AD-A050 750 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 8/11

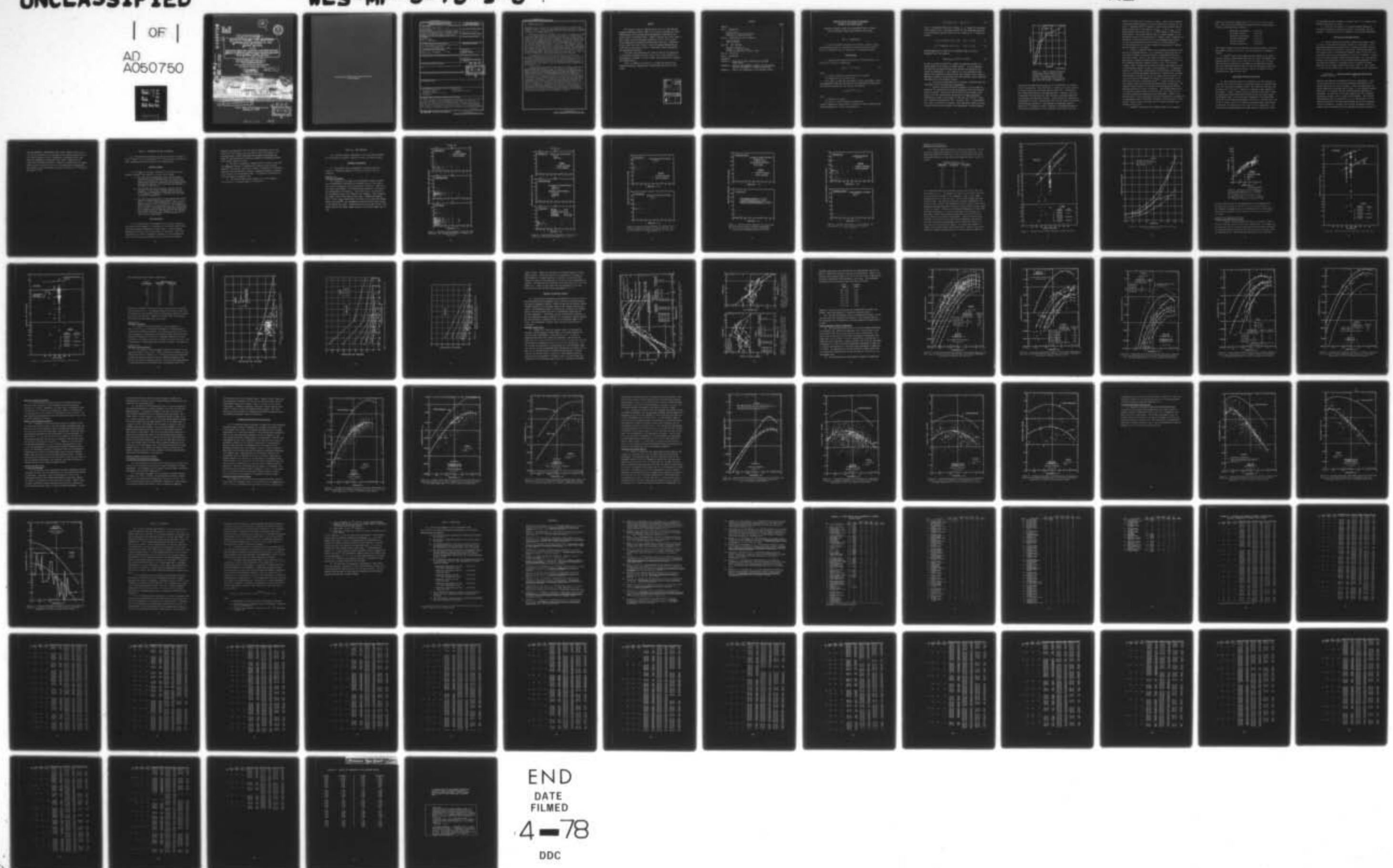
STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED--ETC(U)

DEC 77 F K CHANG, E L KRINITZSKY

UNCLASSIFIED WES-MP-S-73-1-8 NL

| OF |

AD
A050750



END
DATE
FILMED
4-78
DDC

(9) MISCELLANEOUS PAPER S-73-1 -4

(6)

STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES.

Report 8.

DURATION, SPECTRAL CONTENT, AND PREDOMINANT PERIOD OF STRONG MOTION EARTHQUAKE RECORDS FROM WESTERN UNITED STATES.

By

(10) Frank K. Chang, Ellis L. Krinitzsky

Soils and Pavements Laboratory
U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180

(11) Dec[redacted]77 (12) 87 P.

Report 8 of a Series

Approved For Public Release; Distribution Unlimited

(14) WES-MP-S-73-1-8

Prepared for Office, Chief of Engineers, U. S. Army
Washington, D. C. 20314

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: Miscellaneous Paper S-73-1	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES; Report 8, DURATION, SPECTRAL CONTENT, AND PREDOMINANT PERIOD OF STRONG MOTION EARTHQUAKE RECORDS FROM WESTERN UNITED STATES		5. TYPE OF REPORT & PERIOD COVERED: Report 8 of a series 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Frank K. Chang; Ellis L. Krinitzsky		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS: U. S. Army Engineer Waterways Experiment Station, Soils and Pavements Laboratory, P. O. Box 631, Vicksburg, Miss. 39180		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: Office, Chief of Engineers, U. S. Army, Washington, D. C. 20314		12. REPORT DATE: December 1977 13. NUMBER OF PAGES: 82
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report): Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Earthquake engineering
Earthquake hazards
Earthquake resistant structures
Earthquakes
Ground motion
State-of-the-art studies

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The purposes of this investigation were principally to assess the duration and spectral content of strong-earthquake accelerograms and, indirectly, to consider their applicability in earthquake design. Correlations of duration with MM intensity for the near and far fields and for Richter magnitude have been obtained. Difference in durations for soil and rock sites was determined. A set of relations between the duration and distance for soil and rock sites was (Continued)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. ABSTRACT (Continued)

established from records of the San Fernando Earthquake of 9 February 1971 (magnitude of 6.5). Values for other magnitudes were extrapolated. Duration is taken to be the time interval between the first and last peaks of acceleration equal to or greater than 0.05 g.

The spectral content in the range of 0.1-10 Hz for strong-motion records in western United States for acceleration level equal to or greater than 0.05 g was processed with the modified Nigam and Jennings' response spectra computer programs. The corrected accelerograms on the digital magnetic tapes of NIS 130, 131, and 132 provided by the California Institute of Technology were the input data for this study. The critical damping ratios of 5.0, 7.5, and 10.0 percent were assigned to the soil (or soft, alluvial), intermediate (firm sediments), and rock (or hard) sites, respectively. The relative response spectral amplitudes of acceleration, velocity, and displacement were reduced to the ground surface by dividing the relative response spectral amplitude by the dynamic amplification factor of $1/2h$, where h is the critical damping ratio. The frequency-amplitude spectra were then plotted as a function of magnitude, epicentral distance, and site conditions.

The characteristics of duration are as follows: (a) duration is greater in the near field than in the far field and greater in alluvium than in rock with the duration-ratio of alluvium to rock approximately 2 to 1; (b) duration increases with magnitude and intensity, as expected; and (c) the maximum duration at a source in rock for magnitude 8.5 was extrapolated to be about 43 sec. The duration is twice as long where there is magnification by alluvium or soil.

Frequency content and spectral shape have the following characteristics: (a) the predominant frequencies of the strong-motion earthquakes for the magnitude of 5.3-7.7 are in the range of 0.1-6.67 Hz; (b) the maximum acceleration, velocity, and displacement levels are within the ranges of 1.5-5.0, 0.5-1.5, and 0.1-0.5 Hz; (c) the predominant period of the acceleration spectra does not increase with distance within the range of 0-90 km, but the predominant period of displacement does; (d) the spectral mode shape depends on the source spectrum function (magnitude), distance, and local geological conditions; (e) generally, the average or upper-bound peak amplitudes have a uniform envelope, but the possible maximum acceleration was found to be about 0.5 g near surface faulting for the discrete frequency range of 4-5 Hz; and (f) the summation of the maximum amplitude level of the predominant frequencies equals approximately the total amplitude of the ground motion in time history if the selected damping ratio corresponds to the geological condition of the recording site. An assumption is made that the amplitudes of all discrete frequencies on the envelope are in phase.

PREFACE

This report is part of ongoing work at the U. S. Army Engineer Waterways Experiment Station (WES) in Civil Works Investigation Study: "Methodologies for Selecting Design Earthquakes," sponsored by the Office, Chief of Engineers (OCE). General direction was by Mr. James P. Sale, Chief, Soils and Pavements Laboratory, and Mr. Don C. Banks, Chief, Engineering Geology and Rock Mechanics Division. Preparation of the report was by Mr. Frank K. Chang, Earthquake Engineering and Vibrations Division and Dr. Ellis L. Krinitzsky, Chief, Engineering Geology Research Facility.

The report was reviewed by Dr. Bruce A. Bolt of the University of California at Berkeley, and Dr. Shan S. Kuo of the University of New Hampshire at Durham. To both of them, the authors wish to express their appreciation.

COL J. L. Cannon, CE, and Mr. F. R. Brown were Director and Technical Director, respectively, of WES during the period of this study.

CONTENTS

STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES

DURATION, SPECTRAL CONTENT, AND PREDOMINANT PERIOD OF STRONG MOTION EARTHQUAKE RECORDS FROM WESTERN UNITED STATES

PART I: INTRODUCTION

1. This investigation evaluates the duration, spectral content, and predominant period of strong motion records from western United States for parameters that are significant in earthquake design.

Previous Work

2. Gutenberg and Richter[1] presented the following equation for duration as a function of magnitude:

$$\log t_o = -1.4 + 0.32 M \qquad (1)$$

where

t_o = time of duration in seconds at point of origin

M = magnitude in the Richter scale

Their source of data was the standard torsion seismograms. Esteva and Rosenblueth[2] described the duration of an equivalent ground motion with uniform intensity per unit time by the equation:

$$s = 0.02e^{0.74 M} + 0.3\Delta \qquad (2)$$

where

s = duration in seconds

Δ = source to station distance in kilometres

Housner[3] suggested an upper bound for duration of ground shaking during large earthquakes by a linear law expressed as

$$D = 11.2\,M - 53 \qquad \text{for } M > 5 \tag{3}$$

where D represents duration in seconds. If M equals 8.5, the duration is about 45 sec. The study of Bolt[4] for the "bracketed duration" D of acceleration greater than 0.05 g as a function of M yields the formula:

$$D = 17.5 \tanh (M - 6.5) + 19.0 \qquad \text{for } f > 1 \text{ Hz} \tag{4}$$

$$D = 7.5 \tanh (M - 6.0) + 7.5 \qquad \text{for } f > 1 \text{ Hz} \tag{5}$$

Relating magnitude to duration for threshold values of 0.05 g, Kobayashi[5] gave this equation

$$\log_{10} t_{0.05} = 0.50\,M - 2.26 \text{ sec} \tag{6}$$

An effort was made by Husid,[6] to compute the effective duration of shaking based on the concept of energy (Arias[7]). In their approach, the digitized acceleration values were squared, and the sum of the values was accumulated. A plot (Figure 1) of the accumulated value against time (adopting the 95 percentile time interval) has a shape resembling a cumulative distribution curve and provides a direct graphical representation of the duration effects.

3. It should be noted that the site effects on duration were not evaluated in any of the above-mentioned papers.

4. Recently, Trifunac and Brady[8] attempted to give a modified definition of the duration of strong earthquake ground motion from the concept of Husid.[6] They define the duration of the recorded strong motion to be that time interval during which the most significant contribution is made to an integral of the form $\int_0^T f^2(t)dt$[6,7] where $f(t)$ stands for acceleration $a(t)$, velocity $v(t)$, or displacement $d(t)$, and T is finite or infinite. They arbitrarily delete the first 5 percent and the last 5 percent of the amplitudes of these integrals

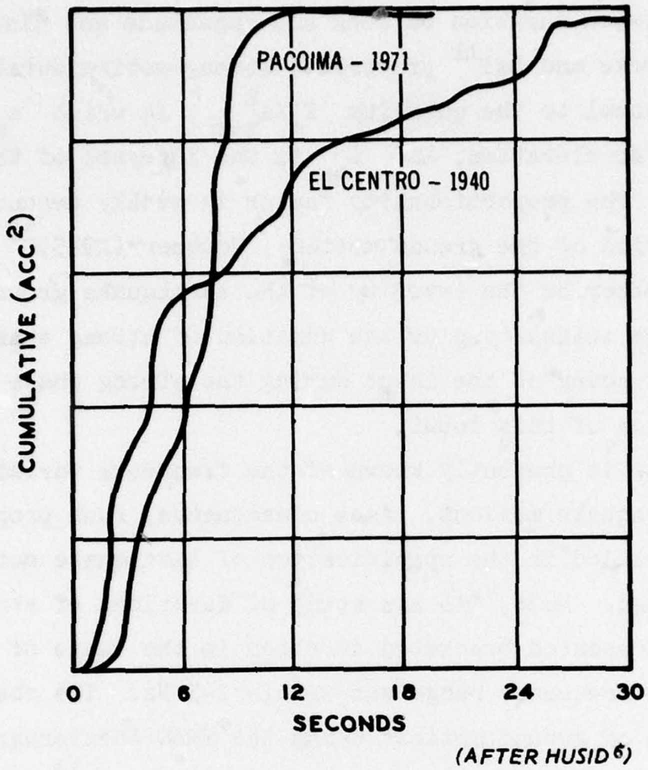


Figure 1. Graph of cumulative squared acceleration values versus time for Pacoima (1971) and El Centro (1940) records; the durations are 12.0 and 25.8 sec, respectively (both durations agree with the results in Appendix B)

and define the remaining 90 percent as the "significant" or "strong-motion" contribution. Their definition of duration is closely related to seismic energy and associated spectral amplitudes. Correlations were established among the following parameters: duration, velocity, displacement, Modified Mercalli (MM) intensity, earthquake magnitude, site geology, and epicentral distance. Hays[9] studied the durations of earthquakes and nuclear explosions and then defined duration as absolute acceleration $\geq$ 5 percent g. Site geology was completely ignored. Dobry et al.[10] conducted a study of duration of horizontal records in the western United States on site conditions from rock to soft clay based on the definition of Trifunac and Brady. They found a consistent correlation between duration on rock and magnitude and distance to the source. Vanmarcke and Lai[11] proposed a strong-motion duration that is nearly proportional to the quantity I_o/a^2_{max} , in which a_{max} is the maximum ground acceleration, and I_o is the integral of the squared accelerations. The proportionality factor is weakly dependent on the predominant period of the ground motion. Housner (1975)[12] suggested two parameters to describe the severity of the earthquake ground motion: (a) the spectrum intensity plus the duration of strong shaking, or (b) the average power of the input during the strong phase of shaking plus the duration of this input.

5. Little is presently known of the frequency variations in time history of earthquake motions. As a consequence, such properties are not usually included in the specification of earthquake motions for structural design. Bolt,[4] in his study of durations of strong earthquake motion, presented bracketed duration in the range of 0.5-10.0 Hz. The predominant frequency range was within 2-5 Hz. The observed frequency range of ground motions using the SMAC Accelerograph in Japan is approximately between 0.25 and 7.0 Hz (Kobayashi).[13] A systematic analysis of strong motion accelerograms for the western United States since the Long Beach Earthquake (California) of 1933 has been performed and published in Volumes III and IV of a report series (Volume I contains uncorrected accelerograms and Volume II corrected data) by the California Institute of Technology (CIT).[14] Volumes III and IV deal with response spectra and Fourier amplitude spectra, respectively. The undamped response spectra of 0 percent critical damping and Fourier amplitude spectra are in good correlation. The response spectral data for the period range between 0.04 and 15.0 sec, or 0.06 and 25.0 Hz, have been presented both graphically and numerically. Based on the presentations of Fourier amplitude spectrum of acceleration in Volume IV, the predominant peaks at 95 percent confidence level are within 0-5 Hz; however, there are some cases where the 95 percent confidence level extends to about 10 Hz.

6. Newmark[15] established the frequency bands of the response

spectra at the critical damping ratio of 0.5, 2.0, 5.0, and 10.0 percent. They are used for averaging the amplifications of displacement, velocity, and acceleration as follows:

Horizontal displacement	0.2-0.4 Hz
Horizontal velocity	0.4-2.0 Hz
Horizontal acceleration	2.0-6.0 Hz
Vertical displacement	0.1-0.3 Hz
Vertical velocity	0.3-3.0 Hz
Vertical acceleration	3.0-10.0 Hz

These values indicate that the predominant frequency range of the strong earthquakes is within 0.1-10.0 Hz. The site condition is completely ignored.

7. Blume[16] studied the response spectrum shapes for 33 significant and different accelerograms generated by 12 major earthquakes with damping ratios of 0.005, 0.01, 0.02, 0.05, 0.07, and 0.10. He found that the effect of duration on the shape of the response spectrum is small for frequencies greater than 2 Hz and that the dynamic amplification factor at longer periods, however, tends to be higher for long duration motions than for short ones.

Definition of Duration and Scope

8. The "bracketed" duration is defined as the time interval between the first and last peaks of acceleration equal to or greater than 0.05 g for the strong earthquake record. This definition has been used by Page et al.[17] and Bolt.[4] Durations in Appendix B were computed in this manner. Figure 1 (Husid[6]) shows the "effective durations," formed by summing the squared digitized accelerations and the values accumulated against time, for the horizontal components of the Pacoima Dam record of the San Fernando Earthquake (California), 9 February 1971, and of the El Centro record of the Imperial Valley Earthquake (California), 18 May 1940. The durations are 12.0 and 25.8 sec, respectively. Appendix B presents approximately the same values of duration for these

two earthquake records, probably a coincident case. For a general case, further investigation is needed.

9. Values for the duration of strong earthquake shaking are determined by magnitude, amplitude, distance, site geology, and wave frequency. These factors will be examined in the following paragraphs.

Definition of Spectral Content

10. Fourier spectrum and relative response spectrum are two useful tools for defining the frequency content of a time signal. Since earthquake engineers are familiar with the response spectrum technique (RST), this method will be used in this study. The frequency bands of the response spectra, established by Newmark[15] within 0.1-10 Hz for acceleration, velocity, and displacement, are also to be adopted. However, only the relative response spectral peak amplitudes, i.e., acceleration, velocity, and displacement of the predominant peak frequencies, will be considered and reduced to the ground surface by dividing the peak amplitudes by the dynamic amplification factor (DAF) or $1/2h$, where h is the critical damping ratio. This relationship can be expressed as

$$\text{Ground peak amplitude spectrum} = \frac{\text{Relative response peak amplitude spectrum}}{\text{DAF}}$$

There are two important justifications for this relationship. First, the peak amplitudes of the discrete predominant frequencies at the ground surface or base could be summed to obtain the approximate resultant amplitude by assuming them in phase, if this computed resultant amplitude is in agreement with the observed maximum amplitude in a seismogram. In this way, the critical damping ratio at a different geological site-model (soil or rock) can be compared. The resultant peak amplitude will be conservative, i.e., an overestimate. For an actual ground motion, the phase angle between the various frequencies should be considered. Secondly, an arbitrary seismogram of any frequency content and duration could be generated using the principle of mode superposition. Tentatively, the critical damping ratios of 5.0, 7.5, and 10.0 percent will be assigned to the response spectra for the soft (soft alluvium or soil), intermediate (sedimentary rock), and hard rock (basement or crystalline rock) sites, respectively, as classified by Trifunac and Brady.[8] Usually, the frequencies of seismic waves in rock are higher than in soil; the amplitudes are attenuated more rapidly in the former than in the latter (Duke et al.,[18] Donovan,[19] and Seed et al.[20]).

PART II: TECHNIQUES FOR DATA PROCESSING

11. The theoretical background of RST can be found in Housner,[21] Biot,[22] Housner et al.,[23] and Hudson.[24,25] The functions of the RST computer program and the data collection are discussed below.

Computer Program

12. The Nigam and Jennings' integration and response spectral computer programs[26] were modified to obtain the following:

a. The time interval between the first and last peaks of acceleration in the frequency bank of 0.1-10.0 Hz was equal to or greater than 0.05 g for each strong motion accelerogram recorded in the western United States during the past four decades. (The corrected accelerograms in CIT Volume II were used.)

b. The peak amplitudes (acceleration, velocity, and displacement) of the relative response spectra and the frequencies corresponding to those peaks were compiled in the sequence of magnitude, distance, and site conditions shown in Appendix B.

c. The relative peak amplitudes of the response spectra were reduced to ground surface by dividing by DAF, or $1/2h$, where h is the critical damping ratio. The critical damping ratios of 0.05, 0.075, and 0.10 were assigned to each recording site in accordance with its classification as soil (soft), intermediate, and hard rock, respectively. This information was provided by the Earthquake Engineering Research Laboratory, CIT (Appendix A). The DAF for 0.05, 0.075, and 0.10 percent critical damping are 10.0, 6.66, and 5.0, respectively.

Data Collection

13. All strong-motion accelerograms (acc $\geq$ 0.05 g) recorded on the free-field and basement of a building for the western United States (from the Long Beach Earthquake, 10 March 1933, to the San Fernando Earthquake, 9 February 1971) were included in this study. These data represented 25 of the 57 earthquakes (Appendix A), 107 recording stations, 201 horizontal accelerograms, and 54 vertical accelerograms.

Appendix A and Appendix B list the items of information, such as the record file (CIT system), station location, date of earthquake, epicentral distance, Richter magnitude, MM intensity (Krinitzsky and Chang,[27]) local MM intensity, and site condition (information provided by Dr. Brady, formerly of CIT).

14. The data in Appendix B, compiled from the output of the modified Nigam and Jennings' integration and response spectra computer programs,[26] include the record file (column 1 of Appendix A), instrument component, peak acceleration, duration, predominant period of acceleration, velocity, and displacement peaks. CIT prepared digitizations of the accelerograms on magnetic tape.

15. The spectrum shapes were computed for a period range of 0.1-10.0 sec or a frequency range of 0.10-10.0 Hz.

PART III: DATA ANALYSES

16. The data listed in Appendixes A and B have been processed for the analysis of duration, spectral content, and spectral shape.

Analyses of Durations

17. The duration data in Appendix B have been plotted as a function of frequency, magnitude, intensity, distance, and site condition.

Duration as a function of frequency

18. Generally, the range of the predominant frequency content in the strong-motion earthquake accelerograms does not vary greatly with duration, magnitude, and site geological conditions. Figures 2-6 show these relationships. The frequency band between 0.1 and 6.66 Hz was encompassed in the duration. On alluvial sites, the long-period or low-frequency waves (<2 Hz) appear to be dominant. Also, durations are longer in soil sites than in rock sites. Long-period Rayleigh waves (<1 Hz), which contain about two thirds of the total wave energy, (Miller and Pursey[28]), are propagated as guide waves and cause motions in the surface soil layer. Rayleigh waves may be the main cause of the longer duration and higher damage potential in alluvium rather than in rock.

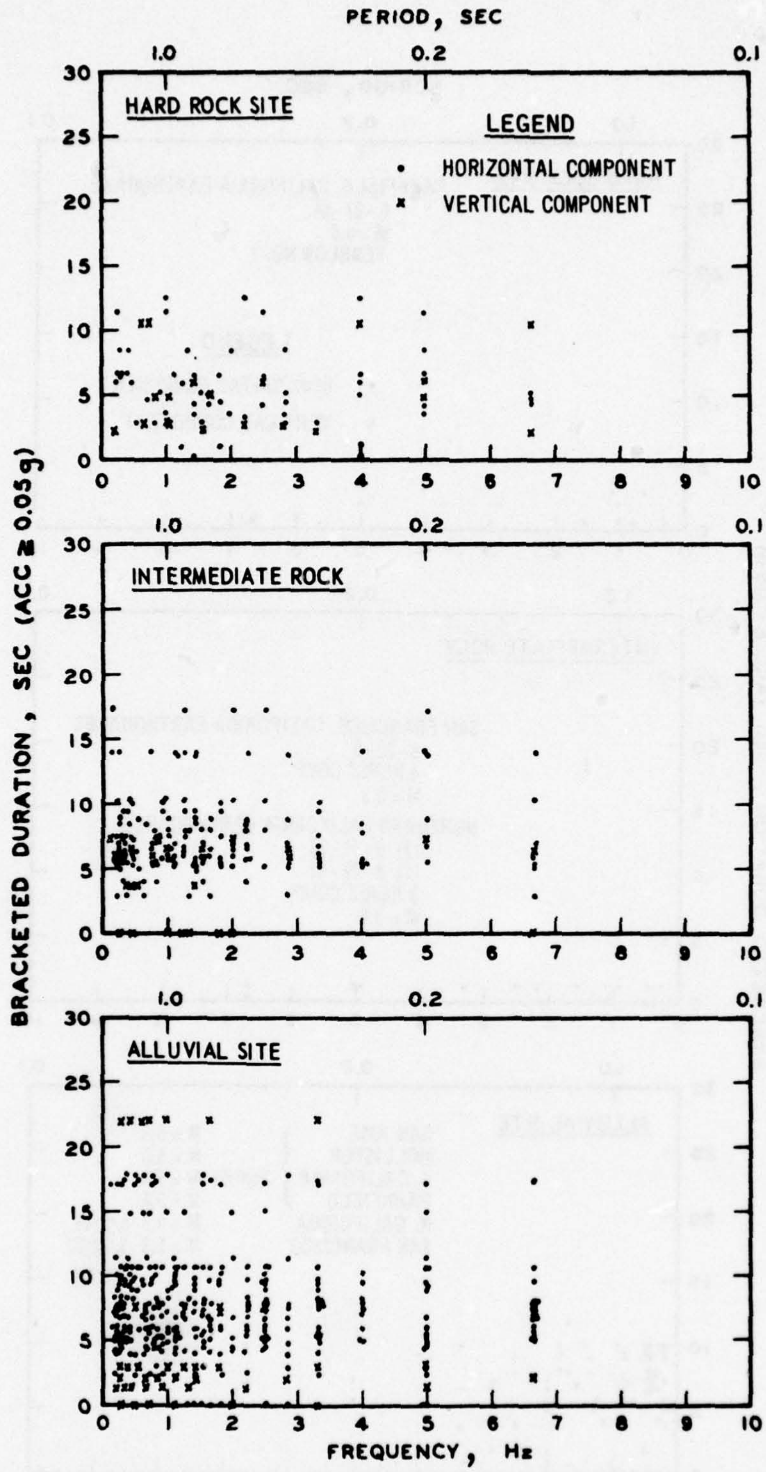


Figure 2. Duration versus frequency for various site conditions, San Fernando Earthquake, 9 February 1971 (M = 6.5)

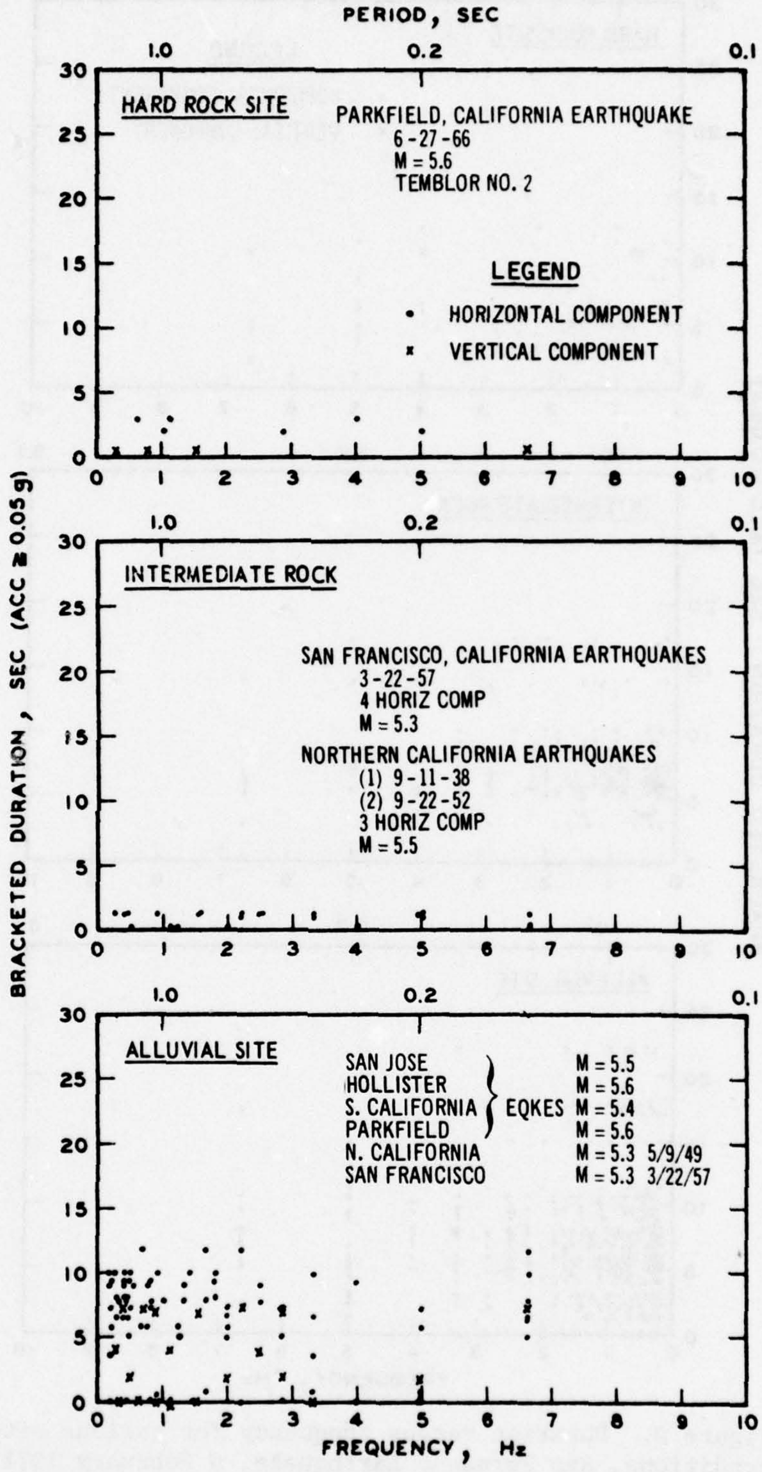


Figure 3. Duration versus frequency for various site conditions, California Earthquakes (M = 5.3-5.6)

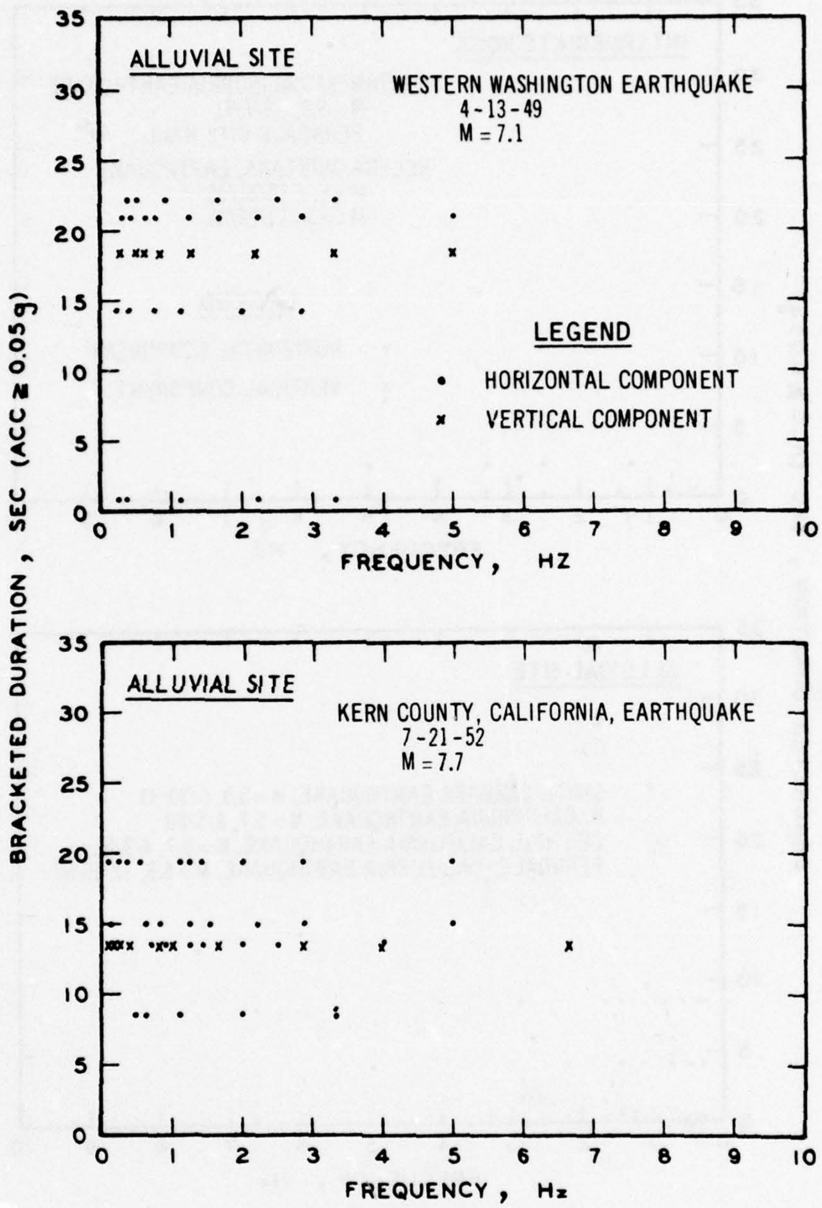


Figure 4. Duration versus frequency for alluvial sites, Western Washington Earthquake, 13 April 1949 (M = 7.1); and Kern County, California, Earthquake, 21 July 1952 (M = 7.5)

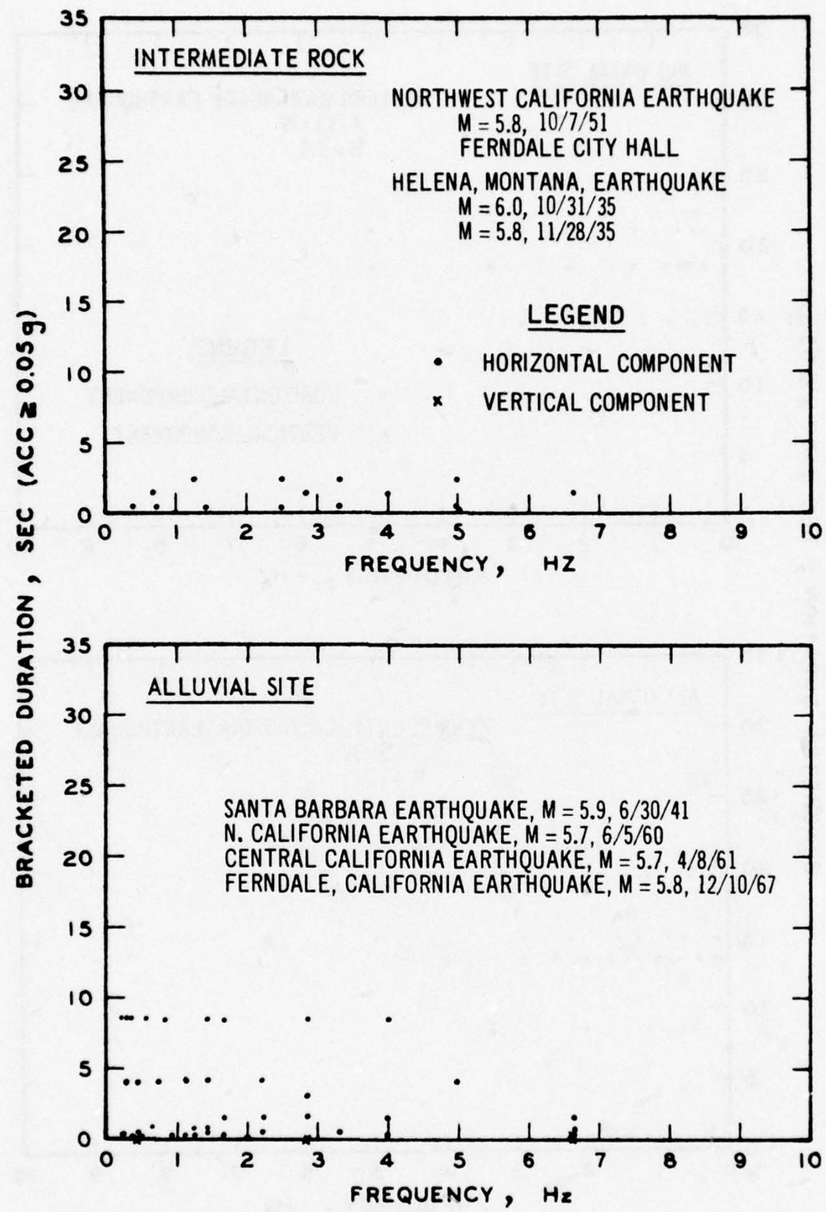


Figure 5. Duration versus frequency for intermediate rock and alluvial sites, California Earthquakes (M = 5.7-5.9); and Helena, Montana, Earthquakes, 31 October and 28 November 1935 (M = 5.7-6.0)

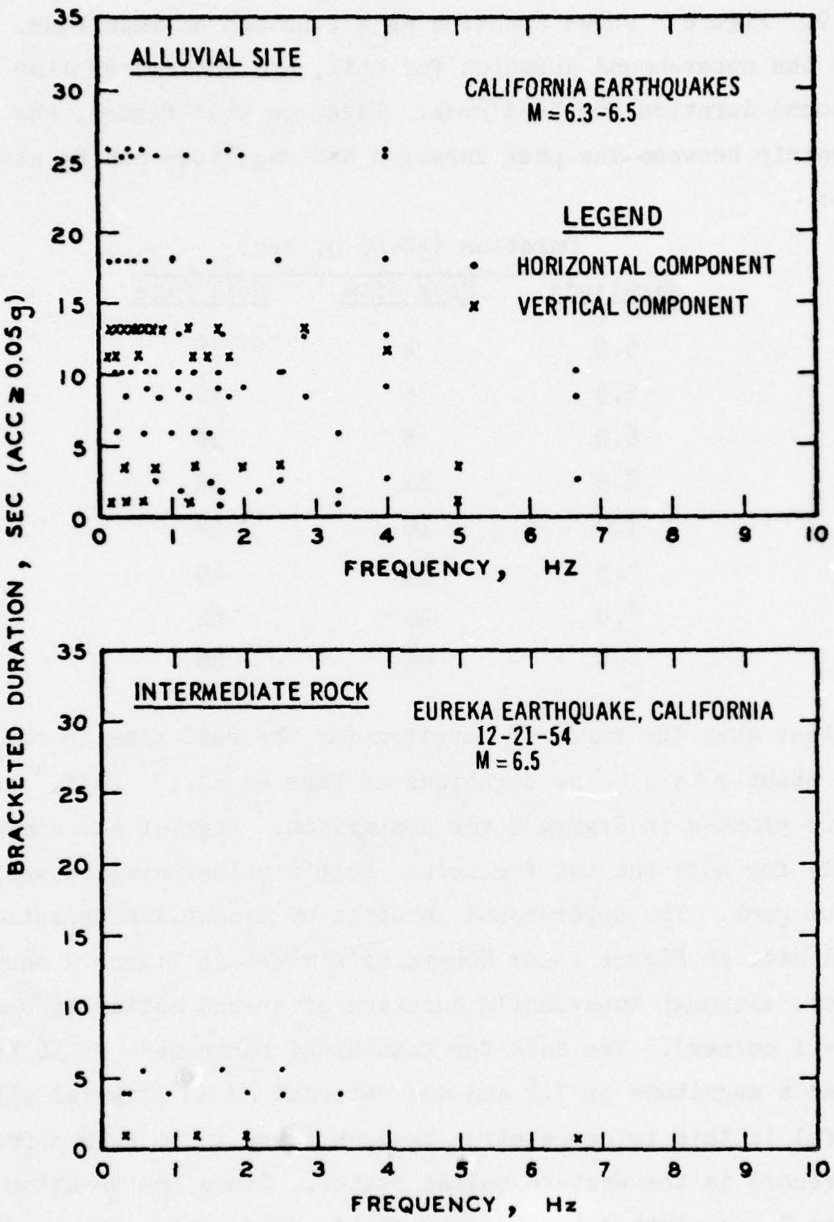


Figure 6. Duration versus frequency for alluvial and intermediate rock sites, California Earthquakes (M = 6.3-6.5)

