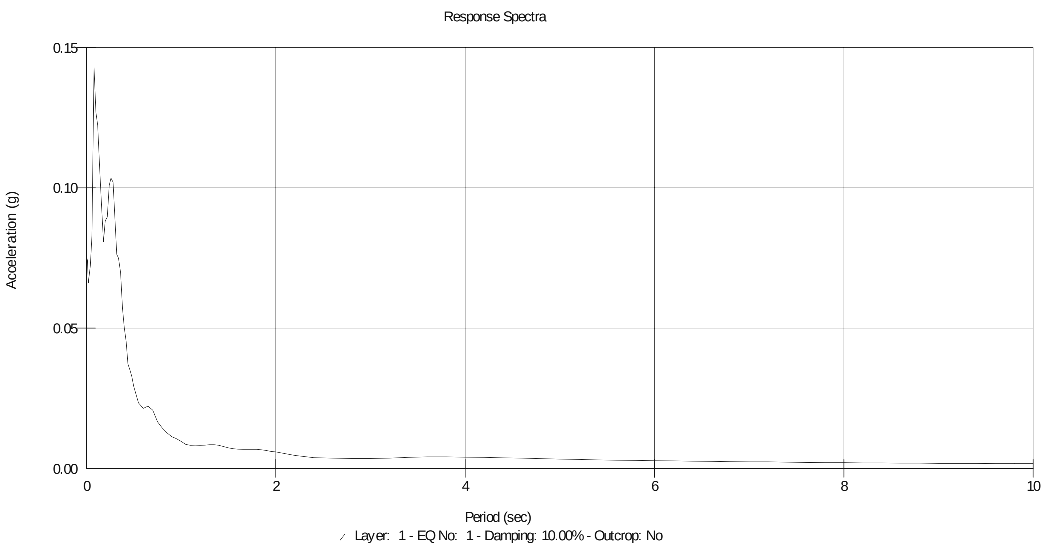
2. Profile D1N

5% Damping:



T=0.12

10% Damping:

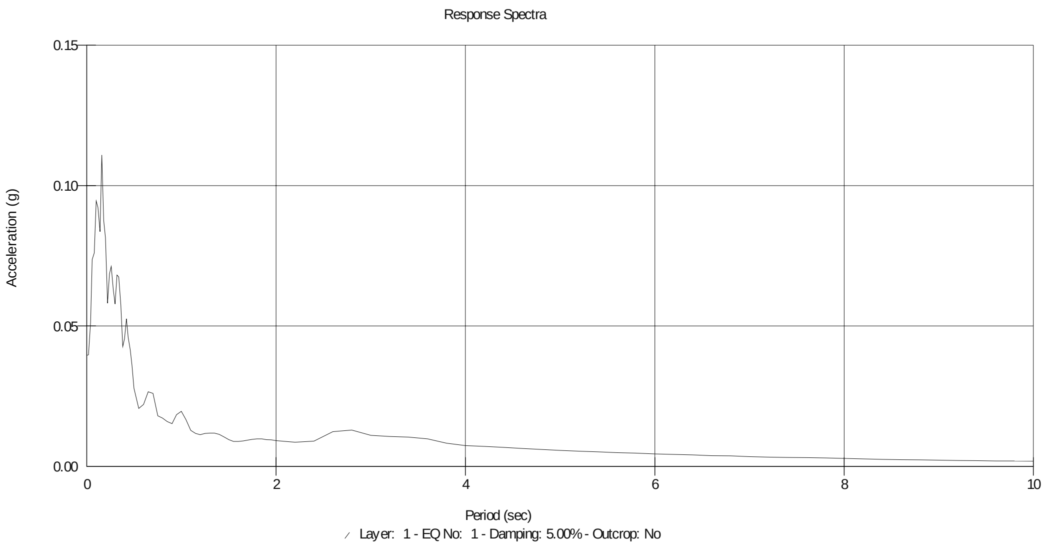


T=0.077 sec

d. Soft layer Thickness= 9m

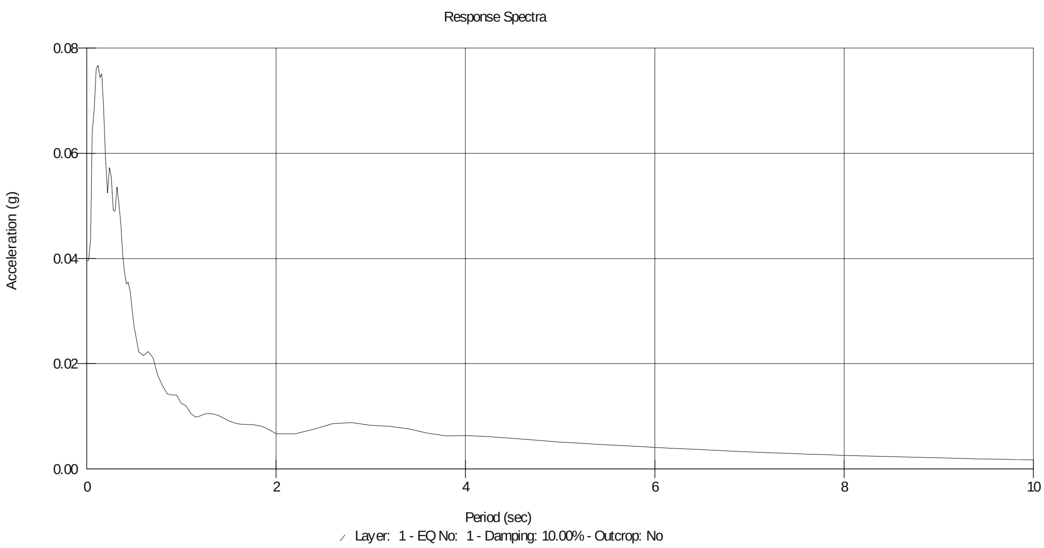
1. Profile $D1_{AC}$

5% Damping



T0.14 sec

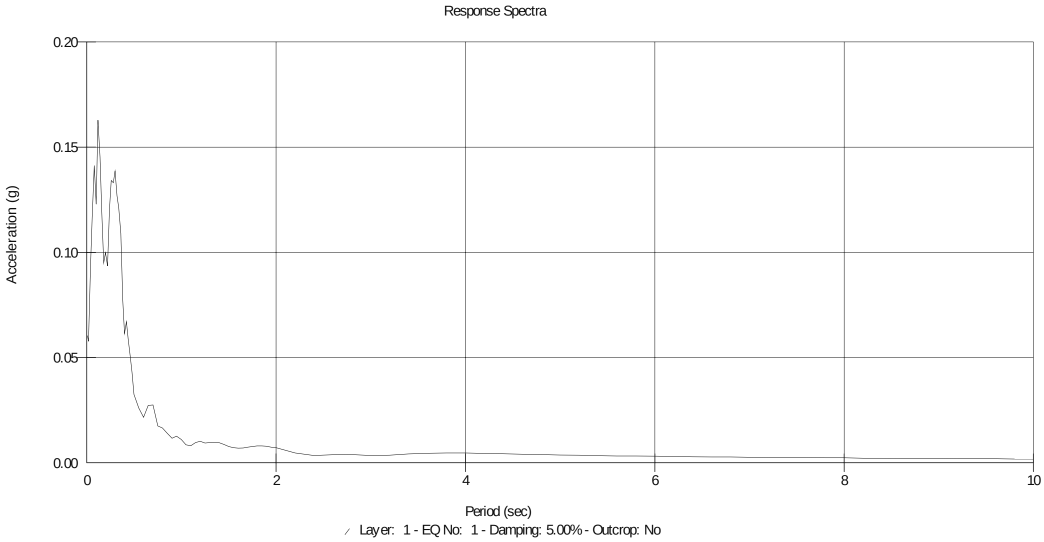
10% Damping



T=0.12 sec

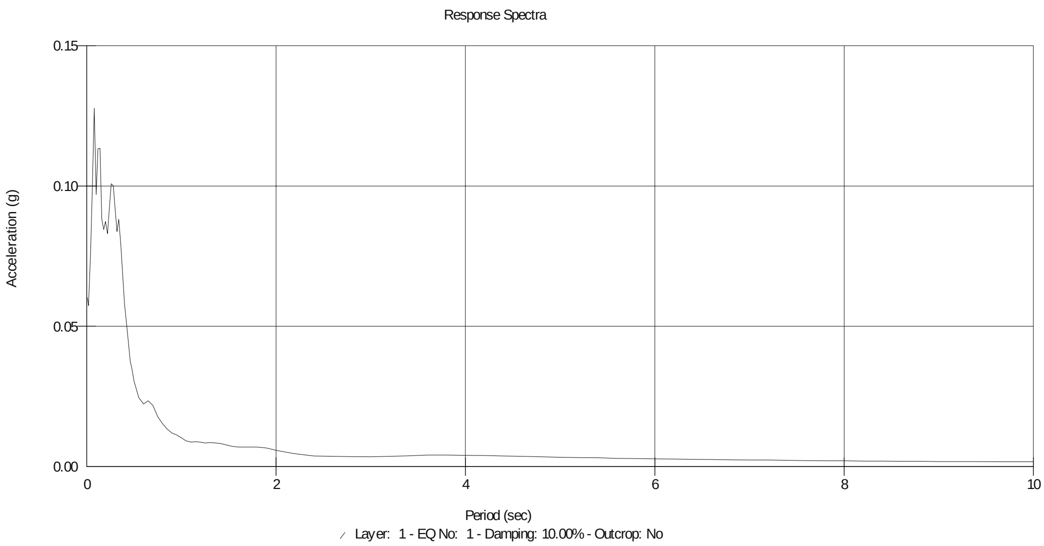
2. Profile D1N

5% Damping:



T=0.12 sec

10% Damping:

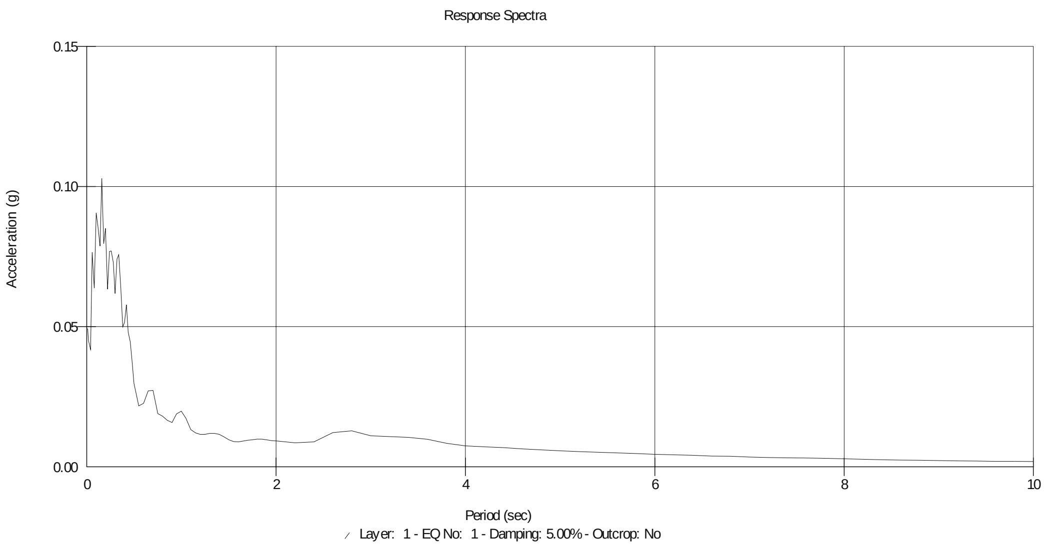


T=0.077 sec

e. Soft layer Thickness= 11m

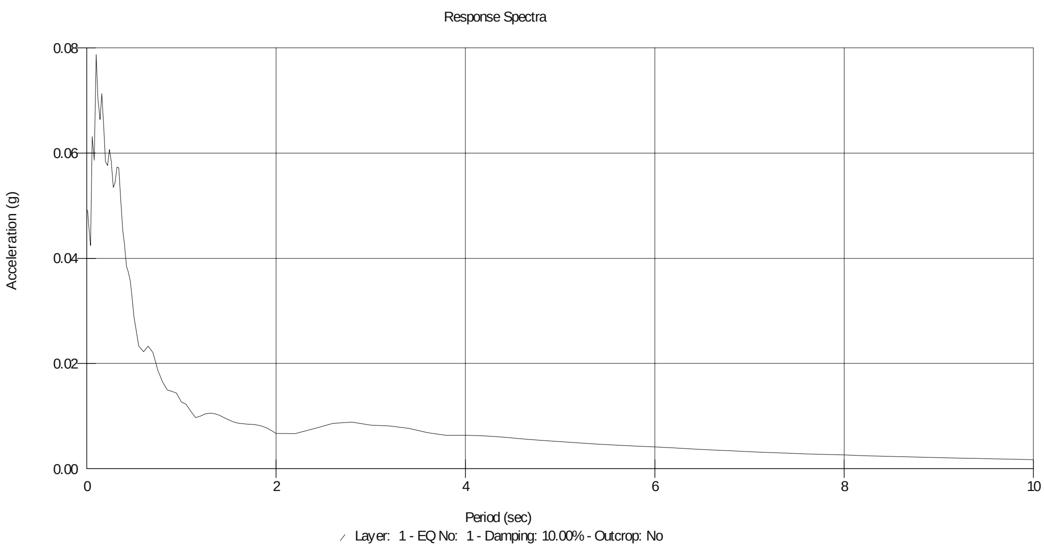
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

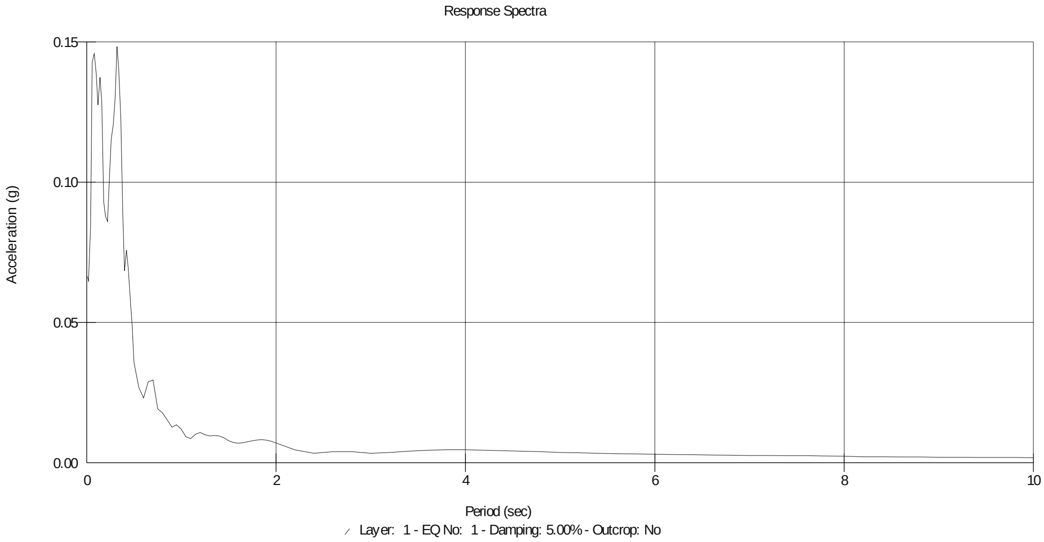
10% Damping



T=0.098 sec

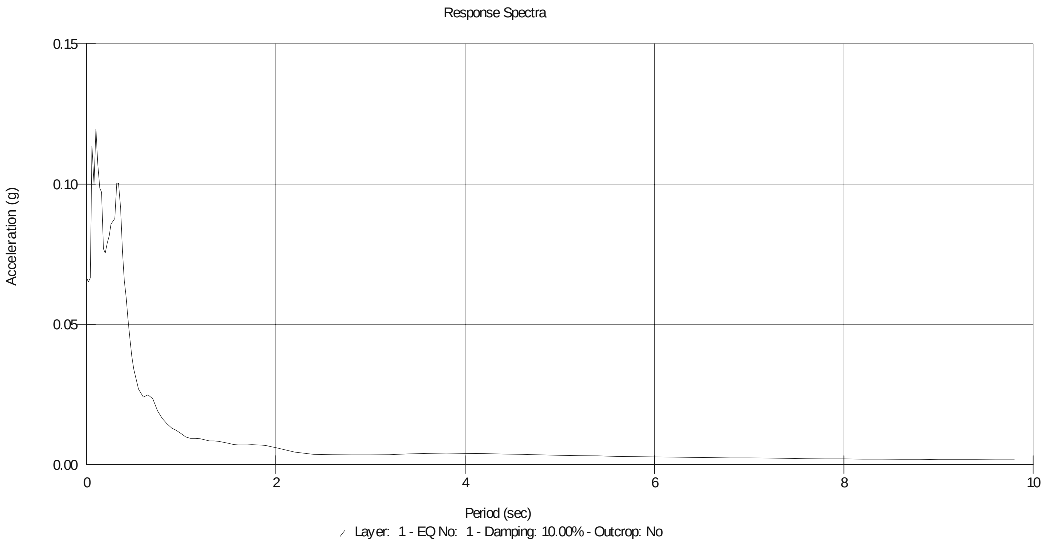
2. Profile D1N

5% Damping:



T=0.33 sec

10% Damping:

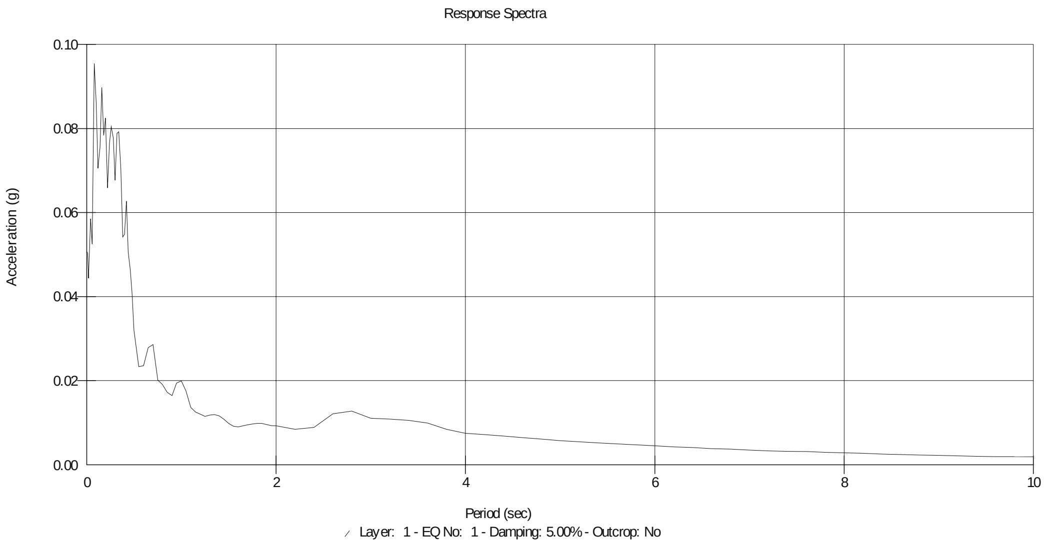


T=0.098 sec

f. Soft layer Thickness= 13m

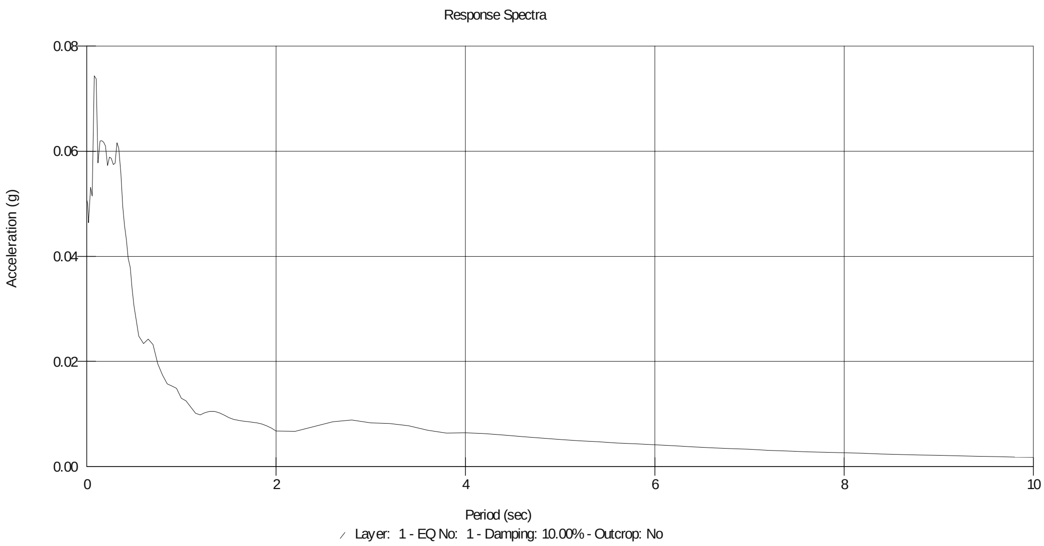
1. Profile $D1_{AC}$

5% Damping



T=0.077

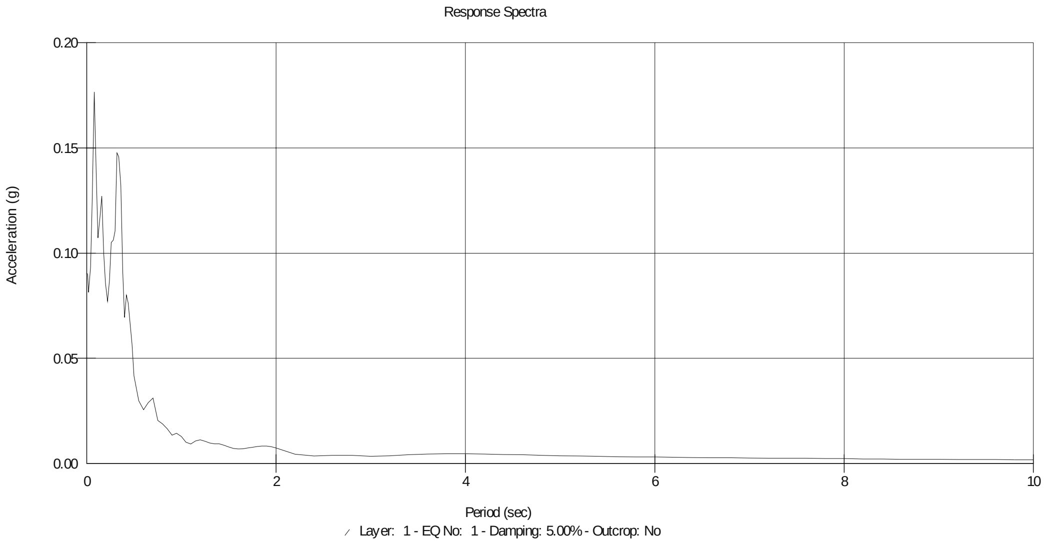
10% Damping



T=0.077 sec

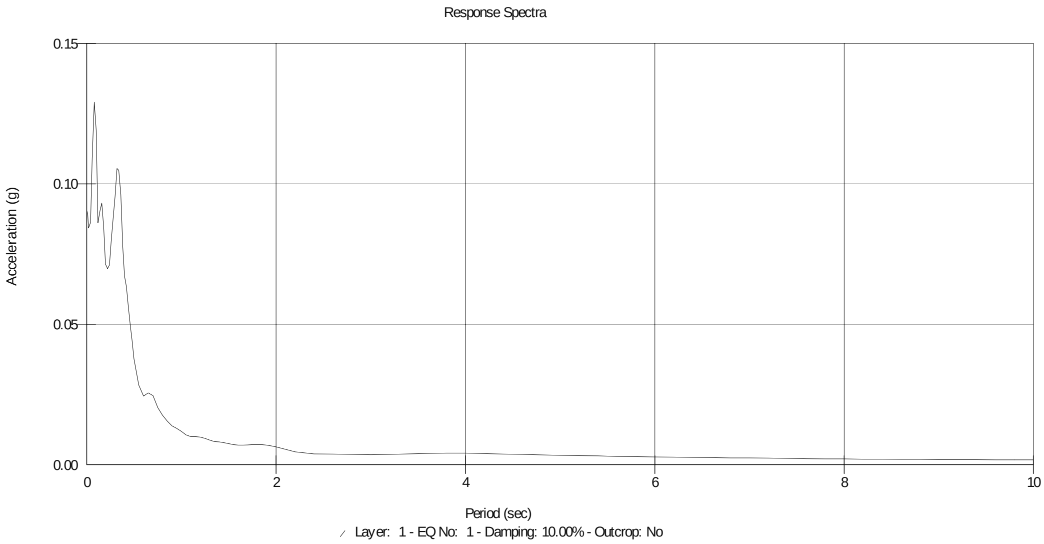
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:

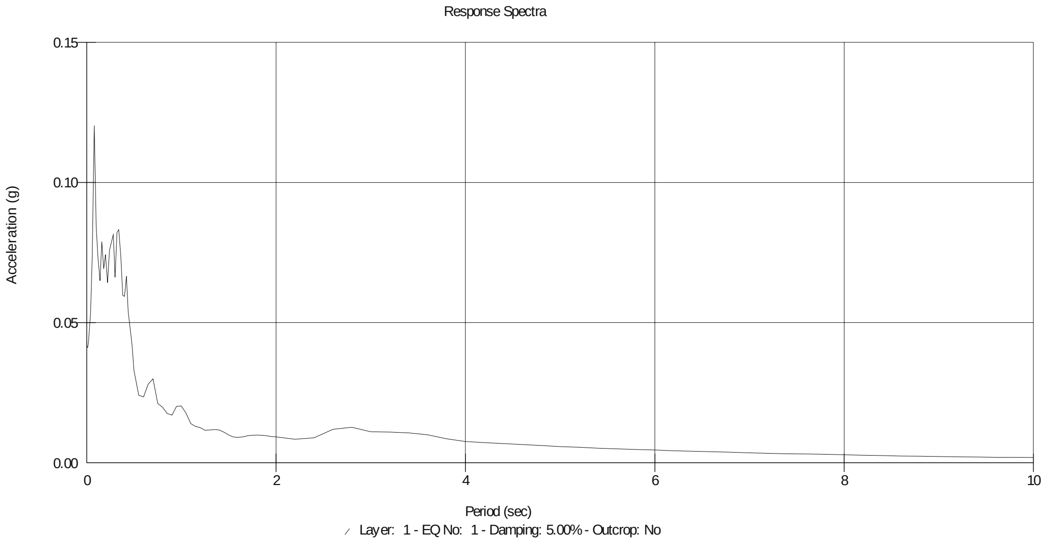


T=0.077 sec

g. Soft layer Thickness= 15m

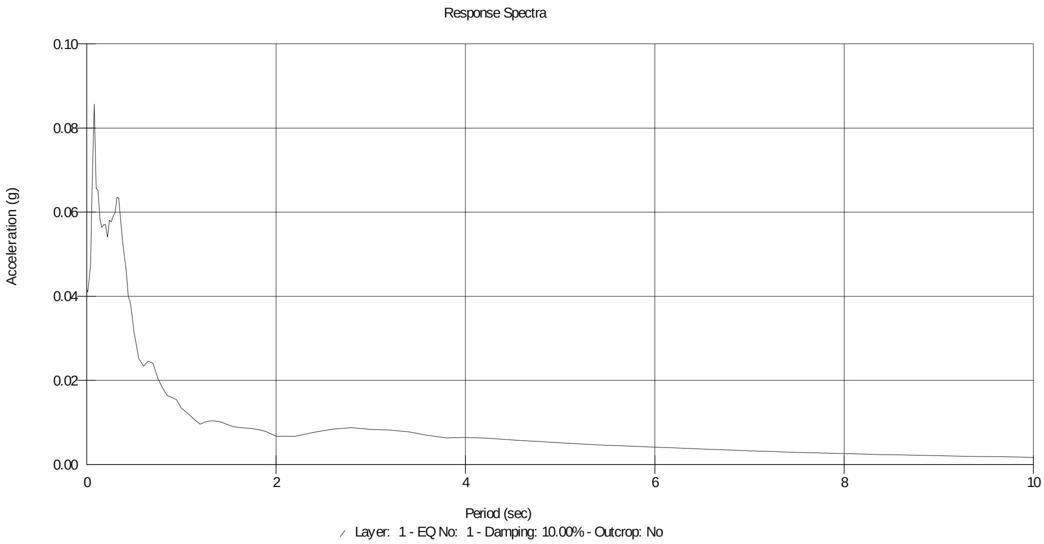
1. Profile $D1_{AC}$

5% Damping



T=0.077 sec

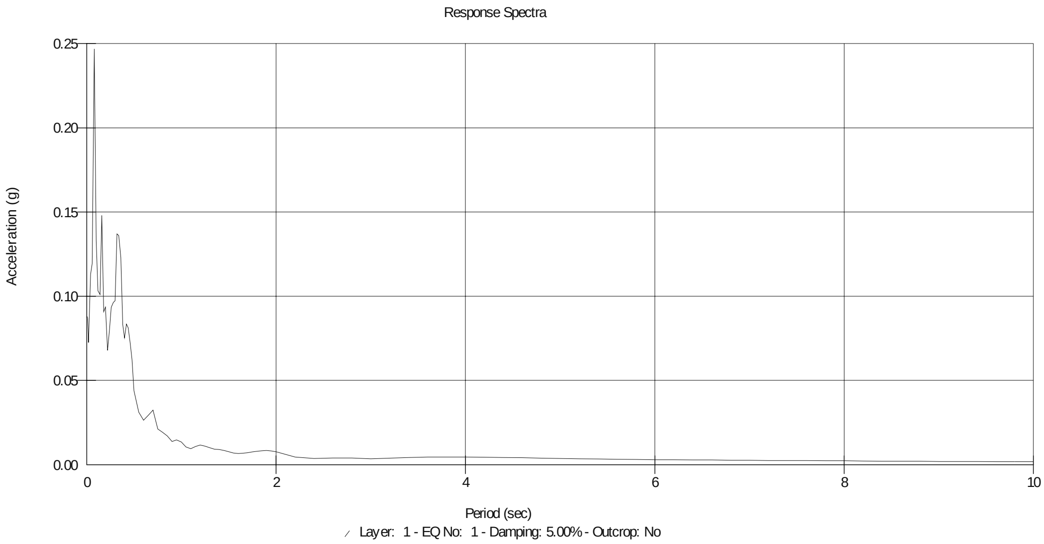
10% Damping



T=0.077 sec

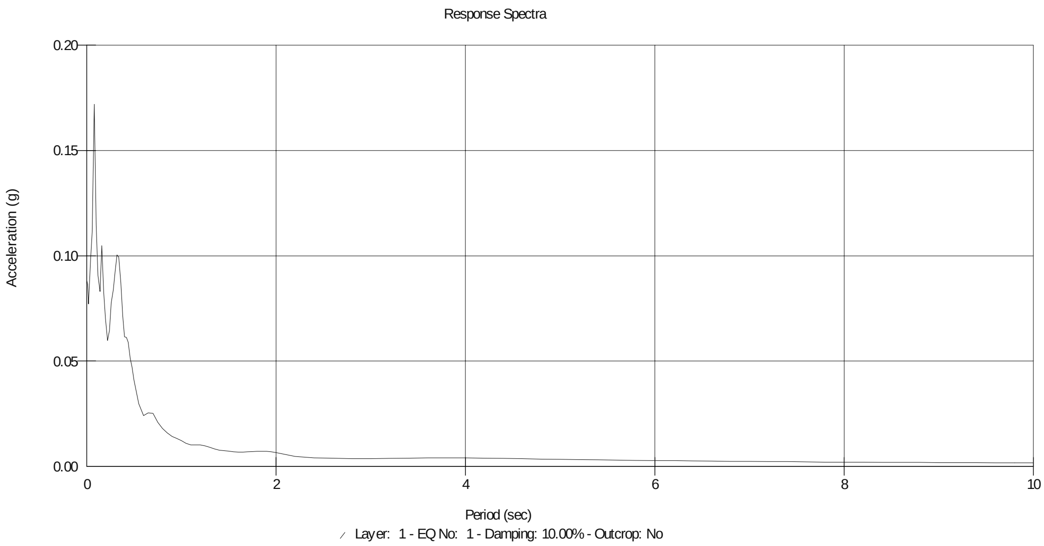
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:



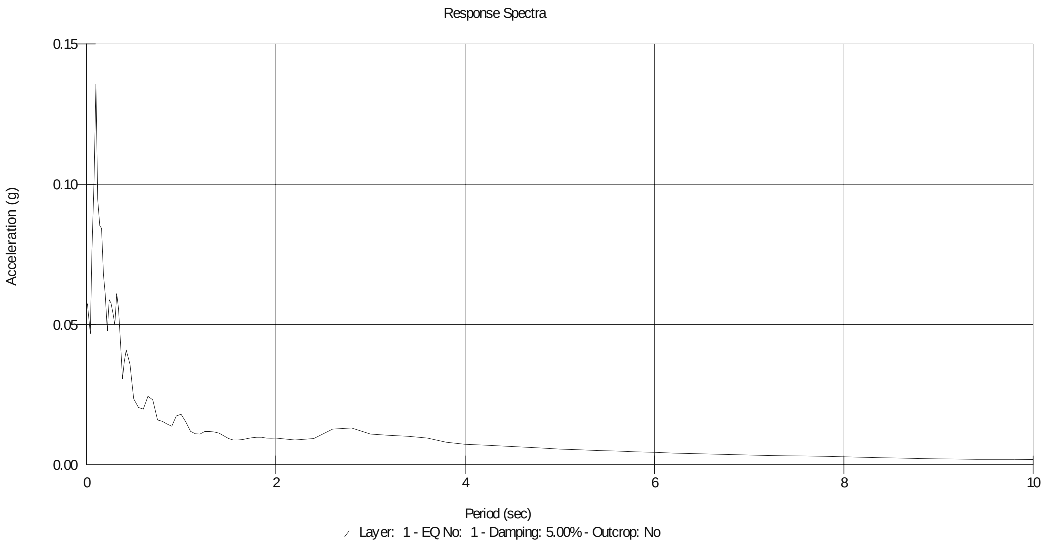
T=0.077 sec

IV. Soft Layer SWV= 250 m/s

a. Soft layer Thickness= 3m

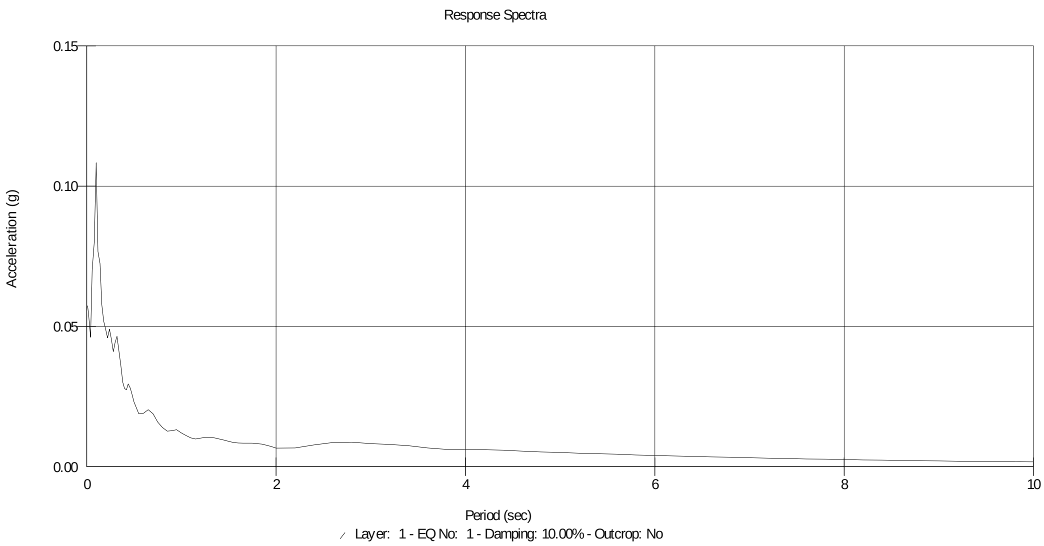
1. Profile $D1_{AC}$

5% Damping



T=0.098 sec

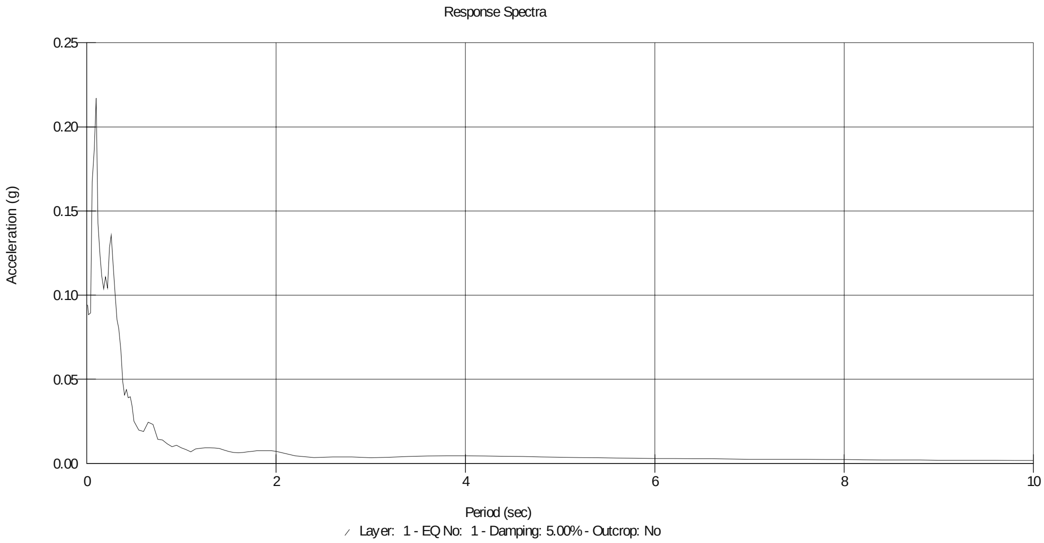
10% Damping



T=0.098

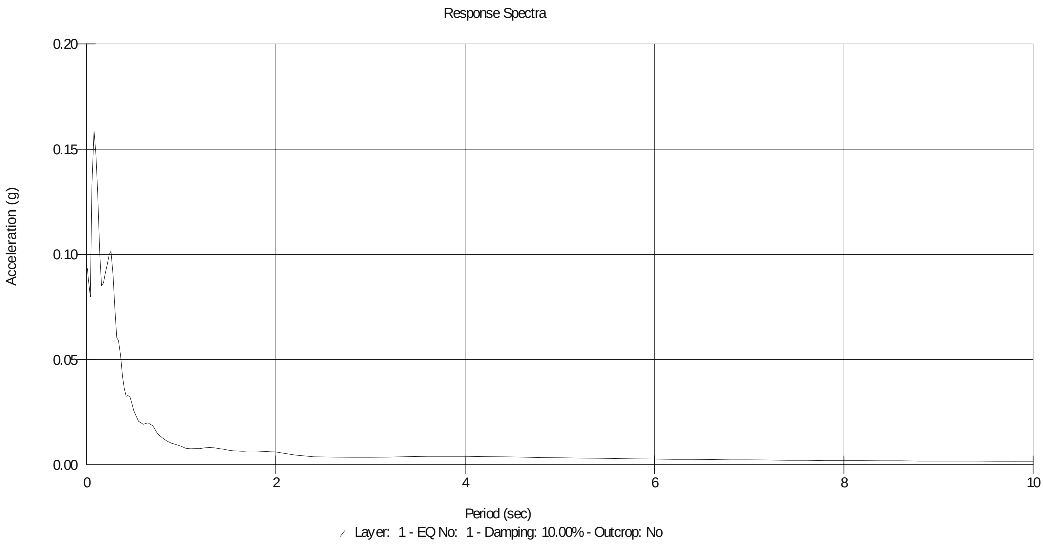
2. Profile D1N

5% Damping:



T=0.098 sec

10% Damping:

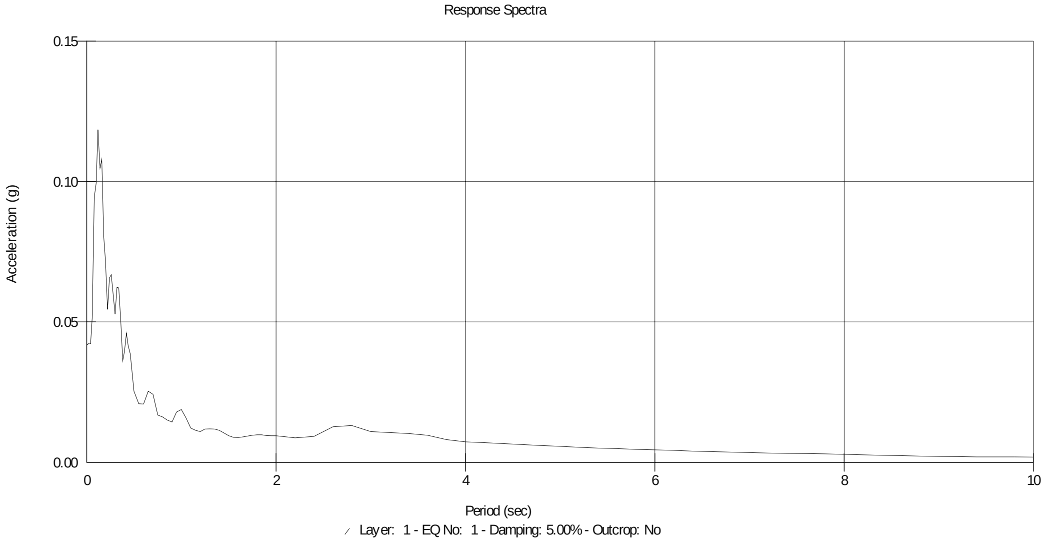


T=0.077 sec

b. Soft layer Thickness= 5m

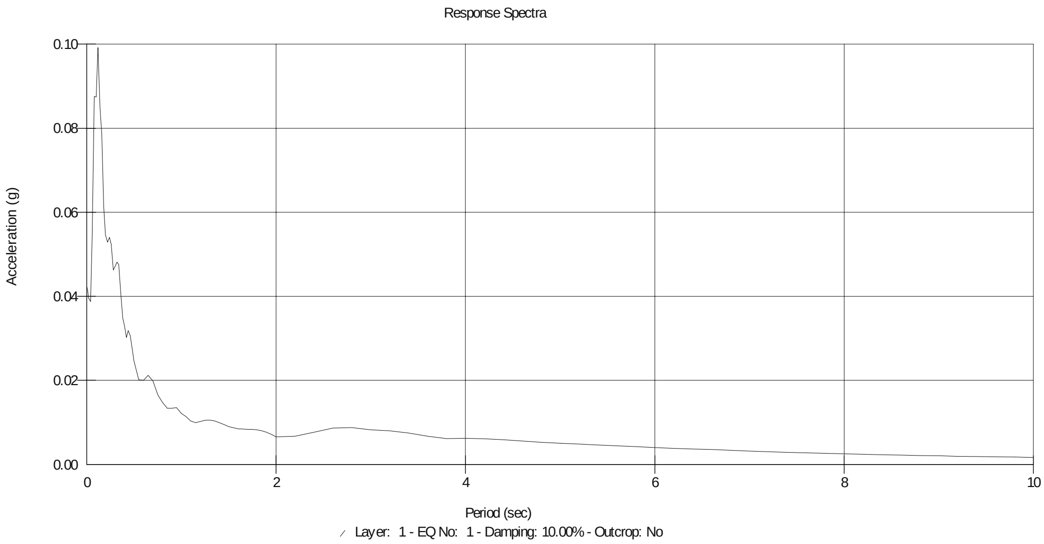
1. Profile $D1_{AC}$

5% Damping



T=0.12 sec

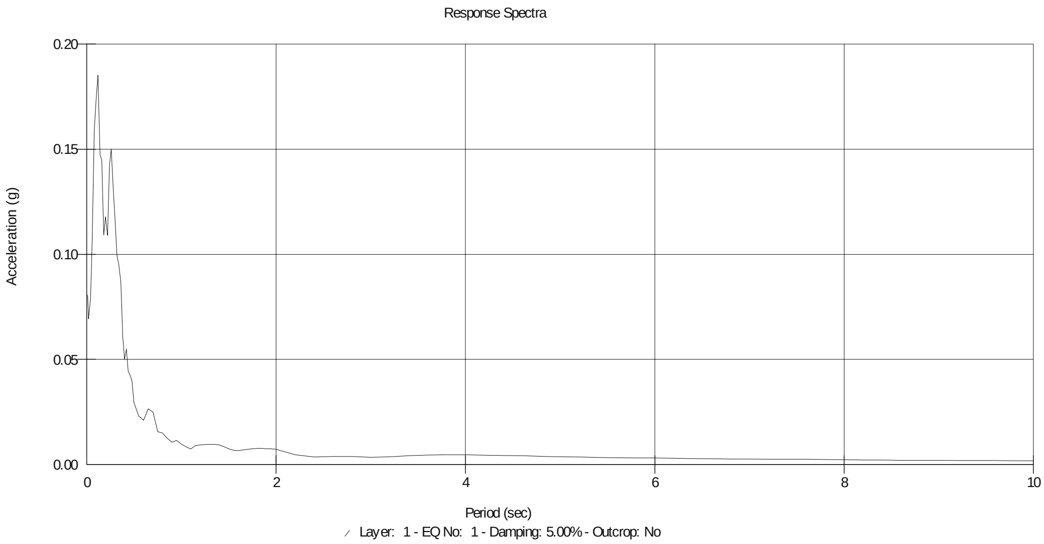
10% Damping



T=0.12 sec

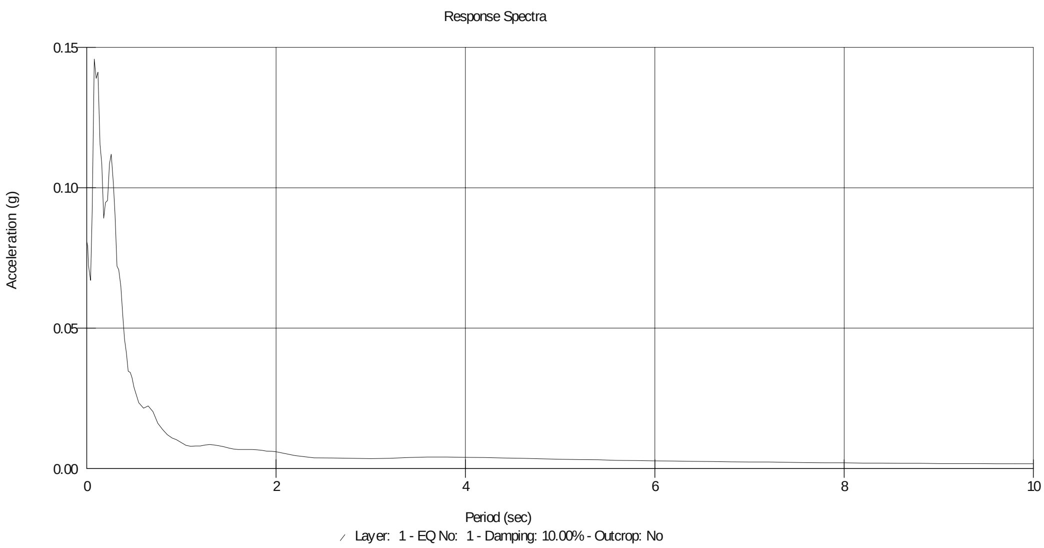
2. Profile D1N

5% Damping:



T=0.12 sec

10% Damping:

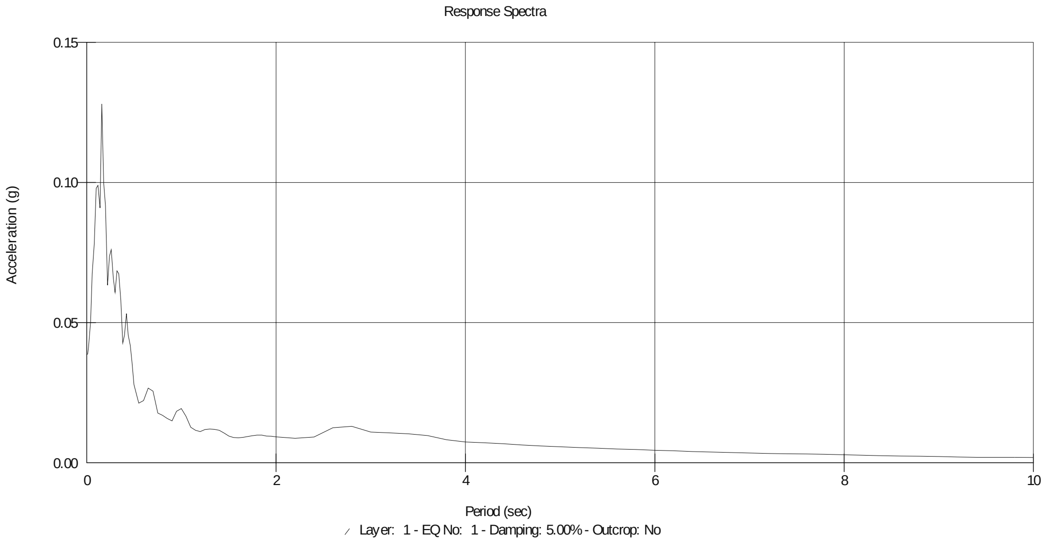


T=0.077 sec

c. Soft layer Thickness= 7m

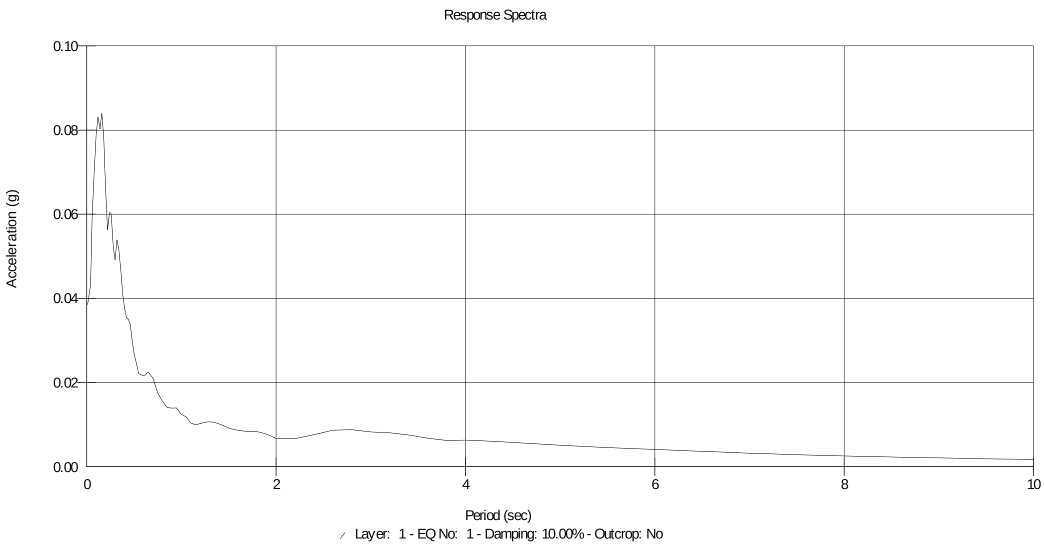
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

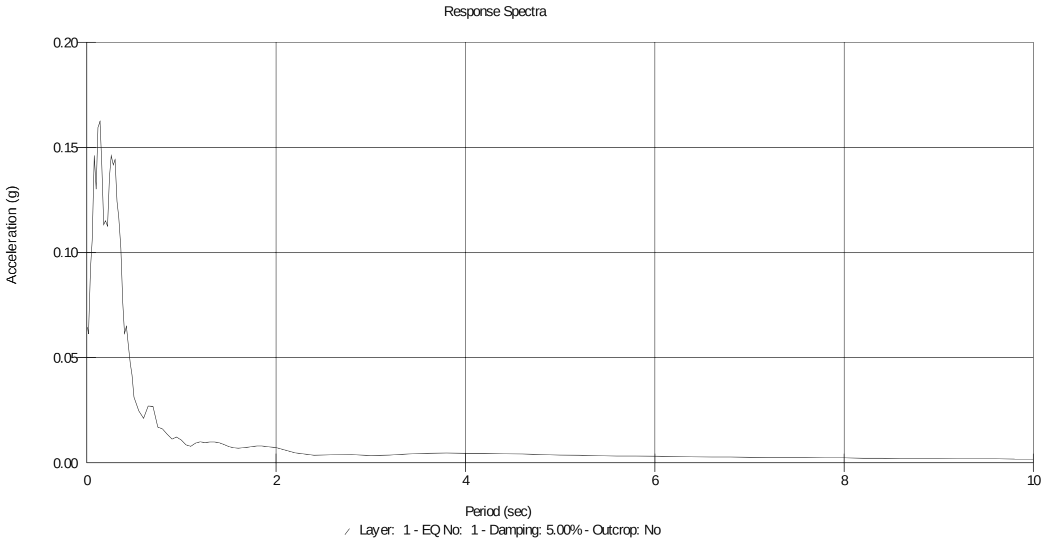
10% Damping



T=0.16 sec

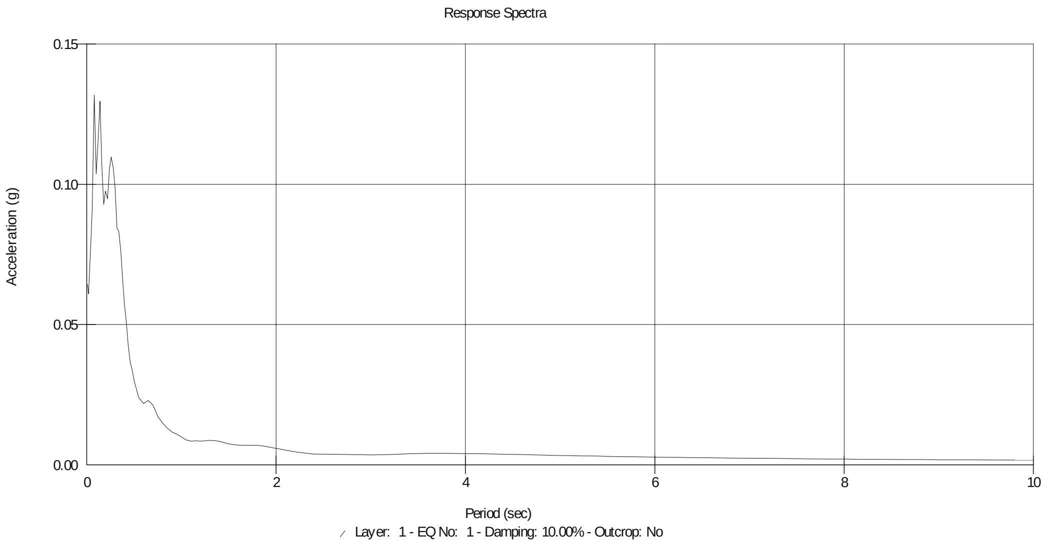
2. Profile D1N

5% Damping:



T=0.14 sec

10% Damping:

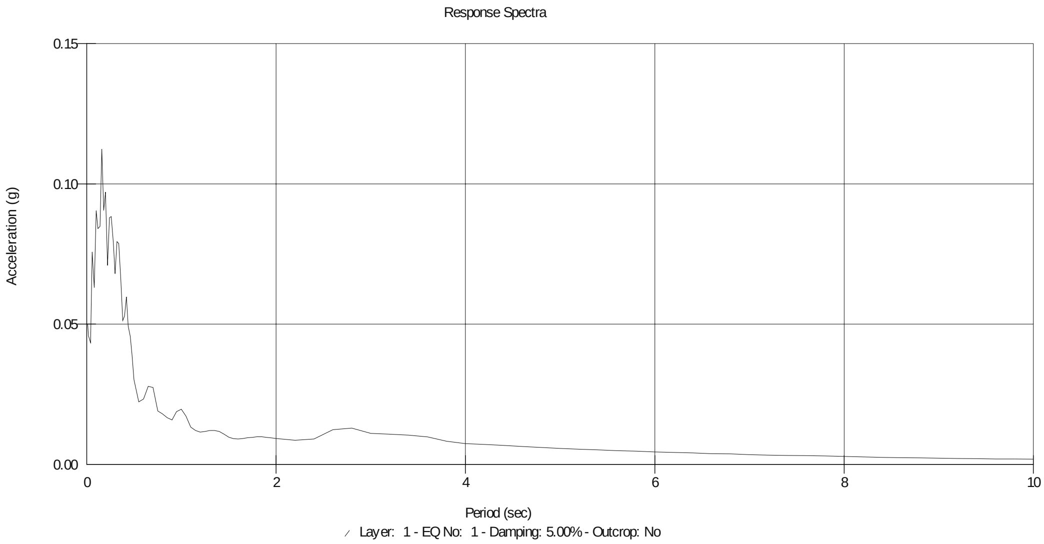


T=0.077 sec

d. Soft layer Thickness= 9m

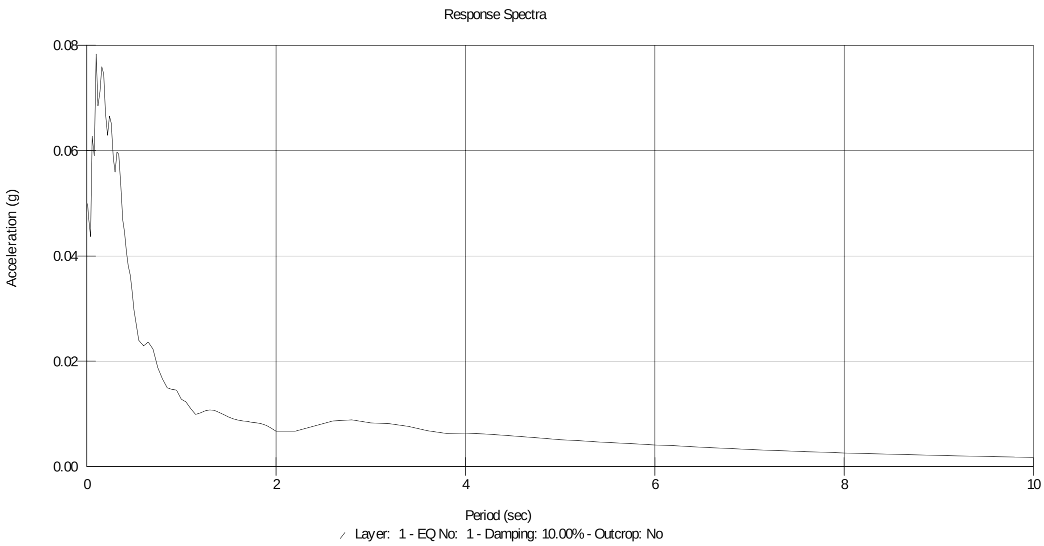
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

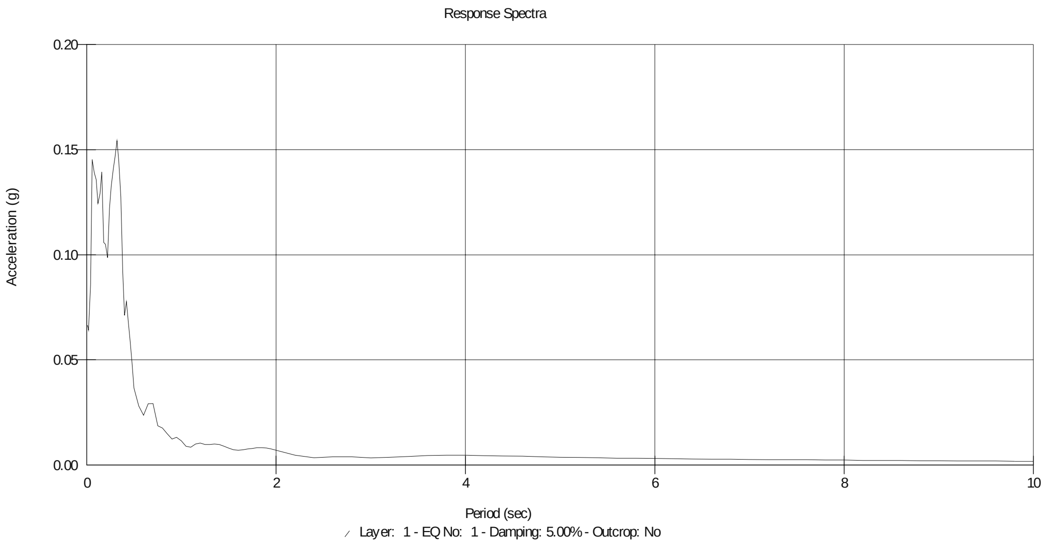
10% Damping



T=0.098 sec

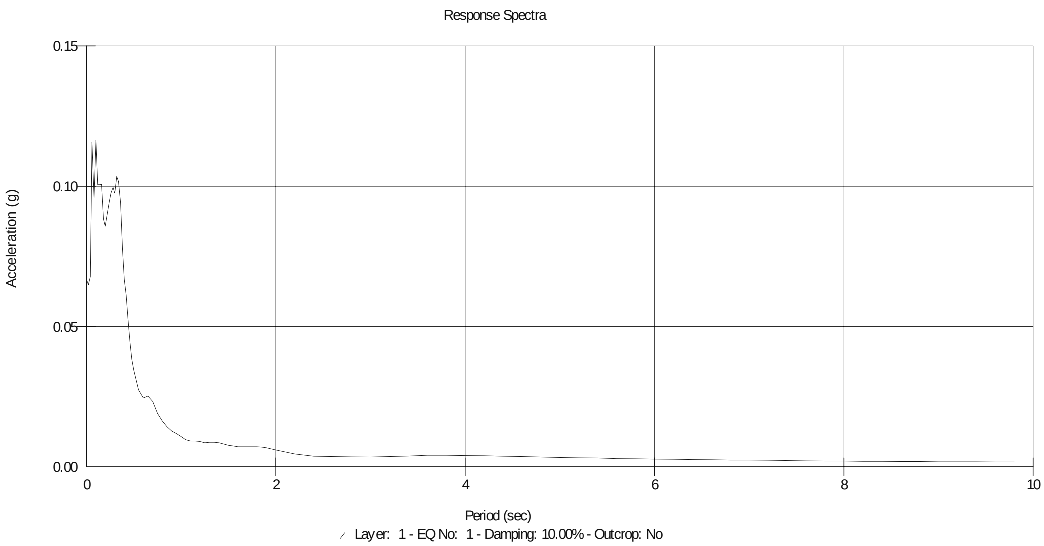
2. Profile D1N

5% Damping:



T=0.33 sec

10% Damping:

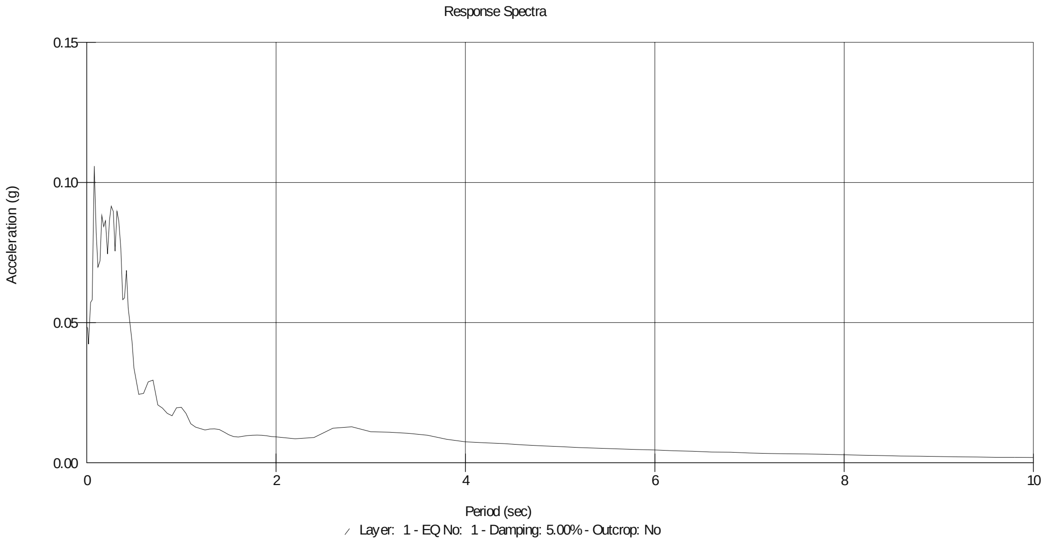


T=0.098 sec

e. Soft layer Thickness= 11m

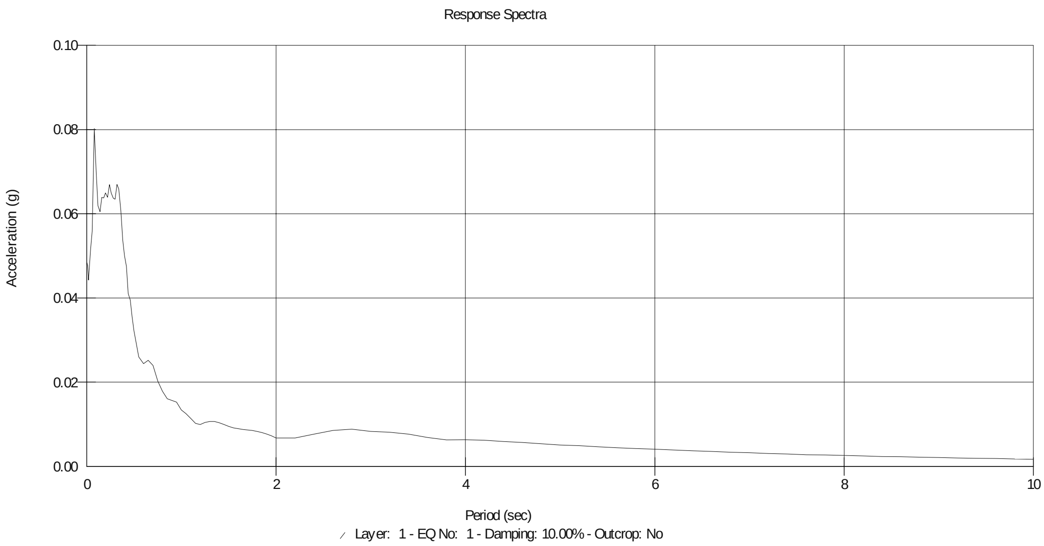
1. Profile $D1_{AC}$

5% Damping



T=0.077 sec

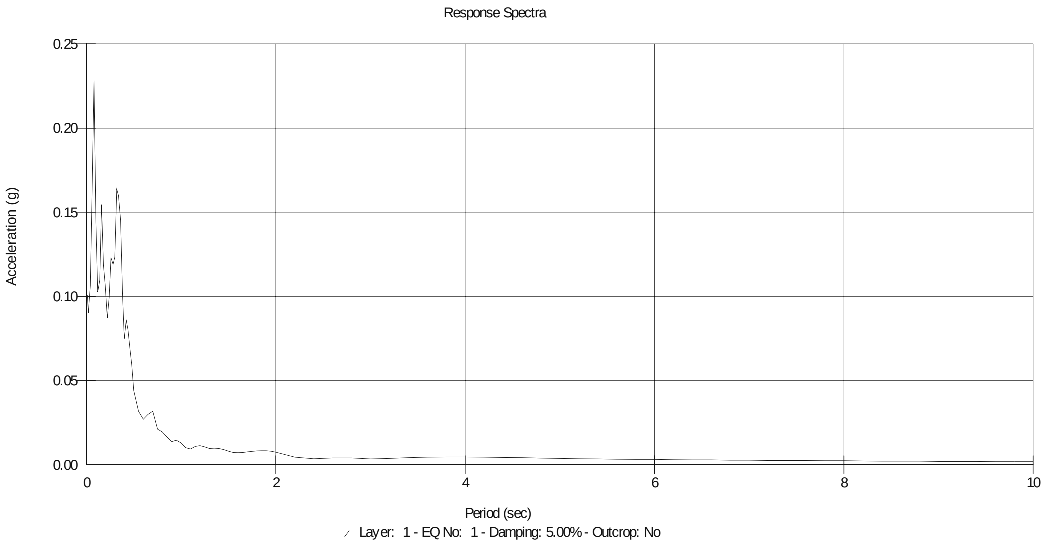
10% Damping



T=0.077 sec

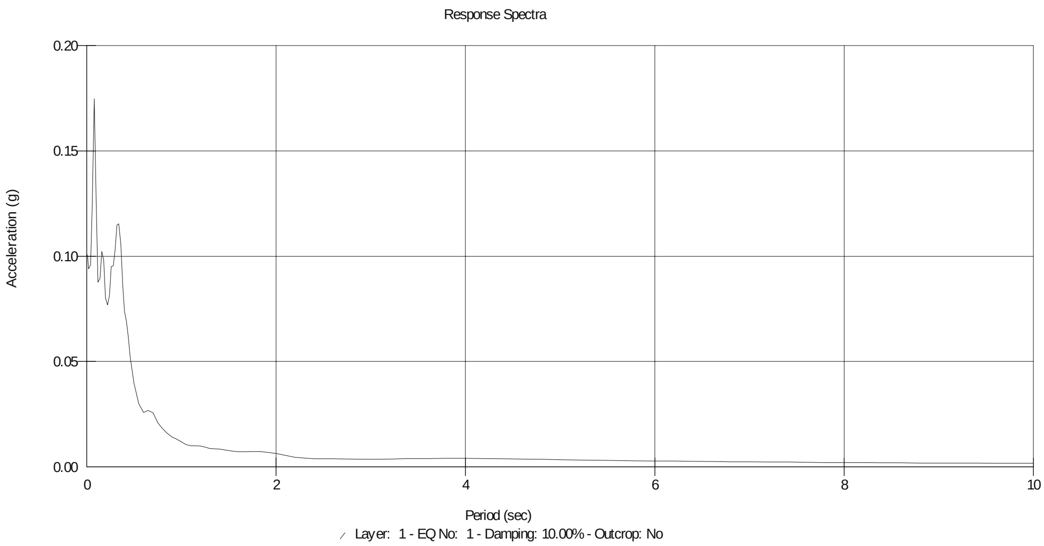
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:

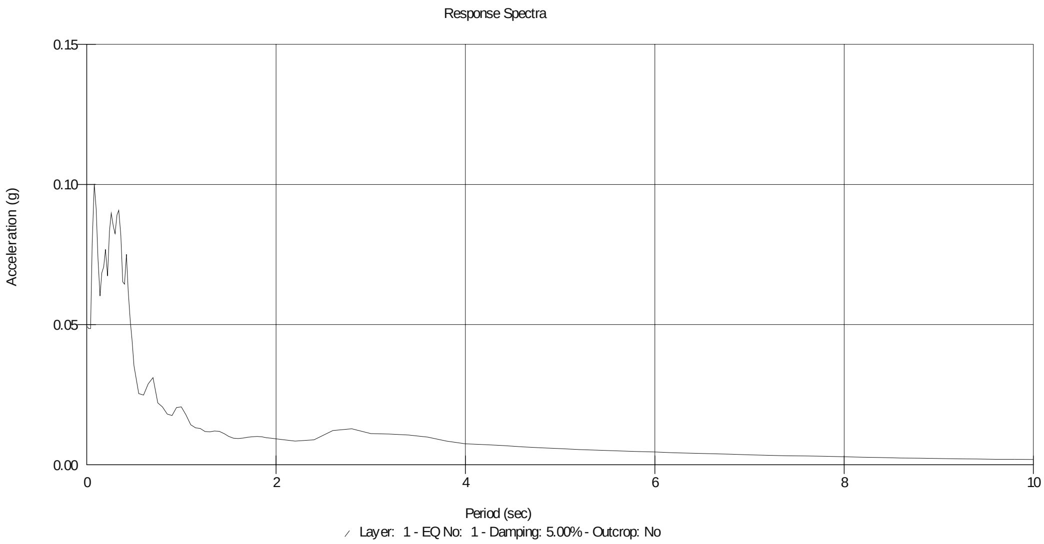


T=0.077 sec

f. Soft layer Thickness= 13m

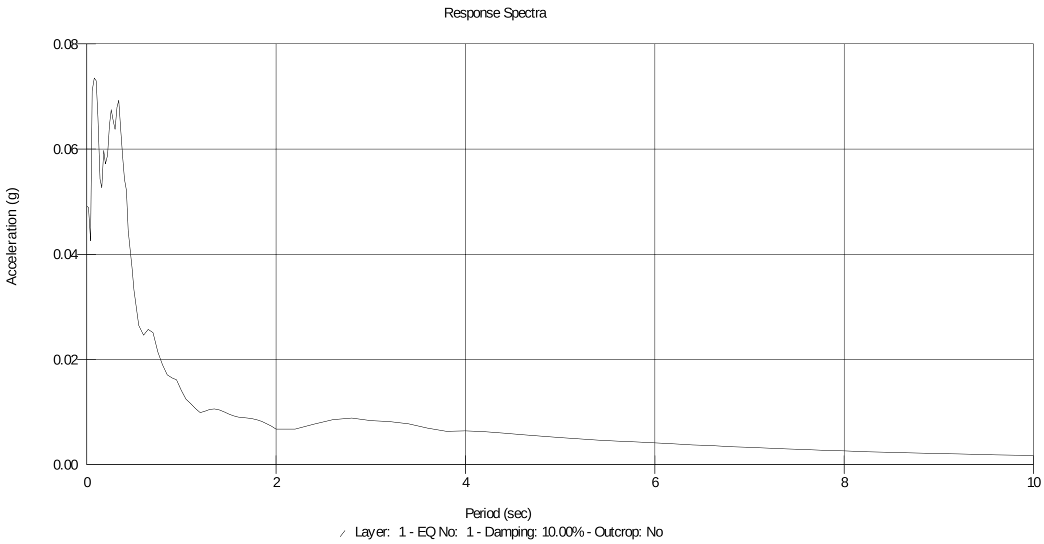
1. Profile $D1_{AC}$

5% Damping



T=0..077 sec

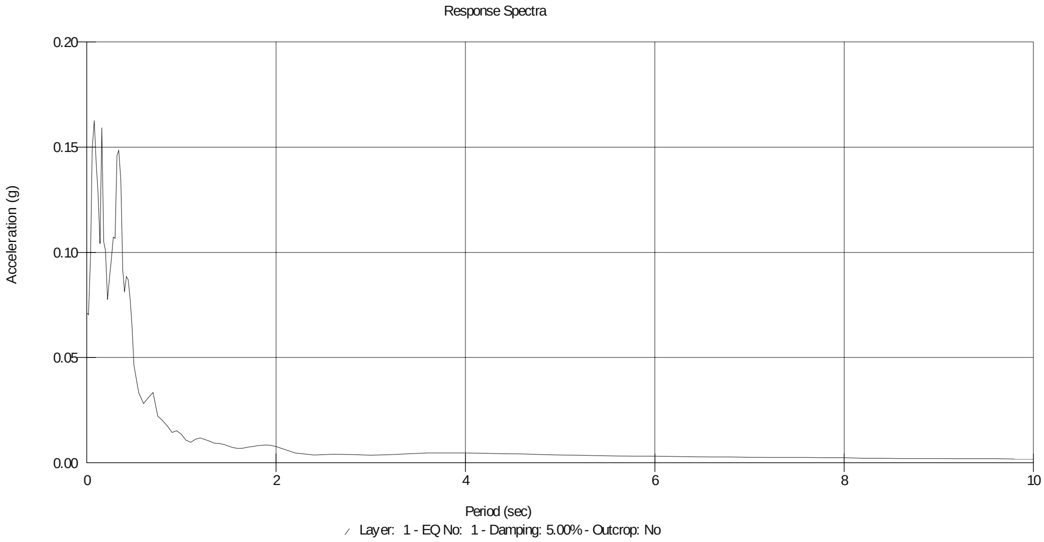
10% Damping



T=0.088 sec

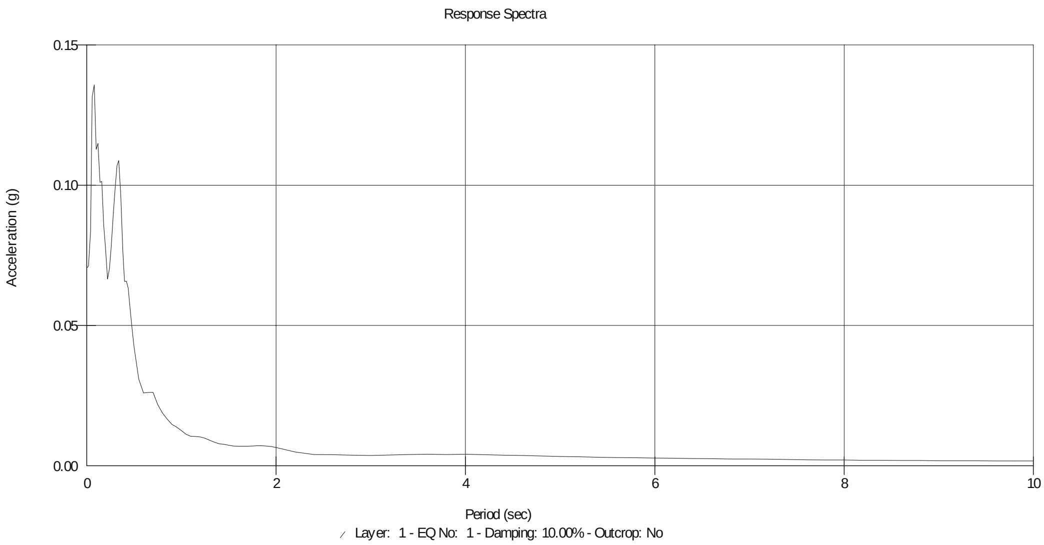
2. Profile D1N

5% Damping:



T=0.088 sec

10% Damping:

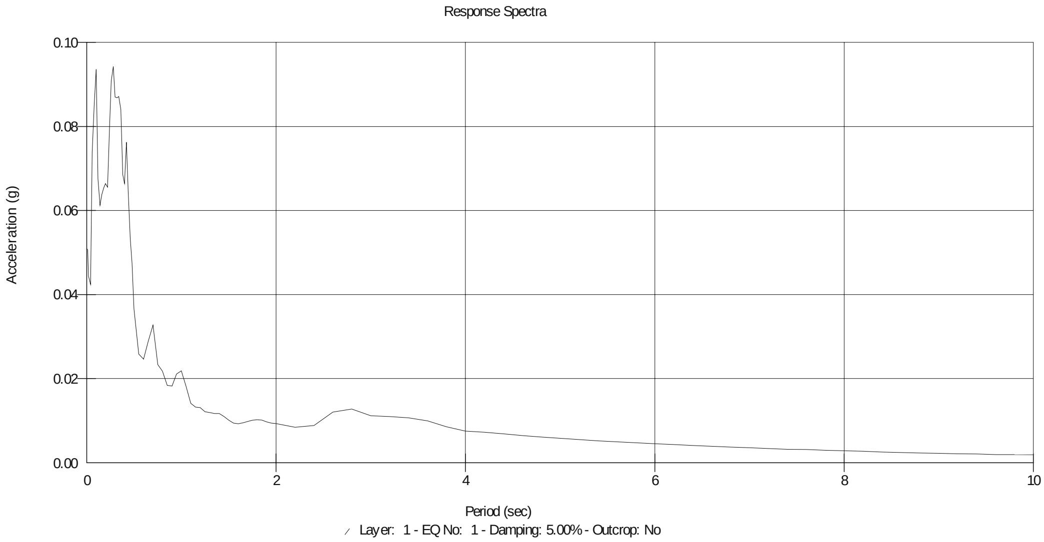


T=0.077 sec

g. Soft layer Thickness= 15m

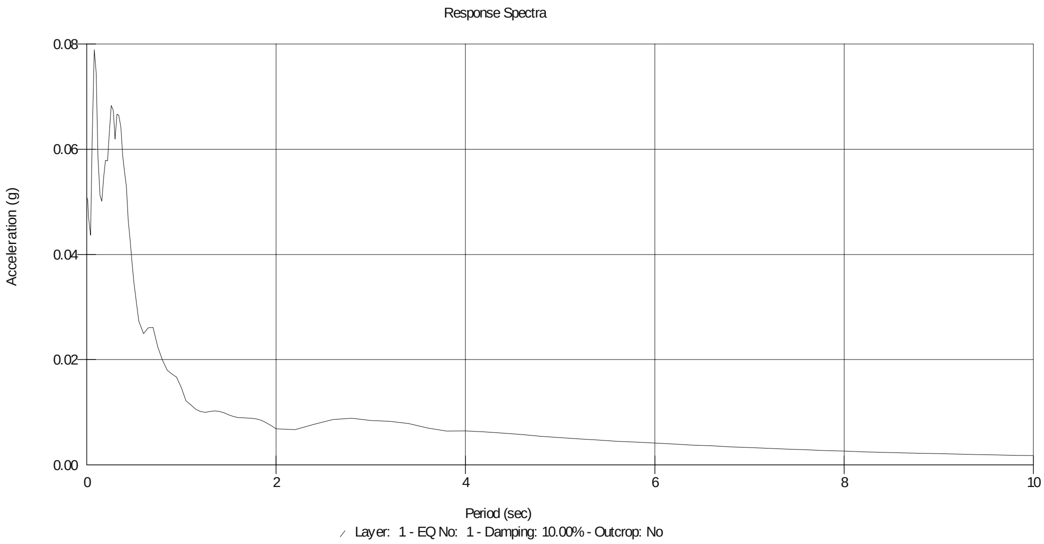
1. Profile $D1_{AC}$

5% Damping



T=0.28 sec

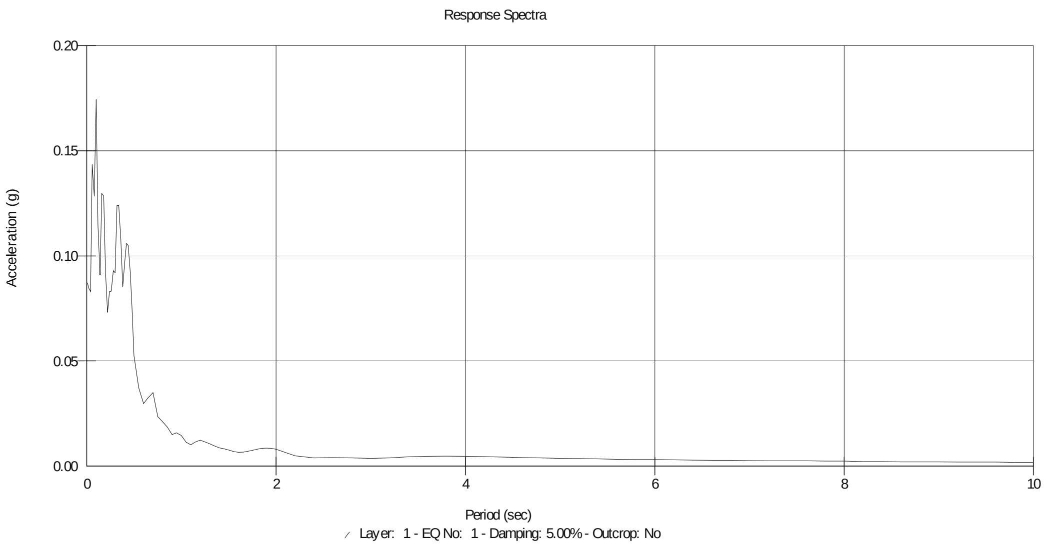
10% Damping



T=0.077 sec

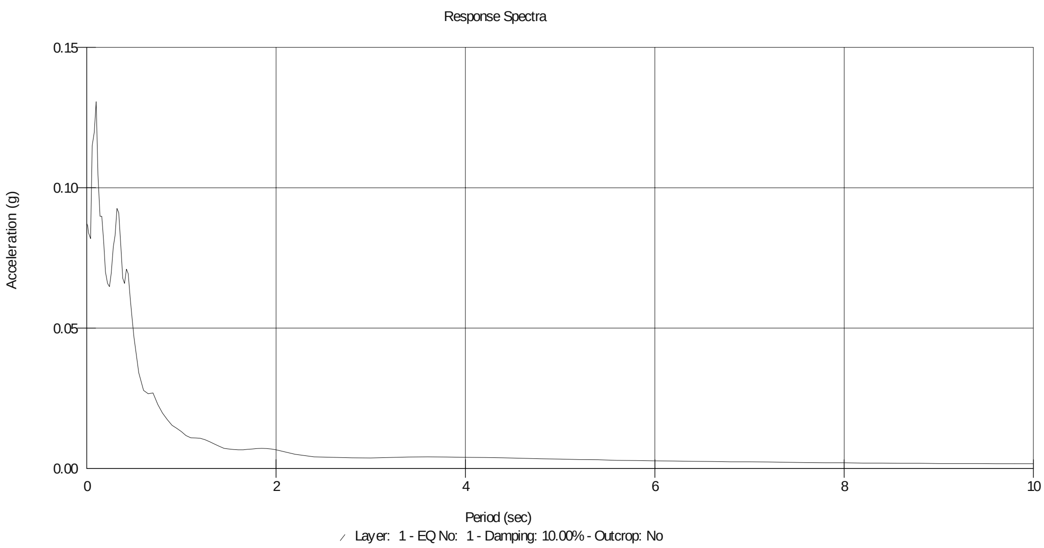
2. Profile D1N

5% Damping:



T+0.098 sec

10% Damping:



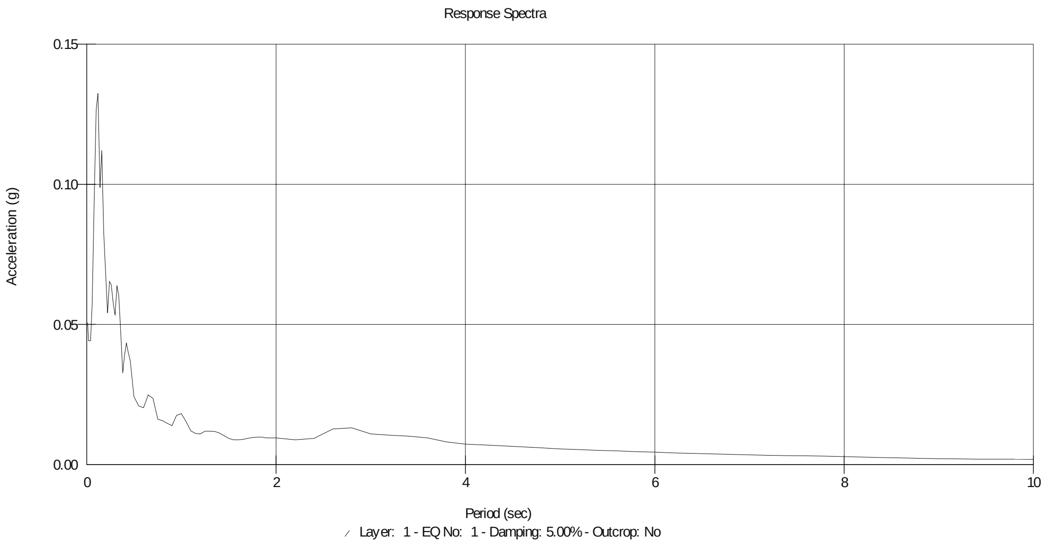
T=0.098 sec

V. Soft Layer SWV= 200 m/s

a. Soft layer Thickness= 3m

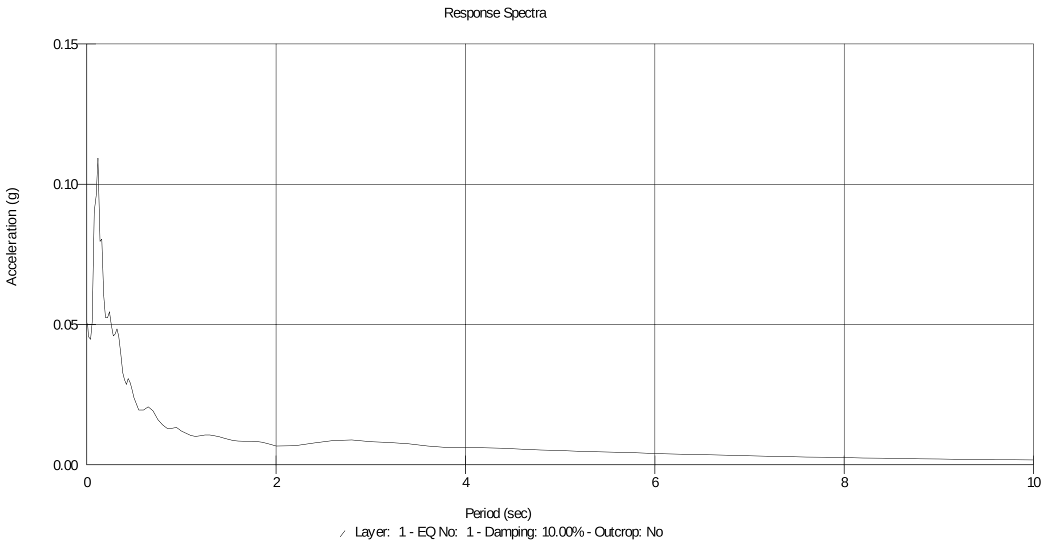
1. Profile $D1_{AC}$

5% Damping



T=0.12 sec

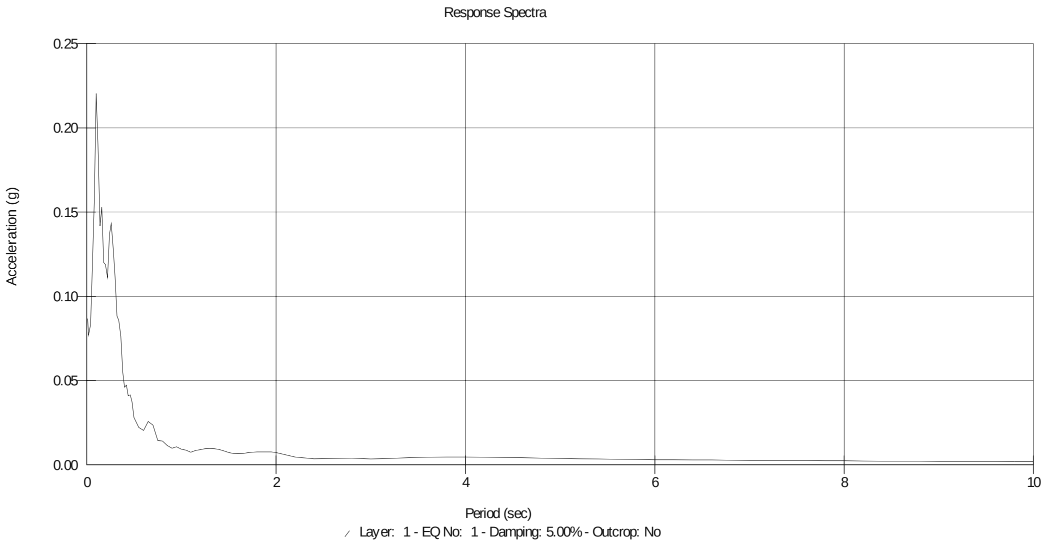
10% Damping



T=0.12 sec

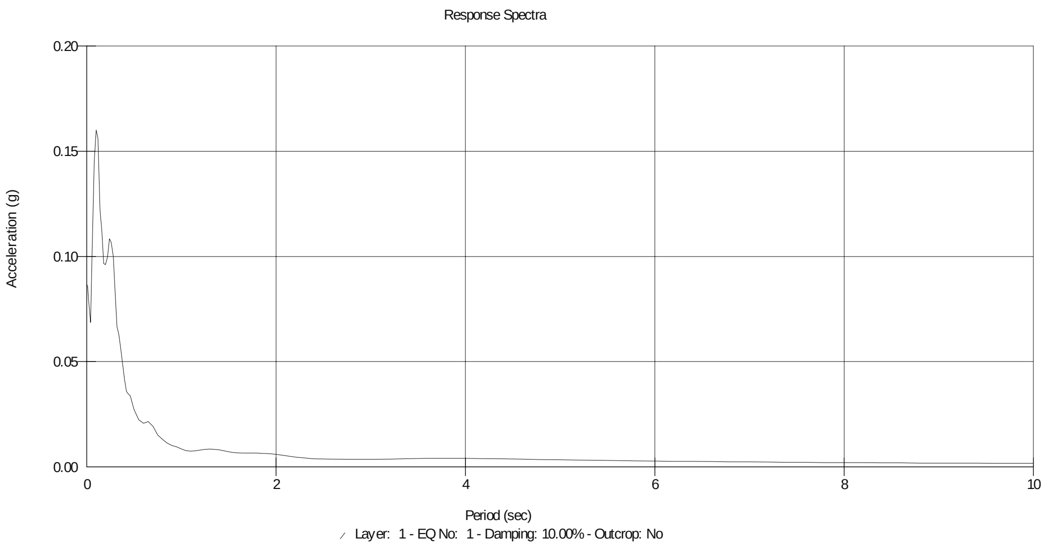
2. Profile D1N

5% Damping:



T=0.098 sec

10% Damping:

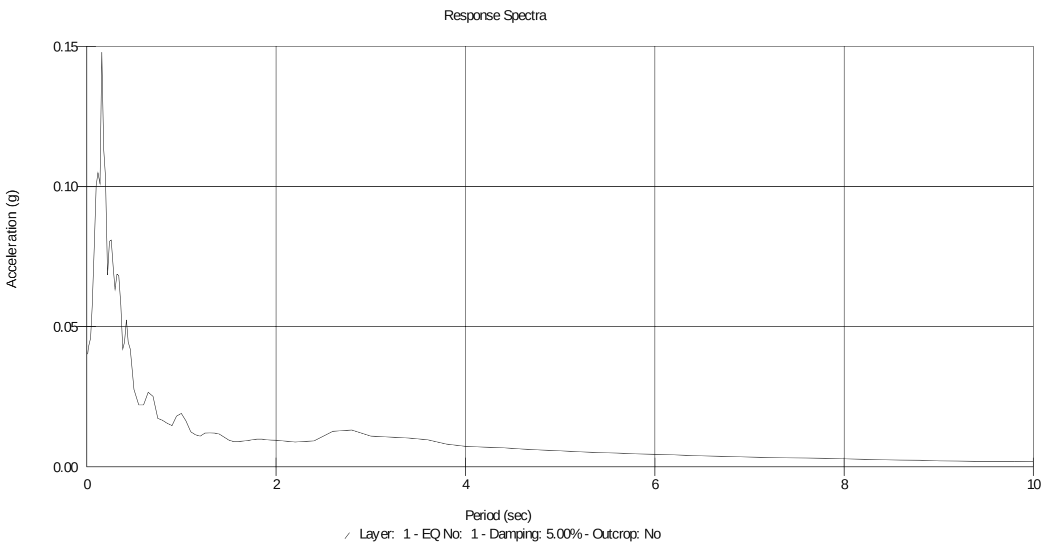


T=0.098 sec

b. Soft layer Thickness= 5m

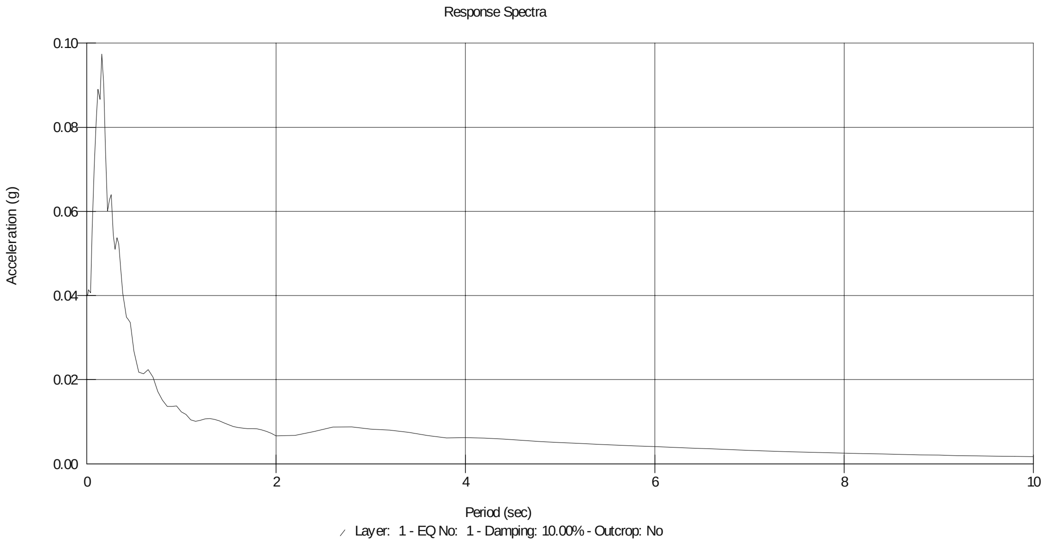
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

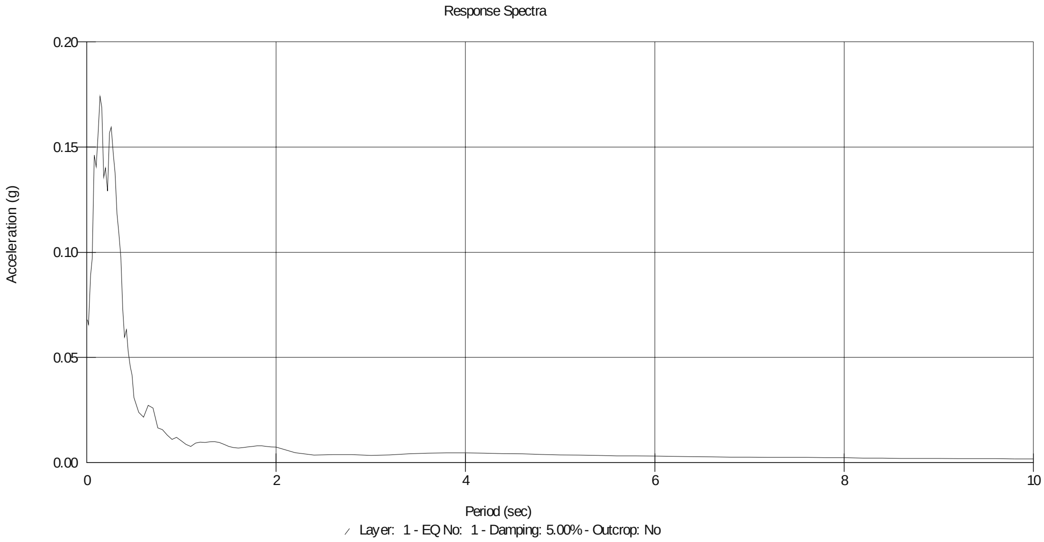
10% Damping



T=0.16 sec

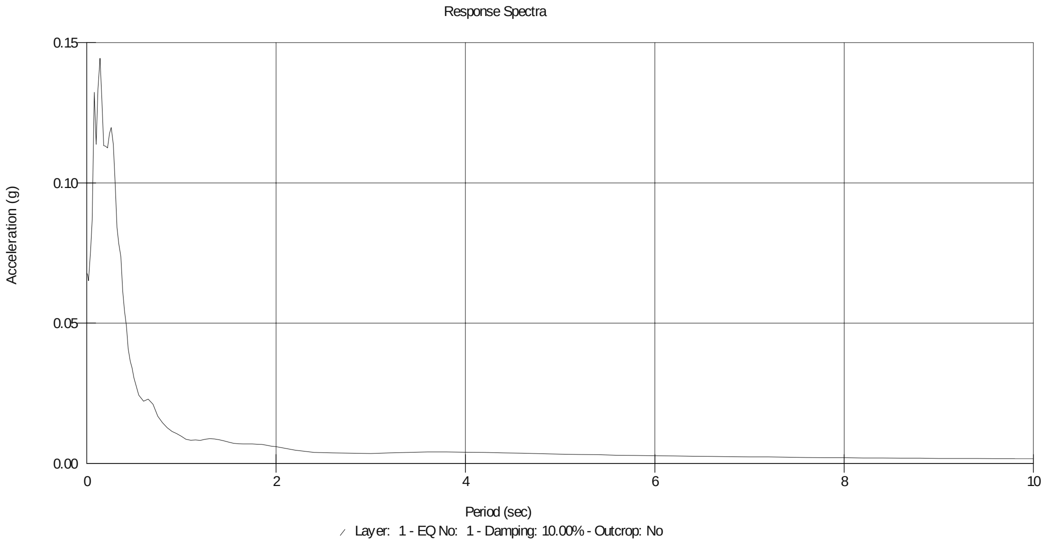
2. Profile D1N

5% Damping:



T=0.14 sec

10% Damping:

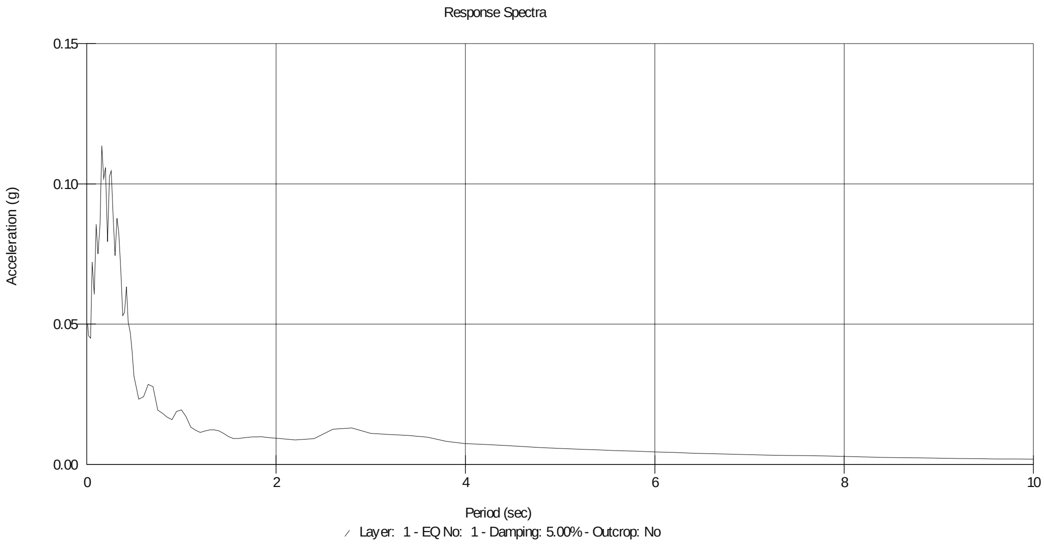


T=0.14 sec

c. Soft layer Thickness= 7m

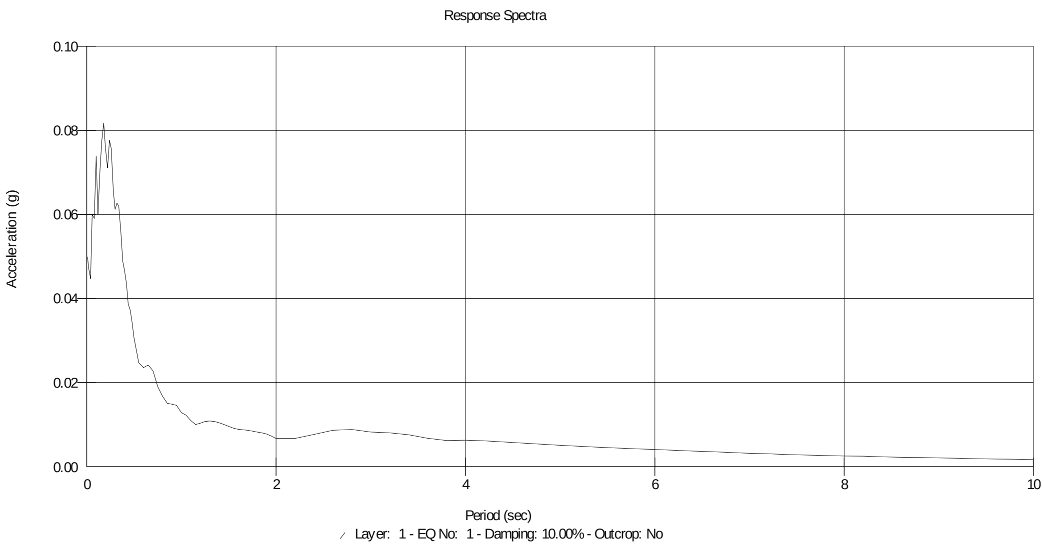
1. Profile $D1_{AC}$

5% Damping



T=0.16 sec

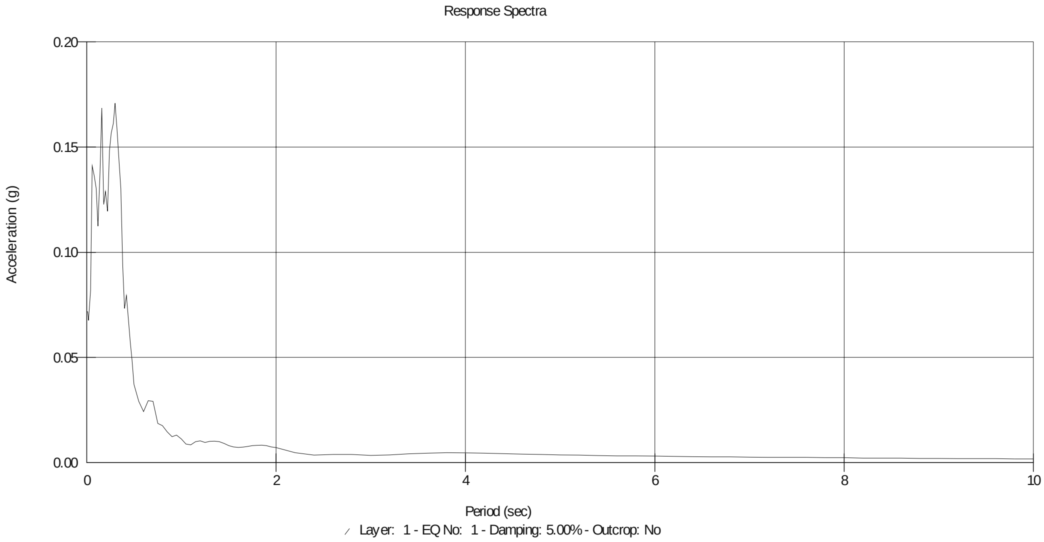
10% Damping



T=0.19 sec

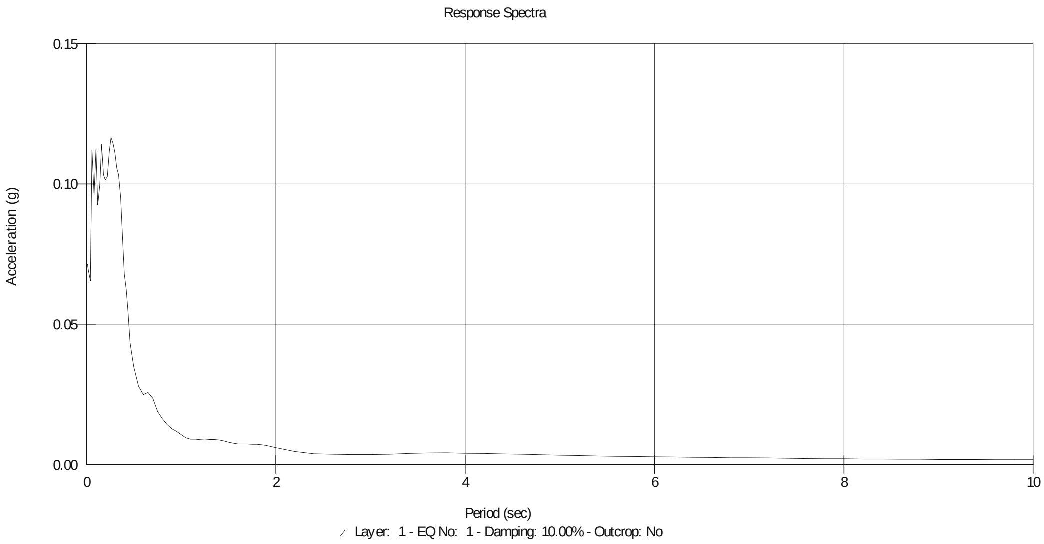
2. Profile D1N

5% Damping:



T=0.31 sec

10% Damping:

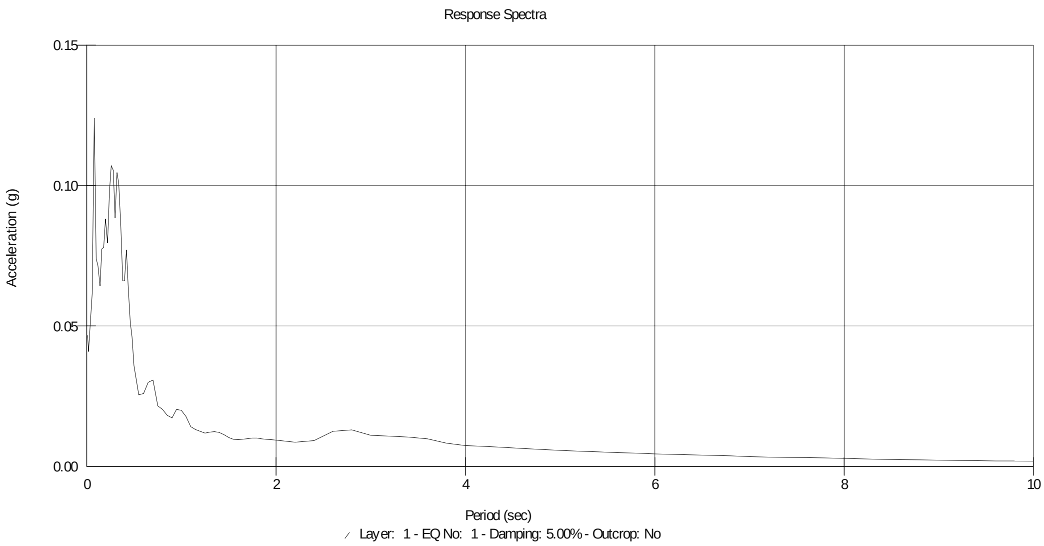


T=0.27 sec

d. Soft layer Thickness= 9m

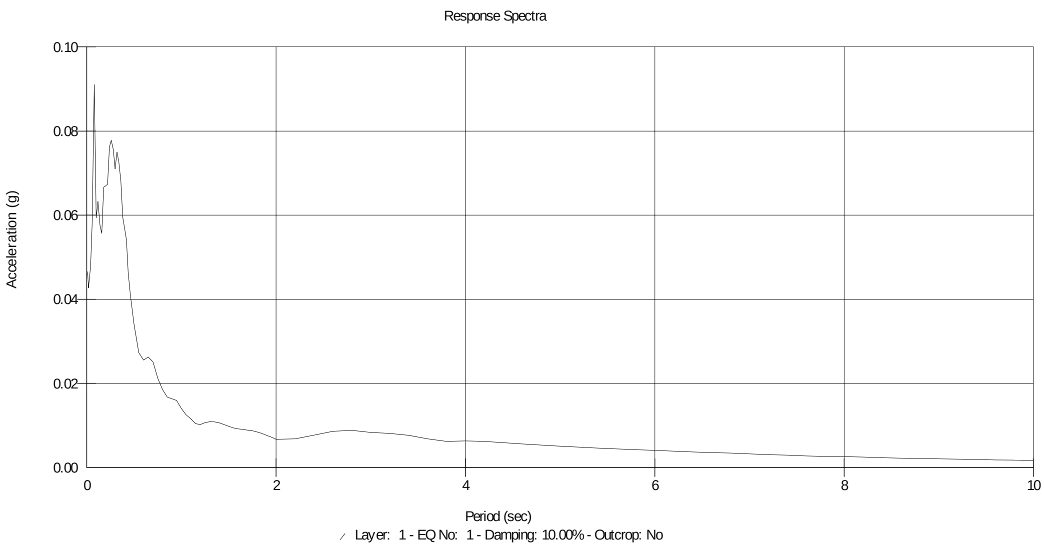
1. Profile $D1_{AC}$

5% Damping



T=0.077 sec

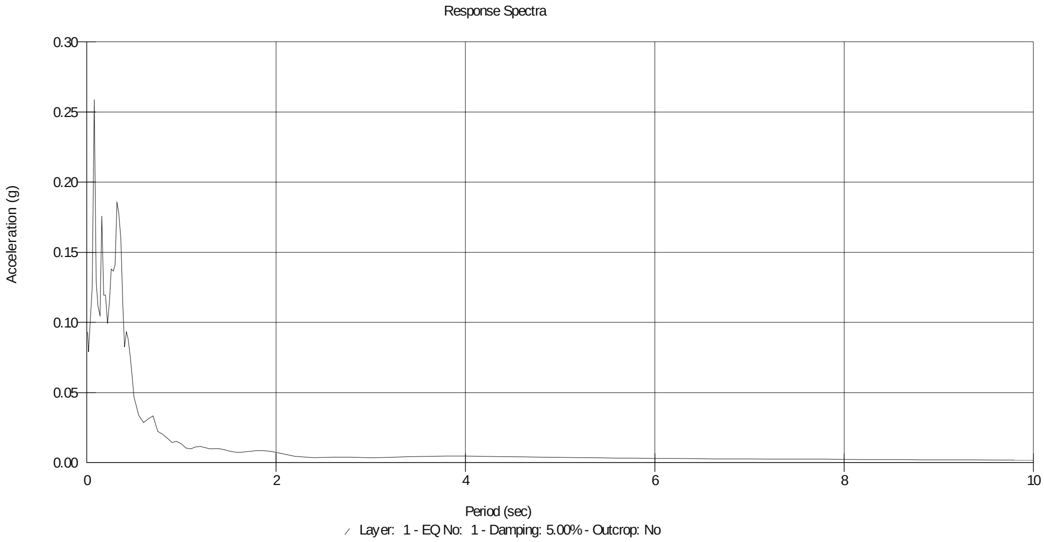
10% Damping



T=0.077 sec

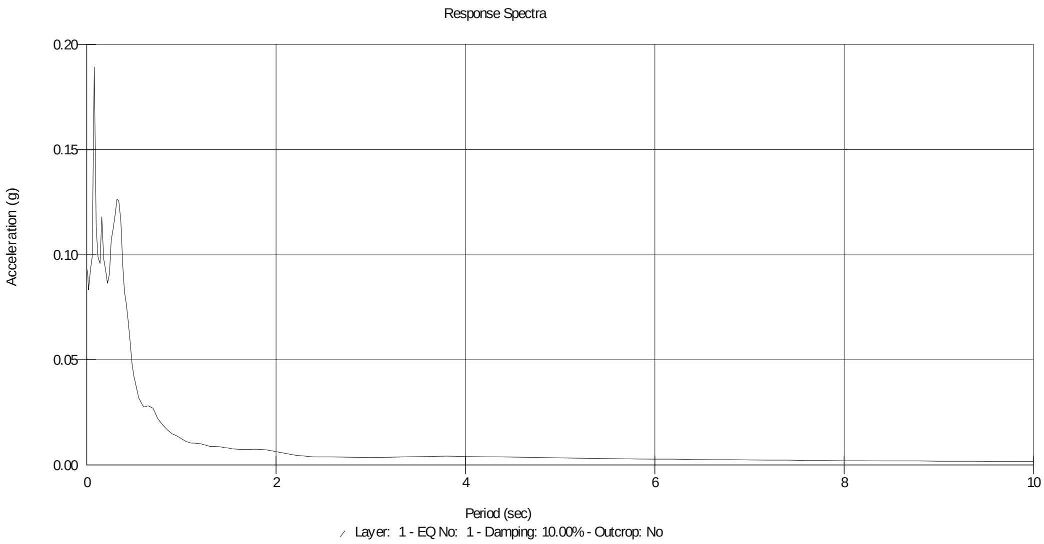
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:

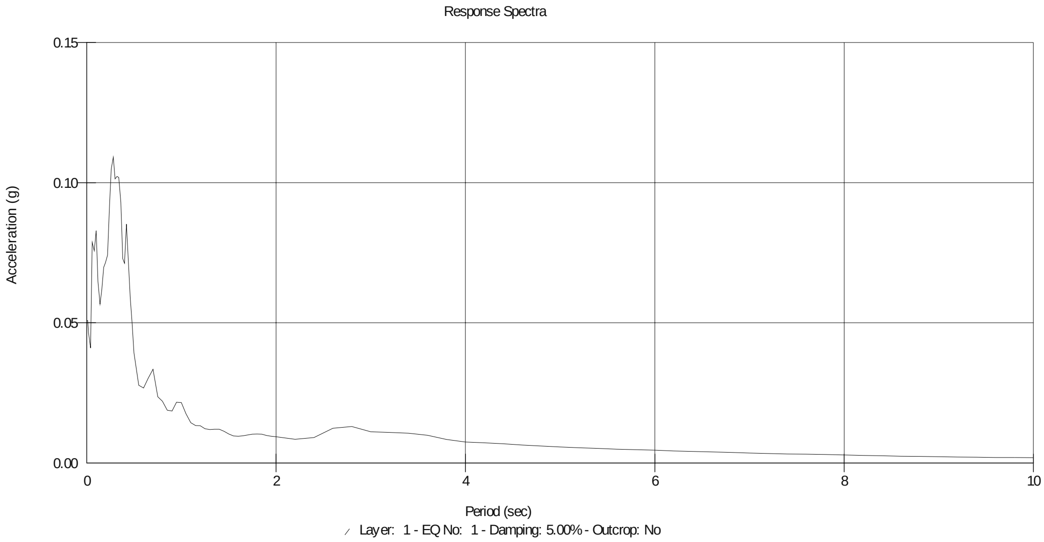


T=0.077 sec

e. Soft layer Thickness= 11m

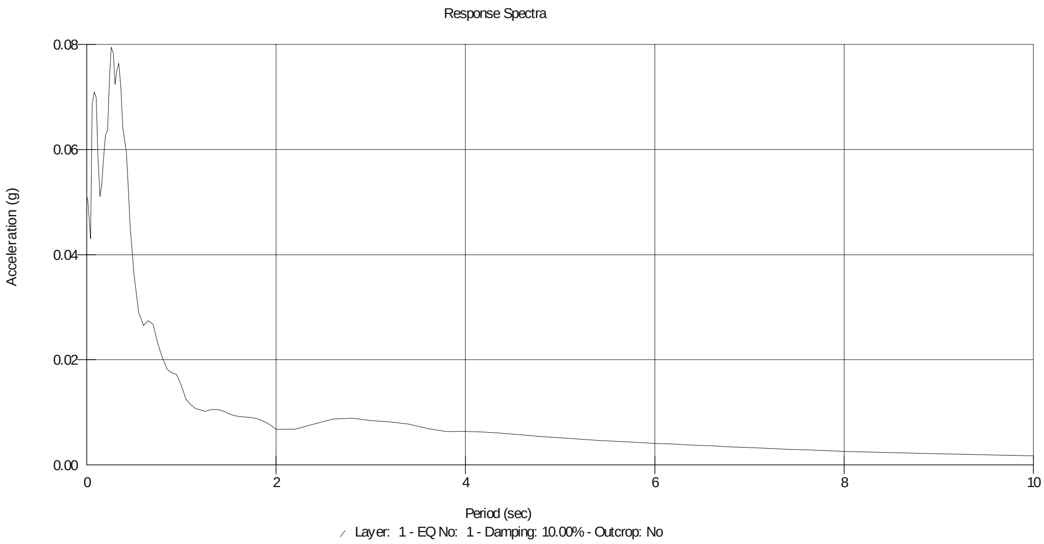
1. Profile $D1_{AC}$

5% Damping



T=0.29 sec

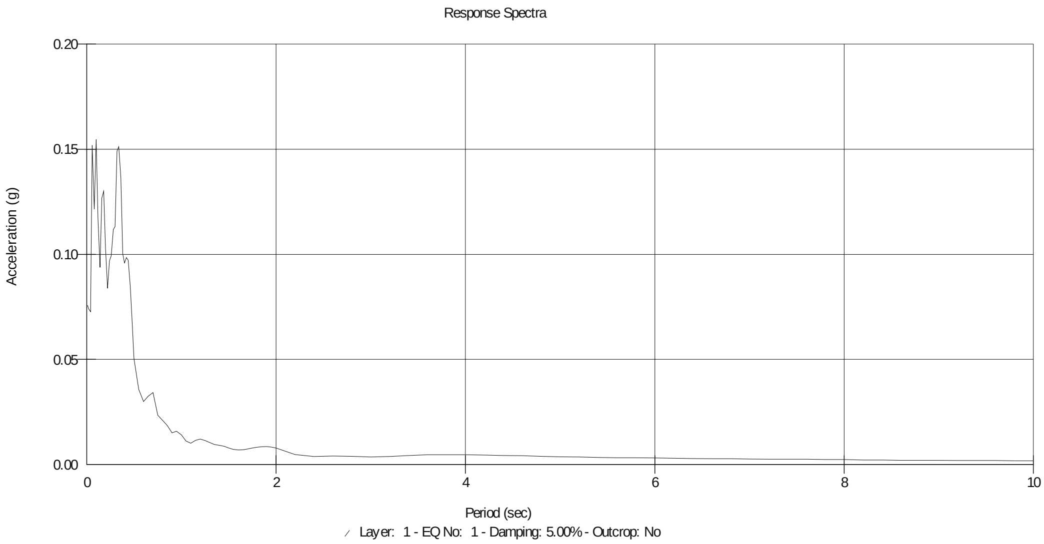
10% Damping



T=0.27 sec

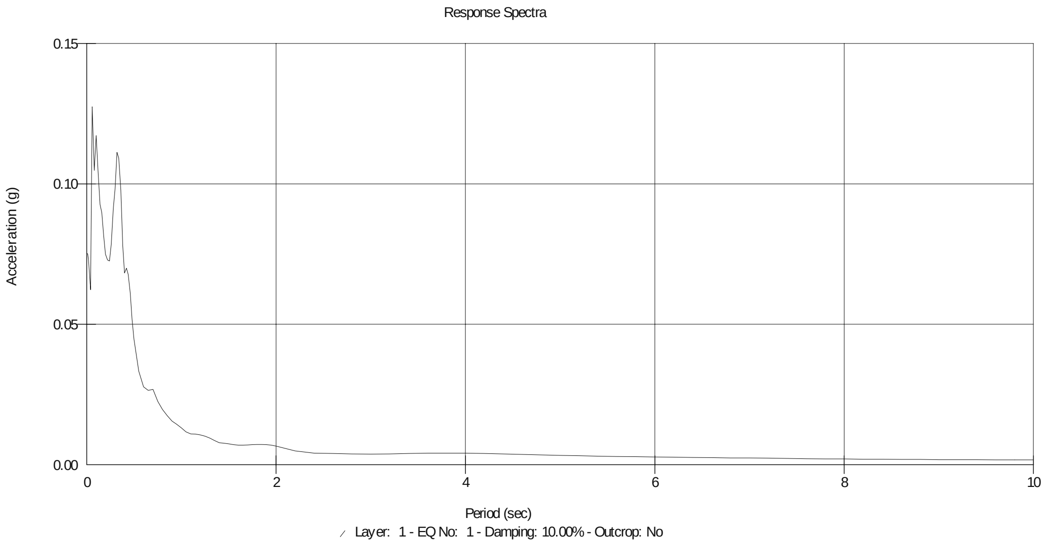
2. Profile D1N

5% Damping:



T=0.98 sec

10% Damping:

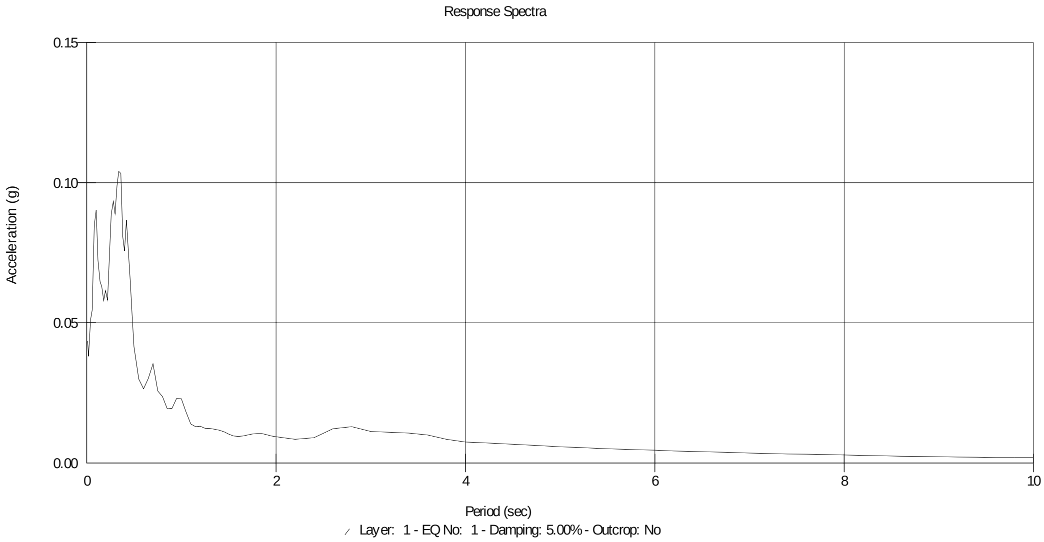


T=0.054 sec

f. Soft layer Thickness= 13m

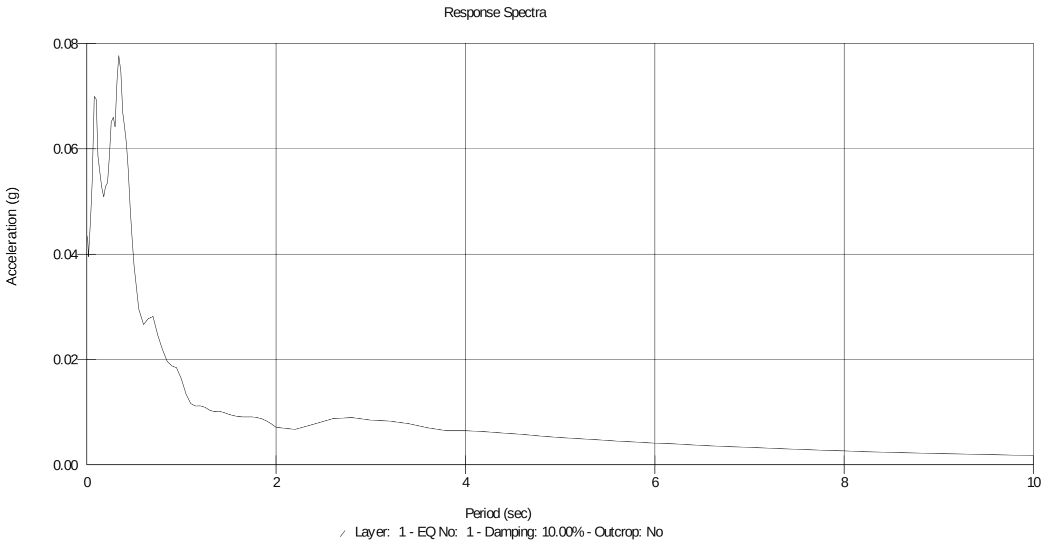
1. Profile $D1_{AC}$

5% Damping



T=0.33 sec

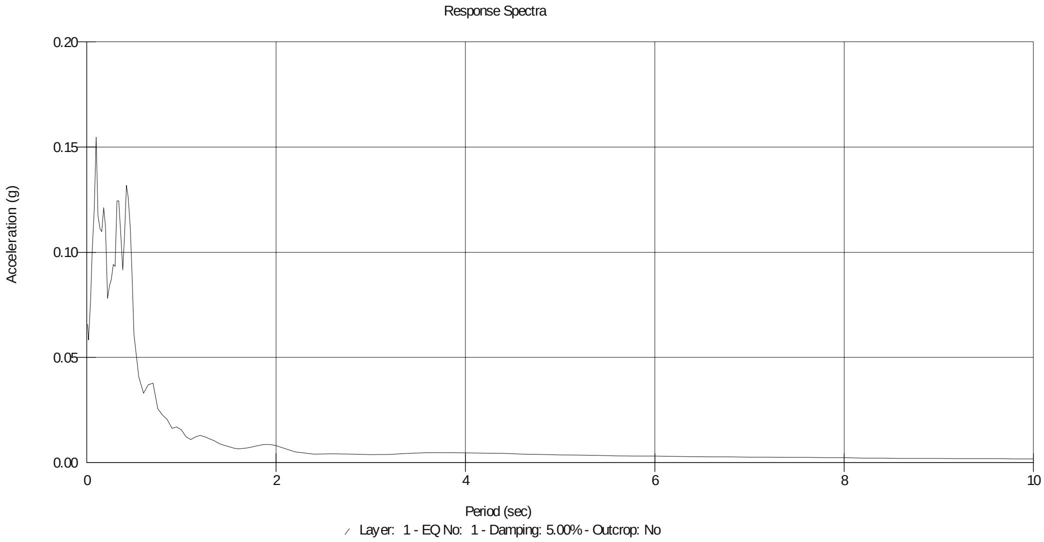
10% Damping



T=0.35 sec

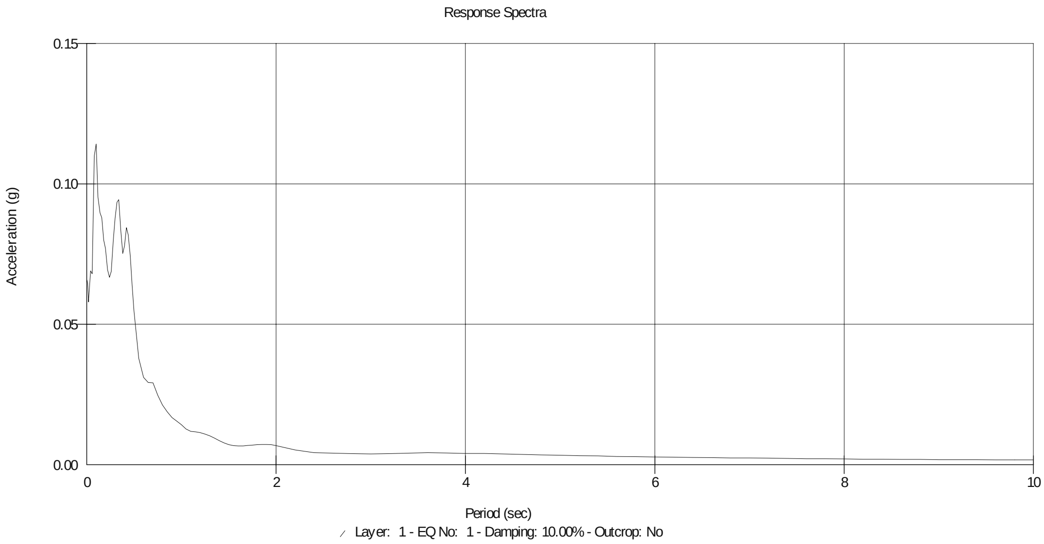
2. Profile D1N

5% Damping:



T=0.098 sec

10% Damping:

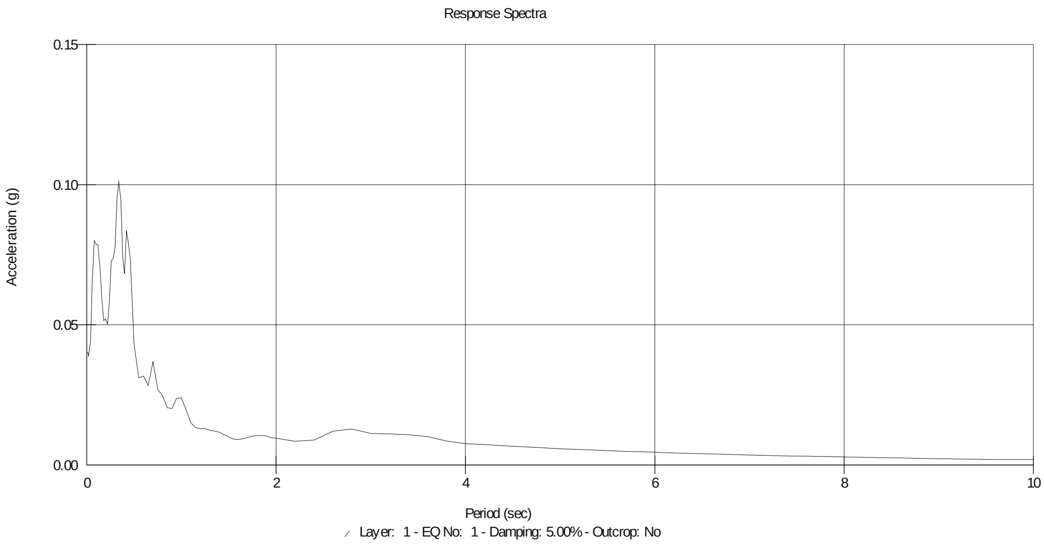


T=0.077 sec

g. Soft layer Thickness= 15m

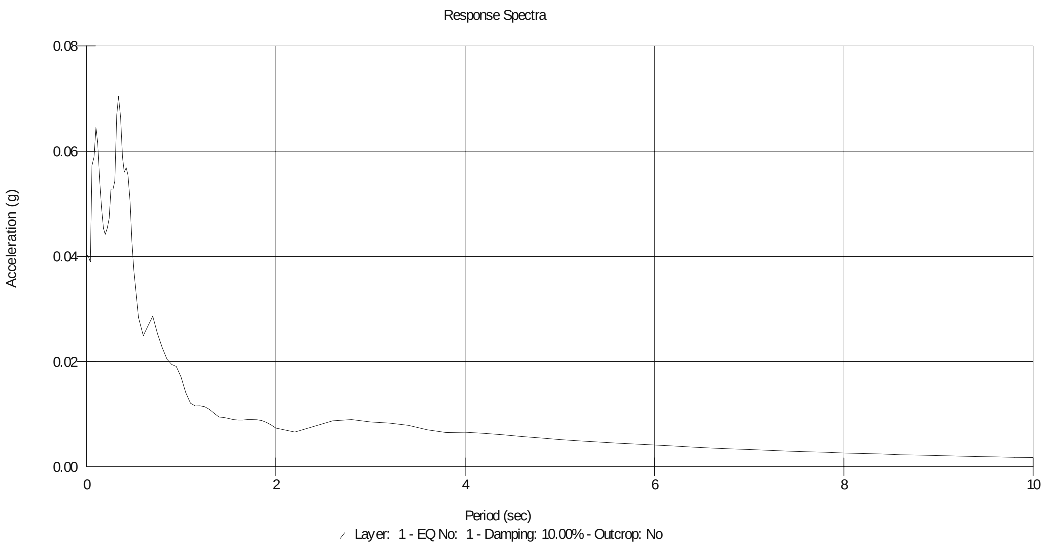
1. Profile $D1_{AC}$

5% Damping



T=0.35 sec

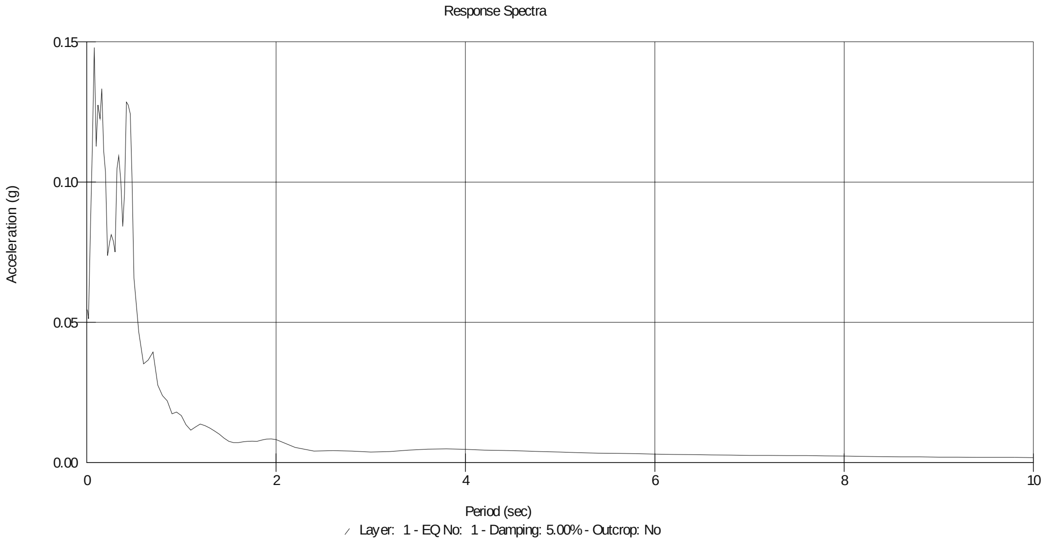
10% Damping



T=0.34 sec

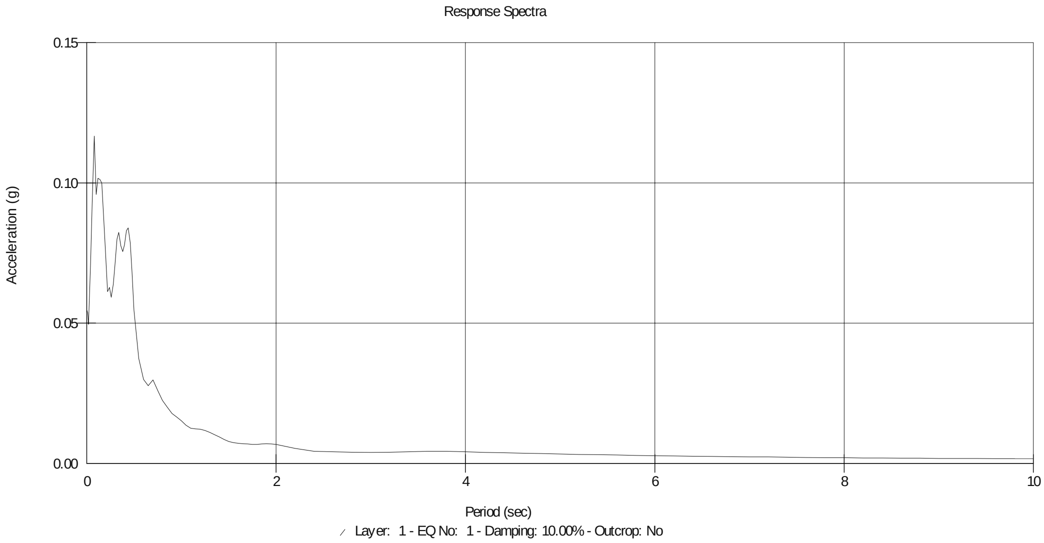
2. Profile D1N

5% Damping:



T=0.077 sec

10% Damping:



T=0.077 sec

Bibliography

1. Kramer, Steven L., "Geotechnical Earthquake Engineering", Prentice Hall, Upper Saddle River, NJ, 1996.

2. Bolt, B. A., "Earthquakes", W. H. Freeman and Company, New York, 1993..

3. FEMA, "NEHRP Recommended Provisions for Seismic Regulations for New Buildings", 2000 Edition, Part 1-Provisions, Washington, DC, 2001, pp. 39-48.

4. Arbelaez, M., "Controlled Source Spectral Analysis of Surface Waves for Soil Profiling", Master thesis, UNCC, Department of Civil Engineering, Charlotte, NC, 1992.
5. FEMA, "NEHRP Recommended Provisions for Seismic Regulations for New Buildings", 2003 Edition, Part 2-Commentary, Washington, DC, 2004, pp. 29-30.

6. Chopra, Anil K., "Dynamics of Structures", Prentice Hall, Upper Saddle River, NJ, 1995.

7. Kanai, K., and Tanaka, T., "On Microtremors", Bulletin, Earthquake Research Institute, Vol. 39, pp. 97-114.

8. Nakamura, Y., and Ueno, M., "A Simple Estimation of dynamic Characteristics of Subsoil", Proceedings of the 7th Japan Earthquake Engineering Symposium, pp. 265- 279.

9. Rodriguez, Victor, and Midorikawa, S., "Applicability of the H/V Ratio of Microtremors in Assessing Site Effects on Seismic Motion", Earthquake Engineering and Structural Dynamics, 2002; 31:261-279, John Wiley & Sons, Ltd., 2001.

10. "Discrete Fourier Transform and the FFT", Internet, Available,

    http://www.cage.curtin.edu.au/mechanical/info/vibrations/tut4.htm). April, 2004

11. SeismoSignal [2003] "Computer Program for Signal Processing of Strong Motion Data" , Internet, Available,

    http://www.seismosoft.com. , April, 2004.

12. EDM Report On Kocaeli, Turkey Earthquake, "Chapter 5. Ground Motion Simulation in Golcuk", Internet, Available,

    http://www.edm.bosai.go.jp/Turkey1999/report/chapter.5.pdf , Oct. 2001

13. Lynn, Paul A., and Fuerst, W., “Introductory Digital Signal Processing”, John Wiley & Sons, New York, NY, 1998.

14. Thomas TheuBl, “On Windowing for Gradient Estimation on Volume Visualization”, internet, Available,

http://www.cg.tuwien.ac.at/studentwork/CESCG/CESCG99/TTheussl/node8.html

, April, 2004.

15. EduPro Civil Systems, Inc., “ProShake Ground Response Analysis Program, Version 1.1”, User Manual, Redmond, Washington

16. Al-Haddad, M., Shaat, N., Assaf, M., “Seismic Microzonation of the City of Haqul and Al-Durrah Customs”, 2nd Annual Report, King Abdulaziz City for Science and Technology, 2002.

17. KACST, Earth Remote Sensing Data Analysis Center, “Geological Tectonic Analysis Using Satellite Data In Eastern Coastal Area of Gulf of Aqaba, KSA”, KACST, Riyadh, KSA, March, 2000, pp. 3-9

18. Stokoe, Kenneth, and Nazarian, Soheil, “Use of Rayleigh Waves in Liquefaction Studies”, Proceedings of a session sponsored by the Geotechnical Engineering Division of the American Society of Civil Engineers in Conjunction with the ASCE Convention in Denver, CO., May 1, 1985, p.2.

19. Rodriguez-Ordonez, J., “ A New Method for Interpretation of Surface Wave Measurements in Soils”, Ph.D. Dissertation, NCSU, Civil Engineering Department, Raleighy, NC, 1994.

20. Parasnis, D., S., “Principles of Applied Geophysics”, Chapman And Hall, London, UK, 1986.

21. Geosciences, “Geophysical Exploration”, Monash University, Internet, Available

www.earth.monash.edu.au/~jcull/galvanic/resistivity.html , November, 2001

22. Rupple, C., D., ”Costal Hydrology & Environmental Geophysics Methods: DC Resistivity”, Internet, Available,

http://hydrate.eas.gatech.edu/sapelo/methods.dir/dcresistivity.html , Oct. 2001.

23. G. Streckeisen AG, ”Portable Very-Broad-Band Tri-Axial Seismometer”, User Manual, Pfungen, Switzerland, May, 1995.

24. Kinemetrics, Inc, Internet, Available http://www.kinemetrics.com/Q330.html , April, 2004.

25. AEGIS Instruments, “SYSCAL R2 Deep Resistivity / IP System”, Internet,

Available
http://www.aegis-instruments.com/syscalr2.htm , April, 2004.

26. Trimble, “5700 CORS”, Internet, Available

http://www.trimble.com/cors5700.html , April, 2004.

27. Al-haddad , etal, “A Study Leading to Preliminary Seismic Design Criteria for the Kingdom”, King Abdul Aziz City for Science ant Technology, Riyadh, Saudi Arabia, 1998, p.65.

28. Ayyub, Bilal, and McCuen, "Richard, Probability, Statistics, & Reliability for Engineers ״, CRC Press, New York, NY, 1997, p.39.

29. USGS, ‘’Earthquake Hazard Program’’, Internet, Available,

http://neic.usgs.gov/neic/eqlists/eqstats.html , Auguest, 2004

30. Jaramillo, Ana, ‘’Seismological Criteria for Selecting and Scaling Real Accelerograms for Use in Engineering Analysis and Design’’, Master thesis, European School of Advanced Studies in Reduction of Seismic Risk, Universita Degli Studi di Pavia, June, 2003, p. 131.