Duration as a function of
magnitude in the near field

19. Figure 7 shows duration as a function of magnitude. The top line is the upper-bound duration for soil, and the second line is the upper-bound duration for hard rock. Based on this figure, the linear relationship between the peak duration and magnitude can be stated as follows:

	Duration ($\geq$0.05 g, sec)	
Magnitude	Rock Site	Soil Site
5.0	4	8
5.5	6	12
6.0	8	16
6.5	11	23
7.0	16	32
7.5	22	45
8.0	31	62
8.5	43	86

It is clear that the ratio of duration for the soil site to the rock site is about 2 to 1. The durations of Page et al.,[17] Bolt,[4] and this study are plotted in Figure 8 for comparison. Page et al. compare favorably for soil but not for rock. Bolt's values compare well with those for rock. The upper-bound duration by linear extrapolation for the soil site in Figure 7 and Kobayashi's data[5] in Figure 9 show a good agreement, although Kobayashi's duration of ground motion exceeds 30 gal (1 gal = 1 cm/sec). The data for Tokachioki Earthquake of 16 May 1968, which had a magnitude of 7.9 and was recorded on an alluvial site, are useful in this interpretation because there is no such strong-motion record in the western United States. Since the duration data in Figure 7 are plotted in the near field, apparently, the duration for rock site could be interpreted as at the source (or focus); the soil site is in the epicentral region. Of course, the duration is longer on the ground surface than at the source. Based on this interpretation, Housner's maximum duration[3] of 45 sec and Bolt's duration

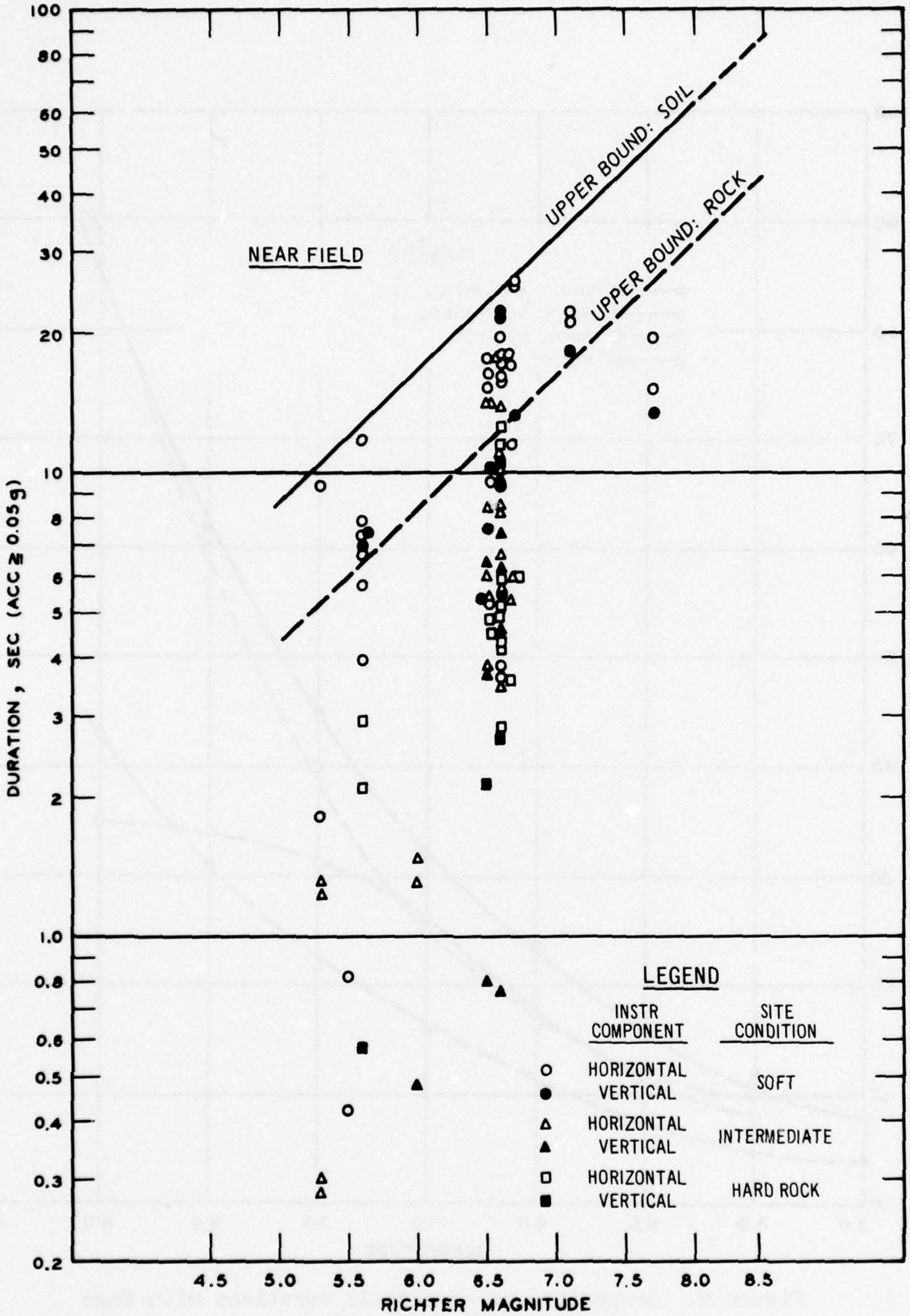


Figure 7. Duration versus Richter magnitude in the near field

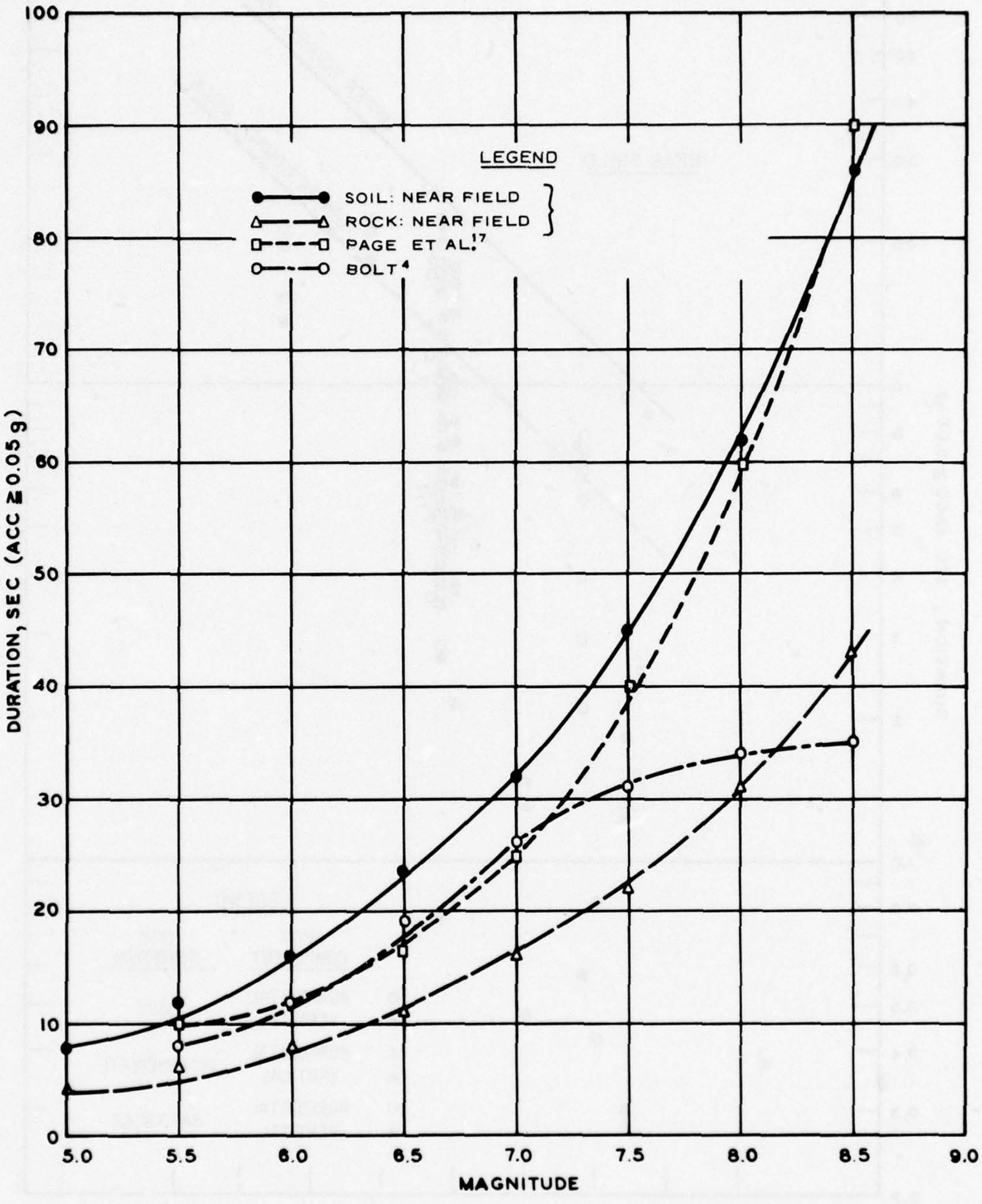


Figure 8. Comparison of near-field durations with Page et al.[17] and Bolt[4]

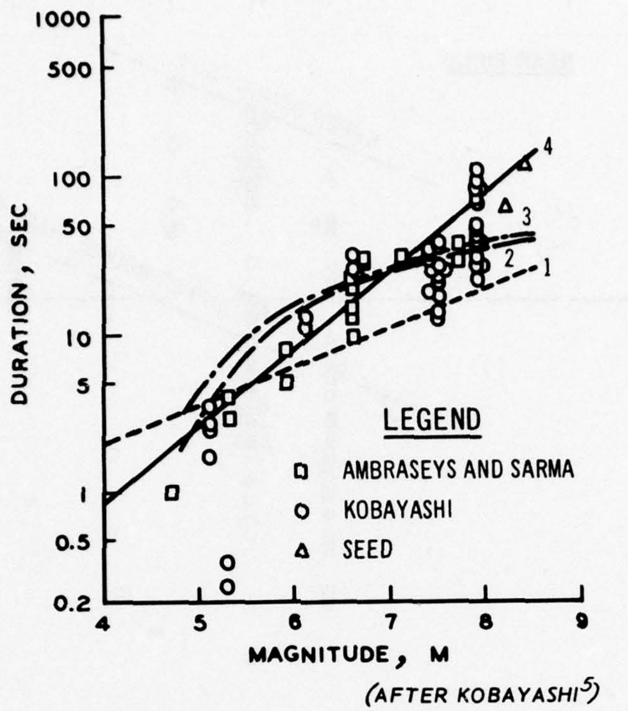


Figure 9. Duration of strong shaking and the earthquake magnitude (1. Gutenberg and Richter, $\log_{10} t_0 = 0.25\ M - 0.7$; 2. Housner, $t_0 = 11.0\ M - 52$; 3. Ambraseys and Sarma; $t_0 = 11.5\ M - 53.0$; and 4. Kobayashi, $\log_{10} t_{30} = 0.50\ M - 2.08$)

of 35 sec (±20 percent) for the magnitude 8.5 can be explained as the duration at the source (focus) of a rock site, but Page et al. and Kobayashi's maximum duration for the magnitude 8.5 corresponds to the upper-bound duration of this study for a soil site in an epicentral area.

Duration as a function of site intensity in the near and far fields

20. Figures 10 and 11 present duration as a function of MM intensity in the near field and far field, respectively. The boundary of the near field and far field has been defined by Krinitzsky and Chang.[27] The upper-bound durations for the soil and rock sites in the near field are tabulated below. (The average MM intensity and site conditions

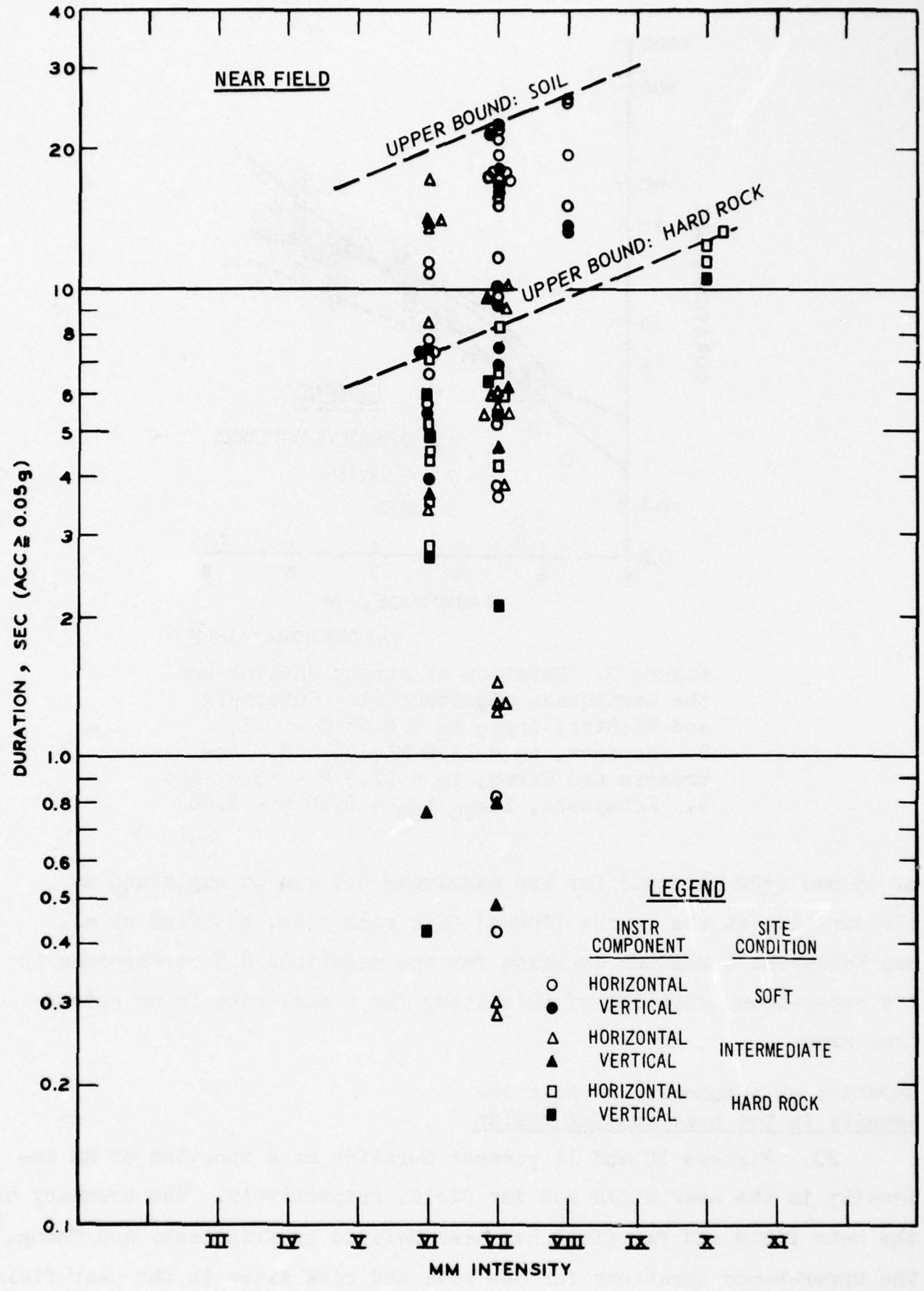


Figure 10. Duration versus MM intensity in the near field

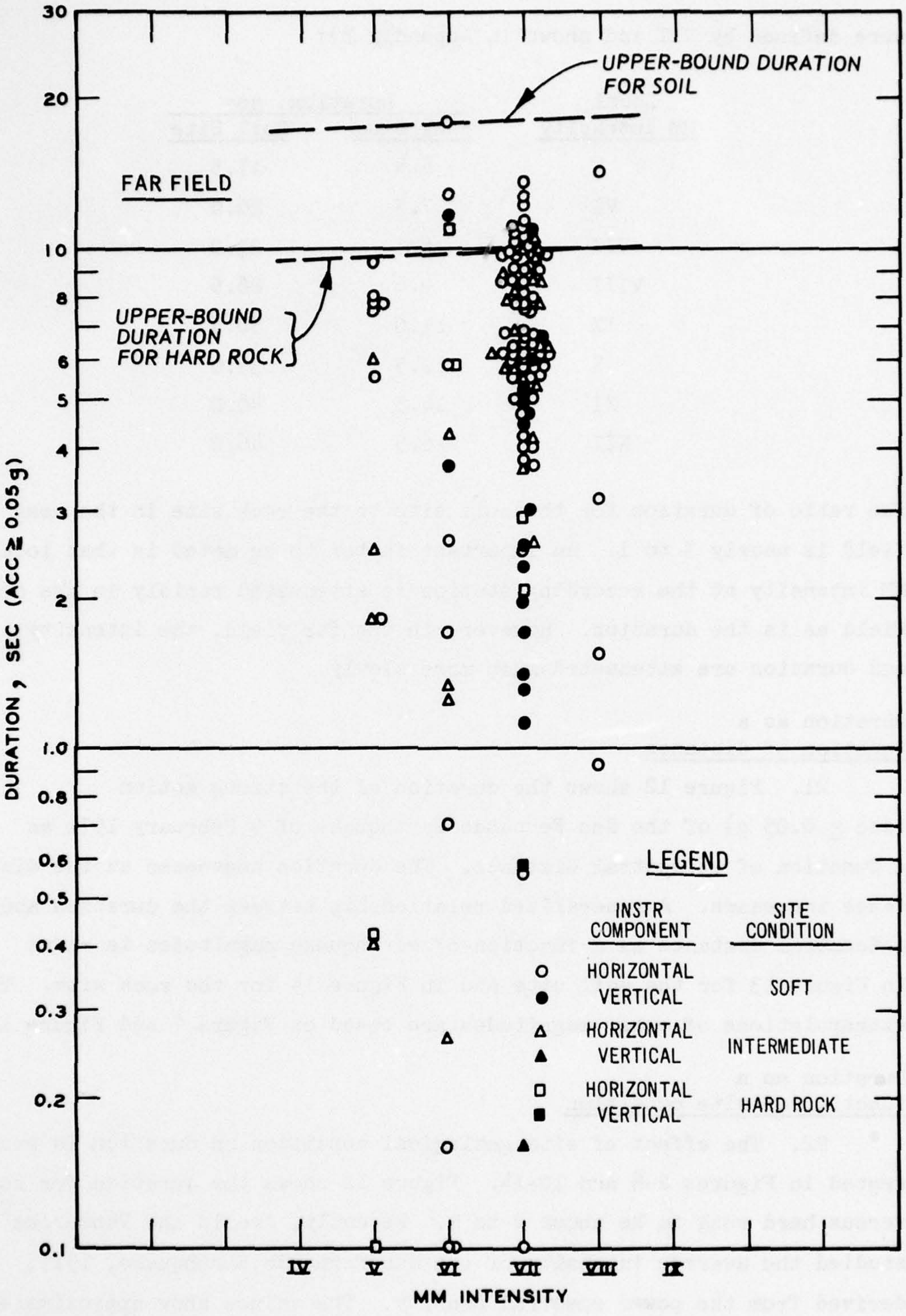


Figure 11. Duration versus MM intensity in the far field

were defined by CIT and shown in Appendix B):

Local MM Intensity	Duration, sec Rock Site	Soil Site
V	6.4	17.5
VI	7.3	20.0
VII	8.3	23.0
VIII	9.6	26.5
IX	11.0	30.0
X	12.5	35.0
XI	14.5	40.0
XII	16.5	46.0

The ratio of duration for the soil site to the rock site in the near field is nearly 3 to 1. An important factor to be noted is that local MM intensity at the recording station is attenuated rapidly in the near field as is the duration. However, in the far field, the intensity and duration are attenuated much more slowly.

Duration as a function of distance

21. Figure 12 shows the duration of the strong motion (acc $\geq$ 0.05 g) of the San Fernando Earthquake of 9 February 1971 as a function of epicentral distance. The duration decreases as the distance increases. A generalized relationship between the duration and epicentral distance as a function of earthquake magnitudes is shown in Figure 13 for the soil site and in Figure 14 for the rock site. The extrapolations of other magnitudes are based on Figure 7 and Figure 12.

Duration as a function of site condition

22. The effect of site geological condition on duration is presented in Figures 2-8 and 10-14. Figure 12 shows the duration for soft versus hard rock to be about 2 to 1. Recently, Arnold and Vanmarcke[29] studied the average intensity of the San Fernando Earthquake, 1971, derived from the power spectral density. The values show approximately a linear attenuation with distance from the epicentral area in the

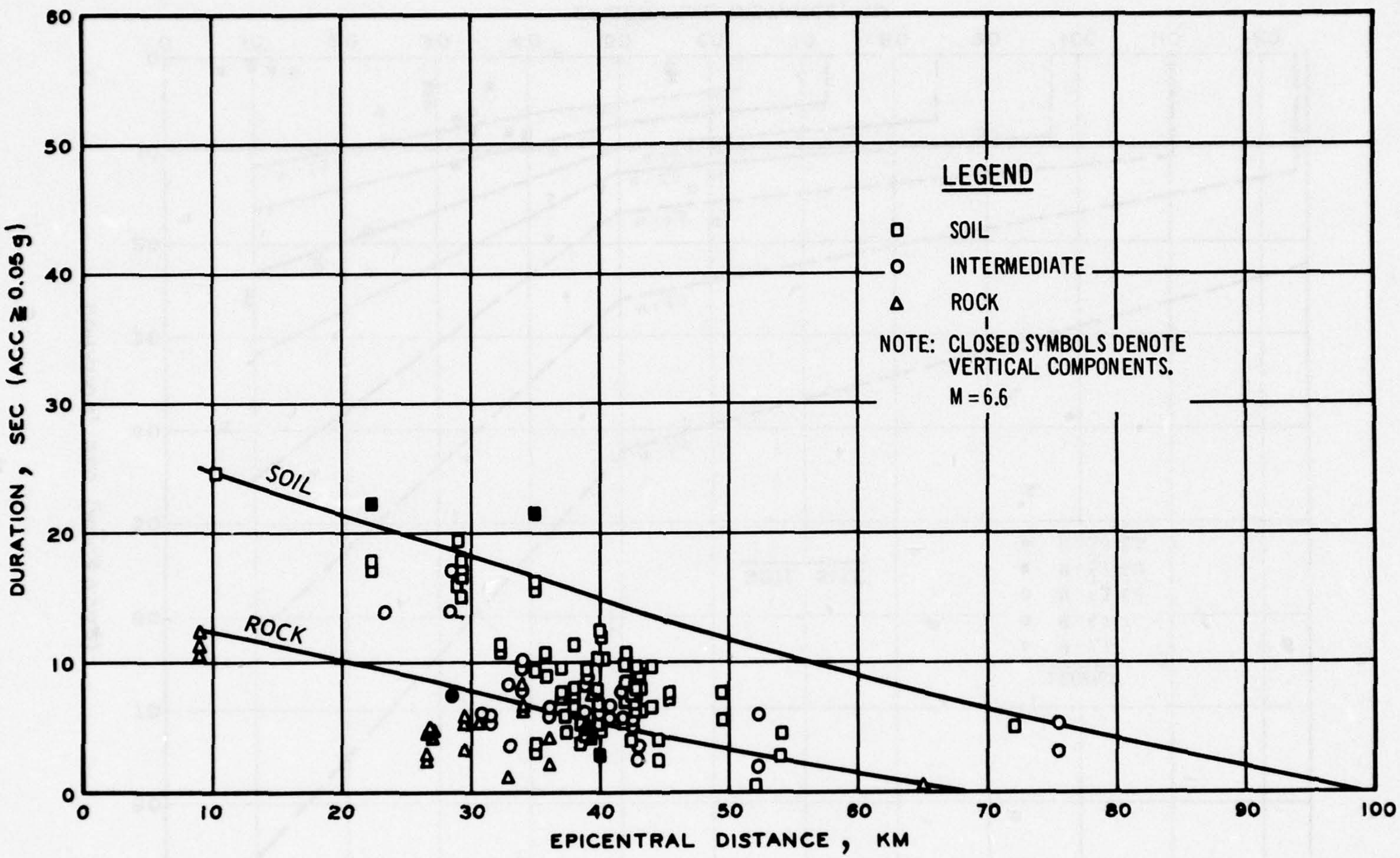


Figure 12. Duration versus epicentral distance, San Fernando Earthquake, California, 9 February 1971 (M - 6.6)

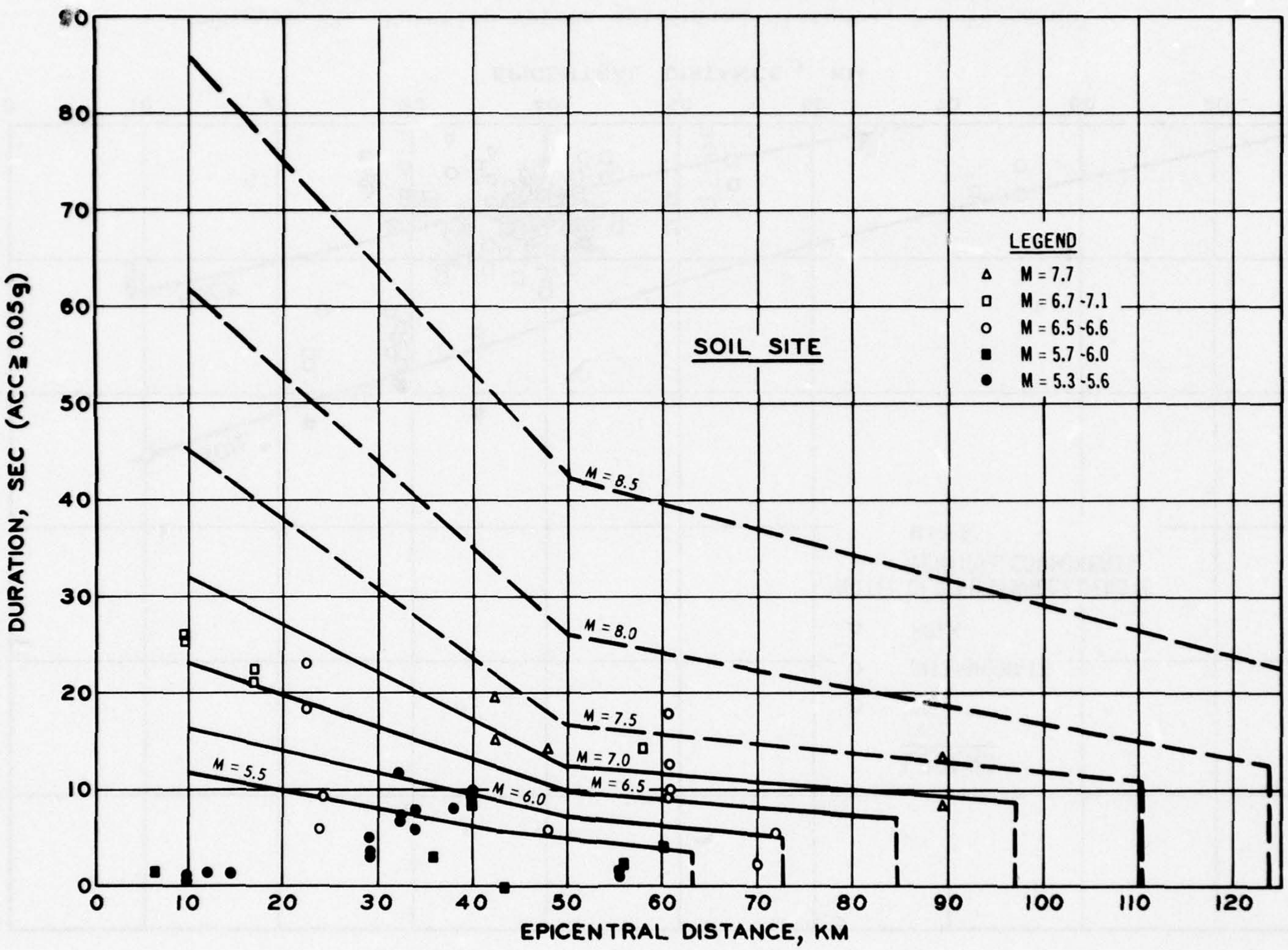


Figure 13. Duration versus epicentral distance and magnitude for the soil site

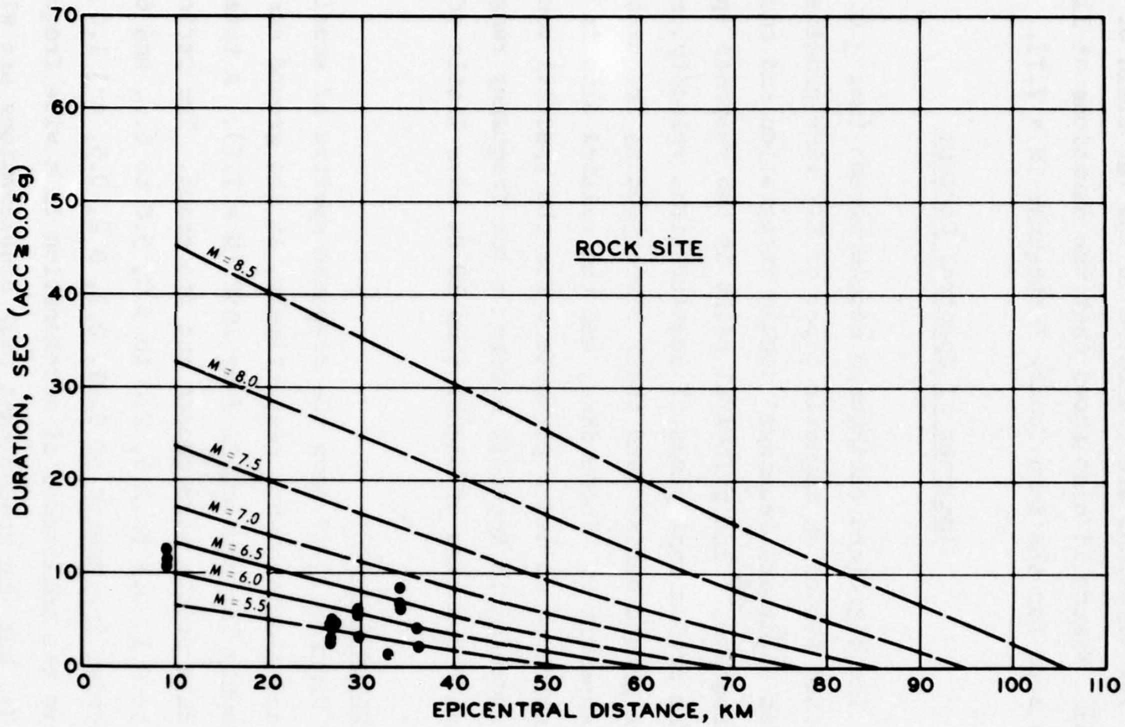


Figure 14. Duration versus epicentral distance and magnitude for the rock site

range of 50 km. Beyond this distance, the intensity seems to be more nearly constant. Since the duration of strong motion is related to peak intensity, the upper-bound line of duration in the near field (Figure 10) shows a linear decrease as the MM intensities decrease with distance. The durations are truncated in the far field of the soil site (Figure 13). Figure 15 also shows that the durations at 119.5 and 126 km are zero for the Kern County Earthquake (M = 7.7).

Analyses of Spectral Content

23. The digitized earthquake accelerograms (acc $\geq$ 0.05 g) of the western United States on magnetic tapes of CIT were processed through the modified Nigam and Jennings' double integration and response spectra computer programs,[26] and principal peaks in the response spectra were chosen. The predominant peaks of acceleration, velocity, and displacement at the ground surface and their corresponding frequencies are listed in Appendix B. These data, and the related data in Appendix A, will be considered as major parameters for the spectral content analyses. The data processed in Appendix B were in the frequency range of 0.1-10 Hz. The frequencies of higher than 10 Hz have little effect on structures.

Frequency range chosen

24. Figures 15-17 show the response spectra of acceleration, velocity, and displacement, respectively, at the ground surface for the Kern County Earthquake, 21 July 1952 (M = 7.7). A total of 48-period data points were chosen and processed. The periods are from 0.01 to 0.1, 0.1 to 2.6, 2.6 to 5.0, 5.0 to 6.0, and 6.0 to 9.0 sec with respective increments of 0.01, 0.1, 0.2, 0.5, and 1.0 sec. Figure 15 shows the amplitudes of acceleration in a wide frequency range of 0.1-50 Hz, but the predominant peak accelerations are within 1-10 Hz. Above 10 Hz, the amplitudes of response spectrum become a constant value at the distance range of 43-126 km. The integrated particle velocities and displacements of Figures 16 and 17 do not present any information in the frequency range over 10 Hz. Evidently, the higher

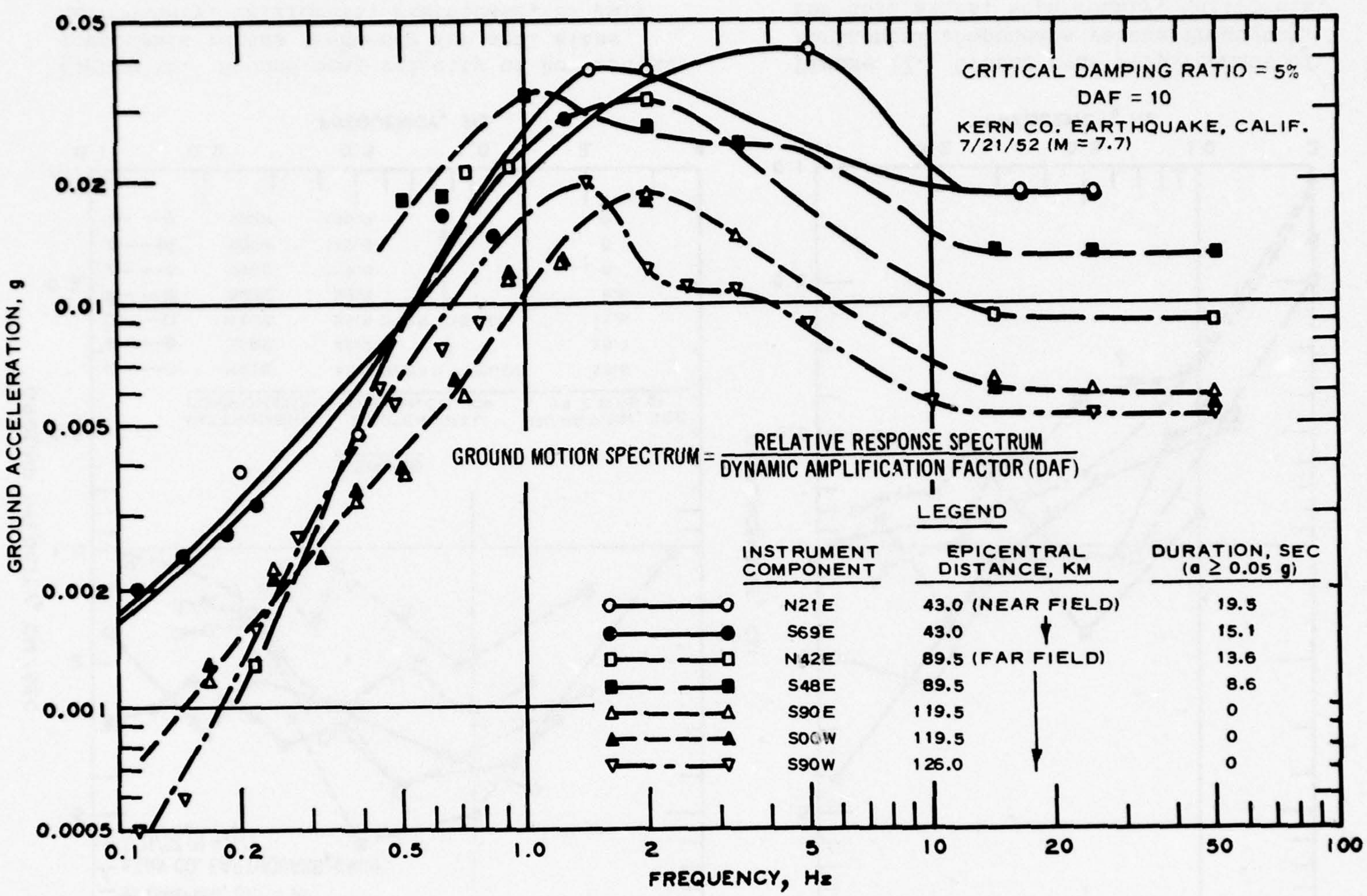


Figure 15. Ground peak acceleration of horizontal components versus frequency for soil sites, Kern County, California, Earthquake, 21 July 1952 (M = 7.7)

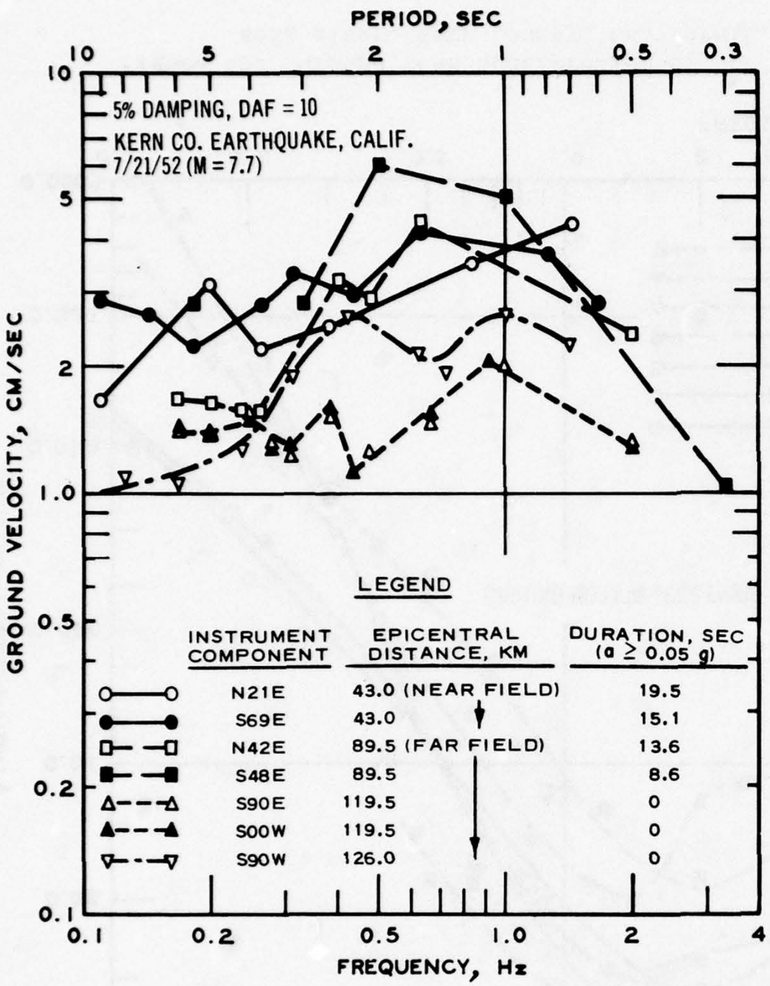


Figure 16. Ground peak velocity of horizontal components versus frequency for soil sites, Kern County, California, Earthquake, 21 July 1952 (M = 7.7)

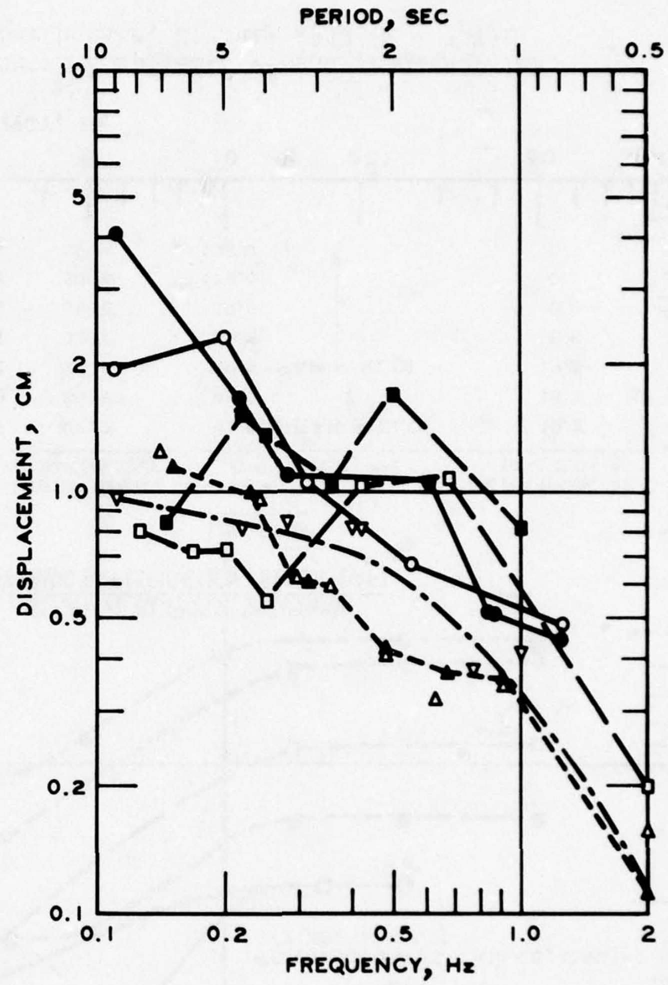


Figure 17. Ground peak displacement of horizontal components versus frequency for soil sites, Kern County, California, Earthquake, 21 July 1952 (M = 7.7)

frequency range above 10 Hz recorded in the accelerograms does not affect or influence the particle velocity and displacement. Based on this relation, the frequency range of 0.1-10 Hz for this study is appropriate. All data in Appendix B were processed in this range. The incremental intervals for the 48 periods chosen were taken as follows:

Period sec	Increment sec
0.1 - 0.8	0.05
0.8 - 1.6	0.10
1.6 - 2.0	0.20
2.0 - 2.6	0.10
2.6 - 5.0	0.20
5.0 - 6.0	0.50
6.0 - 9.0	1.00

Appendix C lists the 48 periods and the corresponding frequency components, which were employed to define the spectral content.

25. The spectra dependent effects of magnitude, distance, recording site condition, and path are discussed in the following sections. The discussions are based mainly on the data presented in Appendixes A, B, and C.

Spectra dependent effect of magnitude

26. The acceleration peak spectra of the San Fernando Earthquake of 9 February 1971, which has a magnitude of 6.5, are plotted in Figures 18 and 19 for the soil and hard rock sites, respectively. Figures 20 and 21 show plots of the other earthquakes of magnitudes that range from 5.3 to 5.9 and 5.7 to 6.0, respectively, with soft and intermediate site conditions. Figure 22 presents the El Centro Earthquake of magnitude 6.7 (1940) and Western Washington Earthquake of magnitude 7.1 (1949), and Figures 15-17, the Kern County Earthquake of magnitude 7.7 (1952). An examination of the above-mentioned figures shows that the predominant frequencies are within the range of 1-6.67 Hz for all earthquakes used.

27. No relationship was found between frequency and magnitude.

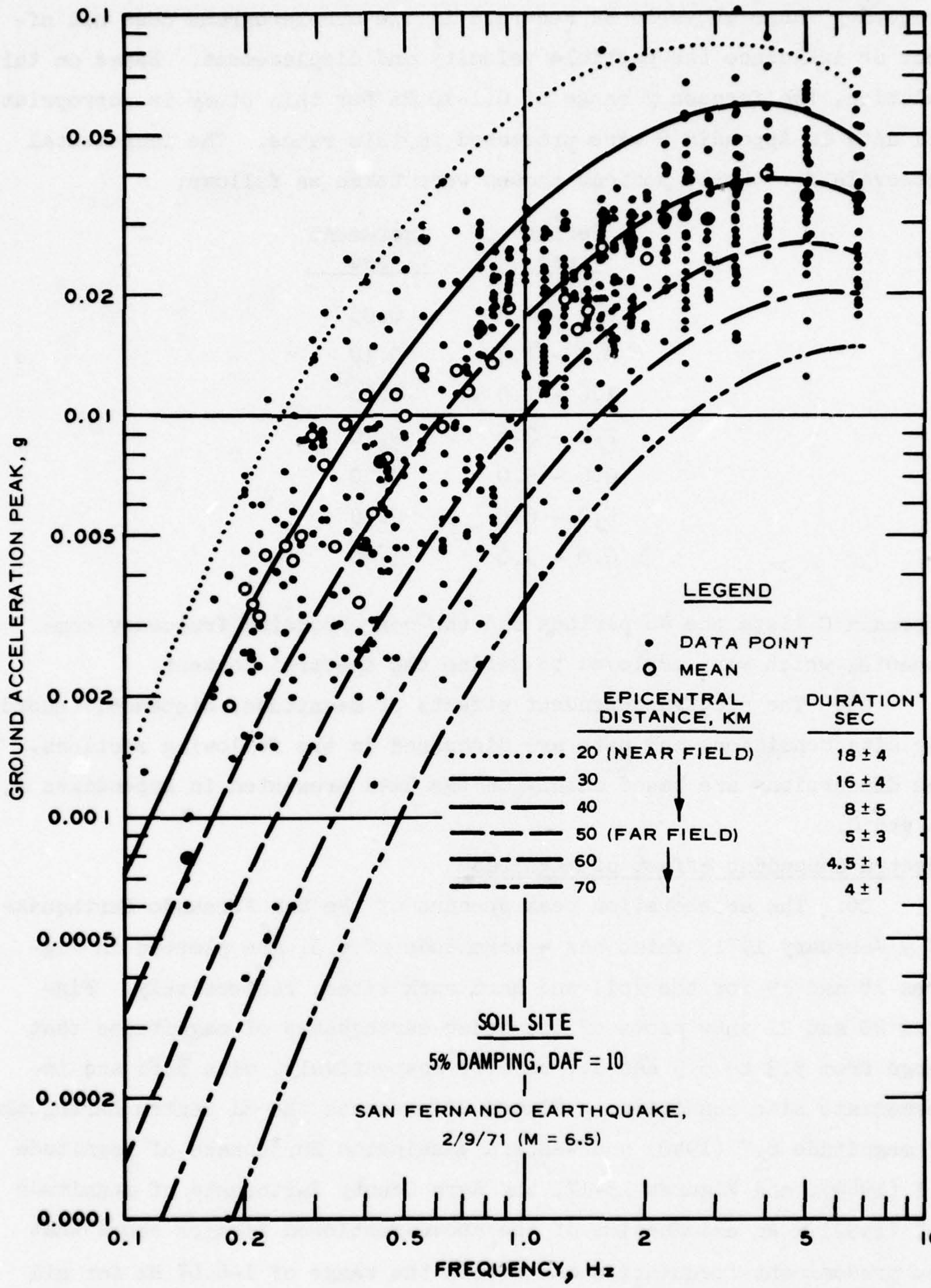


Figure 18. Ground peak acceleration spectra of horizontal components for soil sites at various distances and durations, San Fernando Earthquake, California, 9 February 1971 (M = 6.5)

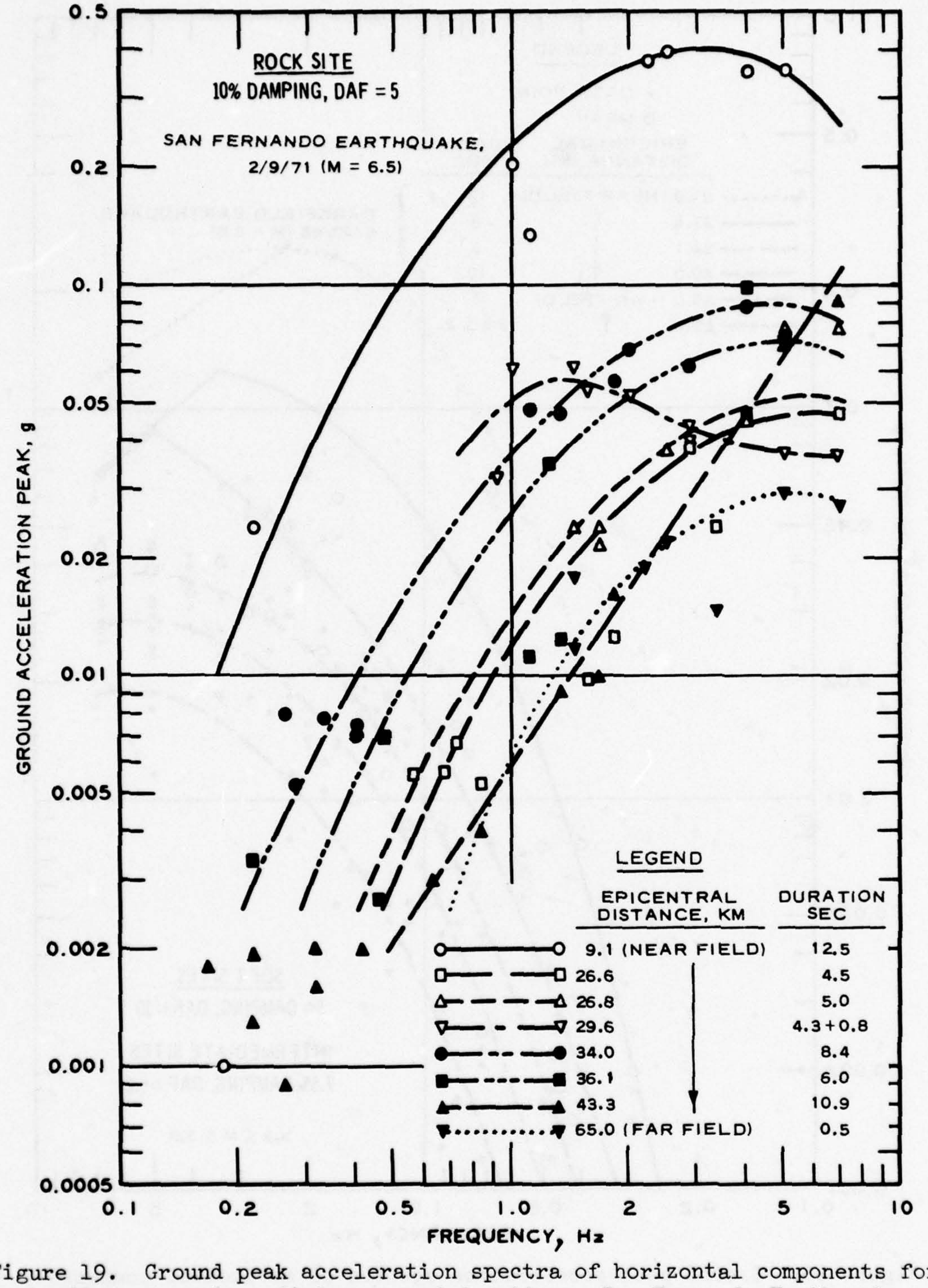


Figure 19. Ground peak acceleration spectra of horizontal components for rock sites at various distances and durations, San Fernando Earthquake, California, 9 February 1971 (M = 6.5)

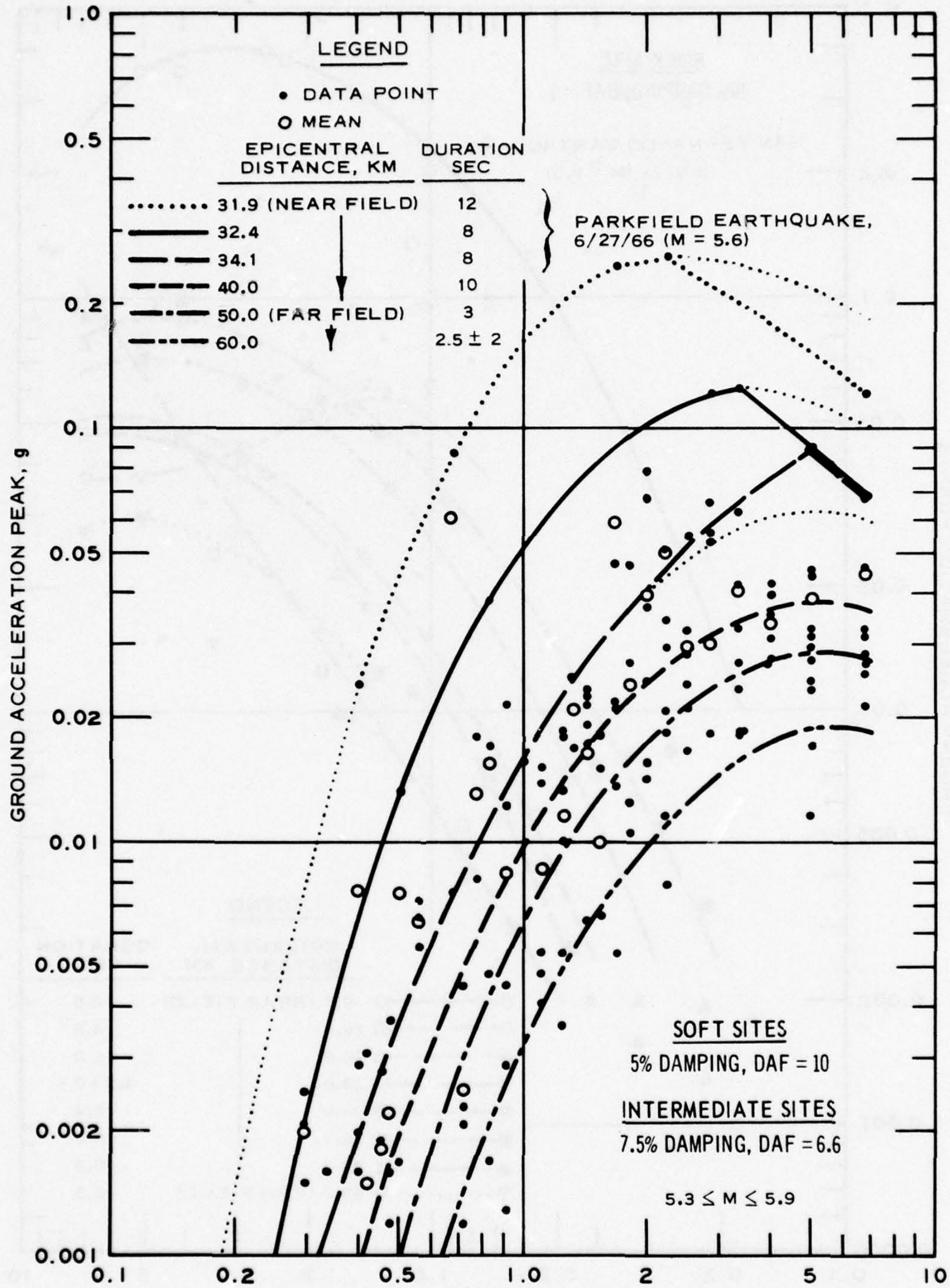


Figure 20. Ground peak acceleration spectra of horizontal components for soft and intermediate sites at various distances and durations for earthquake magnitudes of 5.3-5.9 in western United States

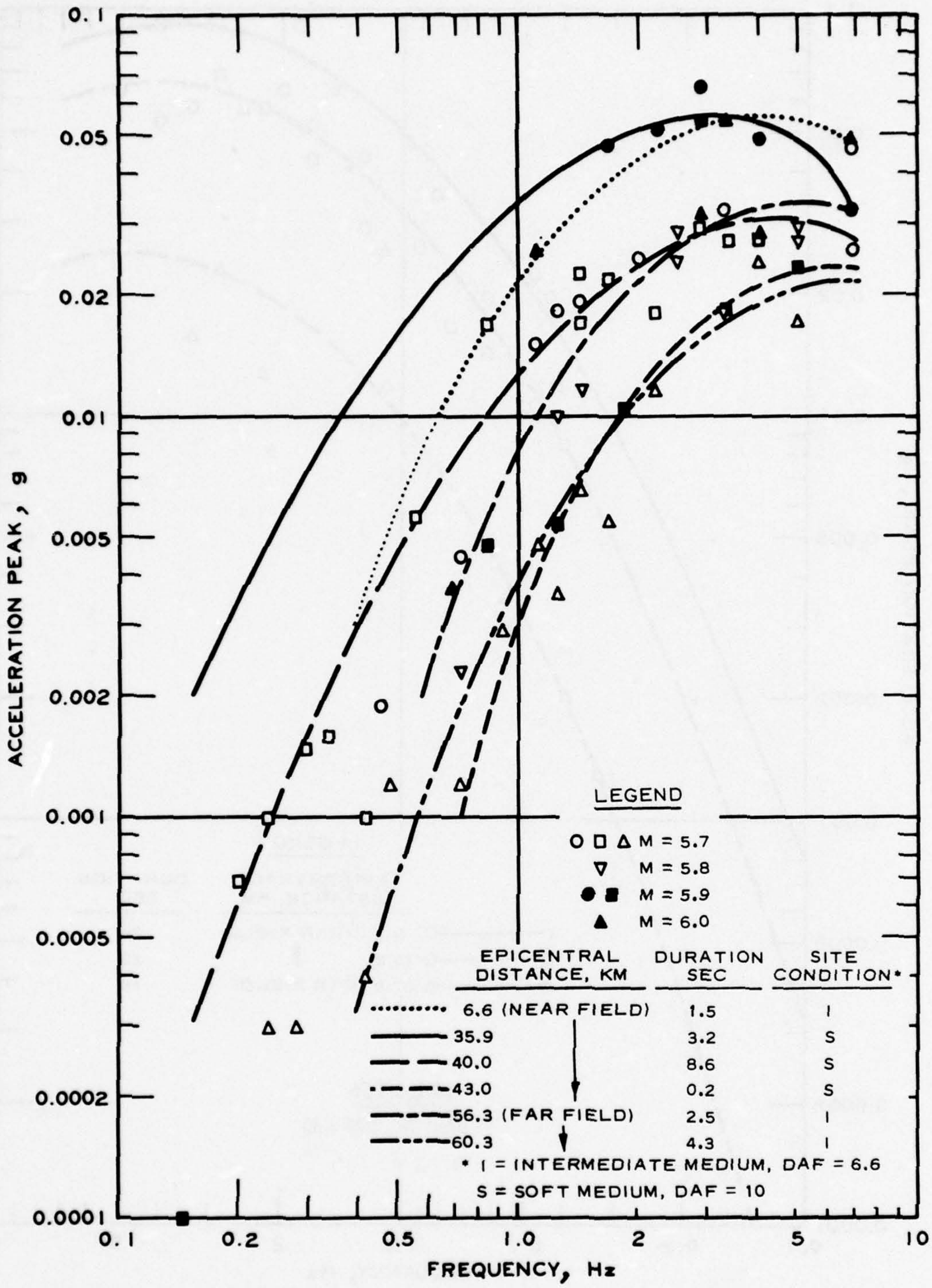


Figure 21. Ground peak acceleration spectra of horizontal components for soft and intermediate sites at various distances and durations for earthquake magnitudes of 5.7-6.0 in western United States

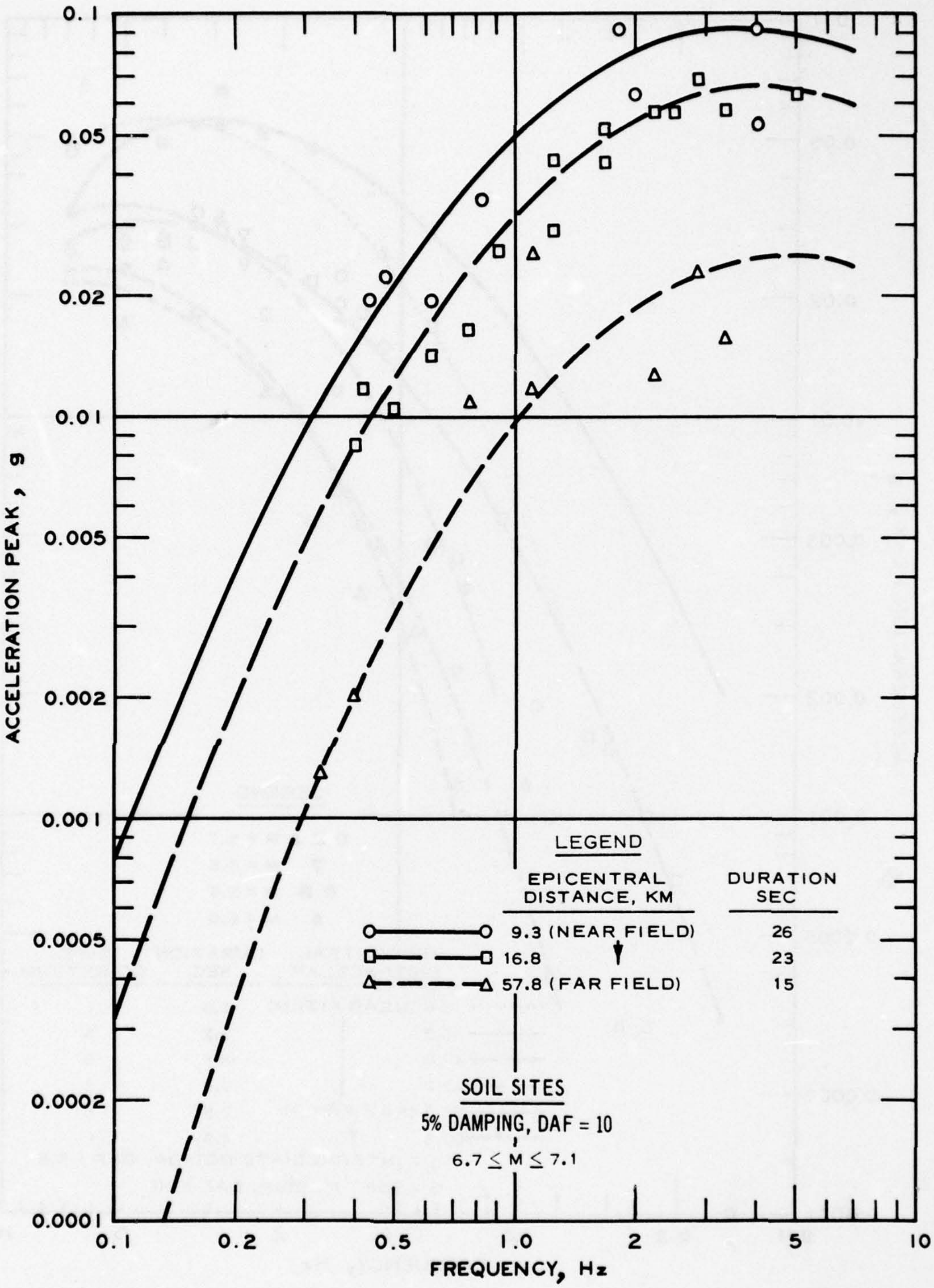


Figure 22. Ground peak acceleration spectra of horizontal components for soil sites at various distances and durations for earthquake magnitudes of 6.7-7.1 in western United States

Effect of distance on spectra

28. The acceleration response spectra of Figures 18-22 do not show any notable increase of the predominant period with distance ($6.6 \text{ km} \leq \Delta < 126 \text{ km}$). Apparently, a reverse case is indicated in Figures 18 and 20. Of course, the distance was limited to within 90 km in this study due to the criteria of time duration (acc $\geq$ 0.05 g). The peak acceleration spectrum has a wide frequency range from 1.0 to 7.0 Hz at a short epicentral distance.

Effect of site geology on spectra

29. A comparison of the acceleration spectra of Figures 18 and 19 for the soil and rock sites of the San Fernando Earthquake shows the soil site with a wider frequency range of maximum acceleration than the rock site, but the rock site has higher accelerations in the near field. The dispersion phenomena are more pronounced in the low-frequency (f) range ($0.5 \text{ Hz} > f > 0.1 \text{ Hz}$) for the soil site than for the rock site; the amplitude range for the soil site is between 0.0001 and 0.03 g and for the rock site between 0.001 and 0.1 g. However, it is noted that the maximum displacement is in the low-cycle region between 0.1 and 0.4 Hz (see paragraph 38). Kasiraj and Yao (1968)[30] presented the results of a theoretical variation of parameter study that investigated damage based on a low-cycle fatigue damage factor using an inelastic model, which included a low-cycle fatigue hysteresis loop. A similar process probably influences the soil site more so than the rock site, so that the maximum displacement, low frequency, and longer duration are affected and show up as important damage criteria.

Spectra-dependent effect
of path and topography

30. The effect of wave transmission path and topography, from the earthquake source to the recording station, on the ground motion history is well known. Especially, after the recording of 1.25 g at the Pacoima Dam during the San Fernando Earthquake, an extensive study of the effect of topography on the ground motion was made. Chang[31] found a linear relationship between the ground motion and the elevation in the San Fernando Valley region of the San Fernando Earthquake. He used

this new relationship, elevation gradient method, to predict the acceleration of 2.29 g at the top of Kagel Mountain, which was also confirmed by the after-shock study.

31. In Figure 19, the acceleration response spectra recorded at the Santa Anita Reservoir, Arcadia (distance = 43.3 km), and the Lake Hughes Array No. 1, California (distance = 29.6 km), both on rock, have different characteristics in comparison with other paths. The former shows a linear increase in acceleration between 0.5 and 7.0 Hz and is nearly constant under 0.5 Hz; the latter shows maximum accelerations that changed from the usual spread of 2-7 Hz for other paths to a range of 1-2 Hz. The duration for the former is longer at the far distance than the near distance. Also, the accelerograms of the Lake Hughes Array (distance from 26.6 to 29.6 km) have lesser durations than those for other paths. The site of the Santa Anita Reservoir is nearly at the southeastern front of the San Gabriel Mountain range and the source-station path is almost entirely within the crystalline mass of the San Gabriel Mountains. The site of Lake Hughes Array No. 1 is at the northern edge of the San Gabriel Mountain range and on the north side of the San Andreas Fault. The source-station path for Lake Hughes Array No. 1 is probably not entirely within the more uniform basement complex, and also the discontinuity of the San Andreas Fault might cause the difference in wave spectra.

Spectra dependent effect of integration process (on acceleration, particle velocity, and particle displacement)

32. The integration procedures tend to smooth out the rapid oscillations of the acceleration and allow the lower frequencies to become predominant. As an example, let us consider the Kern County, California, Earthquake of 21 July 1952 (magnitude 7.7).

33. The highest frequency of the acceleration response spectra in Figure 15 is 50 Hz. However, the accelerations reached a constant value at 14 Hz; the effective frequency was from 0.1 to 10 Hz. Figure 15 also indicates that the predominant frequencies of the acceleration response spectra are between 1 and 5 Hz because the maximum

accelerations are in this frequency range. Figures 16 and 17 show that the predominant frequencies of the velocity response spectra and the displacement spectra are between 0.5 and 1.5 Hz and 0.1 and 0.4 Hz, respectively. Newmark's tripartite logarithmic response spectra technique[15] is based on these predominant frequency ranges. This also explains why the frequencies of maximum acceleration, maximum velocity, and maximum displacement cannot be correlated.

Average and Upper-Bound Spectral Shape

34. The spectral shape is dependent on magnitude, focal mechanism, propagation path, distance, duration, site geology, and damping ratio. At the present time, there is not enough instrumental data of strong earthquakes for a sufficient analysis of the above-mentioned parameters. Based on the total horizontal components of 201 in Appendix B, general average horizontal response spectra of acceleration, velocity, and displacement for the soil, intermediate rock, and hard rock sites are presented in Figures 23, 24, and 25, respectively. The upper-bound spectral shape can thus be extrapolated for the respective sites. Epicentral distances are in the range of 6-90 km. About 70 percent of these data were collected from the San Fernando, California, Earthquake of 9 February 1971. The amplitudes of acceleration, velocity, and displacement listed in Appendix B are not the relative amplitudes of response spectra, for they have to be multiplied by the dynamic amplification factor of 10, 6.67, and 5 for the soft, intermediate rock, and hard rock sites, respectively, to get the relative response spectral amplitudes. However, the average spectral shape is not changed. The processed spectral frequency range is between 0.1 and 10 Hz (see Appendix C), but the effective spectral peak frequency range is between 0.111 and 6.667 Hz (see Appendix B - predominant frequency range).

Average acceleration-peak spectra

35. Figures 23, 24, and 25 show the acceleration-peak distributions within the frequency range of 0.111-6.667 Hz for the magnitudes of 5.3-7.7 at soil, intermediate rock, and hard rock sites, respectively.

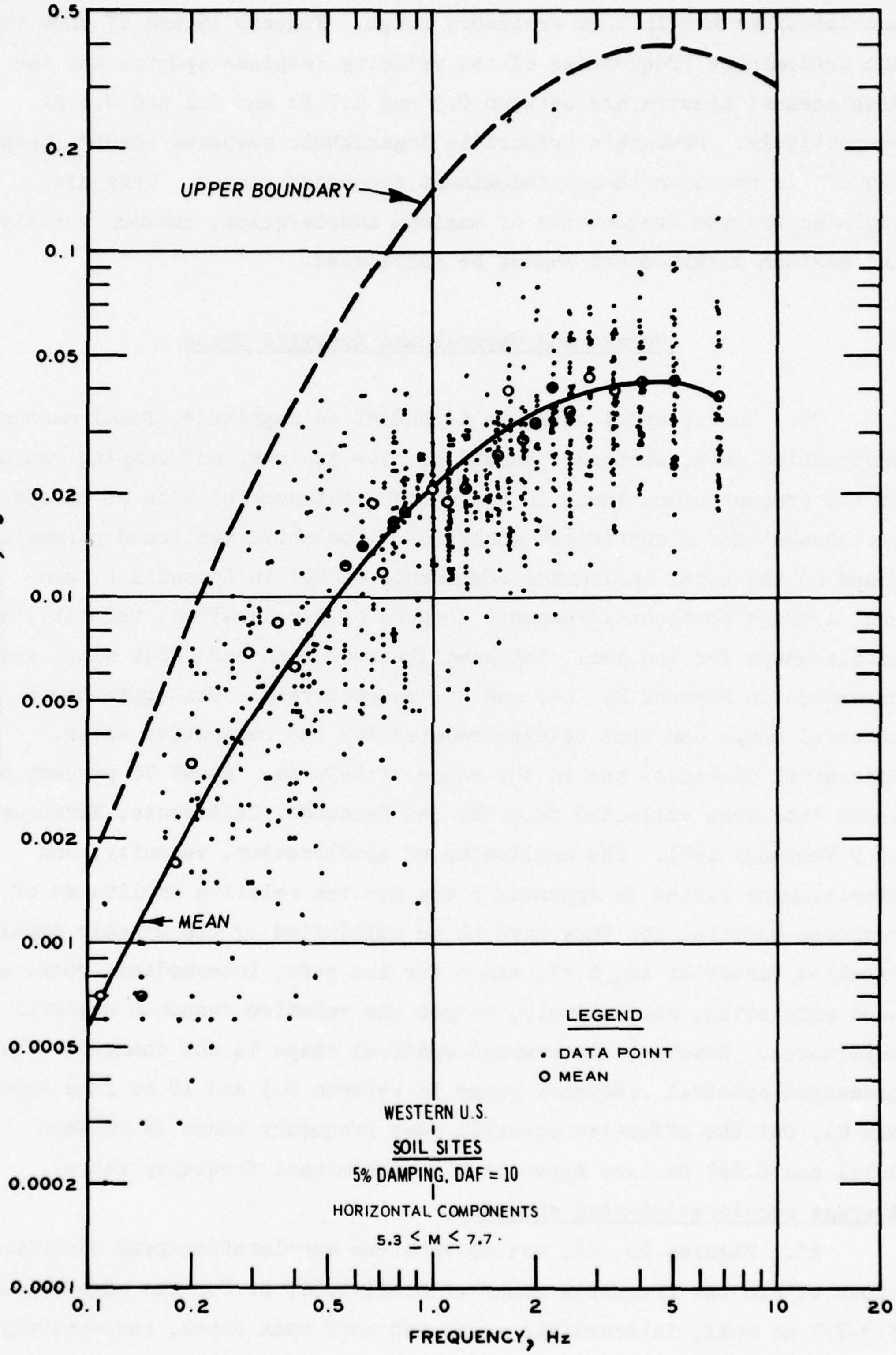


Figure 23. Average ground peak acceleration spectrum (mode shape) and upper-bound envelope of horizontal components for soil sites for earthquake magnitudes of 5.3-7.7 in western United States

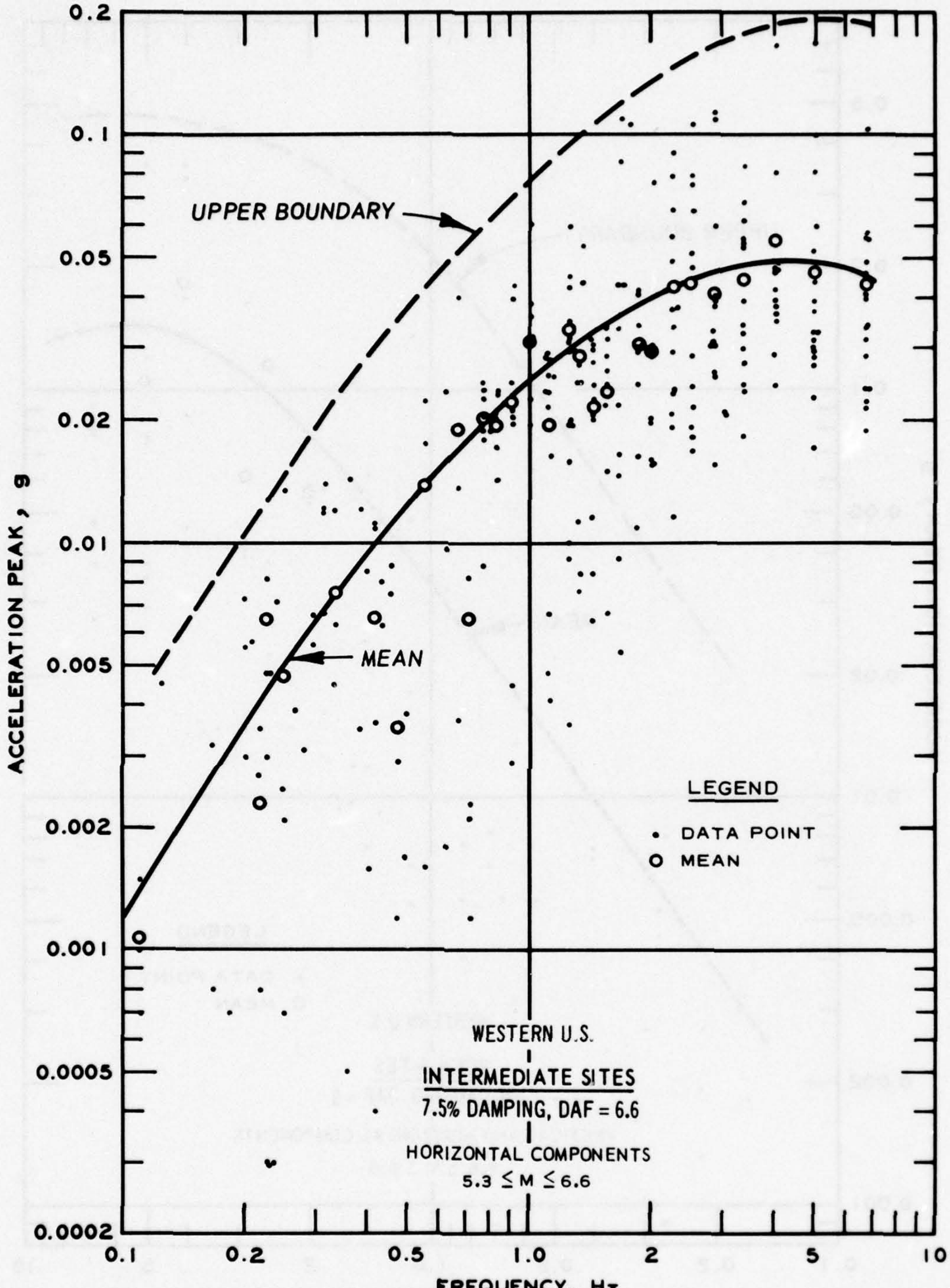


Figure 24. Average ground peak acceleration spectrum (mode shape) and upper-bound envelope of horizontal components for intermediate sites for earthquake magnitudes of 5.3-6.6 in western United States

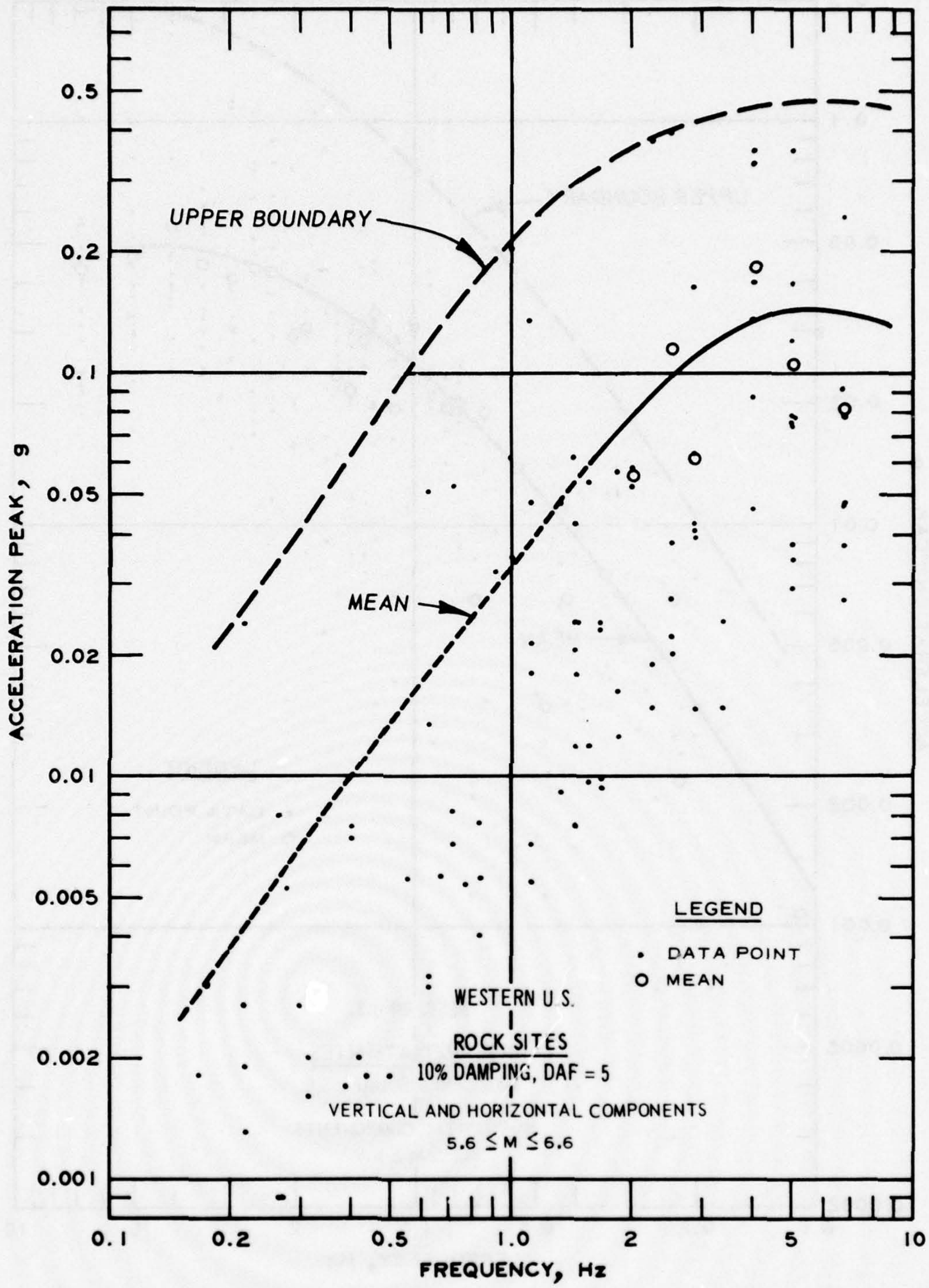


Figure 25. Average ground peak acceleration spectrum (mode shape) and upper-bound envelope of vertical and horizontal components for rock sites for earthquake magnitudes of 5.6-6.6 in western United States

The average acceleration curves of Figures 23-25 are presented in Figure 26, which shows a narrow frequency band of maximum peak accelerations between 2.5 and 5 Hz for the hard rock site and a wider frequency band between 2 and 6 Hz for the intermediate rock and soil sites. The differences between intermediate rock and soil sites are slight.

36. The general pattern of the three average acceleration curves of Figure 26 indicates that the amplitude increases from the lowest at a frequency of 0.11 Hz to the highest at 4 Hz for the soil site and 5 Hz for the intermediate and hard rock sites. In the frequency range of 0.1-2.0 Hz on the average acceleration spectrum for the hard rock site, the acceleration seems to increase linearly with frequency, but the intermediate rock and soil sites do not. The acceleration distribution is between 0.00003 g at 0.11 Hz and 0.4 g at 5 Hz for the soil site and 0.00008 g at 0.11 Hz and 0.45 g at 5 Hz for the hard rock site, according to the extrapolation of the upper-bound envelopes. Both 0.4 and 0.45 g at the discrete frequency of 5 Hz are probably the upper-bound or near upper-bound accelerations for the soil and rock sites at or near the fault rupture. At this point, it should be noted that the 1.25 g of the Pacoima record was the resultant amplitude obtained from the sum of the amplitudes of the predominant frequencies.

Average velocity-peak spectra

37. Figures 27-29 present the upper-bound velocity-peak and the average velocity-peak curves for the western United States strong earthquakes. The maximum average velocity peaks are located in the frequency range of 0.2-1.5 Hz (Figures 27 and 28) for soil and intermediate rock sites and 0.2-2.5 Hz (Figure 29) for the hard rock site. The ground-surface peak-amplitudes are within the range of 0.4-25 cm/sec for soil and intermediate rock sites, and 0.6 to 36 cm/sec for the hard rock site. In general, the soil and intermediate sites have the approximate same characteristics in average velocity spectral content, but the hard rock site has a different characteristic, which shows three peak-regions of 0.2-0.3, 0.7-0.8, and 2-3 Hz. Since the soil and intermediate rock sites have common spectral characteristics, they can be combined into a single representative alluvial or sedimentary site.

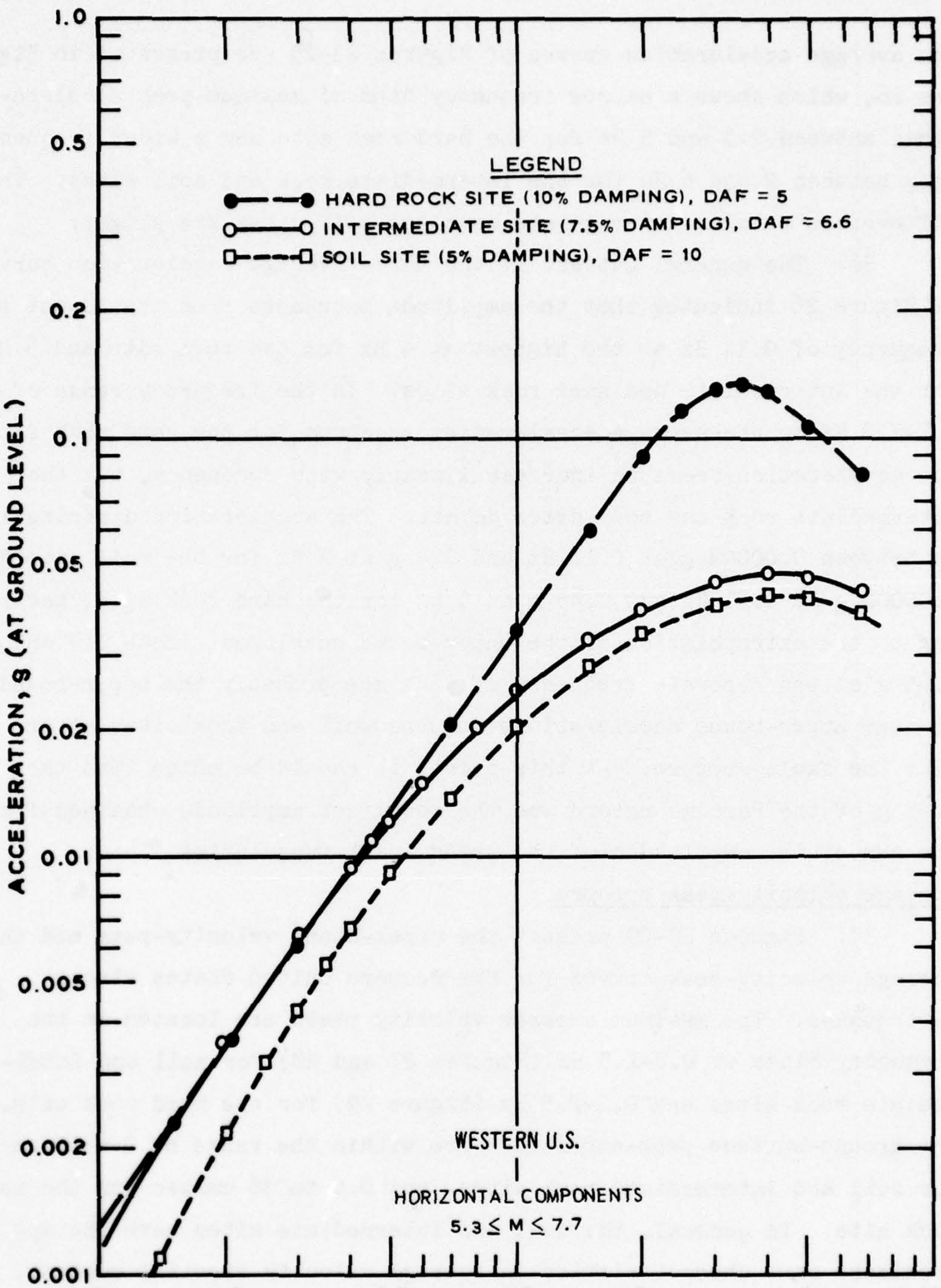


Figure 26. Average ground peak acceleration spectra of horizontal components for various site conditions for earthquake magnitudes of 5.3-7.7 in western United States

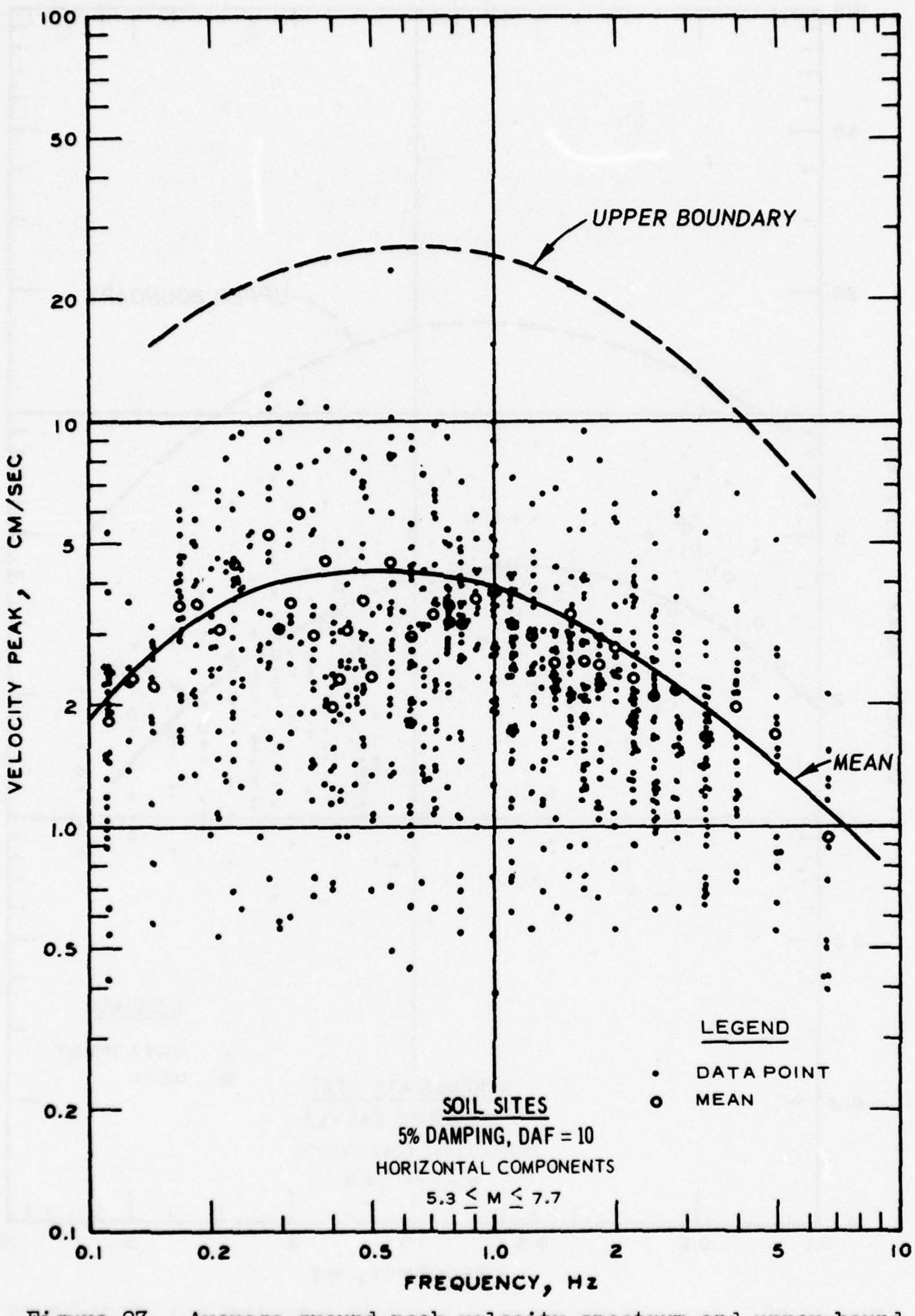


Figure 27. Average ground peak velocity spectrum and upper-bound envelope of horizontal components for soil sites for earthquake magnitudes of 5.3-7.7 in western United States

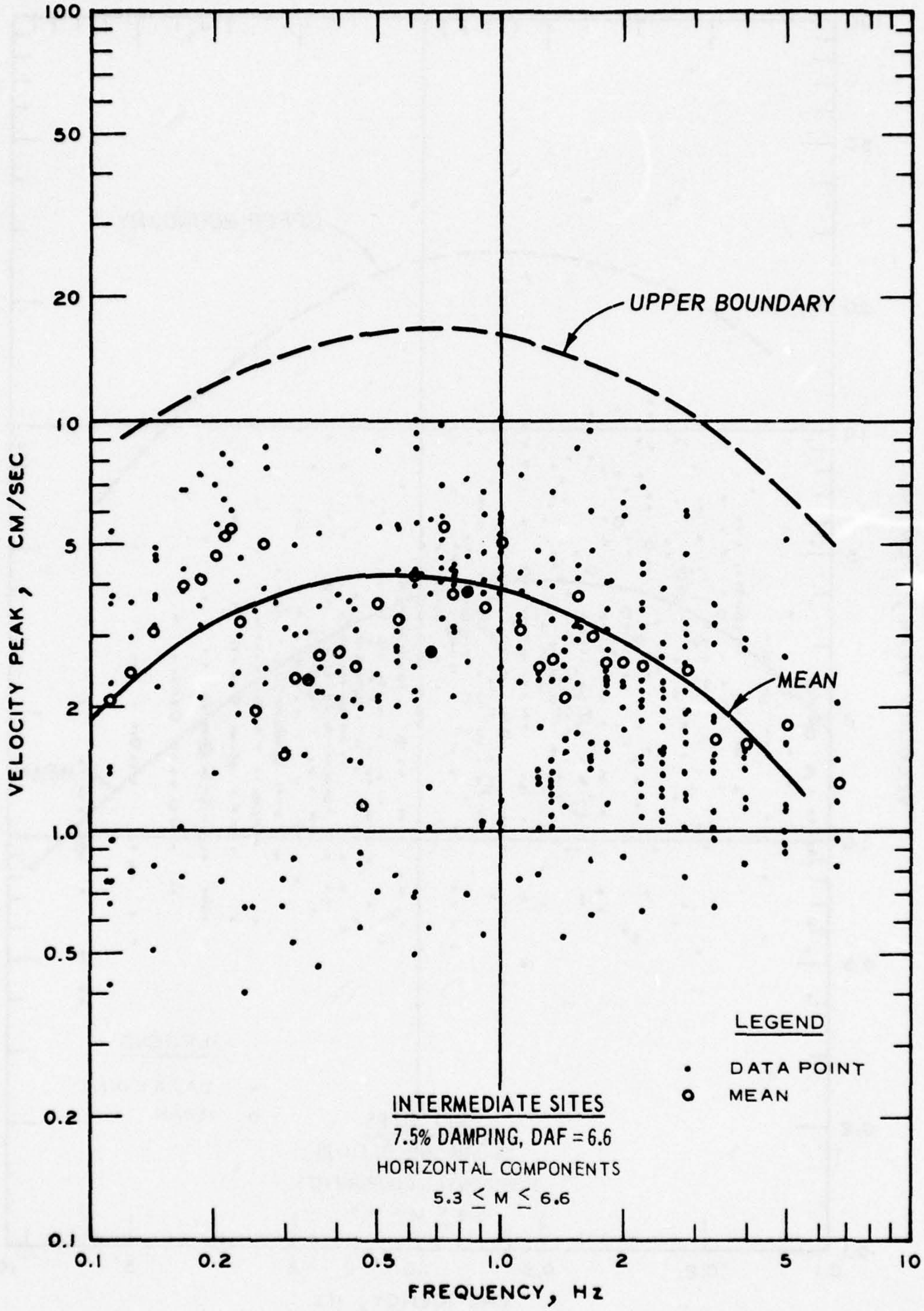


Figure 28. Average ground peak velocity spectrum and upper-bound envelope of horizontal components for intermediate sites for earthquake magnitudes of 5.3-6.6 in western United States

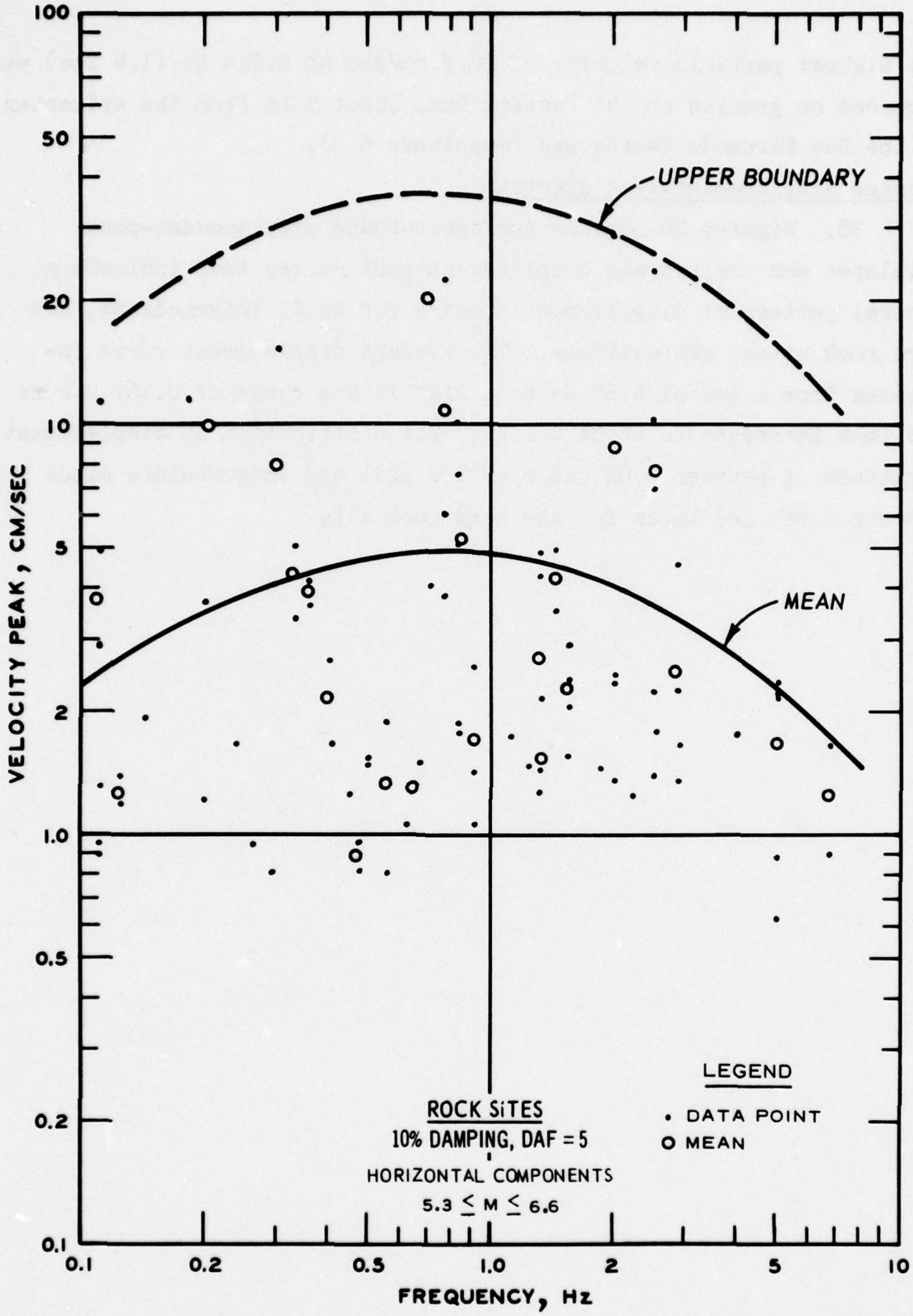


Figure 29. Average ground peak velocity spectrum and upper-bound envelope of horizontal components for rock sites for earthquake magnitudes of 5.6-6.6 in western United States

The highest particle velocity of 36.5 cm/sec at 0.714 Hz (1.4 sec) was recorded on granite at the Pacoima Dam, about 9 km from the epicenter of the San Fernando Earthquake (magnitude 6.5).

Average displacement-peak spectrum

38. Figures 30-32 show the upper-bound displacement-peak envelopes and the average displacement-peak curves that indicate a general pattern of displacement spectra for soil, intermediate, and hard rock sites, respectively. The average displacement curve increases from a low of 6.67 Hz to a high in the range of 0.167-0.2 Hz and then decreases to about 0.1 Hz. The distribution of displacement amplitude is between 0.02 and 8 cm for soil and intermediate sites and between 0.015 and 16 cm for the hard rock site.

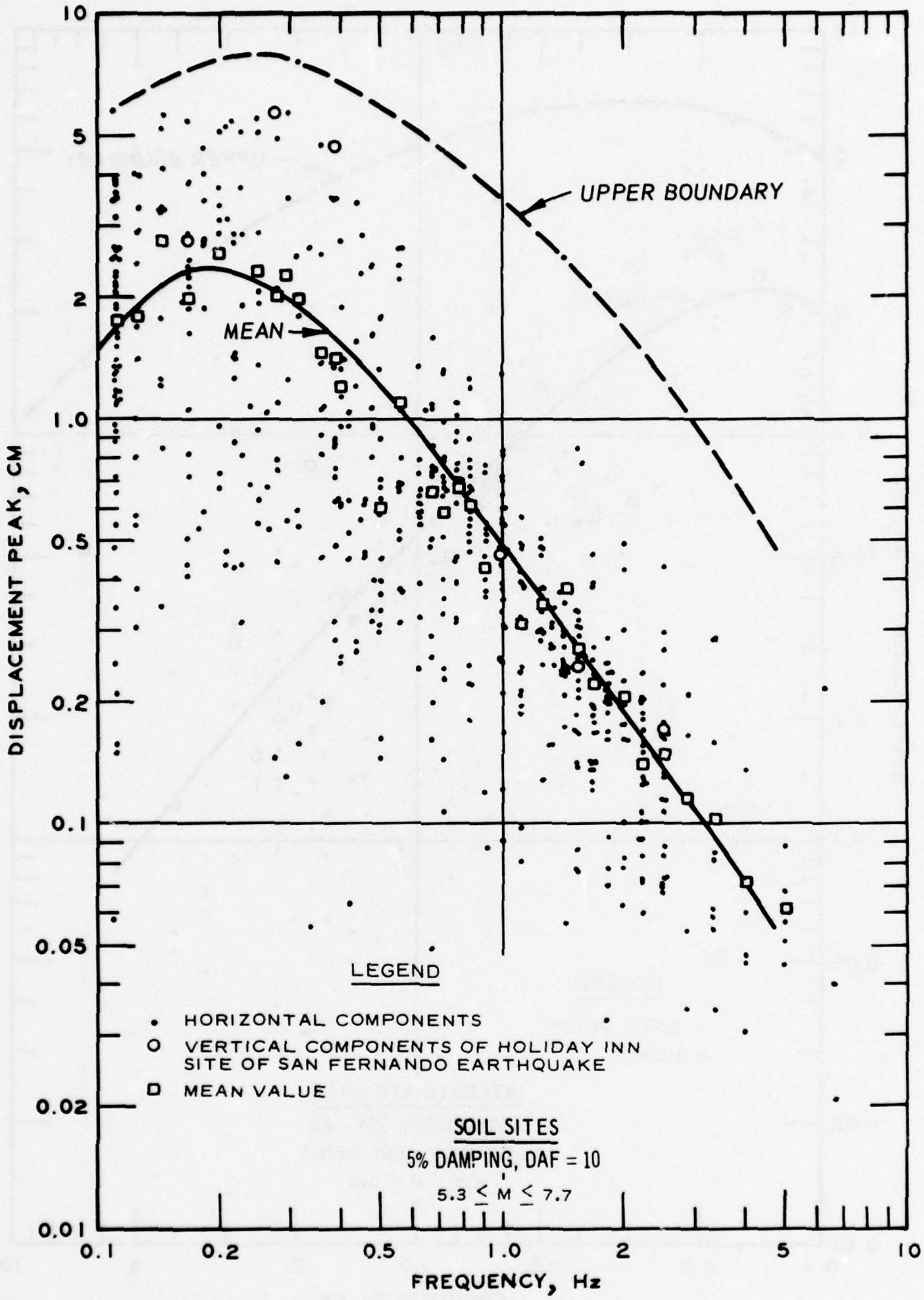


Figure 30. Average ground peak displacement spectrum and upper-bound envelope of horizontal components for soil sites for earthquake magnitude of 5.3-7.7 in western United States

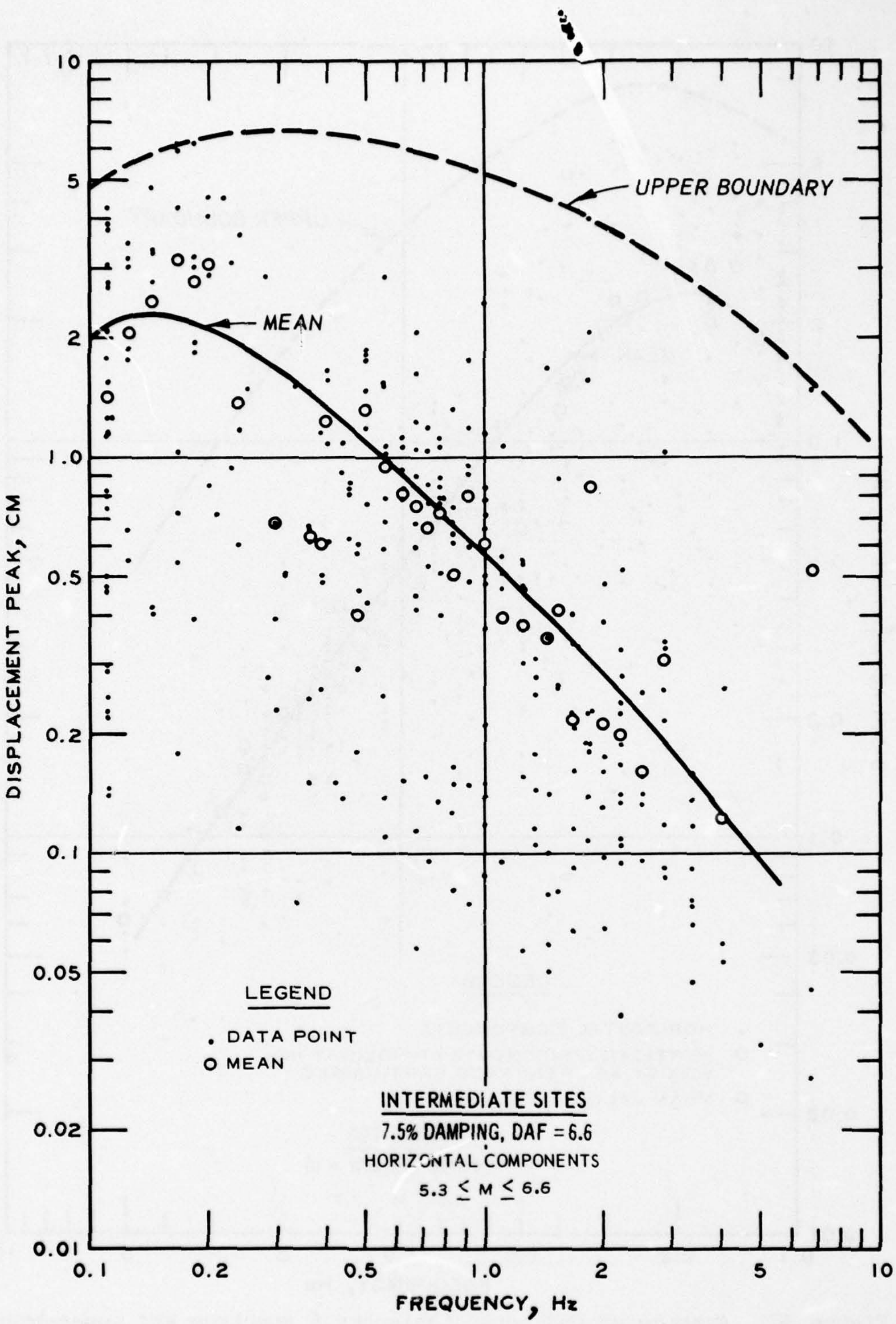


Figure 31. Average ground peak displacement spectra and upper-bound envelope of horizontal components for intermediate sites for earthquake magnitude of 5.3-6.6 in western United States

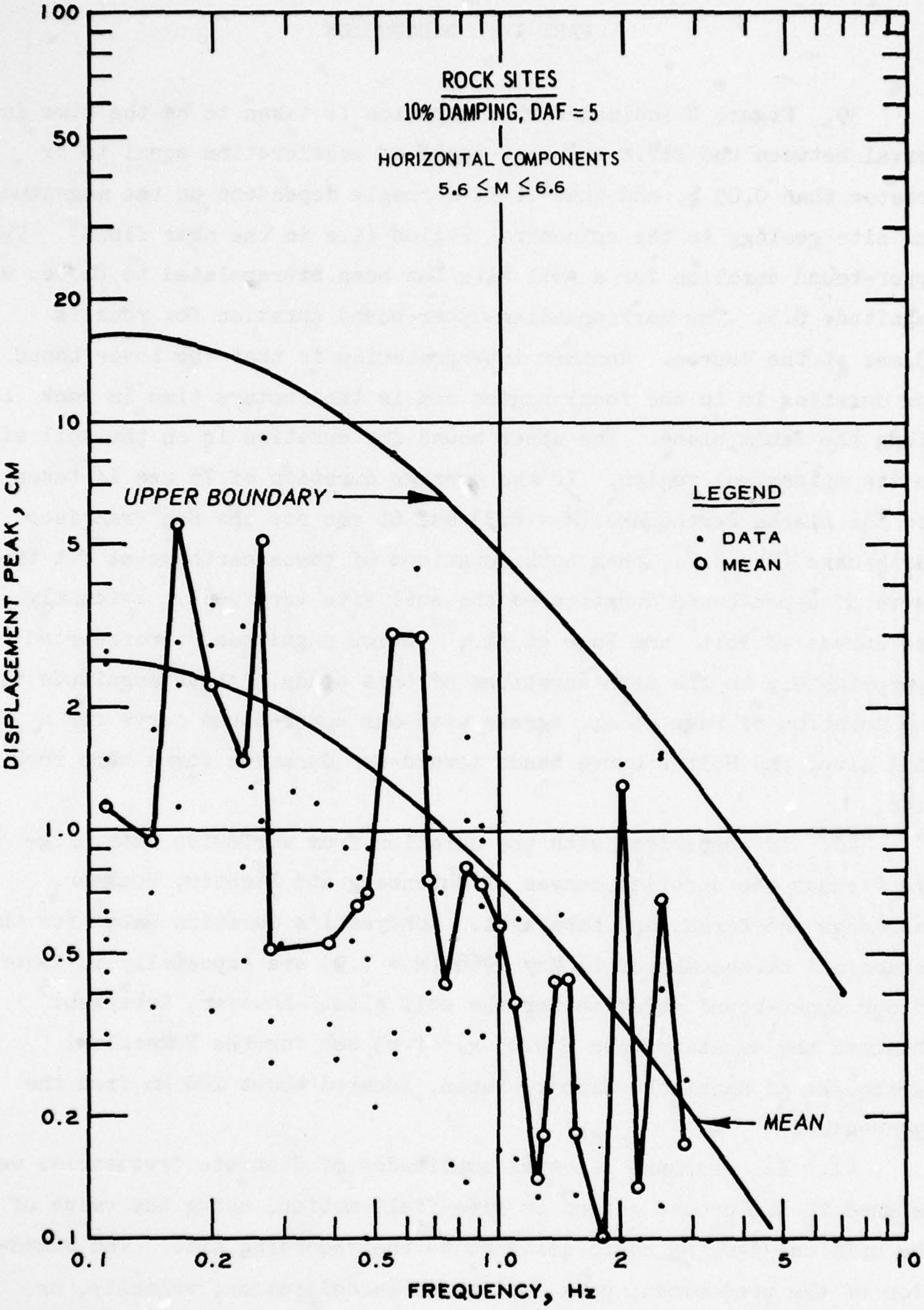


Figure 32. Average ground peak displacement spectrum and upper-bound envelope of horizontal components for rock sites for earthquake magnitudes of 5.6-6.6 in western United States

PART IV: DISCUSSION

39. Figure 8 indicates that duration is taken to be the time interval between the first and last peaks of acceleration equal to or greater than 0.05 g, and that it is strongly dependent on the magnitude and site geology in the epicentral region (i.e in the near field). The upper-bound duration for a soil site has been extrapolated to 86 sec at magnitude 8.5. The corresponding upper-bound duration for rock is 43 sec at the source. Another interpretation is that the lower bound for duration is in the focal region and is the rupture time in rock along the fault plane. The upper bound for duration is on the soil site in the epicentral region. If the average duration of 75 sec is taken for the Alaska Earthquake (M = 8.3) and 65 sec for the San Francisco Earthquake (M = 8.2), then both durations of these earthquakes fit the curve of upper-bound duration on the soil site very well. Evidently, the curves of Bolt[4] and Page et al.,[17] below magnitude 7, correspond approximately to the mean durations of this study. Above magnitude 7, the duration of Page et al. agrees with our upper-bound curve for a soil site, and Bolt's curve bends toward our duration for a hard rock site.

40. In comparison with the duration from worldwide data, Figure 9 shows the duration curves of Gutenberg and Richter, Housner, Ambraseys and Sarma, and Kobayashi. Kobayashi's duration data[5] for the Tokachioki Earthquake of 16 May 1968 (M = 7.9) are especially in favor of our upper-bound duration for the soil site. However, Kobayashi[5] obtained the duration (acc $\geq$ 0.05 g) of 63 sec for the Tokachioki Earthquake at Hachinohe Harbor, Japan, located about 180 km from the hypocenter.

41. All response spectral amplitudes of discrete frequencies were reduced to the ground motion or free-field motion, using the value of the critical damping ratio assigned to the recording site. The summation of the predominant peak amplitudes (acceleration, velocity, or displacement) of the corresponding discrete frequencies will approximately equal the maximum amplitude in time history. This is based on

the theory of the one degree of freedom system with the base shaken by a single frequency at a given time. Therefore, the relative response spectral amplitude does not contain mixed frequencies. This technique provides a simple decomposition procedure to separate the wave frequencies from a seismogram and to provide clues to determine the equivalent damping ratio of various geological sites. Since the equivalent damping ratio is a basic, important factor in earthquake engineering, if the equivalent damping ratio of the site is not known, then the response spectra cannot be considered adequate.

42. A complete analysis of response spectra of acceleration for the San Fernando Earthquake, 9 February 1971, as a function of distance, site geology, and duration, has been made in this report. The data of other moderate and strong earthquakes with magnitudes of 5.3-7.7 in the western United States have also been analyzed and presented.

43. The upper-bound and average curves of the mixed data of acceleration, velocity, and displacement for all magnitudes ($5.3 < M < 7.7$ including San Fernando Earthquake) are presented in Figures 23-25 and 27-32 for different site conditions. Since about 70 percent of the total data were collected from the San Fernando Earthquake of magnitude 6.5, and the average magnitude between 5.3 and 7.7 is also 6.5, the average curves of acceleration, velocity, and displacement are naturally represented by the magnitude 6.5. If the magnitude, epicentral distance, site condition, maximum amplitude, and duration of a design earthquake are given, a synthetic seismogram of displacement could be predicted by the following simple equation of free vibration at any point on the ground surface:

$$y(t, p_i, n_i, \phi_i, \text{and } c_i) = \Sigma_i \, c_i e^{-n_i p_i t} \sin (p_i t + \phi_i) \qquad (1)$$

where

y = amplitudes of the time history of a synthetic seismogram

t = time duration (it is assumed that all predominant frequencies have the same duration)

p_i = 2 π times the frequency of vibration of the i^{th} mode (predominant one)

n_i = ratio of damping in i^{th} mode to critical damping (small damping); but in this case, it is assumed that all predominant frequencies have the same damping

ϕ_i = phase angle of the i^{th} normal mode

c_i = amplitude or coefficient of each predominant frequency in the time history

In this equation, c_i can be chosen from the average smoothed ground-motion curves for different magnitude earthquakes, ϕ_i is the only parameter not known. Since it is assumed that all predominant frequencies are harmonic motions and have the same duration, or that all frequencies start to vibrate at the same time, then ϕ_i can be determined from the complex Fourier coefficients. An alternate way to compute ϕ_i is by a simple oscillator procedure, which is suggested by Khattri and Paul.[32] The predominant frequency band of all moderate and strong earthquakes ($5.3 < M < 7.7$) is found approximately in the range of 0.1-7 Hz. Therefore, the frequency content in a synthetic seismogram should be evenly distributed in this range.

44. The networks of strong-motion instruments for the United States are growing. Eventually, it will be practicable to have all of the representative response spectra for the entire country. For the present, the data used in this report are restricted to the western United States and are of limited extent.

PART V: CONCLUSIONS

45. From the investigation of the strong-motion data (acc $\geq$ 0.05 g) of western United States earthquakes, the following conclusions may be reached:

a. The bracketed duration generally decreases with increasing distance.

b. The duration is generally greater on soil sites than on rock sites.

c. The maximum duration at the source (focus) in rock for the magnitude 8.5 was extrapolated to be about 43 sec but the duration is twice as long on soil or alluvium.

d. The effective frequency content for all geological sites can be limited to a narrow range of 0.1-6.67 Hz. The possible maximum acceleration was found to be about 0.5 g at near-surface faulting for the discrete frequency range of 4-5 Hz.

e. The predominant frequency bands for maximum ground motions of acceleration, velocity, and displacement are established as follows:

Horizontal acceleration for the soft and intermediate sites	2.0-6.0 Hz
Horizontal acceleration for the hard rock site	2.5-5.0 Hz*
Horizontal velocity for the soft and intermediate sites	0.3-2.0 Hz
Horizontal velocity for the hard rock site	0.5-2.5 Hz
Horizontal displacement for the soft and intermediate sites	0.15-0.3 Hz
Horizontal displacement for the hard rock site	0.1-0.5 Hz

f. The acceleration response spectra do not positively indicate that the predominant periods increase with distance.

g. The displacement response spectra do show the predominant periods increasing with distance.

---

* Bolt[4] found 10 Hz for Pacoima record.

REFERENCES

1. Gutenberg, B. and Richter, C. F., "Earthquake Magnitude, Intensity, Energy, and Acceleration," Bulletin, Seismological Society of America, Vol 46, No. 1, Jan 1956, pp 105-145.

2. Esteva, L. and Rosenblueth, E., "Espectros de Temblores a Distomcas Moderodas y Grandes," Bol. Soc. Mex. Ing. Sism., Vol 2, No. 1, 1964, pp 1-18.

3. Housner, G. W., "Intensity of Earthquake Ground Shaking near the Causative Fault," Proceedings, Third World Conference on Earthquake Engineering, New Zealand, Vol 1, 1965, pp 94-111.

4. Bolt, B. A., "Duration of Strong Ground Motion," Proceedings, Fifth World Conference on Earthquake Engineering, Rome, Vol 1, 6-D, Paper No. 292, 1973.

5. Kobayashi, Y., "Effects of Earthquakes on Ground (II) - Ground Motions and Pore-Water Pressure in Soils," Journal, Physics of the Earth, Vol 19, No. 3, 1971, pp 231-241.

6. Husid, R., "Caracteristicas de Terremotos. Analisis General," Revista del IDIEM, Vol 8, No. 1, 1969, pp 21-42.

7. Arias, A., "A Measure of Earthquake Intensity," Seismic Design for Nuclear Power Plants, R. Hansen, ed., Massachusetts Institute of Technology Press, Cambridge, 1970, pp 438-483.

8. Trifunac, M. D. and Brady, A. G., "A Study on the Duration of Strong Earthquake Ground Motion," Bulletin, Seismological Society of America, Vol 65, No. 3, Jun 1975, pp 581-626.

9. Hays, W. W., "A Note on the Duration of Earthquake and Nuclear-Explosion Ground Motions," Bulletin, Seismological Society of America, Vol 65, No. 4, Aug 1975, pp 875-883.

10. Dobry, R. et al., "Influence of Magnitude, Site Conditions and Distance on Significant Duration of Earthquakes," Proceedings, Sixth World Conference on Earthquake Engineering, New Delhi, Vol 2, Jan 1977, pp 131-136.

11. Vanmarcke, E. H. and Lai, S. S., "Strong-Motion Duration of Earthquakes," Publication No. R77-16, Jul 1977, Department of Civil Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

12. Housner, G. W., "Measures of Severity of Earthquake Ground Shaking," Proceedings, U. S. National Conference on Earthquake Engineering, Earthquake Engineering Research Institute, Oakland, Calif., Jun 1975, pp 25-33.

13. Kobayashi, Y., "Duration of Strong Ground Motion," discussion of Bolt's paper, Proceedings, Fifth World Conference on Earthquake Engineering, Rome, 1973, pp 1314-1315.

14. Brady, A. G., Trifunac, M. D., and Hudson, D. E., "Analyses of Strong Motion Earthquake Accelerograms," Response Spectra; and Fourier Amplitude Spectra, Vols III and IV, Aug 1972 and Apr 1975, respectively, Earthquake Engineering Research Laboratory, California Institute of Technology, Pasadena, Calif.

15. Newmark, N. M., "A Study of Vertical and Horizontal Earthquake Spectra," WASH-1255, UC-11, Apr 1973, Directorate of Licensing, U. S. Atomic Energy Commission, Washington, D. C.

16. Blume, J. A., "Recommendations for Shape of Earthquake Response Spectra," WASH-1254, UC-11, Feb 1973, Directorate of Licensing, U. S. Atomic Energy Commission, Washington, D. C.

17. Page, R. A. et al., "Ground Motion Values for Use in the Seismic Design of the Trans-Alaska Pipeline System," Geological Survey Circular 672, 1972, U. S. Geological Survey, Washington, D. C.

18. Duke, C. M. et al., "Effects of Site Classification and Distance on Instrumental Indices in the San Fernando Earthquake," UCLA Eng-7247, Jun 1972, University of California, Los Angeles, Calif.

19. Donovan, N. C., "A Statistical Evaluation of Strong Motion Data Including the Feb. 9, 1971 San Fernando Earthquake," Proceedings, Fifth World Conference on Earthquake Engineering, Rome, Vol 1, 1973, pp 252-261.

20. Seed, H. B. et al., "Relationships Between Maximum Acceleration, Maximum Velocity, Distance from Source and Local Site Conditions for Moderately Strong Earthquakes," Bulletin, Seismological Society of America, Vol 66, Aug 1976, pp 1323-1342.

21. Housner, G. W., "Calculating the Response of an Oscillator to Arbitrary Ground Motion," Bulletin, Seismological Society of America, Vol 31, Apr 1941, pp 143-149.

22. Biot, M. A., "Analytical and Experimental Methods in Engineering Seismology," Proceedings, American Society of Civil Engineers, Vol 68, No. 1, Jan 1942, pp 49-70.

23. Housner, G. W. et al., "Spectrum Analysis of Strong-Motion Earthquakes," Bulletin, Seismological Society of America, Vol 43, No. 1, Apr 1953, pp 97-119.

24. Hudson, D. E., "Response Spectrum Techniques in Engineering Seismology," Proceedings, World Conference on Earthquake Engineering, Earthquake Engineering Research Institute and the University of California, Berkeley, Calif., 1956, p 4-1.

25. __________, "Some Problems in the Application of Spectrum Techniques to Strong-Motion Earthquake Analysis," Bulletin, Seismological Society of America, Vol 52, No. 2, Apr 1962, pp 417-430.

26. Nigam, N. C. and Jennings, P. C., "Digital Calculation of Response Spectra from Strong-Motion Earthquake Record," Jun 1968, Earthquake Engineering Research Laboratory, California Institute of Technology, Pasadena, Calif.

27. Krinitzsky, E. L. and Chang, F. K., "State-of-the-Art for Assessing Earthquake Hazards in the United States; Earthquake Intensity and the Selection of Ground Motions for Seismic Design," Miscellaneous Paper S-73-1, Report 4, Sep 1975, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

28. Miller, G. F. and Pursey, H., "On the Partition of Energy Between Elastic Waves in a Semi-Infinite Solid," Proceedings, Royal Society of London, A, Vol 233, 1955, pp 55-69.

29. Arnold, P. and Vanmarcke, E. H., "Ground Motion Spectral Content: The Influence of Local Soil Conditions and Site Azimuth," Proceedings, Sixth World Conference on Earthquake Engineering, New Delhi, Vol 2, Jan 1977, pp 113-118.

30. Kasiraj, I. and Yao, J. T. P., "Low-Cycle Fatigue Failure of Seismic Structures," Technical Report CE-11(68) NSF-065, Sep 1968, Bureau of Engineering Research, University of New Mexico, Albuquerque, N. Mex.

31. Chang, F. K., "An Empirical Interpretation of the Effects of Topography on Ground Motion of the San Fernando, California, Earthquake, 9 February 1971," Miscellaneous Paper S-76-1, Mar 1976, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

32. Khattri, K. N. and Paul, D. K., "A New Technique for Generating Synthetic Accelerogram Corresponding to Smooth Design Response Spectra," Proceedings, Sixth World Conference on Earthquake Engineering, New Delhi, Vol 2, Jan 1977, p 2-520.

APPENDIX A: STRONG MOTION DATA, EARTHQUAKES OF WESTERN UNITED STATES*

Record	Station Location	Date of Earthquake	Epicentral Location	Epicentral Distance km	Richter Magnitude M	Maximum MM Intensity	Local MM Intensity	Site Conditions**
A1	El Centro Site Imperial Valley	5-18-40	32°44'N 115°27'W	9.3	6.7	X	VIII	S
A2	Northwest California Earthquake, Ferndale City Hall	10-7-51	40°17'N 124°48'W	56.3	5.8	VII	V	I
A3	Kern County Earthquake, California, Cal Tech Athenaeum	7-21-52	35°00'N 119°02'W	126.0	7.7	XI	VII	S
A4	Kern County Earthquake, California, Taft Lincoln School	7-21-52	35°00'N 119°02'W	43.0	7.7	XI	↓	S
A5	Kern County Earthquake, California, Santa Barbara Courthouse	7-21-52	35°00'N 119°02'W	89.5	7.7	XI	↓	S
A6	Kern County Earthquake, California, Hollywood Storage Basement	7-21-52	35°00'N 119°02'W	119.5	7.7	XI	↓	S
A8	Eureka Earthquake, Eureka Federal Building	12-21-54	32°38'N 117°07'W	24.0	6.5	VII	↓	I
A9	Eureka Earthquake, Ferndale City Hall	12-21-54	32°38'N 117°07'W	40.0	6.5	↓	↓	I
A10	San Jose Earthquake, San Jose Bank of America Basement	9-4-55	37°22'N 121°53'W	9.8	5.5	↓	↓	S
A15	San Francisco Earthquake, San Francisco Golden Gate Park	3-22-57	37°40'N 122°29'W	11.8	5.3	↓	↓	I
A16	San Francisco Earthquake, San Francisco State Building Basement	3-22-57	37°40'N 122°29'W	14.6	5.3	↓	↓	I
A18	Hollister Earthquake	4-8-61	36°40'N 121°18'W	40.0	5.6	↓	↓	S
A19	Borrego Mt. Earthquake	4-8-68	33°09'N 116°08'W	69.8	6.5	↓	VI	S
B21	Long Beach Earthquake, Vernon CMD Building	3-10-33	33°35'N 117°59'W	47.8	6.3	IX	VI	S
B22	Southern California Earthquake, Hollywood Storage Building Penthouse	10-2-33	33°47'N 118°08'W	38.2	5.4	VI	V	S
B24	Lower California Earthquake, El Centro Imperial Valley	12-30-34	32°12'N 115°30'W	60.8	6.5	IX	VI	S
B25	Helena, Montana, Earthquake, Helena, Montana, Carroll College	10-31-35	46°37'N 111°58'W	6.6	6.0	VIII	VII	I
B26	First Northwest California Earthquake, Ferndale City Hall	9-11-38	40°18'N 124°48'W	55.3	5.5	VI	VI	I
B28	Western Washington Earthquake, District Engineers Office at Army Base, Seattle	4-13-49	46°06'N 122°42'W	57.8	7.1	VIII	VIII	S
B29	Western Washington Earthquake, Olympia, Washington, Highway Test Lab	4-13-49	46°06'N 122°42'W	16.8	7.1	VIII	VIII	S
B30	Northern California Earthquake, Ferndale City Hall	9-22-52	40°12'N 124°25'W	43.2	5.5	VII	VI	S
B31	Wheeler Ridge, California, Earthquake, Taft Lincoln School Tunnel	1-12-54	35°00'N 119°01'W	43.0	5.9	VIII	VI	S
B32	Puget Sound, Washington, Earthquake, Olympia, Washington	4-29-65	47°24'N 122°18'W	61.1	6.5	VIII	VII	S
B33	Parkfield, California, Earthquake, Cholame, Shandon Array No. 2	6-27-66	35°54'N 120°54'W	31.9	5.6	VII	VII	S
B34	Parkfield, California, Earthquake, Cholame, Shandon Array No. 5	6-27-66	↓	32.4	5.6	↓	VI	S
B35	Parkfield, California, Earthquake, Cholame, Shandon Array No. 8	6-27-66	↓	34.1	5.6	↓	VI	S
B36	Parkfield, California, Earthquake, Cholame, Shandon Array No. 12	6-27-66	↓	36.5	5.6	↓	VI	S
B37	Parkfield, California, Earthquake, Temblor No. 2	6-27-66	↓	31.0	5.6	↓	VII	H
C41	San Fernando Earthquake, Pacoima Dam	2-9-71	34°24'N 118°23'42"W	9.1	6.6	XI	X	H
C48	San Fernando Earthquake, 8244 Orion Boulevard, First Floor Holiday Inn	↓	↓	22.4	↓	↓	VII	S
C51	San Fernando Earthquake, 250 E. First Street Basement, Los Angeles	↓	↓	42.8	↓	↓	VII	S
C54	San Fernando Earthquake, 445 Figueroa Street Subbasement Los Angeles	↓	↓	41.9	↓	↓	VII	I
D56	San Fernando Earthquake, Old Ridge Route, Castaic	↓	↓	28.6	↓	↓	VI	I
D57	San Fernando Earthquake, Hollywood Storage Basement	↓	↓	37.1	↓	↓	VII	S
D58	San Fernando Earthquake, Hollywood Storage P. E. Lot	↓	34°24'N 118°23.7'W	37.1	↓	↓	VII	S

* Uniformly processed at California Institute of Technology.

** Site conditions: S = soft, I = intermediate, and H = hard rock.

Record	Station Location	Date of Earthquake	Epicentral Location	Epicentral Distance km	Richter Magnitude M	Maximum MM Intensity	Local MM Intensity	Site Conditions
D59	San Fernando Earthquake, 1901 Avenue, the Stars Subbasement	2-9-71	34°24'N 118°23.7'W	39.8	6.6	XI	VII	S
D62	San Fernando Earthquake, 1640 S. Marengo Street, First Floor, Los Angeles			42.8				S
D65	San Fernando Earthquake, 3710 Wilshire Boulevard Basement, Los Angeles			40.0				S
D68	San Fernando Earthquake, 7080 Hollywood Boulevard Basement, Los Angeles			35.0				S
E72	San Fernando Earthquake, 4680 Wilshire Boulevard Basement, Los Angeles			39.5				S
E75	San Fernando Earthquake, 3470 Wilshire Boulevard Sub-basement, Los Angeles			40.1				S
E78	San Fernando Earthquake, Water & Power Building Basement, Los Angeles			42.5				I
E81	San Fernando Earthquake, Santa Felicia Dam, California, Outlet Works (Piru)			32.9			VI	I
E83	San Fernando Earthquake, 3407 6th Street, Basement, Los Angeles			40.0			VII	S
F86	San Fernando Earthquake, Vernon, CMD Building			49.4			V	S
F88	San Fernando Earthquake, 633 East Broadway, Glendale			34.1			VII	I
F89	San Fernando Earthquake, 808 S. Olive, Los Angeles			44.0				S
F92	San Fernando Earthquake, 2011 Zonal Avenue Basement, Los Angeles			43.1				I
F95	San Fernando Earthquake, 120 N. Robertson Boulevard Sub-basement, Los Angeles			37.4				S
F98	San Fernando Earthquake, 646 S. Olive Avenue Basement, Los Angeles			42.7				S
F103	San Fernando Earthquake, Pumping Plant, Pearblossom, California			45.4			V	S
F104	San Fernando Earthquake, Oso Pumping Plant, Gorman, California			52.2			V	I
F105	San Fernando Earthquake, UCLA Reactor Lab (Boelter Hall), Los Angeles			38.7			VII	S
G106	San Fernando Earthquake, Seismological Lab, CIT, Pasadena			36.1				H
G107	San Fernando Earthquake, Athenaeum, CIT, Pasadena			39.8				S
G108	San Fernando Earthquake, Millikan Library, CIT, Pasadena			39.8				S
G110	San Fernando Earthquake, Jet Propulsion Laboratory, CIT, Pasadena			31.5				I
G112	San Fernando Earthquake, 611 W. Sixth Street, Los Angeles			42.5				S
G114	San Fernando Earthquake, Fire Station, Palmdale			32.3			VI	S
H115	San Fernando Earthquake, 15250 Ventura Boulevard, Los Angeles			29.3			VII	S
H121	San Fernando Earthquake, 900 S. Fremont Avenue, Alhambra			43.1			VII	S
I128	San Fernando Earthquake, 435 N. Oakhurst Avenue, Beverly Hills			36.0				S
I131	San Fernando Earthquake, 450 N. Roxbury Drive, Beverly Hills			38.2			VI	S
I134	San Fernando Earthquake, 1800 Century Park East, Los Angeles			38.9			VII	S
I137	San Fernando Earthquake, 15910 Ventura Boulevard, Los Angeles			29.0			VII	S

Record	Station Location	Date of Earthquake	Epicentral Location	Epicentral Distance km	Richter Magnitude M	Maximum MM Intensity	Local MM Intensity	Site Conditions**
J141	San Fernando Earthquake, Lake Hughes Array No. 1	2-9-71	34°24'N 118°23.7'W	29.6	6.6	XI	VI	H
J142	San Fernando Earthquake, Lake Hughes Array No. 4			26.8				H
J143	San Fernando Earthquake, Lake Hughes Array No. 9			26.6				H
J144	San Fernando Earthquake, Lake Hughes Array No. 12			23.3				I
J145	San Fernando Earthquake, 15107 Vanowen Street, Los Angeles			34.9			VII	S
J148	San Fernando Earthquake, 616 S. Normandie Avenue, Los Angeles			39.9				I
L166	San Fernando Earthquake, 3838 Lankershim Boulevard, Sheraton Universal Hotel, Los Angeles			30.8				I
M176	San Fernando Earthquake, 1150 S. Hill Street, Los Angeles			42.9				S
N185	San Fernando Earthquake, Carbon Canyon Dam, Brea			75.6			V	I
N186	San Fernando Earthquake, Whittier Narrows Dam, Whittier			54.1			VI	S
N187	San Fernando Earthquake, San Antonio Dam, Upland			72.1			VI	S
N188	San Fernando Earthquake, 1880 Century Park East, Los Angeles			38.9			VII	S
N192	San Fernando Earthquake, 2500 Wilshire Boulevard, Los Angeles			40.7				I
O198	San Fernando Earthquake, Griffith Park Observatory, Los Angeles			34.0				H
O199	San Fernando Earthquake, 1625 Olympic Boulevard, Los Angeles			42.0				S
O207	San Fernando Earthquake, Fairmont Reservoir, Fairmont			32.8			VI	H
P214	San Fernando Earthquake, 4867 Sunset Boulevard, Los Angeles			36.2			VII	I
P217	San Fernando Earthquake, 3345 Wilshire Boulevard, Los Angeles			40.0			VII	S
P221	San Fernando Earthquake, Santa Anita Reservoir, Arcadia			43.3			VI	H
P223	San Fernando Earthquake, Puddingstone Reservoir, San Dimas			65.0			V	H
Q233	San Fernando Earthquake, 14724 Ventura Boulevard, Los Angeles			29.3			VII	S
Q236	San Fernando Earthquake, 1760 N. Orchid Avenue, Los Angeles			34.9				S
Q239	San Fernando Earthquake, 9100 Wilshire Boulevard, Los Angeles			38.0				S
Q241	San Fernando Earthquake, 800 W. First Street, Los Angeles			41.8				I
R244	San Fernando Earthquake, 222 Figueroa Street, Los Angeles			41.9				I
R246	San Fernando Earthquake, 6464 Sunset Boulevard, Los Angeles			35.7				S
R248	San Fernando Earthquake, 6430 Sunset Boulevard, Los Angeles			35.7				S
R249	San Fernando Earthquake, 1900 Avenue of the Stars, Los Angeles			39.2				S
R251	San Fernando Earthquake, 234 S. Figueroa Street, Los Angeles			41.8				I
R253	San Fernando Earthquake, 533 S. Fremont Avenue, Los Angeles			42.0				S
S255	San Fernando Earthquake, 6200 Wilshire Boulevard, Los Angeles			38.9				I
S258	San Fernando Earthquake, 3440 University Avenue, Los Angeles			44.6				S

Record	Station Location	Date of Earthquake	Epicentral Location	Epicentral Distance km	Richter Magnitude M	Maximum MM Intensity	Local MM Intensity	Site Conditions
S261	San Fernando Earthquake, 1177 Beverly Drive, Los Angeles	2-9-71	34°24'N 118°23.7'W	39.6	6.6	XI	VII	S
S262	San Fernando Earthquake, 5900 Wilshire Boulevard, Los Angeles	↓	↓	39.0	↓	↓	↓	I
S265	San Fernando Earthquake, 3411 Wilshire Boulevard, Los Angeles	↓	↓	39.9	↓	↓	↓	I
S266	San Fernando Earthquake, 3550 Wilshire Boulevard, Los Angeles	↓	↓	40.0	↓	↓	↓	S
S267	San Fernando Earthquake, 5260 Century Boulevard, Los Angeles	↓	↓	52.0	↓	↓	VI	S
U297	Helena, Montana, Federal Building	11-28-35	46°37'N 111°58'W	5.8	↓	VI	VI	H
U299	Santa Barbara Courthouse, California	6-30-41	34°22'N 119°35'W	35.9	5.9	VIII	VIII	S
U301	Northern California Earthquake, Public Library, Hollister, California	3- 9-49	37°06'N 121°18'W	29.3	5.3	VII	VII	S
U305	Central California Earthquake, Public Library, Hollister, California	4-25-54	36°48'N 121°48'W	36.2	5.3	VII	VI	S
U308	Northern California Earthquake, Ferndale City Hall	6- 5-60	40°49'N 124°55'W	60.3	5.7	VI	VI	I
U309	Central California Earthquake, Public Library, Hollister, California	4- 8-61	36°30'N 121°18'W	40.0	5.7	VII	VII	S
U312	Northern California Earthquake, City Hall, Ferndale	12-10-67	40°30'N 124°36'W	30.6	5.8	VI	VI	S
V321	San Francisco Earthquake	3-22-57	37°40'N 122°29'W	24.3	5.3	VII	V	S

APPENDIX B: DURATIONS AND FREQUENCY CONTENTS OF STRONG MOTION RECORDS, EARTHQUAKES OF WESTERN UNITED STATES*

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
A1	S00°E	341.7	25.86	4.000 (0.25)	0.0922	1.000 (1.00)	9.0595	0.400 (2.50)	2.7437
				1.818 (0.55)	0.0916	1.818 (0.55)	8.0128	0.111 (9.00)	2.5968
				0.625 (1.60)	0.0195	0.351 (2.80)	8.0061	0.167 (6.00)	2.3915
				0.435 (2.30)	0.0194	1.429 (0.70)	6.8986	1.000 (1.00)	1.2784
				0.167 (6.00)	0.0027	0.111 (9.00)	3.8040	0.833 (1.20)	1.1797
						4.000 (0.25)	3.4109	1.538 (0.65)	0.7738
	S90°W	210.1	25.40	2.000 (0.50)	0.0638	0.476 (2.10)	8.2422	0.143 (7.00)	5.6332
				4.000 (0.25)	0.0530	0.333 (3.00)	7.7652	0.227 (4.40)	3.7316
				1.250 (0.80)	0.0435	0.182 (5.50)	6.9210	0.476 (2.10)	2.4310
				0.833 (1.20)	0.0348	0.278 (3.60)	6.8890	0.833 (1.20)	1.2374
				0.476 (2.10)	0.0223	0.208 (4.80)	6.8131	0.667 (1.50)	1.0593
	UP	206.3	13.26	2.875 (0.35)	0.0236	1.538 (0.65)	1.7490	0.111 (9.00)	1.3922
				1.667 (0.60)	0.0181	0.385 (2.60)	1.6416	0.227 (4.40)	0.8387
				1.250 (0.80)	0.0088	0.143 (7.00)	1.6103	0.385 (2.60)	0.5817
				0.909 (1.10)	0.0063	0.182 (5.50)	1.5422	0.667 (1.50)	0.2520
				0.769 (1.30)	0.0050	0.227 (4.40)	1.3799	0.909 (1.10)	0.1864
				0.667 (1.50)	0.0045	0.500 (2.00)	1.3579	1.538 (0.65)	0.1684
				0.556 (1.80)	0.0044	1.000 (1.00)	1.2935	1.111 (0.90)	0.1591
				0.476 (2.10)	0.0041	2.857 (0.35)	1.2765	2.500 (0.40)	0.0786
A2	S44°W	102.0	0.40	5.000 (0.20)	0.0296	2.500 (0.40)	1.5364	0.111 (9.00)	0.4698
				2.500 (0.40)	0.0241	1.333 (0.75)	1.1972	0.357 (2.80)	0.2441
				3.333 (0.30)	0.0183	5.000 (0.20)	0.9226	1.429 (0.70)	0.1402
				1.429 (0.70)	0.0116	0.455 (2.20)	0.8226	0.667 (1.50)	0.1135
				0.714 (1.40)	0.0023	0.294 (3.40)	0.6449	2.222 (0.45)	0.1090
	N46°W	109.5	2.48	3.333 (0.30)	0.0327	2.222 (0.45)	1.8545	0.143 (7.00)	0.4031
				2.500 (0.40)	0.0289	0.455 (2.20)	1.4768	0.476 (2.10)	0.2949
				5.000 (0.20)	0.0273	3.333 (0.30)	1.4753	1.250 (0.80)	0.1574
				1.250 (0.80)	0.0100	1.250 (0.80)	1.3100	0.909 (1.10)	0.1488
						0.909 (1.10)	1.0593	2.222 (0.45)	0.1347
						0.111 (9.00)	0.7457	3.333 (0.30)	0.0730
A4	N21°E	152.7	19.50	2.857 (0.35)	0.0585	1.429 (0.70)	4.4133	0.111 (9.00)	0.9739
				1.429 (0.70)	0.0383	1.250 (0.80)	3.8653	0.250 (4.00)	0.9384
				2.000 (0.50)	0.0380	0.833 (1.20)	3.5364	0.357 (2.80)	0.9109
				5.000 (0.20)	0.0347	2.857 (0.35)	2.8761	0.227 (4.40)	0.8119
				1.250 (0.80)	0.0308	2.000 (0.50)	2.8670	0.556 (1.80)	0.6682
	S69°E	175.9	15.12	2.222 (0.45)	0.0573	0.625 (1.60)	4.0982	0.111 (9.00)	1.7483
				2.857 (0.35)	0.0448	2.222 (0.45)	3.9551	0.278 (3.60)	1.1044
				5.000 (0.20)	0.0427	1.111 (0.90)	3.7878	0.238 (4.20)	1.0859
				1.538 (0.65)	0.0305	0.313 (3.20)	3.3328	0.625 (1.60)	1.0493
				1.250 (0.80)	0.0286	0.435 (2.30)	2.9447	0.200 (5.00)	0.9558
				0.625 (1.60)	0.0166	1.667 (0.60)	2.8562	0.833 (1.20)	0.5200
				0.833 (1.20)	0.0146	0.263 (3.80)	2.8279	1.111 (0.90)	0.4866
	UP	102.9	13.54	2.857 (0.350)	0.0359	0.263 (3.80)	1.8927	0.111 (9.00)	1.3029
				6.667 (0.150)	0.0270	2.857 (0.35)	1.8127	0.263 (3.80)	0.8152
				4.000 (0.25)	0.0246	0.625 (1.60)	1.7067	0.200 (5.00)	0.7590
				1.667 (0.60)	0.0161	2.222 (0.45)	1.6663	0.435 (2.30)	0.3482
				0.833 (1.20)	0.0077	1.429 (0.70)	1.6081	0.625 (1.60)	0.3355
				1.000 (1.00)	0.0064	1.667 (0.60)	1.5394	1.333 (0.75)	0.1666
A5	N42°E	87.8	13.64	2.000 (0.50)	0.0321	0.625 (1.60)	4.4544	0.667 (1.50)	1.0869
				2.500 (0.40)	0.0253	0.400 (2.50)	3.2212	0.417 (2.40)	1.0288
				0.909 (1.10)	0.0217	0.476 (2.10)	2.9104	0.200 (5.00)	0.7357
				0.714 (1.40)	0.0212	1.250 (0.80)	2.5313	0.167 (6.00)	0.7242
				1.429 (0.70)	0.0211	2.000 (0.50)	2.4026	0.250 (4.00)	0.5544
				1.250 (0.80)	0.0210	1.429 (0.70)	2.2841	1.250 (0.80)	0.3325
				4.000 (0.25)	0.0209	0.167 (6.00)	1.0752	1.818 (0.55)	0.2025
	S48°E	128.6	8.62	1.111 (0.90)	0.0343	0.500 (2.00)	6.0188	0.500 (2.00)	1.7740
				2.000 (0.50)	0.0273	1.000 (1.00)	5.0649	0.217 (4.60)	1.4349
				3.333 (0.30)	0.0247	0.333 (3.00)	2.8524	0.250 (4.00)	1.3447
				0.625 (1.60)	0.0184	0.182 (5.50)	2.8211	0.357 (2.80)	1.0548
				0.500 (2.00)	0.0180	2.857 (0.35)	1.0558	0.143 (7.00)	0.8483
A8	N11°W	164.5	3.80	2.500 (0.40)	0.0652	0.263 (3.80)	8.5207	0.217 (4.60)	4.4951
				3.333 (0.30)	0.0618	0.217 (4.60)	7.8930	0.125 (8.00)	3.4626
				2.000 (0.50)	0.0521	0.833 (1.20)	7.2571	0.556 (1.80)	1.5033
				0.909 (1.10)	0.0427	0.500 (2.00)	5.5037	0.833 (1.20)	1.3163
				0.357 (2.80)	0.0142	1.667 (0.60)	4.8079	1.667 (0.60)	0.4007
				0.313 (3.20)	0.0139	2.500 (0.40)	3.8885	2.500 (0.40)	0.2555
	N79°E	252.7	6.02	2.500 (0.40)	0.1064	0.500 (2.00)	8.4706	0.238 (4.20)	3.6228
				1.667 (0.60)	0.0861	1.538 (0.65)	8.4621	0.111 (9.00)	3.0650
				0.556 (1.80)	0.0222	0.263 (3.80)	7.6352	0.500 (2.00)	1.8511
						0.182 (5.50)	7.4202	1.538 (0.65)	0.8774
						2.222 (0.45)	6.9466	2.222 (0.45)	0.5183
	UP	81.3	0.80	6.667 (0.15)	0.0294	1.111 (0.90)	1.4840	0.111 (9.00)	1.7858
				2.000 (0.50)	0.0118	0.111 (9.00)	1.2076	1.000 (1.00)	0.2023
				1.333 (0.75)	0.0118	0.714 (1.40)	1.1297		
				0.313 (3.20)	0.0017	3.333 (0.30)	0.8150		
A9	N44°E	155.7	10.04	2.500 (0.40)	0.0473	0.625 (1.60)	10.0196	0.182 (5.50)	3.2016
				1.333 (0.75)	0.0435	1.333 (0.75)	4.6121	0.227 (4.40)	3.0994
				0.667 (1.50)	0.0400	2.500 (0.40)	2.6394	0.278 (3.60)	2.8530
						2.000 (0.50)	2.2559	0.556 (1.80)	2.8420
	N46°W	197.3	8.50	1.250 (0.80)	0.0450	0.714 (1.40)	6.9396	0.667 (1.50)	1.6063
				1.818 (0.55)	0.0415	1.000 (1.00)	5.7930	0.111 (9.0)	1.5355
				6.667 (0.15)	0.0397	0.357 (2.80)	3.5270	0.357 (2.80)	1.4590
				2.857 (0.35)	0.0306	1.818 (0.55)	3.4673		
						2.500 (0.40)	1.4639		
A10	N31°W	100.2	0.82	3.333 (0.30)	0.0417	3.333 (0.30)	1.7424	0.111 (9.00)	0.7209
				1.667 (0.60)	0.0137	1.333 (0.75)	1.6648	1.111 (0.90)	0.1867
						0.111 (9.00)	1.1959	2.500 (0.40)	0.1055
	N59°E	105.8	0.42	5.000 (0.20)	0.0450	5.000 (0.20)	1.3687	0.111 (9.00)	0.0580
				0.909 (1.10)	0.0013	2.000 (0.50)	0.5576	2.857 (0.35)	0.0541
						0.625 (1.60)	0 4505	0.667 (1.50)	0.0493

* All data processed from Tape NIS 130, 131, and 132 of California Institute of Technology.

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
A10	N59°E	105.8	0.42			0.111 (9.00)	0.4194	5.000 (0.20)	0.0445
						1.000 (1.00)	0.3880	1.818 (0.55)	0.0322
A15	N10°E	81.8	0.28	4.000 (0.25)	0.0351	3.333 (0.30)	1.3971	0.111 (9.00)	0.4620
				6.667 (0.15)	0.0314	1.250 (0.80)	0.7843	1.000 (1.00)	0.0876
				1.111 (0.90)	0.0041	0.111 (9.00)	0.7505	3.333 (0.30)	0.0662
				0.500 (2.00)	0.0017	0.500 (2.00)	0.7129	1.429 (0.70)	0.0592
	S80°E	102.8	1.30	5.000 (0.20)	0.0438	4.000 (0.25)	1.5268	0.111 (9.00)	0.2200
				2.500 (0.40)	0.0167	2.222 (0.45)	1.2154	0.769 (1.30)	0.1337
				1.538 (0.65)	0.0067	1.000 (1.00)	1.1881	1.000 (1.00)	0.1175
A16	S09°W	83.8	0.30	4.000 (0.25)	0.0418	3.333 (0.30)	1.8609	0.111 (9.00)	0.2986
				6.667 (0.15)	0.0285	1.667 (0.60)	1.5137	0.294 (3.40)	0.2313
				2.000 (0.50)	0.0156	2.500 (0.40)	1.3746	0.476 (2.10)	0.1824
				0.714 (1.40)	0.0021	0.667 (1.50)	1.0161	1.818 (0.55)	0.1087
	S81°W	55.1	1.26	2.500 (0.40)	0.0214	1.333 (0.75)	1.4840	0.111 (9.00)	0.7416
				6.667 (0.15)	0.0213	2.222 (0.45)	1.4570	1.333 (0.75)	0.1787
				1.538 (0.65)	0.0150	0.556 (1.80)	0.7797	0.833 (1.20)	0.1654
				0.400 (2.50)	0.0016	0.294 (3.40)	0.7625	0.556 (1.80)	0.1374
A18	S01°W	63.4	10.00	1.818 (0.55)	0.0271	1.333 (0.75)	2.6131	0.167 (6.00)	0.8176
				1.429 (0.70)	0.0225	0.909 (1.10)	2.3438	0.417 (2.40)	0.4539
				3.333 (0.30)	0.0187	1.818 (0.55)	2.2093	0.714 (1.40)	0.4063
				6.667 (0.15)	0.0181	0.769 (1.30)	2.1556	0.500 (2.00)	0.3679
				0.909 (1.10)	0.0122	0.400 (2.50)	1.3856	0.909 (1.10)	0.3637
	N89°W	175.7	9.04	2.500 (0.40)	0.0552	0.769 (1.30)	3.6520	0.125 (8.00)	1.0098
				1.333 (0.75)	0.0250	2.222 (0.45)	3.6392	0.385 (2.60)	0.8790
				0.769 (1.30)	0.0180	1.333 (0.75)	3.0625	0.769 (1.30)	0.7520
				0.556 (1.80)	0.0072	0.500 (2.00)	2.8771	0.500 (2.00)	0.6841
A19	S00°W	127.8	2.56	4.000 (0.25)	0.0253	0.556 (1.80)	5.9603	0.400 (2.50)	1.8945
				0.769 (1.30)	0.0244	0.417 (2.40)	5.0258	0.313 (3.20)	1.8035
				2.500 (0.40)	0.0227	1.538 (0.65)	2.0954	0.111 (9.00)	1.3019
				6.667 (0.15)	0.0208	2.500 (0.40)	0.9612	2.000 (0.50)	0.1004
				1.538 (0.65)	0.0205	3.333 (0.30)	0.7200		
B21	S08°W	130.6	1.72	3.333 (0.30)	0.0336	1.000 (1.00)	3.5463	0.111 (9.00)	2.2703
				2.222 (0.45)	0.0324	0.435 (2.30)	2.9582	0.909 (1.10)	0.5333
				1.667 (0.60)	0.0312	1.667 (0.60)	2.8142	0.500 (2.00)	0.4538
				1.111 (0.90)	0.0243	0.111 (9.00)	2.5104		
						3.333 (0.30)	1.6089		
	S82°W	151.5	5.82	3.333 (0.300)	0.0324	0.263 (3.80)	3.4127	0.111 (9.00)	2.6346
				1.538 (0.650)	0.0216	1.000 (1.00)	3.3328	0.167 (6.00)	2.0449
				1.000 (1.000)	0.0191	0.417 (2.40)	3.0674	0.250 (4.00)	1.9287
				1.333 (0.750)	0.0177	0.476 (2.10)	2.9798	0.227 (4.40)	1.9026
				0.625 (1.600)	0.0101	1.538 (0.65)	2.0732	0.833 (1.20)	0.5451
						3.333 (0.30)	1.4746	1.333 (0.75)	0.2465
						2.500 (0.40)	1.4129	1.538 (0.65)	0.2256
	DOWN	149.5	3.64	5.000 (0.20)	0.0268	0.278 (3.60)	2.2832	0.182 (5.50)	1.3408
				2.500 (0.40)	0.0221	0.143 (7.00)	1.6259	0.769 (1.30)	0.2866
				2.000 (0.50)	0.0147	2.500 (0.40)	1.4417	2.000 (0.50)	0.0904
				0.769 (1.30)	0.0069	0.769 (1.30)	1.3307	1.333 (0.75)	0.0903
				1.333 (0.75)	0.0065	0.625 (1.60)	1.1444	2.500 (0.40)	0.0878
B22	N90°E	85.4	8.04	1.818 (0.55)	0.0462	1.667 (0.60)	4.0599	0.111 (9.00)	1.0947
				0.294 (3.40)	0.0025	0.227 (4.40)	1.4753	0.217 (4.60)	0.8734
				0.400 (2.50)	0.0020	0.294 (3.40)	1.4251	0.278 (3.60)	0.7470
				0.455 (2.20)	0.0019	0.435 (2.30)	0.9572	1.667 (0.60)	0.3829
						0.111 (9.00)	0.9518	0.833 (1.20)	0.1781
B24	N00°E	156.8	12.86	4.000 (0.25)	0.0608	1.667 (0.60)	3.1244	0.217 (4.60)	1.2536
				2.857 (0.35)	0.0380	1.111 (0190)	3.1240	0.385 (2.60)	0.8985
				1.818 (0.55)	0.0350	0.769 (1.30)	3.1006	0.125 (8.00)	0.8095
				1.111 (0190)	0.0212	0.400 (2.50)	2.4152	0.278 (3.60)	0.7906
				0.400 (2.50)	0.0055	4.000 (0.25)	2.3029	0.909 (1.10)	0.5542
	N90°W	179.1	18.12	4.000 (0.25)	0.0635	1.429 (0.70)	3.9192	0.263 (3.80)	1.0354
				2.500 (0.40)	0.0463	2.000 (0.50)	3.0587	0.111 (9.00)	0.9352
				1.538 (0.65)	0.0330	1.111 (0190)	2.8593	0.500 (2.00)	0.6400
				0.667 (1.50)	0.0066	0.909 (1.10)	2.7684	0.455 (2.20)	0.6130
				0.500 (2.00)	0.0065	0.417 (2.40)	2.2843	0.400 (2.50)	0.6115
						4.000 (0.25)	2.2604	0.909 (1.10)	0.3970
	UP	68.1	11.70	4.000 (0.25)	0.0218	0.143 (7.00)	1.3040	0.111 (9.00)	1.6326
				1.818 (0.55)	0.0106	1.538 (0.65)	1.0780	0.400 (2.50)	0.2999
				1.538 (0.65)	0.0093	1.818 (0.55)	1.0553	0.476 (2.10)	0.2879
				1.333 (0.75)	0.0074	0.500 (2.00)	1.0533	1.000 (1.00)	0.1255
				0.556 (1.80)	0.0030	0.417 (2.40)	0.9610	1.250 (0.80)	0.1146
						2.857 (0.35)	0.8865	1.538 (0.65)	0.0973
						1.000 (1.00)	0.7710	1.818 (0.55)	0.0800
B25	S00°W	143.5	1.46	6.667 (0.15)	0.0490	2.000 (0.50)	1.9844	0.278 (3.60)	0.2770
				2.857 (0.35)	0.0308	2.500 (0.40)	1.9443	0.385 (2.60)	0.2582
				4.000 (0.25)	0.0285	0.667 (1.50)	1.2796	0.556 (1.80)	0.2528
				0.667 (1.50)	0.0037	6.667 (0.15)	1.1756	0.111 (9.00)	0.2471
								1.667 (0.60)	0.1606
								1.333 (0.75)	0.1447
								6.667 (0.15)	0.0271
	S90°W	142.5	1.30	3.333 (0.30)	0.0542	0.667 (1.50)	3.8217	0.111 (9.00)	0.8277
				6.667 (0.15)	0.0456	0.833 (1.20)	3.8212	0.500 (2.00)	0.7591
				1.111 (0.90)	0.0257	1.111 (0.90)	3.7863	0.833 (1.20)	0.6840
						2.857 (0.35)	2.8009	2.500 (0.40)	0.1661
						0.111 (9.00)	2.0990		
	DOWN	87.5	0.48	4.000 (0.25)	0.0292	0.476 (2.10)	2.6009	0.455 (2.20)	0.7996
				6.667 (0.15)	0.0288	0.208 (4.80)	1.6967	0.333 (3.00)	0.7162
				2.857 (0.35)	0.0276	2.500 (0.40)	1.5971	2.222 (0.45)	0.1033
				0.625 (1.60)	0.0097	1.250 (0.80)	0.7535	1.538 (0.65)	0.0802
				1.250 (0.80)	0.0072	6.667 (0.15)	0.6696		
B26	N45°E	140.9	1.32	3.333 (0.30)	0.0342	2.000 (0.50)	2.2874	0.111 (9.00)	0.8051
				5.000 (0.20)	0.0313	3.333 (0.30)	1.5236	2.000 (0.50)	0.1757
				2.222 (0.45)	0.0295	0.909 (1.10)	1.0356	0.833 (1.20)	0.1481
				0.909 (1.10)	0.0045	0.313 (3.20)	0.8525	1.333 (0.75)	0.1156
								3.333 (0.30)	0.0759

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
B26	S45°E	87.1	1.24	5.000 (0.20)	0.0329	2.222 (0.45)	1.5023	0.111 (9.00)	0.2279
				3.333 (0.30)	0.0235	3.333 (0.30)	1.1184	0.714 (1.40)	0.1563
				2.222 (0.45)	0.0207	1.000 (1.00)	1.0542	0.625 (1.60)	0.1534
						1.333 (0.75)	1.0281	1.000 (1.00)	0.1502
						5.000 (0.20)	0.9960	2.222 (0.45)	0.1047
						0.111 (9.00)	0.6574	5.000 (0.20)	0.0326
B28	S02°W	66.5	14.32	1.111 (0.90)	0.0256	1.111 (0.90)	3.6339	1.000 (1.00)	0.5515
				2.857 (0.35)	0.0226	0.769 (1.30)	2.2414	0.769 (1.30)	0.4534
				2.000 (0.50)	0.0155	2.857 (0.35)	1.1793	0.385 (2.60)	0.3181
				0.769 (1.30)	0.0109	0.400 (2.50)	1.1424	0.227 (4.40)	0.3140
				0.400 (2.50)	0.0020	1.818 (0.55)	1.1304	0.125 (8.00)	0.3050
	N88°W	65.9	0.92	3.333 (0.30)	0.0156	1.111 (0.90)	1.5348	0.111 (9.00)	0.4851
				2.222 (0.45)	0.0127	2.000 (0.50)	0.7940	0.208 (4.80)	0.4688
				1.111 (0.90)	0.0118	0.667 (1.50)	0.7301	1.111 (0.90)	0.2372
				0.357 (2.80)	0.0013	0.227 (4.40)	0.6971	0.667 (1.50)	0.1619
						3.333 (0.30)	0.6718	2.000 (0.50)	0.0728
								3.333 (0.30)	0.0347
B29	N04°W	161.6	22.30	3.333 (0.30)	0.0580	0.833 (1.20)	4.9345	0.111 (9.00)	1.5028
				2.500 (0.40)	0.0578	0.667 (1.50)	4.3088	0.217 (4.60)	1.4333
				1.667 (0.60)	0.0430	1.667 (0.60)	4.1891	0.400 (2.50)	1.3164
				0.909 (1.10)	0.0260	2.000 (0.50)	4.0064	0.294 (3.40)	1.2516
				0.500 (2.00)	0.0104	0.435 (2.30)	3.9826	0.435 (2.30)	1.2094
				0.400 (2.50)	0.0085	2.500 (0.40)	3.3256	0.833 (1.20)	0.8985
						0.227 (4.40)	3.2983	0.625 (1.60)	0.7907
						6.667 (0.15)	0.9157	1.667 (0.60)	0.3825
								2.000 (0.50)	0.3019
	N86°E	274.6	21.04	2.857 (0.35)	0.0684	0.313 (3.20)	5.4396	0.313 (3.20)	2.5580
				5.000 (0.20)	0.0637	1.667 (0.60)	5.4378	0.111 (9.00)	1.3184
				2.222 (0.45)	0.0573	0.357 (2.80)	5.3406	0.143 (7.00)	1.2656
				1.667 (0.60)	0.0521	1.111 (0.90)	4.4304	0.714 (1.40)	0.7878
				1.250 (0.80)	0.0291	0.625 (1.60)	4.4105	0.909 (1.10)	0.5075
				0.769 (1.30)	0.0164	0.455 (2.20)	4.3070	1.111 (0.90)	0.4958
				0.625 (1.60)	0.0142	2.222 (0.45)	4.0113	1.667 (0.60)	0.4634
				0.417 (2.40)	0.0118	2.857 (0.35)	3.7022	2.857 (0.35)	0.2073
	UP	90.6	18.36	3.333 (0.30)	0.0257	0.294 (3.40)	1.8084	0.111 (9.00)	1.3961
				5.000 (0.20)	0.0218	0.250 (4.00)	1.7271	0.278 (3.60)	0.9109
				2.222 (0.45)	0.0144	0.625 (1.60)	1.5865	0.625 (1.60)	0.3658
				0.833 (1.20)	0.0066	0.167 (6.00)	1.5073	0.833 (1.20)	0.2360
				1.250 (0.80)	0.0061	0.455 (2.20)	1.4162	2.222 (0.45)	0.0720
				0.625 (1.60)	0.0058	0.500 (2.00)	1.3664	1.818 (0.55)	0.0646
				0.500 (2.00)	0.0038	0.833 (1.20)	1.3226	2.857 (0.35)	0.0587
B30	S46°E	74.1	0.06	5.000 (0.20)	0.0246	2.500 (0.40)	1.1508	1.500 (2.00)	0.1615
				2.857 (0.35)	0.0184	2.000 (0.50)	1.0879	0.111 (9.00)	0.1497
				1.111 (0.90)	0.0054	1.538 (0.65)	0.8748	0.278 (3.60)	0.1457
						1.111 (0.90)	0.8184	0.909 (1.10)	0.1197
						4.000 (0.25)	0.7706	1.538 (0.65)	0.0868
						0.500 (2.00)	0.7057	2.500 (0.40)	0.0705
B31	N21°E	63.9	0.02	3.333 (0.30)	0.0186	1.818 (0.55)	1.1101	0.111 (9.00)	0.2467
				0.833 (1.20)	0.0048	0.625 (1.60)	0.9604	0.667 (1.50)	0.1995
				0.143 (7.00)	0.0001	3.333 (0.30)	0.7573	0.313 (3.20)	0.1571
						0.238 (4.20)	0.6277	1.818 (0.55)	0.0920
	S69°E	66.8	0.02	5.000 (0.20)	0.0236	1.111 (0.90)	0.9187	0.111 (9.00)	0.2230
				1.818 (0.55)	0.0104	1.667 (0.60)	0.9077	0.500 (2.00)	0.1446
				1.250 (0.80)	0.0054	4.000 (0.25)	0.7315	0.714 (1.40)	0.1437
						0.556 (1.80)	0.7151	1.818 (0.55)	0.0769
								2.857 (0.35)	0.0345
								4.000 (0.25)	0.0306
B32	S04°E	134.2	10.18	6.667 (0.15)	0.0548	1.667 (0.60)	3.0671	0.167 (6.00)	0.4385
				1.667 (0.60)	0.0310	1.111 (0.90)	2.6604	0.227 (4.40)	0.4383
				2.500 (0.40)	0.0235	0.714 (1.40)	1.7983	0.208 (4.80)	0.4333
				1.111 (0.90)	0.0179	0.833 (1.20)	1.7182	0.125 (8.00)	0.3831
				0.769 (1.30)	0.0077	6.667 (0.15)	1.2617	0.714 (1.40)	0.3602
	S86°W	194.3	9.20	4.000 (0.25)	0.0493	0.625 (1.60)	3.5263	0.111 (9.00)	0.8841
				1.667 (0.60)	0.0286	0.500 (2.00)	3.3771	0.500 (2.00)	0.8748
				2.000 (0.50)	0.0236	1.111 (0.90)	2.9308	0.667 (1.50)	0.7553
				1.111 (0.90)	0.0197	1.667 (0.60)	2.5684	1.111 (0.90)	0.3945
				0.667 (1.50)	0.0136	1.333 (0.75)	2.2239	1.667 (0.60)	0.2549
						3.333 (0.30)	2.0012	2.500 (0.40)	0.1136
	UP	59.9	1.12	5.000 (0.20)	0.0180	1.818 (0.55)	0.6637	0.111 (9.00)	0.4011
				2.000 (0.50)	0.0073	2.500 (0.40)	0.6595	0.625 (1.60)	0.1499
				1.250 (0.80)	0.0041	3.333 (0.30)	0.6436	0.333 (3.00)	0.1191
				0.625 (1.60)	0.0024	0.625 (1.60)	0.6384	0.278 (3.60)	0.1055
				0.385 (2.60)	0.0006	1.538 (0.65)	0.6025	1.000 (1.00)	0.0708
						1.250 (0.80)	0.5609	1.250 (0.80)	0.0654
						0.833 (1.20)	0.5486	1.667 (0.60)	0.0547
						1.000 (1.00)	0.5437	2.857 (0.35)	0.0362
B33	N65°E	479.6	11.74	2.222 (0.45)	0.2588	0.556 (1.80)	23.7264	0.313 (3.20)	7.5725
				1.667 (0.60)	0.2471	1.538 (0.65)	22.1588	0.111 (9.00)	5.7794
				6.667 (0.15)	0.1229	0.227 (4.40)	20.9512	1.429 (0.70)	2.5234
				0.667 (1.50)	0.0879				
	DOWN	202.2	6.90	1.538 (0.65)	0.0576	0.714 (1.40)	6.3966	0.111 (9.00)	1.3926
				2.857 (0.35)	0.0521	1.538 (0.65)	5.4544	0.667 (1.50)	1.3656
				0.909 (1.10)	0.0347	0.167 (6.00)	4.0558	0.217 (4.60)	1.2528
						2.857 (0.35)	2.5183	1.250 (0.80)	0.6391
						6.667 (0.15)	2.1301	5.000 (0.20)	0.0565
B34	N05°W	347.8	6.64	3.333 (0.30)	0.1268	2.000 (0.50)	6.3052	0.111 (9.00)	1.1749
				2.000 (0.50)	0.0791	3.333 (0.30)	5.3534	0.263 (3.80)	0.6765
				6.667 (0.15)	0.0682	1.250 (0.80)	4.4756	2.000 (0.50)	0.4892
				0.476 (2.10)	0.0037	1.000 (1.00)	3.7856	1.111 (0.90)	0.4206
				0.417 (2.40)	0.0031	0.476 (2.10)	2.9653	0.476 (2.10)	0.4032
				0.294 (3.40)	0.0021	0.278 (3.60)	2.4840	3.333 (0.30)	0.2835
	N85°E	425.7	7.30	2.857 (0.35)	0.1212	2.500 (0.40)	6.6673	0.143 (7.00)	1.7740
				5.000 (0.20)	0.0890	2.000 (0.50)	5.7632	0.400 (2.50)	1.4041
				2.000 (0.50)	0.0676	0.476 (2.10)	4.6624	0.357 (2.80)	1.3706
				0.833 (1.20)	0.0213	0.833 (1.20)	4.2528	0.500 (2.00)	1.3152

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks Frequency (Period) Hz (sec)	Predominant Acceleration Peaks Amplitude (g)	Predominant Velocity Peaks Frequency (Period) Hz (sec)	Predominant Velocity Peaks Amplitude cm/sec	Predominant Displacement Peaks Frequency (Period) Hz (sec)	Predominant Displacement Peaks Amplitude cm
B34	N85°E	425.7	7.30	0.500 (2.00)	0.0133	1.111 (0.90)	3.6092	0.833 (1.20)	0.7592
						0.667 (1.50)	3.1034	2.500 (0.40)	0.4313
								2.000 (0.50)	0.4205
	DOWN	116.9	7.32	6.667 (0.15)	0.0400	2.000 (0.50)	1.7252	0.238 (4.20)	0.5567
				2.222 (0.45)	0.0231	0.208 (4.80)	1.1067	0.111 (9.00)	0.4322
				0.714 (1.40)	0.0041	0.238 (4.20)	1.0830	0.556 (1.80)	0.2264
				0.385 (2.60)	0.0021	1.429 (0.70)	1.0492	2.000 (0.50)	0.1676
						0.625 (1.60)	1.0263	1.538 (0.65)	0.0926
						5.000 (0.20)	0.9318	1.111 (0.90)	0.0760
						0.111 (9.00)	0.9181	5.000 (0.20)	0.0274
B35	N50°E	232.6	7.84	6.667 (0.15)	0.0686	1.000 (1.00)	2.6059	0.111 (9.00)	1.1138
				2.500 (0.40)	0.0325	1.667 (0.60)	2.1080	1.000 (1.00)	0.3844
				1.667 (0.60)	0.0209	1.250 (0.80)	2.0862	1.667 (0.60)	0.1859
				1.333 (0.75)	0.0169	2.222 (0.45)	2.0702	2.222 (0.45)	0.1514
				1.000 (1.00)	0.0156	5.000 (0.20)	1.8664	5.000 (0.20)	0.0570
	N40°W	269.6	5.70	5.000 (0.20)	0.0890	2.000 (0.50)	3.0493	0.111 (9.00)	1.0294
				2.000 (0.50)	0.0368	1.250 (0.80)	2.9962	0.385 (2.60)	0.6303
				1.250 (0.80)	0.0185	5.000 (0.20)	2.7443	0.556 (1.80)	0.5301
				0.769 (1.30)	0.0082	2.857 (0.35)	2.6980	1.000 (1.00)	0.3569
				0.667 (1.50)	0.0076	0.714 (1.40)	2.5467	2.000 (0.50)	0.2250
						0.476 (2.10)	1.9132	1.538 (0.65)	0.1699
						1.538 (0.65)	1.8721	5.000 (0.20)	0.0877
	DOWN	77.7	3.94	1.111 (0.90)	0.0090	1.000 (1.00)	1.3279	0.111 (9.00)	0.3104
				2.500 (0.40)	0.0079	0.769 (1.30)	1.1155	0.208 (4.80)	0.2892
				0.278 (3.60)	0.0007	0.182 (5.50)	0.5370	0.714 (1.40)	0.1979
						4.000 (0.25)	0.4953	0.417 (2.40)	0.1343
						2.222 (0.45)	0.4846	2.000 (0.50)	0.0338
						1.818 (0.55)	0.4796	4.000 (0.25)	0.0171
B37	N65°W	264.3	2.90	4.000 (0.25)	0.1365	2.500 (0.40)	7.0274	0.250 (4.000)	1.2888
				1.111 (0.90)	0.0180	0.333 (3.00)	5.0506	0.313 (3.20)	1.2535
				0.625 (1.60)	0.0135	0.714 (1.40)	4.0648	0.111 (9.00)	1.1436
						1.429 (0.70)	3.5016	0.476 (2.10)	0.9054
								2.500 (0.40)	0.4119
	S25°W	340.8	2.08	2.857 (0.35)	0.1624	2.500 (0.40)	10.2746	0.111 (9.00)	1.5028
				5.000 (0.20)	0.1201	0.833 (1.20)	7.5019	0.167 (6.00)	1.1391
				1.000 (1.00)	0.0350	0.111 (9.00)	4.9159	0.278 (3.60)	0.9916
						1.333 (0.75)	4.8882	0.909 (1.10)	0.9509
						0.357 (2.80)	3.6368	0.714 (1.40)	0.7072
								2.500 (0.40)	0.6340
	DOWN	129.8	0.58	6.667 (0.15)	0.0468	2.857 (0.35)	1.7799	0.111 (9.00)	0.3368
				1.538 (0.65)	0.0120	1.333 (0.75)	1.4624	0.238 (4.20)	0.3280
				0.769 (1.30)	0.0054	0.625 (1.60)	1.3852	0.500 (2.00)	0.2990
				0.263 (3.80)	0.0009	0.833 (1.20)	1.1022	1.429 (0.70)	0.1262
						0.417 (2.40)	1.0798	1.111 (0.90)	0.1186
C41	S16°E	1148.1	11.36	2.500 (0.40)	0.3957	0.714 (1.40)	36.4629	0.167 (6.00)	15.8704
				5.000 (0.20)	0.3549	0.208 (4.80)	25.0099	0.263 (3.80)	9.1517
				1.000 (1.00)	0.2042	2.500 (0.40)	23.6821	0.556 (1.80)	8.4209
				0.217 (4.60)	0.0240			2.500 (0.40)	1.5366
								2.000 (0.50)	1.4654
	S74°W	1054.9	12.44	2.222 (0.45)	0.3780	2.000 (0.50)	28.8445	0.625 (1.60)	4.3962
				4.000 (0.25)	0.3525	0.769 (1.30)	22.4607	0.238 (4.20)	3.1944
				1.111 (0.90)	0.1350	0.313 (3.20)	15.2545	0.200 (5.00)	2.8298
						0.182 (5.50)	11.4690	0.111 (9.00)	2.7345
						0.111 (9.00)	11.2648	2.000 (0.50)	2.2208
	DOWN	696.0	10.50	4.000 (0.25)	0.3336	2.857 (0.35)	16.6026	0.125 (8.00)	8.2036
				6.667 (0.15)	0.2427	0.455 (2.20)	15.5078	0.333 (3.00)	5.0793
				0.714 (1.40)	0.0527	0.357 (2.80)	15.0347	1.538 (0.65)	0.8104
				0.625 (1.60)	0.0512	0.111 (9.00)	13.3605	2.857 (0.35)	0.7877
						0.167 (6.00)	11.6005		
						1.538 (0.65)	9.2975		
						1.250 (0.80)	8.5784		
C48	N00°W	250.0	17.22	1.538 (0.65)	0.0810	0.556 (1.80)	10.2220	0.217 (4.60)	5.4476
				1.818 (0.55)	0.0739	0.769 (1.30)	9.2299	0.455 (2.20)	2.8314
				3.333 (0.30)	0.0693	0.217 (4.60)	8.1832	0.556 (1.80)	2.6390
				2.500 (0.40)	0.0662	1.538 (0.65)	8.1015	0.111 (9.00)	2.5089
				5.000 (0.20)	0.0573	0.455 (2.20)	7.5525	1.538 (0.65)	0.8447
				0.769 (1.30)	0.0399	0.278 (3.60)	6.5595		
				0.476 (2.10)	0.0247	1.250 (0.80)	6.2827		
				0.227 (4.40)	0.0110	2.222 (0.45)	4.1531		
				0.263 (3.80)	0.0101				
				0.111 (9.00)	0.0013				
	S90°W	131.7	17.82	2.857 (0.35)	0.0545	0.333 (0.30)	11.1422	0.357 (2.80)	4.7429
				1.538 (0.65)	0.0323	0.667 (1.50)	7.3718	0.125 (8.00)	3.9953
				0.769 (1.30)	0.0301	0.476 (2.10)	7.1037	0.200 (5.00)	3.6966
				1.000 (1.00)	0.0293	0.227 (4.40)	6.0709	0.476 (2.10)	2.3752
				0.667 (1.50)	0.0287	1.000 (1.00)	4.6375	0.667 (1.50)	1.5953
				0.357 (2.80)	0.0245	1.538 (0.65)	3.1443	1.000 (1.00)	0.7256
				0.500 (2.00)	0.0232	2.857 (0.35)	3.0277	1.538 (0.65)	0.3364
						1.818 (0.55)	2.6453	2.222 (0.45)	0.1801
								2.857 (0.35)	0.1644
	DOWN	167.5	22.22	3.333 (0.30)	0.0615	0.278 (3.60)	10.9572	0.278 (3.60)	5.7027
				0.435 (2.30)	0.0300	0.385 (2.60)	10.9468	0.385 (2.60)	4.6584
				1.667 (0.60)	0.0243	0.167 (6.00)	4.6812	0.167 (6.00)	2.7632
				0.294 (3.40)	0.0188	2.857 (0.35)	2.8892	1.000 (1.00)	0.4634
				1.000 (1.00)	0.0187	0.769 (1.30)	2.7578	1.538 (0.65)	0.2454
				0.625 (1.60)	0.0175	1.538 (0.65)	2.1979	2.500 (0.40)	0.1713
C51	N36°E	97.8	8.16	2.500 (0.40)	0.0317	0.769 (1.30)	3.2489	0.111 (9.00)	2.6356
				3.333 (0.30)	0.0288	0.143 (7.00)	2.8214	0.833 (1.20)	0.6563
				1.538 (0.65)	0.0196	0.278 (3.60)	2.5429	1.250 (0.80)	0.3035
				1.333 (0.75)	0.0194	1.250 (0.80)	2.4115	1.538 (0.65)	0.2044
				0.833 (1.20)	0.0185	1.538 (0.65)	2.1061	2.222 (0.45)	0.1563
				0.455 (2.20)	0.0057	2.222 (0.45)	2.0949		
				0.313 (3.20)	0.0048	3.333 (0.30)	1.4120		
	N54°W	122.7	6.16	2.222 (0.45)	0.0328	0.714 (1.40)	3.3737	0.111 (9.00)	2.5171
				1.818 (0.55)	0.0283	1.000 (1.00)	3.3316	0.714 (1.40)	0.6501
				5.000 (0.20)	0.0254	1.538 (0.65)	2.7852	0.625 (1.60)	0.6476
				1.000 (1.00)	0.0212	0.111 (9.00)	2.4557	1.000 (1.00)	0.5250
				0.769 (1.30)	0.0142	1.818 (0.55)	2.3989	1.429 (0.70)	0.2736

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
C51	N54°W	122.7	6.16	0.417 (2.40)	0.0027	0.167 (6.00)	2.1147		
				0.217 (4.60)	0.0024	2.222 (0.45)	2.0129		
C54	N52°W	147.1	5.52	2.222 (0.45)	0.0564	0.909 (1.10)	5.8706	0.556 (1.80)	1.0586
				4.000 (0.25)	0.0460	0.625 (1.60)	5.6074	0.909 (1.10)	0.9143
				1.667 (0.60)	0.0427	1.538 (0.65)	4.1245	1.538 (0.65)	0.4137
				1.000 (1.00)	0.0357	0.125 (8.00)	3.6036	2.222 (0.45)	0.2830
				0.200 (5.00)	0.0030	2.222 (0.45)	3.5971	0.111 ([illegible].00)	3.7455
	S38°W	117.0	9.92	4.000 (0.25)	0.0470	0.208 (4.80)	6.4462	0.200 (5.00)	4.5201
				2.000 (0.50)	0.0298	0.556 (1.80)	2.8202	0.556 (1.80)	0.7911
				1.333 (0.75)	0.0247	1.111 (0.90)	2.8029	0.667 (1.50)	0.6818
				1.111 (0.90)	0.0232	1.429 (0.70)	2.7608	0.833 (1.20)	0.6046
				0.833 (1.20)	0.0171	0.833 (1.20)	2.5963	1.818 (0.55)	0.1900
				0.313 (3.20)	0.0119	1.818 (0.55)	2.3263	3.333 (0.30)	0.0921
						2.222 (0.45)	2.1948		
						3.333 (0.30)	1.8884		
D56	N21°E	309.4	13.78	2.857 (0.35)	0.1127	2.000 (0.50)	6.3364	0.111 (9.00)	2.0883
				6.667 (0.15)	0.1042	2.857 (0.35)	6.0272	0.208 (4.80)	0.7233
				2.222 (0.45)	0.0796	1.000 (1.00)	5.6499	0.357 (2.80)	0.6709
				1.250 (0.80)	0.0317	1.250 (0.80)	4.8263	0.833 (1.20)	0.6371
				0.111 (9.00)	0.0010	0.556 (1.80)	3.0971	2.000 (0.50)	0.4798
						0.294 (3.40)	3.0942	2.857 (0.35)	0.3396
	N69°W	265.4	17.24	5.000 (0.20)	0.0811	1.000 (1.00)	7.8559	0.111 (9.00)	2.7315
				2.500 (0.40)	0.0794	1.667 (0.60)	6.0484	0.385 (2.60)	1.1432
				2.000 (0.50)	0.0763	0.357 (2.80)	5.2922	1.000 (1.00)	1.1415
				1.250 (0.80)	0.0598	4.000 (0.25)	2.4433	0.769 (1.30)	1.1247
				0.111 (9.00)	0.0015				
	DOWN	153.3	7.42	5.000 (0.20)	0.0743	4.000 (0.25)	2.7895	0.111 (9.00)	1.2382
				2.000 (0.50)	0.0242	2.222 (0.45)	1.9117	1.818 (0.55)	0.1604
				0.833 (1.20)	0.0049	0.476 (2.10)	1.6684	1.111 (0.90)	0.1566
				0.111 (9.00)	0.0006	0.111 (9.00)	1.4747	3.333 (0.30)	0.1072
D57	S00°W	103.8	9.70	4.000 (0.25)	0.0351	0.227 (4.40)	4.1332	0.217 (4.60)	2.7310
				1.818 (0.55)	0.0317	1.818 (0.55)	2.7966	0.417 (2.40)	0.9644
				2.222 (0.45)	0.0298	1.000 (1.00)	2.6307	1.000 (1.00)	0.3778
				1.429 (0.70)	0.0191	2.417 (2.40)	2.5367	0.769 (1.30)	0.3240
				1.111 (0.90)	0.0158	1.429 (0.70)	2.3430	1.818 (0.55)	0.2362
				0.769 (1.30)	0.0078	0.625 (1.60)	1.7759	1.429 (0.70)	0.2319
				0.500 (2.00)	0.0071	2.857 (0.35)	1.5770		
	N90°E	148.2	7.74	4.000 (0.25)	0.0532	0.714 (1.40)	5.8458	0.111 (9.00)	3.5771
				2.857 (0.35)	0.0459	0.227 (4.40)	4.5297	0.714 (1.40)	1.2948
				1.250 (0.80)	0.0292	1.111 (0.90)	3.7515	2.500 (0.40)	0.1683
				0.769 (1.30)	0.0282	2.500 (0.40)	2.7782		
				0.294 (3.40)	0.0084	1.667 (0.60)	2.0579		
D58	S00°W	167.3	5.98	4.000 (0.25)	0.0492	1.818 (0.55)	2.9036	0.167 (6.00)	2.2180
				1.818 (0.55)	0.0316	0.200 (5.00)	2.8028	1.000 (1.00)	0.3879
				2.222 (0.45)	0.0310	1.000 (1.00)	2.7560	0.556 (1.80)	0.3819
				1.429 (0.70)	0.0192	1.429 (0.70)	2.4014	1.818 (0.55)	0.2362
				1.111 (0.90)	0.0165	0.111 (9.00)	2.1716	1.429 (0.70)	0.2328
				0.556 (1.80)	0.0048	0.625 (1.60)	1.9507		
				0.263 (3.80)	0.0039	3.333 (0.30)	1.8200		
	N90°E	207.0	7.72	4.000 (0.25)	0.0741	0.714 (1.40)	5.8730	0.111 (9.00)	3.8738
				2.857 (0.35)	0.0549	0.227 (4.40)	4.6407	0.714 (1.40)	1.3091
				1.818 (0.55)	0.0319	0.278 (3.60)	4.5556	1.667 (0.60)	0.2726
				1.250 (0.80)	0.0302	1.111 (0.90)	3.8357	2.500 (0.40)	0.1786
				0.769 (1.30)	0.0287	2.500 (0.40)	3.1076		
				0.313 (3.20)	0.0092	1.667 (0.60)	3.0672		
						4.000 (0.25)	2.5374		
	UP	87.0	6.00	2.857 (0.35)	0.0116	0.769 (1.30)	1.2574	0.167 (6.00)	0.5568
				1.429 (0.70)	0.0062	0.200 (5.00)	0.8997	0.769 (1.30)	0.2369
				0.833 (1.20)	0.0058	1.111 (0.90)	0.6880	1.111 (0.90)	0.0877
				0.263 (3.80)	0.0011	1.333 (0.75)	0.6851	2.222 (0.45)	0.0382
						2.857 (0.35)	0.6348	4.000 (0.25)	0.0190
						4.000 (0.25)	0.5039		
D59	N46°W	133.8	6.14	6.667 (0.15)	0.0579	0.556 (1.80)	2.0821	0.111 (9.00)	1.3525
				3.333 (0.30)	0.0274	1.000 (1.00)	1.9949	0.313 (3.20)	0.5439
				2.500 (0.40)	0.0206	3.333 (0.30)	1.3927	0.556 (1.80)	0.5058
				1.667 (0.60)	0.0152	1.667 (0.60)	1.3749	0.769 (1.30)	0.3140
				1.000 (1.00)	0.0124	2.222 (0.45)	1.3564	1.000 (1.00)	0.3064
				0.769 (1.30)	0.0075	6.667 (0.15)	1.3028	1.667 (0.60)	0.1352
				0.625 (1.60)	0.0068	0.294 (3.40)	1.2323	2.222 (0.45)	0.1006
				0.357 (2.80)	0.0025	0.417 (2.40)	1.1644	3.333 (0.30)	0.0613
				0.143 (7.00)	0.0007	0.111 (9.00)	0.9939		
	S44°W	147.1	6.80	6.667 (0.15)	0.0529	0.200 (5.00)	3.8799	0.143 (7.00)	3.3099
				2.500 (0.40)	0.0409	2.500 (0.40)	2.5781	0.556 (1.80)	0.6964
				1.667 (0.66)	0.0201	0.625 (1.60)	2.5305	1.667 (0.60)	0.1789
				1.250 (0.80)	0.0138	1.667 (0.60)	1.8458	2.500 (0.40)	0.1611
				0.667 (1.50)	0.0113	1.111 (0.90)	1.7538		
				0.400 (2.50)	0.0047	0.400 (2.50)	1.5764		
						6.667 (0.15)	1.1670		
D62	N38°W	118.0	6.68	5.000 (0.20)	0.0381	0.769 (1.30)	3.9336	0.111 (9.00)	3.2981
				2.857 (0.35)	0.0374	1.250 (0.80)	2.8911	0.385 (2.60)	0.8647
				1.667 (0.60)	0.0260	0.238 (4.20)	2.7591	0.833 (1.20)	0.6842
				1.250 (0.80)	0.0215	0.143 (7.00)	2.6558	0.667 (1.50)	0.6780
				0.909 (1.10)	0.0195	1.667 (0.60)	2.5317	1.250 (0.80)	0.3389
				0.417 (2.40)	0.0059	0.455 (2.20)	2.0965	2.857 (0.35)	0.1133
						2.857 (0.35)	1.8479		
						2.222 (0.45)	1.6017		
	S52°W	130.0	6.68	4.000 (0.25)	0.0395	0.833 (1.20)	5.1660	0.111 (9.00)	1.4019
				2.222 (0.45)	0.0314	1.250 (0.80)	3.4784	0.769 (1.30)	0.9255
				1.250 (0.80)	0.0291	1.667 (0.60)	2.8502	1.250 (0.80)	0.4611
				1.538 (0.65)	0.0280	0.111 (9.00)	1.8870	1.538 (0.65)	0.2932
				0.909 (1.10)	0.0253				
D65	S00°W	146.7	5.78	3.333 (0.30)	0.0409	1.538 (0.65)	2.9725	0.111 (9.00)	2.1439
				5.000 (0.20)	0.0333	0.833 (1.20)	2.8680	0.833 (1.20)	0.4737
				1.667 (0.60)	0.0309	1.111 (0.90)	2.6408	1.538 (0.65)	0.3010
				2.222 (0.45)	0.0302	0.111 (9.00)	1.9568		
				0.385 (2.60)	0.0024	0.435 (2.30)	1.8413		

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks Frequency (Period) Hz (sec)	Predominant Acceleration Peaks Amplitude (g)	Predominant Velocity Peaks Frequency (Period) Hz (sec)	Predominant Velocity Peaks Amplitude cm/sec	Predominant Displacement Peaks Frequency (Period) Hz (sec)	Predominant Displacement Peaks Amplitude cm
D65	S00°W	146.7	5.78	0.227 (4.40)	0.0020	0.167 (6.00)	1.7566		
						3.333 (0.30)	1.5861		
	S90°W	155.7	6.06	3.333 (0.30)	0.0562	0.833 (1.20)	4.5119	0.111 (9.00)	1.8733
				1.538 (0.65)	0.0296	1.538 (0.65)	2.9938	0.769 (1.30)	0.8754
				0.833 (1.20)	0.0236	0.357 (2.80)	2.7432	0.385 (2.60)	0.7596
				0.400 (2.50)	0.0047	2.222 (0.45)	2.4920	1.538 (0.65)	0.3085
				0.200 (5.00)	0.0016	1.818 (0.55)	2.4571		
						0.143 (7.00)	1.8735		
	DOWN	73.1	2.56	3.333 (0.30)	0.0320	3.333 (0.30)	1.5514	0.143 (7.00)	0.5638
				5.000 (0.20)	0.0284	0.714 (1.40)	1.4381	0.400 (2.50)	0.2633
				1.538 (0.65)	0.0077	2.500 (0.40)	1.3829	0.714 (1.40)	0.2455
				0.833 (1.20)	0.0061	0.227 (4.40)	0.9837	0.625 (1.60)	0.2409
						1.538 (0.65)	0.9182	0.833 (1.20)	0.2156
						0.385 (2.60)	0.8722	2.500 (0.40)	0.0759
						5.000 (0.20)	0.8704	3.333 (0.30)	0.0714
						0.111 (9.00)	0.3301		
D68	N00°E	81.2	3.60	3.333 (0.30)	0.0268	1.818 (0.55)	2.4840	0.125 (8.00)	1.7037
				1.818 (0.55)	0.0265	0.111 (9.00)	1.9309	0.667 (1.50)	0.2589
				5.000 (0.20)	0.0240	1.208 (4.80)	1.7378	1.111 (0.90)	0.2052
				1.250 (0.80)	0.0109	1.111 (0.90)	1.7006	1.818 (0.55)	0.1975
				0.714 (1.40)	0.0050	0.667 (1.50)	1.5766		
				0.278 (3.60)	0.0025	3.333 (0.30)	1.2400		
						2.500 (0.40)	1.2384		
	N90°E	98.0	3.84	2.857 (0.35)	0.0303	0.714 (1.40)	3.5462	0.143 (7.00)	1.2205
				6.667 (0.15)	0.0211	0.400 (2.50)	1.8389	0.667 (1.50)	0.7658
				0.769 (1.30)	0.0167	2.222 (0.45)	1.8074	0.385 (2.60)	0.6249
				0.455 (2.20)	0.0044	1.667 (0.60)	1.4359	2.222 (0.45)	0.1237
				0.217 (4.60)	0.0016	0.182 (5.50)	1.3650	1.667 (0.60)	0.1219
						0.217 (4.60)	1.3004		
						0.111 (9.00)	1.1288		
						6.667 (0.15)	0.3974		
E72	N75°W	82.2	7.76	1.818 (0.55)	0.0251	0.167 (6.00)	5.7712	0.167 (6.00)	5.4092
				4.000 (0.25)	0.0206	0.714 (1.40)	3.5285	0.476 (2.10)	0.8033
				1.333 (0.75)	0.0200	0.313 (3.20)	3.2023	0.714 (1.40)	0.7231
				2.500 (0.40)	0.0192	1.333 (0.75)	2.4794	1.333 (0.75)	0.2782
				0.769 (1.30)	0.0158	1.818 (0.55)	2.2347	1.818 (0.55)	0.1885
				0.500 (2.00)	0.0077	0.476 (2.10)	2.2271		
				0.200 (5.00)	0.0071	4.000 (0.25)	0.6960	0.111 (9.00)	2.4728
	N15°E	115.0	5.50	6.667 (0.15)	0.0343	1.111 (0.90)	3.1892	0.357 (2.80)	0.8239
				4.000 (0.25)	0.0296	1.429 (0.70)	2.7002	0.667 (1.50)	0.4827
				2.857 (0.35)	0.0288	0.111 (0.90)	2.5144	1.000 (1.00)	0.4771
				2.222 (0.45)	0.0277	1.818 (0.55)	2.2885	1.429 (0.70)	0.2972
				1.818 (0.55)	0.0275	0.357 (2.80)	2.2884	1.818 (0.55)	0.2063
				1.538 (0.65)	0.0255	0.667 (1.50)	2.2383	2.222 (0.45)	0.1378
				1.111 (0.90)	0.0208	0.167 (6.00)	2.0739		
				0.714 (1.40)	0.0092	2.222 (0.45)	1.8667		
				0.400 (2.50)	0.0047	2.857 (0.35)	1.5726		
				0.208 (4.80)	0.0023	4.000 (0.25)	0.9458		
	DOWN	64.80	1.70	6.667 (0.15)	0.0203	0.833 (1.20)	1.1637	0.111 (9.00)	0.4938
				2.222 (0.45)	0.0119	0.714 (1.40)	1.1012	0.417 (2.40)	0.2374
				2.857 (0.35)	0.0106	2.222 (0.45)	0.8720	0.769 (1.30)	0.2180
				1.667 (0.60)	0.0062	0.278 (3.60)	0.7618	1.333 (0.75)	0.0727
				0.833 (1.20)	0.0054	1.429 (0.70)	0.7030	2.222 (0.45)	0.0594
						0.476 (2.10)	0.7022	6.667 (0.15)	0.0113
						2.857 (0.35)	0.6106		
						6.667 (0.15)	0.4257		
E75	N00°E	133.8	5.10	3.333 (0.30)	0.0445	1.111 (0.90)	4.3913	0.111 (9.00)	2.3057
				5.000 (0.20)	0.0355	0.667 (1.50)	3.8797	0.667 (1.50)	0.7477
				1.538 (0.65)	0.0318	0.833 (1.20)	3.5488	1.000 (1.00)	0.6980
				1.111 (0.90)	0.0287	1.538 (0.65)	3.4484	0.357 (2.80)	0.4554
				0.714 (1.40)	0.0151	0.111 (9.00)	2.7831	1.429 (0.70)	0.3760
				0.400 (2.50)	0.0026	0.238 (4.20)	2.3222		
				0.200 (5.00)	0.0026	2.500 (0.40)	2.1725		
						0.385 (2.60)	2.0200		
	S90°W	111.8	10.44	3.333 (0.30)	0.0379	0.167 (6.00)	5.3101	0.143 (7.00)	5.1677
				1.818 (0.55)	0.0287	0.769 (1.30)	3.8790	0.385 (2.60)	1.3045
				2.500 (0.40)	0.0285	0.400 (2.50)	3.0146	0.833 (1.20)	0.7887
				6.667 (0.15)	0.0265	1.111 (0.90)	2.5212	0.556 (1.80)	0.6776
				0.833 (1.20)	0.0222	1.818 (0.55)	2.4206	1.818 (0.55)	0.2160
				1.250 (0.80)	0.0168	0.556 (1.80)	2.4140	1.538 (0.65)	0.2155
				0.556 (1.80)	0.0084	3.333 (0.30)	1.6812	2.500 (0.40)	0.1122
				0.400 (2.50)	0.0084	2.500 (0.40)	1.6705	3.333 (0.30)	0.0847
				0.200 (5.00)	0.0064				
E78	N50°W	126.5	5.26	2.857 (0.35)	0.0392	0.714 (1.40)	5.3855	0.111 (9.00)	3.8416
				2.222 (0.45)	0.0372	0.111 (0.90)	3.7710	0.714 (1.40)	1.0375
				6.667 (0.15)	0.0338	1.538 (0.65)	2.9259	1.111 (0.90)	0.5617
				1.538 (0.65)	0.0316	0.217 (4.60)	2.2521	1.429 (0.70)	0.3501
				1.111 (0.90)	0.0282	2.222 (0.45)	2.0782		
				0.769 (1.30)	0.0238				
	S40°W	169.2	5.68	3.333 (0.30)	0.0456	0.769 (1.30)	4.2831	0.667 (1.50)	0.8919
				1.333 (0.75)	0.0347	0.625 (1.60)	4.2445	0.455 (2.20)	0.8486
				0.833 (1.20)	0.0214	1.250 (0.80)	4.0167	0.833 (1.20)	0.7554
				0.714 (1.40)	0.0180	0.385 (2.60)	2.9433	1.250 (0.80)	0.5373
						0.143 (7.00)	2.2506	0.111 (9.00)	0.5055
						2.500 (0.40)	2.2049	0.182 (5.50)	0.3936
						6.667 (0.15)	0.9511	2.222 (0.45)	0.1398
E81	S08°E	213.0	8.48	3.333 (0.30)	0.0300	1.000 (1.00)	3.0965	0.111 (9.00)	1.2555
				1.000 (1.00)	0.0195	0.263 (3.80)	2.2617	0.227 (4.40)	0.9368
				1.667 (0.60)	0.0165	0.769 (1.30)	2.1160	0.294 (3.40)	0.6782
				0.417 (2.40)	0.0036	6.667 (0.15)	2.0498	1.000 (1.00)	0.4779
				0.250 (4.00)	0.0021	0.556 (1.80)	2.0283	0.500 (2.00)	0.4275
				0.111 (9.00)	0.0007	2.000 (0.50)	1.7458	0.769 (1.30)	0.3989
						1.667 (0.60)	1.6370	2.000 (0.50)	0.1303
						2.500 (0.40)	1.5866	6.667 (0.15)	0.0456
						0.435 (2.30)	1.4884		
						0.111 (9.00)	1.4266		
	S82°W	198.3	3.48	1.818 (0.55)	0.0188	1.429 (0.70)	1.6748	1.429 (0.70)	1.6748

Record	Instrument Direction	Peak Acceleration cm/sec^2	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
E81	S82°W	198.3	3.48	0.625 (1.60)	0.0034	1.818 (0.55)	1.5700	1.818 (0.55)	1.5700
				0.250 (4.00)	0.0013	6.667 (0.15)	1.4836	6.667 (0.15)	1.4836
						0.167 (6.00)	1.0169	0.167 (6.00)	1.0169
						2.857 (0.35)	1.0168	2.857 (0.35)	1.0168
	DOWN	63.7	0.76	3.333 (0.30)	0.0146	1.429 (0.70)	0.9378	1.000 (1.00)	0.1117
				1.667 (0.60)	0.0079	0.833 (1.20)	0.8722	0.111 (9.00)	0.1108
						1.818 (0.55)	0.8203	0.625 (1.60)	0.1102
						2.857 (0.35)	0.7884	0.833 (1.20)	0.1088
						0.111 (9.00)	0.4733	2.857 (0.35)	0.0433
E83	S00°W	158.2	12.32	3.333 (0.30)	0.0569	1.111 (0.90)	4.3900	0.167 (6.00)	2.3226
				5.000 (0.20)	0.0430	1.538 (0.65)	3.5589	0.278 (3.60)	2.0788
				1.538 (0.65)	0.0319	0.833 (1.20)	3.2173	0.111 (9.00)	2.0238
				1.111 (0.90)	0.0292	1.818 (0.55)	3.1926	0.476 (2.10)	0.9505
				0.769 (1.30)	0.0158	0.625 (1.60)	3.0918	0.769 (1.30)	0.6594
				0.500 (2.00)	0.0090	2.857 (0.35)	2.7971	1.000 (1.00)	0.6481
				0.333 (3.00)	0.0070	0.476 (2.10)	2.6384	1.429 (0.70)	0.3486
	N90°E	161.9	12.60	6.667 (0.15)	0.0719	0.200 (5.00)	4.3715	0.208 (4.80)	3.1020
				3.333 (0.30)	0.0338	0.167 (6.00)	4.2734	0.125 (8.00)	2.9143
				1.538 (0.65)	0.0272	0.833 (1.20)	3.8759	0.400 (2.50)	1.4022
				2.222 (0.45)	0.0207	0.400 (2.50)	3.5254	0.769 (1.30)	0.7121
				0.909 (1.10)	0.0205	1.538 (0.65)	2.7631	0.625 (1.60)	0.5453
				1.250 (0.80)	0.0177	3.333 (0.30)	1.8081	1.429 (0.70)	0.2884
				0.417 (2.40)	0.0093	6.667 (0.15)	1.5268	6.667 (0.15)	0.0399
	DOWN	55.5	0.02	6.667 (0.15)	0.0171	3.333 (0.30)	0.7967	0.111 (9.00)	0.6808
				3.333 (0.30)	0.0170	2.000 (0.50)	0.7087	0.556 (1.80)	0.0969
				2.000 (0.50)	0.0079	1.250 (0.80)	0.5769	1.111 (0.90)	0.0762
				1.429 (0.70)	0.0043	0.833 (1.20)	0.5241	2.000 (0.50)	0.0492
				1.250 (0.80)	0.0040	0.143 (7.00)	0.4912	3.333 (0.30)	0.0377
				0.455 (2.20)	0.0009	0.500 (2.00)	0.3860		
F86	N83°W	104.6	5.52	2.222 (0.45)	0.0315	1.000 (1.00)	3.4465	0.111 (9.00)	2.6166
				4.000 (0.25)	0.0281	0.833 (1.20)	3.2903	0.385 (2.600)	0.7128
				1.000 (1.00)	0.0226	1.429 (0.70)	2.1565	0.769 (1.300)	0.6206
				1.818 (0.55)	0.0215	1.667 (0.60)	2.0395	0.500 (2.00)	0.5848
				1.429 (0.70)	0.0196	0.111 (9.00)	2.0154	1.000 (1.00)	0.5573
				0.417 (2.40)	0.0045	2.222 (0.45)	1.8577	1.429 (0.70)	0.2369
						3.333 (0.30)	1.2466	2.222 (0.45)	0.1577
	S07°W	80.5	7.72	4.000 (0.25)	0.0252	0.227 (4.40)	1.8762	0.111 (9.00)	1.6017
				2.857 (0.35)	0.0248	1.250 (0.80)	1.7901	0.500 (2.00)	0.3384
				1.250 (0.80)	0.0156	2.222 (0.45)	1.5209	1.250 (0.80)	0.2459
				1.429 (0.70)	0.0136	0.111 (9.00)	1.4890	1.000 (1.00)	0.2096
				0.833 (1.20)	0.0060	1.000 (1.00)	1.4385	2.222 (0.45)	0.1063
F88	S70°E	265.7	8.02	1.667 (0.60)	0.1098	1.000 (1.00)	15.6470	0.125 (8.00)	2.9696
				1.250 (0.80)	0.1071	1.667 (0.60)	9.4654	1.000 (1.00)	2.4144
				2.222 (0.45)	0.0901	0.625 (1.60)	8.5561	0.500 (2.00)	1.7587
				3.333 (0.30)	0.0684	0.111 (9.00)	5.3867	0.294 (3.40)	1.6820
				5.000 (0.20)	0.0598	5.000 (0.20)	1.8072		
	S20°W	209.1	10.20	5.000 (0.20)	0.1004	1.000 (1.00)	10.0056	0.667 (1.50)	2.0460
				2.500 (0.40)	0.0757	0.714 (1.40)	9.7703	0.500 (2.00)	1.8049
				1.000 (1.00)	0.0606	0.625 (1.00)	9.2055	0.909 (1.10)	1.7643
				1.333 (0.75)	0.0535	1.333 (0.75)	6.7316	0.333 (3.00)	1.5080
						0.313 (3.20)	4.9957	0.250 (4.00)	1.4828
						2.222 (0.45)	4.5064	0.111 (9.00)	1.1530
						3.333 (0.30)	2.8503	2.000 (0.50)	0.3826
						5.000 (0.20)	2.6463	5.000 (0.20)	0.0997
	DOWN	131.5	9.62	1.250 (0.80)	0.0553	1.111 (0.90)	7.3479	0.111 (9.00)	1.3876
				1.667 (0.60)	0.0454	1.667 (0.60)	4.0944	0.217 (4.60)	1.2879
				4.000 (0.25)	0.0406	0.278 (3.60)	3.3603	1.111 (0.90)	1.0606
				2.222 (0.45)	0.0395	2.222 (0.45)	2.3875	0.333 (3.00)	1.0373
				0.385 (2.60)	0.0056	0.111 (9.00)	2.3644	0.667 (1.50)	0.7372
				0.263 (3.80)	0.0032			2.222 (0.45)	0.1966
F89	S53°E	131.9	6.52	2.222 (0.45)	0.0409	1.000 (1.00)	5.1903	0.125 (8.00)	3.3291
				2.857 (0.35)	0.0385	0.625 (1.60)	4.3444	0.667 (1.50)	0.8601
				5.000 (0.20)	0.0378	0.167 (6.00)	3.2656	1.000 (1.00)	0.8136
				1.000 (1.00)	0.0329	1.538 (0.65)	2.9652	0.556 (1.80)	0.7983
				1.250 (0.80)	0.0321	1.818 (0.55)	2.9452	1.538 (0.65)	0.3315
				1.538 (0.65)	0.0317	2.857 (0.35)	1.7871	1.818 (0.55)	0.2478
				0.400 (2.50)	0.0049	4.000 (0.25)	1.3446		
	S37°W	139.0	9.76	6.667 (0.15)	0.0342	0.208 (4.80)	4.6380	0.182 (5.50)	3.4546
				2.857 (0.35)	0.0242	0.833 (1.20)	2.9957	0.833 (1.20)	0.5607
				1.333 (0.75)	0.0218	1.250 (0.80)	2.8241	1.333 (0.75)	0.3043
				1.818 (0.55)	0.0175	0.556 (1.80)	2.2377	2.500 (0.40)	0.0877
				0.909 (1.10)	0.0170	1.818 (0.55)	1.4597		
				0.313 (3.20)	0.0091	2.500 (0.40)	1.2720		
				0.556 (1.80)	0.0086	5.000 (0.20)	0.8085		
	DOWN	75.3	2.96	3.333 (0.30)	0.0278	0.208 (4.80)	1.8985	0.182 (5.50)	1.3820
				6.667 (0.15)	0.0175	0.833 (1.20)	1.5768	0.435 (2.30)	0.3512
				0.833 (1.20)	0.0096	3.333 (0.30)	1.2990	0.833 (1.20)	0.3399
				1.429 (0.70)	0.0078	0.111 (9.00)	1.0708	1.429 (0.70)	0.0945
				0.556 (1.80)	0.0037	0.500 (2.00)	1.0023	3.333 (0.30)	0.0618
				0.250 (4.00)	0.0027	1.429 (0.70)	0.9190	2.000 (0.50)	0.0617
						2.222 (0.45)	0.8742	2.500 (0.40)	0.0612
F92	S62°E	64.2	2.56	6.667 (0.15)	0.0239	0.769 (1.30)	4.3216	0.200 (5.0)	0.8480
				0.909 (1.10)	0.0211	1.250 (0.80)	2.4179	0.769 (1.3)	0.7865
				1.250 (0.80)	0.0195	0.333 (3.00)	2.3894	0.385 (2.6)	0.4992
				2.000 (0.50)	0.0159	1.667 (0.6)	1.4009		
				2.857 (0.35)	0.0155	4.000 (0.25)	0.8226		
				1.667 (0.60)	0.0147	2.857 (0.35)	0.6607		
	S28°W	79.1	3.66	2.857 (0.35)	0.0330	0.714 (1.40)	3.3031	0.111 (9.00)	1.2467
				4.000 (0.25)	0.0291	1.250 (0.80)	2.3571	0.238 (4.20)	0.6005
				6.667 (0.15)	0.0238	1.429 (0.70)	2.3380	0.667 (1.50)	0.5938
				1.538 (0.65)	0.0216	0.455 (2.20)	1.9759	0.385 (2.60)	0.4828
				0.833 (1.20)	0.0143	2.500 (0.40)	1.7925	1.333 (0.75)	0.2787
				0.167 (6.00)	0.0008	0.294 (3.40)	1.5366		
						0.200 (5.00)	1.3768		
						0.111 (9.00)	1.3707		
F95	S88°E	96.2	4.70	3.333 (0.30)	0.0235	0.769 (1.30)	3.4604	0.167 (6.00)	1.0585

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks Frequency (Period) Hz (sec)	Amplitude (g)	Predominant Velocity Peaks Frequency (Period) Hz (sec)	Amplitude cm/sec	Predominant Displacement Peaks Frequency (Period) Hz (sec)	Amplitude cm
F95	S88°E	96.2	4.70	2.500 (0.40)	0.0227	0.143 (7.00)	1.7225	0.833 (1.20)	0.6640
				1.111 (0.90)	0.0203	1.818 (0.55)	1.3159	0.500 (2.00)	0.3964
				1.818 (0.55)	0.0167	2.500 (0.40)	1.2285	1.667 (0.60)	0.1352
				0.263 (3.80)	0.0020	3.333 (0.30)	0.9941	2.222 (0.45)	0.0912
	S02°W	83.9	5.96	2.000 (0.50)	0.0319	0.167 (6.00)	3.7061	0.143 (7.00)	3.2956
				2.857 (0.35)	0.0287	1.000 (1.00)	2.8262	0.714 (1.40)	0.5126
				5.000 (0.20)	0.0252	2.000 (0.50)	2.4185	1.000 (1.00)	0.4323
				1.538 (0.65)	0.0211	0.400 (2.50)	2.2424	1.429 (0.70)	0.2392
				1.111 (0.90)	0.0178	1.429 (0.70)	2.0860	2.000 (0.50)	0.1968
				0.208 (4.80)	0.0041				
				0.333 (3.00)	0.0036				
F98	S53°E	236.4	7.56	5.000 (0.20)	0.0462	0.833 (1.20)	4.1776	0.125 (8.00)	4.0003
				2.222 (0.45)	0.0337	1.000 (1.00)	3.7358	0.769 (1.30)	0.7776
				1.538 (0.65)	0.0315	1.250 (0.80)	3.6438	0.667 (1.50)	0.7361
				1.250 (0.80)	0.0305	1.538 (0.65)	3.2235	1.000 (1.00)	0.5975
				1.000 (1.00)	0.0242	2.222 (0.45)	2.1663	0.445 (2.20)	0.5600
				0.833 (1.20)	0.0200	5.000 (0.20)	1.4995	1.250 (0.80)	0.4837
						2.857 (0.35)	1.4962	2.222 (0.45)	0.1701
	S37°W	192.0	9.80	5.000 (0.20)	0.0673	0.278 (3.60)	4.7643	0.111 (9.00)	3.4973
				2.222 (0.45)	0.0402	0.217 (4.60)	4.5278	0.200 (5.00)	3.3644
				3.333 (0.30)	0.0400	1.538 (0.65)	3.3793	0.833 (1.20)	0.5887
				1.538 (0.65)	0.0304	0.769 (1.30)	3.3316	1.538 (0.65)	0.3181
				0.833 (1.20)	0.0166	2.222 (0.45)	2.7971	1.250 (0.80)	0.2822
				0.294 (3.40)	0.0095	0.556 (1.80)	2.7466	2.222 (0.45)	0.2031
				0.556 (1.80)	0.0094	1.250 (0.80)	2.4908	5.000 (0.20)	0.0670
				0.435 (2.30)	0.0077	5.000 (0.20)	2.1065		
						3.333 (0.30)	1.9059		
	DOWN	69.2	4.68	0.833 (1.20)	0.0088	0.200 (5.0)	2.0104	0.200 (5.00)	1.5327
				1.818 (0.55)	0.0078	0.833 (1.20)	1.6630	0.417 (2.40)	0.4231
				1.250 (0.80)	0.0078	0.455 (2.20)	1.2183	0.667 (1.50)	0.3422
				0.250 (4.00)	0.0031	1.250 (0.80)	0.9672	0.769 (1.30)	0.3339
						1.667 (0.60)	0.6752	1.250 (0.80)	0.1232
						2.222 (0.45)	0.6649	1.667 (0.60)	0.0658
						5.000 (0.20)	0.5513		
F103	N00°E	91.5	7.72	6.667 (0.15)	0.0382	2.857 (0.35)	1.0830	0.143 (7.00)	0.3435
				2.857 (0.35)	0.0199	0.625 (1.60)	1.0020	0.111 (9.00)	0.3414
				1.538 (0.65)	0.0074	6.667 (0.15)	0.8952	0.625 (1.60)	0.2397
				1.250 (0.80)	0.0051	0.833 (1.20)	0.7630	0.357 (2.80)	0.2016
				0.625 (1.60)	0.0038	1.538 (0.65)	0.7609	0.294 (3.40)	0.1309
				0.769 (1.30)	0.0030	1.111 (0.90)	0.7364	1.000 (1.00)	0.0898
				0.417 (2.40)	0.0012	0.357 (2.80)	0.6827	1.538 (0.65)	0.0770
				0.200 (5.00)	0.0004	0.294 (3.40)	0.5860	2.500 (0.40)	0.0730
						0.143 (7.00)	0.5801	1.818 (0.55)	0.0701
	N90°W	120.5	7.48	6.667 (0.15)	0.0440	2.500 (0.40)	1.2821	0.111 (9.00)	0.6610
				2.857 (0.35)	0.0195	1.818 (0.55)	1.1100	0.435 (2.30)	0.2648
				1.333 (0.75)	0.0055	4.000 (0.25)	1.1097	0.400 (2.50)	0.2596
				0.625 (1.60)	0.0022	1.333 (0.75)	0.8803	1.111 (0.90)	0.0971
				0.435 (2.30)	0.0020	1.000 (1.00)	0.7533	0.909 (1.10)	0.0869
				0.238 (4.20)	0.0006	0.833 (1.20)	0.7054	2.000 (0.50)	0.0816
						0.111 (9.00)	0.5447	4.000 (0.25)	0.0450
F104	N00°E	85.2	6.00	5.000 (0.20)	0.0369	0.556 (1.80)	2.6133	0.167 (6.00)	0.7241
				2.500 (0.40)	0.0182	0.333 (3.00)	1.5382	0.556 (1.80)	0.6926
				1.818 (0.55)	0.0152	1.333 (0.75)	1.2915	1.667 (0.60)	0.1164
				1.333 (0.75)	0.0112	1.818 (0.55)	1.1699		
				0.625 (1.60)	0.0096	4.000 (0.25)	1.1375		
				0.769 (1.30)	0.0088	2.222 (0.45)	1.0914		
	N90°W	103.1	1.80	5.000 (0.20)	0.0328	2.222 (0.45)	1.3040	0.111 (9.00)	1.1347
				2.222 (0.45)	0.0192	2.857 (0.35)	1.2155	0.313 (3.20)	0.5108
				1.111 (0.90)	0.0067	0.385 (2.60)	1.1949	1.000 (1.00)	0.1393
				0.500 (2.00)	0.0038	4.000 (0.25)	1.1946	0.833 (1.20)	0.1264
						0.111 (9.00)	0.9428	2.222 (0.45)	0.0945
F105	S00°W	83.1	3.76	5.000 (0.20)	0.0314	0.143 (7.00)	1.1463	0.111 (9.00)	1.1477
				1.111 (0.90)	0.0061	0.909 (1.10)	0.9949	1.000 (1.00)	0.1214
				0.238 (4.20)	0.0015	0.200 (5.00)	0.9588	1.538 (0.65)	0.0658
				0.313 (3.20)	0.0014	5.000 (0.20)	0.9450	2.222 (0.45)	0.0596
						2.857 (0.35)	0.9428		
						2.222 (0.45)	0.9009		
						0.357 (2.80)	0.7511		
						1.667 (0.60)	0.7061		
	N90°E	77.6	1.86	3.333 (0.30)	0.0244	1.667 (0.60)	1.4272	0.111 (9.00)	1.3507
				5.000 (0.20)	0.0238	1.250 (0.80)	1.4112	0.500 (2.00)	0.3093
				2.500 (0.40)	0.0172	0.500 (2.00)	1.0466	1.111 (0.90)	0.1944
				1.667 (0.60)	0.0158	3.333 (0.30)	1.0456	1.667 (0.60)	0 1400
				1.250 (0.80)	0.0123	2.500 (0.40)	0.9831	2.500 (0.40)	0.0674
				0.556 (1.80)	0.0035	0.111 (9.00)	0.8951	3.333 (0.30)	0.0542
				0.714 (1.40)	0.0034	0.278 (3.60)	0.7493		
				0.143 (7.00)	0.0008	0.400 (2.50)	0.7302		
	UP	67.1	5.40	6.667 (0.15)	0.0264	0.667 (1.50)	1.5351	0.167 (6.00)	0.3330
				0.769 (1.30)	0.0065	5.000 (0.20)	0.7562	0.625 (1.60)	0.3233
				1.538 (0.65)	0.0061	0.333 (3.00)	0.7438	0.250 (4.00)	0.2474
				0.313 (3.20)	0.0008	0.217 (4.60)	0.7171	0.357 (2.80)	0.1813
				0.182 (5.50)	0.0004	3.333 (0.30)	0.6751	1.429 (0.70)	0.0734
						2.222 (0.45)	0.6446	2.000 (0.50)	0.0490
						1.538 (0.65)	0.6428	3.333 (0.30)	0.0303
						0.125 (8.00)	0.5404	5.000 (0.20)	0.0232
:106	S00°W	87.5	4.20	4.000 (0.25)	0.0472	0.833 (1.20)	1.8669	0.143 (7.00)	0.7076
				1.333 (0.75)	0.0124	4.000 (0.25)	1.7564	0.278 (3.60)	0.3416
				1.111 (0.90)	0.0112	1.111 (0.90)	1.7340	0.385 (2.60)	0.3347
				0.455 (2.20)	0.0027	0.238 (4.20)	1.6628	0.833 (1.20)	0.3231
				0.182 (5.50)	0.0010	0.500 (2.00)	1.5246	2.000 (0.50)	0.0883
						1.333 (0.75)	1.5161	3.333 (0.30)	0.0746
						0.125 (8.00)	1.3994		
						2.222 (0.45)	1.2542		
	S90°W	188.6	5.88	4.000 (0.25)	0.0988	1.000 (1.00)	5.1588	0.167 (6.00)	2.2735
				1.250 (0.80)	0.0352	0.769 (1.30)	5.0298	0.455 (2.20)	0.7688
				0.476 (2.10)	0.0070	2.857 (0.35)	4.5414	0.385 (2.60)	0.7320
				0.217 (4.60)	0.0034	1.333 (0.75)	4.2546	0.909 (1.10)	0.6479

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
G106	S90°W	188.6	5.88			0.200 (5.00)	3.6973	1.111 (0.90)	0.6101
						0.333 (3.00)	3.3754	2.857 (0.35)	0.2445
						0.111 (9.00)	2.9027		
	DOWN	83.5	2.12	6.667 (0.45)	0.0339	3.333 (0.30)	1.6103	0.111 (9.00)	0.3653
				3.333 (0.30)	0.0318	1.429 (0.70)	1.5762	0.417 (2.40)	0.2023
				1.667 (0.60)	0.0137	2.500 (0.40)	1.4234	0.385 (2.60)	0.2016
				0.208 (4.80)	0.0006	0.833 (1.20)	1.2092	1.333 (0.75)	0.1428
						0.400 (2.50)	1.0757	2.857 (0.35)	0.0765
						0.143 (7.00)	0.9639		
G107	N00°E	93.5	6.42	3.333 (0.30)	0.0305	1.111 (0.90)	2.9606	0.278 (3.60)	0.4404
				1.250 (0.80)	0.0205	0.833 (1.20)	1.4643	0.217 (4.60)	0.4335
				6.667 (0.15)	0.0195	0.556 (1.80)	1.4263	0.167 (6.00)	0.4133
				1.667 (0.60)	0.0150	1.667 (0.60)	1.4053	1.111 (0.90)	0.3921
				0.714 (1.40)	0.0051	0.667 (1.50)	1.3087	0.556 (1.80)	0.3132
				0.625 (1.60)	0.0047	2.222 (0.45)	1.3033	0.400 (2.50)	0.2511
				0.294 (3.40)	0.0015	2.857 (0.35)	1.2952	0.714 (1.40)	0.2442
						0.385 (2.60)	1.2828	0.833 (1.20)	0.2440
						0.238 (4.20)	1.2787	1.538 (0.65)	0.1407
						6.667 (0.15)	0.4256	2.222 (0.45)	0.0914
	N90°E	107.3	7.92	2.222 (0.45)	0.0400	0.909 (1.10)	3.3507	0.167 (6.00)	1.9618
				3.333 (0.30)	0.0373	1.111 (0.90)	3.1335	0.400 (2.50)	0.9585
				5.000 (0.20)	0.0333	2.222 (0.45)	2.6529	0.909 (1.10)	0.5702
				1.111 (0.90)	0.0205	0.357 (2.80)	2.5985	0.769 (1.30)	0.4519
				1.538 (0.65)	0.0195	0.200 (5.00)	2.3922	1.429 (0.70)	0.2343
				0.909 (1.10)	0.0191	0.143 (7.00)	2.3596	2.222 (0.45)	0.2016
				0.455 (2.20)	0.0073	0.227 (4.40)	2.2849		
				0.217 (4.60)	0.0030	0.455 (2.20)	2.2061		
						1.429 (0.70)	2.1704		
						1.667 (0.60)	1.8338		
	DOWN	92.9	0.56	3.333 (0.30)	0.0197	2.857 (0.35)	0.9282	0.111 (9.00)	0.4641
				1.818 (0.55)	0.0104	1.818 (0.55)	0.8643	0.385 (2.60)	0.1091
				1.111 (0.90)	0.0037	1.111 (0.90)	0.6742	0.769 (1.30)	0.1020
				0.400 (2.50)	0.0007	0.909 (1.10)	0.6400	1.667 (0.60)	0.0798
				0.143 (7.00)	0.0003	0.111 (9.00)	0.5262	0.278 (3.60)	0.0762
						0.357 (2.80)	0.3919	0.476 (2.10)	0.0729
						0.417 (2.40)	0.3455	2.857 (0.35)	0.0502
G110	S82°E	207.8	5.60	2.857 (0.35)	0.1097	2.857 (0.35)	5.8924	0.182 (5.50)	1.9555
				1.111 (0.90)	0.0233	0.769 (1.30)	3.7298	0.476 (2.10)	0.6033
				0.263 (3.80)	0.0039	1.111 (0.90)	3.2492	0.769 (1.30)	0.5092
						0.227 (4.40)	2.9572	1.111 (0.90)	0.4651
								2.857 (0.35)	0.3297
	S08°W	139.0	5.88	4.000 (0.25)	0.0490	0.909 (1.10)	3.8133	0.455 (2.20)	0.8291
				2.857 (0.35)	0.0392	1.429 (0.70)	2.9636	0.125 (8.00)	0.6470
				1.333 (0.75)	0.0249	0.476 (2.10)	2.5860	0.909 (1.10)	0.5978
				1.667 (0.60)	0.0235	0.625 (1.60)	2.5111	1.667 (0.60)	0.2088
				1.000 (1.00)	0 0225	2.857 (0.35)	2.1776	2.857 (0.35)	0.1178
						4.000 (0.25)	1.6673		
	DOWN	126.3	4.60	2.857 (0.35)	0.0556	2.857 (0.35)	3.0125	0.182 (5.50)	0.6063
				1.818 (0.55)	0.0144	0.556 (1.80)	1.4330	0.556 (1.80)	0.2192
				1.429 (0.70)	0.0098	1.333 (0.75)	1.3162	2.857 (0.35)	0.1673
				0.833 (1.20)	0.0044	1.000 (1.00)	1.2082	1.429 (0.70)	0.1174
				0.455 (2.20)	0.0022	0.357 (2.80)	1.0551	1.111 (0.90)	0.1158
				0.333 (3.00)	0.0019	0.143 (7.00)	1.0279	1.818 (0.55)	0.1064
G112	N52°W	101.9	7.42	1.667 (0.60)	0.0215	0.167 (6.00)	2.9024	0.143 (7.00)	2.7208
				2.222 (0.45)	0.0204	0.263 (3.80)	2.7388	0.833 (1.20)	0.5027
				6.667 (0.15)	0.0189	0.833 (1.20)	2.5709	1.667 (0.60)	0.1919
				0.909 (1.10)	0.0142	0.435 (2.30)	2.1124		
				1.111 (0.90)	0.0131	1.667 (0.60)	2.0899		
				0.556 (1.80)	0.0067	0.556 (1.80)	1.8904		
				0.455 (2.20)	0.0065	2.222 (0.45)	1.3057		
				0.313 (3.20)	0.0055	6.667 (0.15)	0.4493		
	N38°E	78.5	4.00	1.667 (0.60)	0.0265	0.833 (1.20)	3.4918	0.125 (8.00)	2.4432
				2.222 (0.45)	0.0258	0.625 (1.60)	2.7334	0.625 (1.60)	0.6249
				5.000 (0.20)	0.0235	1.538 (0.65)	2.5064	0.833 (1.20)	0.6095
				1.250 (0.80)	0.0215	0.125 (8.00)	2.4690	0.294 (3.40)	0.5596
				0.182 (5.50)	0.0023	2.222 (0.45)	1.6913	1.538 (0.65)	0.2567
						0.227 (4.40)	1.6102		
						5.000 (0.20)	0.5494		
	DOWN	53.2	1.30	4.000 (0.25)	0.0198	0.227 (4.40)	1.1589	0.200 (5.00)	0.6477
				2.500 (0.40)	0.0060	0.909 (1.10)	0.8172	0.625 (1.60)	0.1488
				1.250 (0.80)	0.0058	1.250 (0.80)	0.7744	0.909 (1.10)	0.1391
				2.000 (0.50)	0.0056	4.000 (0.25)	0.7115	0.500 (2.00)	0.1074
				1.538 (0.65)	0.0052	0.667 (1.50)	0.6861	1.250 (0.80)	0.0924
				0.909 (1.10)	0.0047	1.538 (0.65)	0.6227	2.000 (0.50)	0.0347
				0.667 (1.5)	0.0027	0.476 (2.10)	0.4372	4.000 (0.25)	0.0304
				0.294 (3.40)	0.0016	2.000 (0.50)	0.4056		
G114	S60°E	110.8	10.88	4.000 (0.25)	0.0343	0.625 (1.60)	4.9244	0.625 (1.60)	1.3500
				1.818 (0.55)	0.0300	1.818 (0.55)	2.4302	0.182 (5.50)	0.5884
				2.857 (0.35)	0.0273	0.294 (3.40)	1.9049	1.333 (0.75)	0.2715
				0.667 (1.50)	0.0216	0.167 (6.00)	1.6374	1.667 (0.60)	0.2328
				1.333 (0.75)	0.0195	2.857 (0.35)	1.5135		
				1.111 (0.90)	0.0167	4.000 (0.25)	1.1726		
	S30°W	136.2	11.44	3.333 (0.30)	0.0369	0.769 (1.30)	3.8935	0.714 (1.40)	0.8085
				6.667 (0.15)	0.0332	1.667 (0.60)	2.1948	0.556 (1.80)	0.6947
				1.818 (0.55)	0.0262	3.333 (0.30)	1.8450	0.125 (8.00)	0.5762
				0.769 (1.30)	0.0182	0.294 (3.40)	1.5703	0.263 (3.80)	0.5337
				1.000 (1.00)	0.0127	0.357 (2.80)	1.4652	0.167 (6.00)	0.5093
				1.250 (0.80)	0.0117	0.208 (4.80)	1.0968	1.667 (0.60)	0.2141
				0.333 (3.00)	0.0022	0.111 (9.00)	1.0446	3.333 (0.30)	0.0817
	DOWN	86.6	5.46	5.000 (0.20)	0.0277	0.769 (1.30)	2.8736	0.769 (1.30)	0.5776
				2.857 (0.35)	0.0174	1.538 (0.65)	1.3656	0.455 (2.20)	0.5226
				1.818 (0.55)	0.0149	1.818 (0.55)	1.3140	0.167 (6.00)	0.4591
				0.769 (1.30)	0.0138	0.125 (8.00)	0.9734	0.125 (8.00)	0.4255
				1.111 (0.90)	0.0121	2.500 (0.40)	0.9076	1.538 (0.65)	0.1403
				0.500 (2.00)	0.0049	5.000 (0.20)	0.9016	5.000 (0.20)	0.0275
H115	N11°E	220.6	16.82	4.000 (0.25)	0.0873	0.278 (3.60)	11.0790	0.294 (3.40)	5.7034
				2.500 (0.40)	0.0671	0.556 (1.80)	8.1032	0.250 (4.00)	5.1382

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
H115	N11°E	220.6	16.82	0.556 (1.80)	0.0298	0.476 (2.10)	6.9377	0.556 (1.80)	2.3840
				1.818 (0.55)	0.0290	2.500 (0.40)	4.3440	0.455 (2.20)	2.2809
				1.538 (0.65)	0.0241	4.000 (0.25)	3.4669	1.333 (0.75)	0.3123
				1.333 (0.75)	0.0224	1.429 (0.70)	2.7313	2.500 (0.40)	0.2673
				0.476 (2.10)	0.0206	1.667 (0.60)	2.2023	1.818 (0.55)	0.2172
						0.833 (1.20)	2.6427	4.000 (0.25)	0.1357
	N79°W	146.0	17.90	2.500 (0.40)	0.0560	0.385 (2.60)	8.5381	0.385 (2.60)	3.4829
				0.909 (1.10)	0.0225	0.250 (4.00)	4.9913	0.143 (7.00)	3.2926
				1.667 (0.60)	0.0221	0.167 (6.00)	3.6338	0.250 (4.00)	2.8822
				0.400 (2.50)	0.0218	2.222 (0.45)	3.5219	0.227 (4.40)	2.8447
				0.250 (4.00)	0.0073	0.833 (1.20)	3.3390	0.833 (1.20)	0.7276
				0.167 (6.00)	0.0035	0.111 (9.00)	2.9391	1.429 (0.70)	0.2377
						1.538 (0.65)	2.3989	2.222 (0.45)	0.2350
						1.250 (0.80)	2.0092		
	DOWN	94.5	9.34	2.500 (0.40)	0.0339	0.208 (4.80)	2.3354		
				3.333 (0.30)	0.0287	2.500 (0.40)	2.0600	0.200 (5.00)	1.6495
				5.000 (0.20)	0.0257	0.500 (2.00)	1.8168	0.313 (3.20)	0.8370
				1.538 (0.65)	0.0158	0.143 (7.00)	1.7847	0.455 (2.20)	0.5934
				1.818 (0.55)	0.0152	1.538 (0.65)	1.6756	1.538 (0.65)	0.1655
				0.769 (1.30)	0.0067	0.625 (1.60)	1.6648	2.500 (0.40)	0.1332
				0.496 (2.10)	0.0054	0.333 (3.00)	1.5925		
				0.333 (3.00)	0.0037	3.333 (0.30)	1.3079		
						1.000 (1.00)	0.8515		
H121	S90°W	119.4	9.10	3.333 (0.30)	0.0364	0.769 (1.30)	5.0166	0.167 (6.00)	2.8653
				5.000 (0.20)	0.0281	0.182 (5.50)	4.1006	0.714 (1.40)	0.9813
				1.250 (0.80)	0.0224	2.500 (0.40)	1.8269	0.476 (2.10)	0.9580
				0.833 (1.20)	0.0220				
				1.000 (1.00)	0.0214				
				1.538 (0.65)	0.0196				
				0.500 (2.00)	0.0088				
				0.313 (3.20)	0.0055				
	S00°W	112.3	6.38	6.667 (0.15)	0.0374	1.250 (0.80)	2.9163	0.500 (2.00)	0.7130
				4.000 (0.25)	0.0299	0.909 (1.10)	2.7827	0.238 (4.20)	0.6887
				1.818 (0.55)	0.0254	1.667 (0.60)	2.2213	0.200 (5.00)	0.6769
				2.222 (0.45)	0.0252	0.476 (2.10)	2.1654	0.313 (3.20)	0.5964
				1.250 (0.80)	0.0243	0.333 (3.00)	1.9059	0.909 (1.10)	0.4578
				0.556 (1.80)	0.0073	0.217 (4.60)	1.3486	0.111 (9.00)	0.4078
						0.167 (6.00)	1.3326	1.250 (0.80)	0.3838
						3.333 (0.30)	1.1836	1.667 (0.60)	0.2200
						6.667 (0.15)	0.7380	6.667 (0.15)	0.0207
	DOWN	79.2	4.86	5.000 (0.20)	0.0206	0.833 (1.2)	1.9007	0.238 (4.20)	0.8184
				2.500 (0.40)	0.0128	0.250 (4.00)	1.4054	0.167 (6.00)	0.8160
				0.909 (1.10)	0.0101	0.167 (6.00)	1.1662	0.833 (1.20)	0.3349
				1.538 (0.65)	0.0098	1.333 (0.75)	1.0410	1.333 (0.75)	0.1342
				1.333 (0.75)	0.0097	0.455 (2.20)	1.0300	2.222 (0.45)	0.0583
				0.455 (2.20)	0.0026	2.222 (0.45)	0.9312	5.000 (0.20)	0.0204
				0.385 (2.60)	0.0024	1.818 (0.55)	0.8943		
				0.294 (3.40)	0.0022	5.000 (0.20)	0.6443		
I128	S90°W	91.6	5.58	2.500 (0.40)	0.0241	0.200 (5.00)	2.4572	0.167 (6.00)	1.8689
				6.667 (0.15)	0.0178	1.111 (0.90)	2.3666	0.417 (2.40)	0.5244
				1.111 (0.90)	0.0172	2.500 (0.40)	1.4617	1.111 (0.90)	0.3443
				0.714 (1.40)	0.0068	0.714 (1.40)	1.4091	0.714 (1.40)	0.3295
				0.455 (2.20)	0.0041	0.556 (1.80)	1.3385	2.222 (0.45)	0.1003
				0.278 (3.60)	0.0035	1.667 (0.60)	1.2381		
I131	N50°E	184.3	7.74	4.000 (0.25)	0.0538	0.227 (4.40)	3.6613	0.182 (5.50)	2.6864
				2.500 (0.40)	0.0446	0.167 (6.00)	3.2620	0.667 (1.50)	0.5025
				1.111 (0.90)	0.0140	2.222 (0.45)	2.8048	0.909 (1.10)	0.3752
				0.357 (2.80)	0.0063	1.000 (1.00)	2.2905	2.222 (0.45)	0.1849
				0.435 (2.30)	0.0060	0.714 (1.40)	2.2370	1.667 (0.60)	0.1691
						4.000 (0.25)	2.1314		
	N40°W	160.6	6.26	5.000 (0.20)	0.0433	2.000 (0.50)	2.3560	0.125 (8.00)	1.4053
				1.111 (0.90)	0.0120	2.500 (0.40)	2.0944	0.217 (4.60)	0.5503
				0.833 (1.20)	0.0065	1.000 (1.00)	1.9436	0.278 (3.60)	0.5382
				0.385 (2.60)	0.0026	3.333 (0.30)	1.6303	0.667 (1.50)	0.2916
				0.455 (2.20)	0.0025	0.714 (1.40)	1.5684	1.000 (1.00)	0.2497
				0.143 (7.00)	0.0010	0.111 (9.00)	1.4863	2.000 (0.50)	0.1614
						0.455 (2.20)	1.4247	1.538 (0.65)	0.1371
I134	N54°E	97.9	5.12	2.500 (0.40)	0.0381	2.500 (0.40)	2.3536	0.111 (9.00)	2.1752
				2.000 (0.50)	0.0269	0.111 (9.00)	2.0694	0.625 (1.60)	0.3884
				5.000 (0.20)	0.0224	2.000 (0.50)	2.0387	0.476 (2.10)	0.3325
				0.909 (1.10)	0.0089	0.667 (1.50)	2.0036	1.818 (0.55)	0.1689
				0.714 (1.40)	0.0078	0.833 (1.20)	1.6562	2.500 (0.40)	0.1499
				0.208 (4.80)	0.0026	1.333 (0.75)	1.1340		
				0.238 (4.20)	0.0026	1.111 (0.90)	1.1209		
	S36°E	82.3	5.54	2.500 (0.40)	0.0259	2.222 (0.45)	1.8149	0.111 (9.00)	1.2461
				6.667 (0.15)	0.0248	1.111 (0.90)	1.7222	0.250 (4.00)	0.6303
				3.333 (0.30)	0.0226	0.667 (1.50)	1.4008	0.625 (1.60)	0.2938
				1.667 (0.60)	0.0141	0.111 (9.00)	1.3194	0.435 (2.30)	0.2834
				1.111 (0.90)	0.0121	1.667 (0.60)	1.3110	1.111 (0.90)	0.2419
				0.833 (1.20)	0.0063	3.333 (0.30)	1.1185	0.833 (1.20)	0.2230
				0.625 (1.60)	0.0046	1.429 (0.70)	1.0553	2.222 (0.45)	0.1257
				0.476 (2.10)	0.0025	0.417 (2.40)	0.9450	1.667 (0.60)	0.1256
	DOWN	62.5	0.30	3.333 (0.30)	0.0293	3.333 (0.30)	1.4141	0.250 (4.00)	0.2975
				5.000 (0.20)	0.0154	2.000 (0.50)	0.7893	0.111 (9.00)	0.2432
				2.000 (0.50)	0.0085	0.263 (3.80)	0.7258	0.556 (1.80)	0.0927
				1.111 (0.90)	0.0023	0.556 (1.80)	0.5745	0.714 (1.40)	0.0831
				0.714 (1.40)	0.0017	0.667 (1.50)	0.5646	3.333 (0.30)	0.0653
				0.294 (3.40)	0.0008	1.000 (1.00)	0.4303	1.000 (1.00)	0.0540
						0.125 (8.00)	0.3598	2.000 (0.50)	0.0517
								1.667 (0.60)	0.0390
I137	S81°E	140.2	19.50	2.222 (0.45)	0.0354	0.385 (2.60)	6.5263	0.357 (2.80)	2.5650
				1.538 (0.65)	0.0343	1.250 (0.80)	4.1519	0.250 (4.00)	2.0763
				6.667 (0.15)	0.0324	0.238 (4.20)	3.8722	0.111 (9.00)	1.1721
				4.000 (0.25)	0.0292	0.625 (1.60)	2.5496	0.625 (1.60)	0.6665
				0.435 (2.30)	0.0177	2.222 (0.45)	2.2669	1.250 (0.80)	0.5038
						0.714 (1.40)	2.1784	2.000 (0.50)	0.1765
	S09°W	129.0	16.12	4.000 (0.25)	0.0388	0.556 (1.80)	9.2257	0.294 (3.40)	3.4978

Record	Instrument Direction	Peak Acceleration cm/sec^2	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks		Predominant Velocity Peaks		Predominant Displacement Peaks	
				Frequency (Period) Hz (sec)	Amplitude (g)	Frequency (Period) Hz (sec)	Amplitude cm/sec	Frequency (Period) Hz (sec)	Amplitude cm
I137	S09°W	129.0	16.12	0.625 (1.60)	0.0380	0.294 (3.40)	7.7421	0.217 (4.60)	2.8851
				2.500 (0.40)	0.0326	0.208 (4.80)	5.4560	0.182 (5.50)	2.7511
				6.667 (0.15)	0.0287	0.909 (1.10)	4.2477	0.556 (1.80)	2.6336
				1.111 (0.90)	0.0276	1.111 (0.90)	3.4970	0.435 (2.30)	1.5452
				1.429 (0.70)	0.0266	1.429 (0.70)	2.9802	0.909 (1.10)	0.7749
				0.909 (1.10)	0.0259	2.000 (0.50)	2.3338	1.333 (0.75)	0.3436
				0.769 (1.30)	0.0232	2.500 (0.40)	2.1316	2.000 (0.50)	0.1606
				0.333 (3.00)	0.0126	3.333 (0.30)	1.3477	4.000 (0.25)	0.0600
	DOWN	99.9	10.20	2.500 (0.40)	0.0243	0.667 (1.50)	1.8452	0.182 (5.50)	0.7366
				6.667 (0.15)	0.0238	1.429 (0.70)	1.6262	0.556 (1.80)	0.3844
				4.000 (0.25)	0.0172	2.222 (0.45)	1.5487	0.400 (2.50)	0.3107
				1.538 (0.65)	0.0147	0.208 (4.80)	1.0358	1.429 (0.70)	0.1680
				0.714 (1.40)	0.0071	0.167 (6.00)	1.0292	2.222 (0.45)	0.1064
				0.200 (5.00)	0.0011	0.909 (1.10)	0.9143		
						4.000 (0.25)	0.6259		
						6.667 (0.15)	0.4951		
J141	N21°E	145.5	3.54	1.429 (0.70)	0.0620	0.833 (1.20)	10.1098	0.833 (1.20)	1.7060
				1.000 (1.00)	0.0618			0.667 (1.50)	1.5012
				2.000 (0.50)	0.0528			0.263 (3.80)	1.0425
				2.857 (0.35)	0.0428				
				5.000 (0.20)	0.0376				
	S69°E	108.9	5.14	1.538 (0.65)	0.0539	0.833 (1.20)	5.8133	0.833 (1.20)	1.0521
				2.857 (0.35)	0.0407	1.429 (0.70)	4.9160	0.417 (2.40)	0.9021
				6.667 (0.15)	0.0377	0.357 (2.80)	4.1586	0.238 (4.20)	0.8220
				0.909 (1.10)	0.0322	2.857 (0.35)	1.6487	0.111 (9.00)	0.6399
								1.429 (0.70)	0.6239
	DOWN	93.0	5.96	1.429 (0.70)	0.0424	0.625 (1.60)	5.3417	0.556 (1.80)	1.1558
				5.000 (0.20)	0.0347	0.476 (2.10)	4.6991	0.111 (9.00)	1.0697
				2.500 (0.40)	0.0201	1.111 (0.90)	4.6117	0.385 (2.60)	1.0101
						0.200 (5.00)	2.4075	5.000 (0.20)	0.0340
						5.000 (0.20)	0.8433		
J142	S69°E	168.2	4.94	6.667 (0.15)	0.0781	0.909 (1.10)	2.5578	0.667 (1.50)	0.3978
				4.000 (0.25)	0.0459	1.538 (0.65)	2.3803	0.111 (9.00)	0.3824
				1.667 (0.60)	0.0232	2.000 (0.50)	2.3362	0.909 (1.10)	0.3132
						6.667 (0.15)	1.6550	0.400 (2.50)	0.2746
						0.200 (5.00)	1.2118	0.278 (3.60)	0.2724
								1.538 (0.65)	0.2355
								6.667 (0.15)	0.0431
	S21°W	143.5	4.32	5.000 (0.20)	0.0792	0.769 (1.30)	3.8177	0.435 (2.30)	0.5393
				2.500 (0.40)	0.0380	1.538 (0.65)	2.9032	1.000 (1.00)	0.4927
				1.667 (0.60)	0.0241	0.400 (2.50)	2.6472	0.238 (4.20)	0.4808
				1.429 (0.70)	0.0241	2.500 (0.40)	2.4641	0.111 (9.00)	0.3185
						2.000 (0.50)	2.4497	2.222 (0.45)	0.1717
						5.000 (0.20)	2.3579	5.000 (0.20)	0.0772
	DOWN	150.8	4.82	5.000 (0.20)	0.0779	5.000 (0.20)	2.3306	0.208 (4.80)	0.5384
				1.667 (0.60)	0.0094	0.714 (1.40)	1.9615	0.294 (3.40)	0.4567
				0.833 (1.20)	0.0077	0.833 (1.20)	1.9225	0.500 (2.00)	0.3756
				1.111 (0.90)	0.0068	2.500 (0.40)	1.7793	0.625 (1.60)	0.3746
						0.125 (8.00)	1.5003	2.500 (0.40)	0.0852
						1.818 (0.55)	1.1900	4.000 (0.25)	0.0793
						1.538 (0.65)	1.1519	1.667 (0.60)	0.0788
J143	N21°E	119.3	4.50	6.667 (0.15)	0.0473	2.857 (0.35)	2.2424	0.667 (1.50)	0.3253
				2.857 (0.35)	0.0391	0.833 (1.20)	1.7813	0.556 (1.80)	0.3215
				1.818 (0.55)	0.0126	0.500 (2.00)	1.4873	2.500 (0.40)	0.1208
				0.714 (1.40)	0.0068				
	N69°W	109.4	2.82	3.333 (0.30)	0.0242	0.556 (1.80)	1.8818	0.476 (2.10)	0.4836
				1.538 (0.65)	0.0097	0.417 (0.55)	1.6589	0.111 (9.00)	0.4509
				0.667 (1.50)	0.0057	1.818 (0.55)	1.4356	1.000 (1.00)	0.1656
				0.556 (1.80)	0.0056	1.333 (0.75)	1.2804	1.818 (0.55)	0.0844
				0.833 (1.20)	0.0053	2.857 (0.35)	1.2444	2.222 (0.45)	0.0806
						0.909 (1.10)	1.0721	2.857 (0.35)	0.0695
						6.667 (0.15)	0.9503		
						0.111 (9.00)	0.8937		
	DOWN	71.5	2.68	2.222 (0.45)	0.0149	0.500 (2.00)	1.1657	0.111 (9.00)	0.7129
				2.857 (0.35)	0.0147	0.435 (2.30)	1.0680	0.417 (2.40)	0.2829
				1.111 (0.90)	0.0055	2.222 (0.45)	1.0035	1.000 (1.00)	0.1259
				0.625 (1.60)	0.0032	0.357 (2.80)	0.9882	2.222 (0.45)	0.0737
						1.111 (0.90)	0.9268		
J144	N21°E	346.2	14.04	5.000 (0.20)	0.1678	5.000 (0.20)	5.1485	0.167 (6.00)	0.5460
				1.111 (0.90)	0.0214	1.000 (1.00)	3.7920	1.000 (1.00)	0.5066
				1.429 (0.70)	0.0206	0.111 (9.00)	2.2812	0.476 (2.10)	0.4597
						0.357 (2.80)	2.1845	0.294 (3.40)	0.3908
								2.857 (0.35)	0.2149
								2.000 (0.50)	0.1622
	N69°W	277.9	14.10	4.000 (0.25)	0.1672	4.000 (0.25)	6.6591	0.111 (9.00)	2.6914
				0.714 (1.40)	0.0082	0.125 (8.00)	2.3554	0.400 (2.50)	0.6150
				0.217 (4.60)	0.0027	1.000 (1.00)	2.3254	0.357 (2.80)	0.6136
						0.182 (5.50)	2.1111	0.667 (1.50)	0.4190
						0.625 (1.60)	2.0776	4.000 (0.25)	0.2585
						0.227 (4.40)	1.9159	1.000 (1.00)	0.2115
						0.417 (2.40)	1.9009	1.818 (0.55)	0.1893
	DOWN	105.3	3.66	1.429 (0.70)	0.0076	4.000 (0.25)	1.1972	0.111 (9.00)	0.7620
				0.500 (2.00)	0.0018	2.500 (0.40)	1.0564	1.000 (1.00)	0.1206
				0.435 (2.30)	0.0018	1.111 (0.90)	0.9947	1.818 (0.55)	0.0583
				0.385 (2.60)	0.0017	2.000 (0.50)	0.8517	4.000 (0.25)	0.0437
						0.435 (2.30)	0.7639		
						0.313 (3.20)	0.6800		
						0.250 (4.00)	0.6514		
J145	S00°W	113.9	15.74	2.500 (0.40)	0.0328	0.227 (4.40)	9.2230	0.200 (5.00)	5.1426
				1.111 (0.90)	0.0284	0.556 (1.80)	8.3584	0.227 (4.40)	5.0967
				5.000 (0.20)	0.0281	0.313 (3.20)	7.1102	0.111 (9.00)	3.4553
				0.556 (1.80)	0.0276	0.167 (6.00)	6.1068	0.556 (1.80)	2.2054
				2.000 (0.50)	0.0274	0.769 (1.30)	5.4861	0.769 (1.30)	1.0993
				0.769 (1.30)	0.0263	1.111 (0.90)	3.8312	1.111 (0.90)	0.5695
				1.538 (0.65)	0.0248	2.500 (0.40)	1.8582	2.500 (0.40)	0.1285
				0.357 (2.80)	0.0153				
				0.294 (3.40)	0.0138				
	S90°W	103.4	16.26	2.500 (0.40)	0.0334	0.278 (3.60)	9.0099	0.278 (3.60)	4.8949

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
J145	S90°W	103.4	16.26	6.667 (0.15)	0.0324	0.435 (2.30)	8.5603	0.182 (5.50)	4.6858
				0.714 (1.40)	0.0323	0.556 (1.80)	8.2460	0.385 (2.60)	3.4993
				4.000 (0.25)	0.0322	0.714 (1.40)	6.8564	0.435 (2.30)	3.3988
				0.556 (1.80)	0.0274	0.238 (4.20)	6.6766	1.333 (0.75)	0.3011
				1.818 (0.55)	0.0266	0.182 (5.50)	5.8055	1.818 (0.55)	0.1976
				0.455 (2.20)	0.0263	1.429 (0.70)	2.2747	2.222 (0.45)	0.1387
				1.429 (0.70)	0.0222	1.818 (0.55)	2.2037		
				0.294 (3.40)	0.0154	2.222 (0.45)	2.0779		
				0.200 (5.00)	0.0065				
	DOWN	106.3	21.60	5.000 (0.20)	0.0356	0.385 (2.60)	6.7934	0.385 (2.60)	3.0331
				3.333 (0.30)	0.0346	0.500 (2.00)	6.5474	0.278 (3.60)	3.0211
				2.222 (0.45)	0.0292	0.278 (3.60)	5.6506	0.167 (6.00)	2.7699
				0.500 (2.00)	0.0217	0.200 (5.00)	3.4561	0.111 (9.00)	2.6226
				0.385 (2.60)	0.0181	0.167 (6.00)	3.1970	0.217 (4.60)	2.2169
				1.538 (0.65)	0.0162	0.833 (1.20)	2.4582	1.500 (2.00)	2.1449
				0.909 (1.10)	0.0149	2.222 (0.45)	2.1392	1.333 (0.75)	0.1919
				0.294 (3.40)	0.0104	0.111 (9.00)	2.0349	2.222 (0.45)	0.1470
				0.227 (4.40)	0.0046	1.538 (0.65)	1.9204	3.333 (0.30)	0.0771
				0.167 (6.00)	0.0031	1.333 (0.75)	1.8330		
				0.125 (8.00)	0.0014	1.818 (0.55)	1.7091		
						3.333 (0.30)	1.5630		
J148	N00°E	107.6	6.94	6.667 (0.15)	0.0404	0.167 (6.00)	4.3663	0.182 (5.50)	3.0090
				2.857 (0.35)	0.0380	1.111 (0.90)	4.2820	0.714 (1.40)	0.8547
				2.000 (0.50)	0.0314	0.769 (1.30)	4.1706	1.000 (1.00)	0.6498
				1.538 (0.65)	0.0289	1.538 (0.65)	3.1586	0.476 (2.10)	0.4860
				1.111 (0.90)	0.0286	2.000 (0.50)	2.5119	2.500 (0.40)	0.1327
				0.769 (1.30)	0.0189	0.357 (2.80)	2.5046		
				0.227 (4.40)	0.0048	2.857 (0.35)	1.9391		
				0.333 (3.00)	0.0045	6.667 (0.15)	0.8232		
	S90°W	112.0	10.24	3.333 (0.30)	0.0527	0.167 (6.00)	6.7571	0.167 (6.00)	5.9264
				1.818 (0.55)	0.0341	0.909 (1.10)	4.7394	0.400 (2.50)	1.6057
				0.909 (1.10)	0.0247	0.417 (2.40)	3.6239	0.769 (1.30)	0.7671
				0.417 (2.40)	0.0109	1.538 (0.65)	3.1655	1.538 (0.65)	0.2662
				0.200 (5.00)	0.0073	0.313 (3.20)	3.0282	3.333 (0.30)	0.1168
						3.333 (0.30)	2.3349		
						2.500 (0.40)	2.1276		
L166	N00°E	164.2	5.42	6.667 (0.15)	0.0561	0.143 (7.00)	2.9802	0.182 (5.50)	2.0673
				2.857 (0.35)	0.0403	0.667 (1.50)	2.7288	0.667 (1.50)	0.4465
				1.818 (0.55)	0.0245	1.429 (0.70)	2.5138	1.000 (1.00)	0.3717
				1.429 (0.70)	0.0201	0.263 (3.80)	2.4858	1.333 (0.75)	0.2531
				1.111 (0.90)	0.0164	1.818 (0.55)	2.4427	1.818 (0.55)	0.1820
				0.217 (4.60)	0.0035	0.227 (4.40)	2.4054	2.500 (0.40)	0.1404
				0.385 (2.60)	0.0035	1.111 (0.90)	2.3437		
						2.500 (0.40)	2.2867		
						0.500 (2.00)	2.0921		
						5.000 (0.20)	1.6368		
	S90°W	147.6	5.36	4.000 (0.25)	0.0813	0.769 (1.30)	4.0920	0.125 (8.00)	1.7693
				1.429 (0.70)	0.0307	1.250 (0.80)	3.5814	0.435 (2.30)	0.9113
				1.818 (0.55)	0.0302	0.143 (7.00)	3.1798	0.769 (1.30)	0.7830
				0.769 (1.30)	0.0189	0.500 (2.00)	3.0463	1.250 (0.80)	0.4689
				0.455 (2.20)	0.0075	4.000 (0.25)	2.9176	1.818 (0.55)	0.2255
						1.818 (0.55)	2.7315	3.333 (0.30)	0.1354
	DOWN	69.7	6.14	2.857 (0.35)	0.0266	0.667 (1.50)	1.6620	0.111 (9.00)	1.1036
				1.538 (0.65)	0.0080	0.556 (1.80)	1.5463	0.294 (3.40)	0.4091
				0.769 (1.30)	0.0067	2.857 (0.35)	1.3920	0.500 (2.00)	0.3799
				0.333 (3.00)	0.0017	0.143 (7.00)	1.1849	0.667 (1.50)	0.3259
				0.182 (5.50)	0.0008	0.294 (3.40)	1.0460	0.435 (2.30)	0.3132
						1.111 (0.90)	0.9999	1.111 (0.90)	0.1344
						0.238 (4.20)	0.9440	2.000 (0.50)	0.0841
						1.429 (0.70)	0.8977	2.857 (0.35)	0.0800
M176	N37°E	83.4	7.90	0.833 (1.20)	0.0267	0.769 (1.30)	4.9775	0.111 (9.00)	3.7966
				2.222 (0.45)	0.0258	0.167 (6.00)	3.5725	0.400 (2.50)	1.1216
				6.667 (0.15)	0.0235	0.500 (2.00)	3.3899	0.476 (2.10)	1.0641
				3.333 (0.30)	0.0212	0.278 (3.60)	2.8726	0.769 (1.30)	1.0105
				1.538 (0.65)	0.0178	2.222 (0.45)	1.5830	1.538 (0.65)	0.1861
				0.313 (3.20)	0.0059	1.538 (0.65)	1.5265	2.222 (0.45)	0.1286
						3.333 (0.30)	0.9022		
	S53°E	116.0	7.06	0.909 (1.10)	0.0249	0.909 (1.10)	4.3622	0.143 (7.00)	4.1467
				1.538 (0.65)	0.0249	0.167 (6.00)	4.0635	0.909 (1.10)	0.7440
				2.222 (0.45)	0.0242	1.429 (0.70)	2.2430	0.625 (1.60)	0.7332
				1.250 (0.80)	0.0217	2.222 (0.45)	1.5409	0.714 (1.40)	0.6761
				0.625 (1.60)	0.0116	3.333 (0.30)	0.7051		
				0.294 (3.40)	0.0051	6.667 (0.15)	0.5214		
				0.200 (5.00)	0.0046				
N185	S50°E	67.3	3.02	2.857 (0.35)	0.0305	2.857 (0.35)	1.7355	0.125 (8.00)	0.5535
				6.667 (0.15)	0.0220	1.429 (0.70)	1.1359	0.556 (1.80)	0.1103
				1.667 (0.60)	0.0092	1.250 (0.80)	1.3057	1.333 (0.75)	0.1052
				1.333 (0.75)	0.0076	0.143 (7.00)	0.8231	2.857 (0.35)	0.0917
				0.625 (1.60)	0.0018	0.208 (4.80)	0.7521	0.909 (1.10)	0.0744
				0.217 (4.60)	0.0008	0.625 (1.60)	0.6915		
				0.357 (2.80)	0.0005	0.476 (2.10)	0.5639		
	S40°W	67.3	5.34	4.000 (0.25)	0.0380	2.500 (0.40)	1.5535	0.143 (7.00)	0.4168
				2.857 (0.35)	0.0255	4.000 (0.25)	1.4120	0.357 (2.80)	0.1527
				1.429 (0.70)	0.0084	1.333 (0.75)	1.0931	0.417 (2.40)	0.1500
				0.556 (1.80)	0.0016	0.455 (2.20)	0.8701	1.429 (0.70)	0.1006
				0.250 (4.00)	0.0007	0.125 (8.00)	0.8080	2.000 (0.50)	0.0974
						0.167 (6.00)	0.7728	2.500 (0.40)	0.0948
						0.833 (1.20)	0.7022	1.667 (0.60)	0.0917
						0.625 (1.60)	0.7007	0.833 (1.20)	0.0801
						0.238 (4.20)	0.6467	4.000 (0.25)	0.0587
N186	S37°E	95.7	2.76	5.000 (0.20)	0.0321	1.429 (0.70)	1.4817	0.111 (9.00)	0.5420
				2.857 (0.35)	0.0206	0.714 (1.40)	1.1706	0.769 (1.30)	0.2034
				1.538 (0.65)	0.0120	1.111 (0.90)	1.1568	0.357 (2.80)	0.2022
				0.833 (1.20)	0.0050	2.500 (0.40)	1.1519	1.429 (0.70)	0.1354
						4.000 (0.25)	1.0746	1.250 (0.80)	0.1275
						2.000 (0.50)	1.0078	2.000 (0.50)	0.0774
						0.294 (3.40)	0.7504	2.500 (0.40)	0.0737
						0.111 (9.00)	0.5700		

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks Frequency (Period) Hz (sec)	Amplitude (g)	Predominant Velocity Peaks Frequency (Period) Hz (sec)	Amplitude cm/sec	Predominant Displacement Peaks Frequency (Period) Hz (sec)	Amplitude cm
N186	S53°W	96.7	4.62	5.000 (0.20)	0.0321	1.667 (0.60)	1.6011	0.111 (9.00)	0.5519
				2.500 (0.40)	0.0209	1.333 (0.75)	1.4409	0.625 (1.60)	0.3236
				2.000 (0.50)	0.0168	0.667 (1.50)	1.3542	0.476 (2.10)	0 3152
				1.538 (0.65)	0.0165	2.500 (0.40)	1.2340	0.385 (2.60)	0.2834
				0.833 (1.20)	0.0055	4.000 (0.25)	1.2273	1.538 (0.65)	0.1718
				0.667 (1.50)	0.0055	0.111 (9.00)	0.6307	1.333 (0 75)	0.1568
								2.500 (0.40)	0.0835
N187	N75°W	55.7	5.12	4.000 (0.25)	0.0309	2.222 (0.45)	1.2385	0.111 (9.00)	0.1584
				1.111 (0.90)	0.0041	4.000 (0.25)	1.2032	0.714 (1.40)	0.1076
				0.769 (1.30)	0.0024	1.429 (0.70)	0.6399	2.222 (0.45)	0 0832
				0.182 (5.50)	0.0001	0.714 (1.40)	0.6296	1.111 (0.90)	0.0807
						0.833 (1.20)	0 6212	0.417 (2.40)	0 0630
						1.111 (0.90)	0.6174	1.429 (0.70)	0.0566
						0.556 (1.80)	0.4930	0.333 (3.00)	0 0556
								4.000 (0.25)	0.0476
N188	N54°E	114.4	5.22	3.333 (0.30)	0.0355	0.200 (5.00)	3.0655	0.167 (6.00)	2.4295
				2.500 (0.40)	0.0340	0.667 (1.50)	2.3637	0.625 (1.60)	0.5692
				5.000 (0.20)	0.0301	0.125 (8.00)	2.2479	1.111 (0.90)	0.2253
				1.111 (0.90)	0.0113	2.500 (0.40)	2.1303	2.500 (0.40)	0.1331
				0.667 (1.50)	0.0093	1.111 (0.90)	1.4484		
				0.238 (4.20)	0.0041				
				0.357 (2.80)	0.0037				
	N36°W	126.5	9.46	3.333 (0.30)	0.0595	2.500 (0.90)	3.3893	0.167 (6.00)	2.1278
				2.500 (0.40)	0.0554	3.333 (0.30)	2.6469	0.385 (2.60)	0.4878
				5.000 (0.20)	0.0468	0.182 (5.50)	2.4369	0.556 (1.80)	0.3785
				1.111 (0.90)	0.0113	0.238 (4.20)	2.2356	1.000 (1.00)	0.2538
				0.625 (1.60)	0.0055	0.625 (1.60)	1.8417	0.833 (1.20)	0.2203
				0.250 (4.00)	0.0038	1.111 (0.90)	1.7872	2.500 (0.40)	0 2196
				0.385 (2.60)	0.0029	5.000 (0.20)	1.4262	1.667 (0.60)	0.1402
				0.333 (3.00)	0.0024	0.357 (2.80)	1.4138		
						0.417 (2.40)	1.2356		
	DOWN	62.5	5.08	3.333 (0.30)	0.0165	1.000 (1.00)	1.2446	0 167 (6.00)	0.5846
				6.667 (0.15)	0.0159	0.625 (1.60)	1.1008	0.333 (3.00)	0.3090
				2.500 (0.40)	0.0157	2.500 (0.40)	0.9658	0.455 (2.20)	0.2207
				1.000 (1.00)	0.0083	3.333 (0.30)	0.8638	0.625 (1.60)	0.2135
				0.769 (1.30)	0.0040	0.500 (2.00)	0.8212	1 000 (1.00)	0.2050
				0.357 (2.80)	0.0015	1.818 (0.55)	0.7971	1.818 (0.55)	0.0647
				0.238 (4.20)	0.0010	0.357 (2.80)	0.7837	2.500 (0.40)	0.0626
						0.227 (4.40)	0.7835	1.538 (0.65)	0.0587
						0.125 (8.00)	0.6937	3.333 (0.30)	0.0367
						0.278 (3.60)	0.6056		
N192	N29°E	96.7	6.70	5.000 (0.20)	0.0302	0.769 (1.30)	3.9716	0.125 (8.00)	1.8781
				3.333 (0.30)	0.0245	0.556 (1.80)	2.7455	0.182 (5.50)	1.8509
				0.769 (1.30)	0.0204	0.143 (7.00)	2.5608	0.769 (1.30)	0.8477
				2.000 (0.50)	0.0199	1.250 (0.80)	2.1837	0.357 (2.80)	0.6474
				1.250 (0.80)	0.0193	0.400 (2.50)	2.1097	0.455 (2.20)	0.6191
				0.227 (4.40)	0.0030	0.250 (4.00)	1.8075	1.250 (0.80)	0.3023
						1.818 (0.55)	1.6266		
						2.500 (0.40)	1.2240		
						5.000 (0.20)	0.8864		
	N61°W	98.9	5.82	0.909 (1.10)	0.0400	0.909 (1.10)	6.6983	0.143 (7.00)	2.7598
				1.818 (0.55)	0.0307	0.714 (1.40)	5.1022	0.909 (1.10)	1.1889
				3.333 (0.30)	0.0277	0.143 (7.00)	3.7670	0.500 (2.00)	1.1840
				1.429 (0.70)	0.0244	0.435 (2.30)	3.4638	0.667 (1.50)	1.0379
						1.818 (0.55)	2.1868	1.818 (0.55)	0.2287
						2.500 (0.40)	1.2523		
						3.333 (0.30)	0.9626		
0198	S00°W	176.0	6.60	4.000 (0.25)	0.0874	1.000 (1.00)	7.8771	0.200 (5.00)	3.5756
				1.818 (0.55)	0.0571	0.208 (4.80)	5.8615	1.000 (1.00)	1.1090
				1.111 (0.90)	0.0480	0.143 (7.00)	5.4799	0.667 (1.50)	0.7427
				0.263 (3.80)	0.0080	1.818 (0.55)	4.8232		
				0.333 (3.00)	0.0078	0.385 (2.60)	4.6514		
				0.400 (2.50)	0.0070	0.667 (1.50)	4.0322		
						3.333 (0.30)	3.1434		
	S90°W	167.0	8.34	5.000 (0.20)	0.0752	1.000 (1.00)	6.4136	0.167 (6.00)	2.9126
				2.857 (0.35)	0.0638	0.769 (1.30)	5.9160	0.357 (2.80)	1.1603
				2.000 (0.50)	0.0585	1.333 (0.75)	5.8482	0.909 (1.10)	1.0234
				1.333 (0.75)	0.0474	2.000 (0.50)	4.3465		
				0.400 (2.50)	0.0075	0.227 (4.40)	4.0960		
				0.278 (3.60)	0.0053	1.667 (0.60)	4.0339		
						0.143 (7.00)	3.7590		
						0.500 (2.00)	3.7325		
						4.000 (0.25)	2.2708		
	DOWN	120.0	6.38	5.000 (0.200)	0.0469	1.333 (0.75)	2.6618	0.111 (9.00)	0.9456
				2.500 (0.40)	0.0275	2.500 (0.40)	1.8853	0.250 (4.00)	0.8320
				1.429 (0.70)	0.0240	4.000 (0.25)	1.7842	0.417 (2.40)	0.3250
				0.294 (3.40)	0.0027	0.294 (3.40)	1.6667	1.333 (0.75)	0.2913
						0.769 (1.30)	1.4443	0.625 (1.60)	0.2812
						1.818 (0.55)	1.4407	0.909 (1.10)	0.2631
						0.125 (8.00)	1.3256	2.500 (0.40)	0.1066
P214	S89°W	154.0	6.12			3.333 (0.30)	3.2186		
						2.500 (0.40)	2.8625		
	S01°E	156.0	5.74	4.000 (0.25)	0.0860	1.000 (1.00)	5.2750	0.200 (5.00)	2.8588
				2.222 (0.45)	0.0439	0.227 (4.40)	4.0866	1.000 (1.00)	0.8294
				1.000 (1.00)	0.0339	0.263 (3.80)	3.9153	1.818 (0.55)	0.2878
				1.429 (0.70)	0.0316	3.333 (0.30)	3.5539	3.333 (0.30)	0.1587
				0.476 (2.10)	0.0065	1.818 (0.55)	3.1052		
				0.263 (3.80)	0.0062	0.125 (8.00)	2.9766		
						0.500 (2.00)	2.4083		
						0.625 (1.60)	2.1922		
	DOWN	115.0	6.62	6.667 (0.15)	0.0318	0.909 (1.10)	2.8635	0.278 (3.60)	1.1712
				2.857 (0.35)	0.0226	0.313 (3.20)	2.4804	0.238 (4.20)	1.1669
				1.000 (1.00)	0.0169	0.250 (4.00)	2.2487	0.909 (1.10)	0.4822
				1.538 (0.65)	0.0152	2.222 (0.45)	1.4630	1.429 (0.70)	0.1670
				0.435 (2.30)	0.0055	1.429 (0.70)	1.4401	2.222 (0.45)	0.1032
						5.000 (0.20)	0.7285		

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks Frequency (Period) Hz (sec)	Amplitude (g)	Predominant Velocity Peaks Frequency (Period) Hz (sec)	Amplitude cm/sec	Predominant Displacement Peaks Frequency (Period) Hz (sec)	Amplitude cm
P217	S00°W	108.0	5.52	2.222 (0.45)	0.0327	1.000 (1.00)	3.6584	0.111 (9.00)	2.1188
				3.333 (0.30)	0.0310	0.625 (1.60)	2.9120	1.000 (1.00)	0.6033
				1.111 (0.90)	0.0248	0.769 (1.30)	2.7003	0.714 (1.40)	0.6008
				1.538 (0.65)	0.0241	1.538 (0.65)	2.4968	0.455 (2.20)	0.4682
				5.000 (0.20)	0.0238	2.000 (0.50)	2.1919	1.538 (0.65)	0.2505
				0.769 (1.30)	0.0135	0.182 (5.50)	2.1811		
				0.278 (3.60)	0.0038	0.227 (4.40)	2.0950		
						0.357 (2.80)	1.9261		
	N90°E	88.1	5.32	3.333 (0.30)	0.0229	0.833 (1.20)	3.9686	0.111 (9.00)	1.9176
				6.667 (0.15)	0.0219	0.435 (2.30)	1.9951	0.769 (1.30)	0.7128
				0.833 (1.20)	0.0195	1.429 (0.70)	1.7070	0.417 (2.40)	0.6338
				2.500 (0.40)	0.0184	0.125 (8.00)	1.6425	0.455 (2.20)	0.6333
				2.000 (0.50)	0.0166	2.500 (0.40)	1.0441	1.429 (0.70)	0.1734
				1.429 (0.70)	0.0143	3.333 (0.30)	0.9579	2.500 (0.40)	0.0725
				1.111 (0.90)	0.0135				
				0.182 (5.50)	0.0014				
	DOWN	60.1	3.00	5.000 (0.20)	0.0136	0.217 (4.60)	1.0924	0.111 (9.00)	0.9775
				3.333 (0.30)	0.0120	1.000 (1.00)	0.8164	0.200 (5.00)	0.8059
				1.818 (0.55)	0.0100	1.818 (0.55)	0.7622	0.556 (1.80)	0.2264
				1.429 (0.70)	0.0065	0.111 (9.00)	0.7363	1.000 (1.00)	0.1313
				1.250 (0.80)	0.0056	0.556 (1.80)	0.7327	1.429 (0.70)	0.0789
				1.000 (1.00)	0.0053	0.833 (1.20)	0.6624	1.818 (0.55)	0.0751
				0.556 (1.80)	0.0028	3.333 (0.30)	0.6269	2.500 (0.40)	0.0346
				0.263 (3.80)	0.0018	1.250 (0.80)	0.6056		
				0.385 (2.60)	0.0016	2.500 (0.40)	0.5296		
P221	N03°E	137.0	10.88	5.000 (0.20)	0.0734	5.000 (0.20)	2.1518	0.143 (7.00)	1.7606
				1.667 (0.60)	0.0099	0.143 (7.00)	1.9427	0.294 (3.40)	0.5315
				1.333 (0.75)	0.0092	1.333 (0.75)	1.4473	0.500 (2.00)	0.2151
				0.833 (1.20)	0.0040	0.625 (1.60)	1.0530	0.769 (1.30)	0.1523
				0.625 (1.60)	0.0030	0.476 (2.10)	0.9494	1.250 (0.80)	0.1276
				0.417 (2.40)	0.0020			2.857 (0.35)	0.0868
				0.313 (3.20)	0.0020				
				0.167 (6.00)	0.0018				
				0.217 (4.60)	0.0013				
	N87°W	165.0	5.80	6.667 (0.15)	0.0921	0.111 (9.00)	2.3241	0.111 (9.00)	2.2582
				1.818 (0.55)	0.0163	5.000 (0.20)	2.2116	0.556 (1.80)	0.2834
				0.217 (4.60)	0.0019	2.500 (0.40)	1.7852	1.111 (0.90)	0.1571
				0.313 (3.20)	0.0016	1.538 (0.65)	1.5590	1.538 (0.65)	0.1285
						0.667 (1.50)	1.4997	2.857 (0.35)	0.0882
						0.909 (1.10)	1.4211	5.000 (0.20)	0.0691
						0.455 (2.20)	1.2468		
P223	N55°E	69.7	0.42	5.000 (0.20)	0.0294	1.333 (0.75)	2.1436	0.143 (7.0)	0.3701
				2.500 (0.40)	0.0222	1.538 (0.65)	2.0641	1.333 (0.75)	0.2313
				1.429 (0.70)	0.0179	2.500 (0.40)	1.3918	2.222 (0.45)	0.1001
						0.263 (3.80)	0.9572		
						0.111 (9.00)	0.9481		
						5.000 (0.20)	0.8826		
						0.556 (1.80)	0.8024		
	N35°W	53.2	0.02	6.667 (0.15)	0.0277	1.250 (0.80)	1.4749	0.111 (9.00)	0.5410
				2.222 (0.45)	0.0190	2.000 (0.50)	1.3554	0.200 (5.00)	0.3626
				3.333 (0.30)	0.0149	0.125 (8.00)	1.1890	1.250 (0.80)	0.1631
				1.429 (0.70)	0.0119	0.294 (3.40)	0.8154	0.833 (1.20)	0.1387
				0.263 (3.80)	0.0009	0.476 (2.10)	0.8139	1.818 (0.55)	0.1114
						5.000 (0.20)	0.7260	0.476 (2.10)	0.1009
								5.000 (0.20)	0.0240
Q233	S12°W	243.0	17.48	3.333 (0.30)	0.1054	0.238 (4.20)	9.4413	0.250 (4.00)	5.5487
				6.667 (0.15)	0.0631	0.294 (3.40)	9.4177	0.208 (4.80)	5.3294
				1.667 (0.60)	0.0368	0.476 (2.10)	5.0107	0.476 (2.10)	1.6101
				0.313 (3.20)	0.0180	2.500 (0.40)	4.9557	0.769 (1.30)	0.7162
				0.556 (1.80)	0.0178	3.333 (0.30)	4.8358	1.429 (0.70)	0.3845
				0.833 (1.20)	0.0177	0.556 (1.80)	4.5836	2.500 (0.40)	0.2950
						1.667 (0.60)	0.0474		
						0.714 (1.40)	3.5905		
						2.000 (0.50)	3.4946		
						1.250 (0.80)	3.0606		
	N78°W	197.0	15.12	5.000 (0.20)	0.0646	0.357 (2.80)	6.0685	0.167 (6.00)	3.8220
				2.500 (0.40)	0.0385	0.182 (5.50)	4.9755	0.333 (3.00)	2.6605
				2.000 (0.50)	0.0358	0.556 (1.80)	3.3637	0.556 (1.80)	1.0398
				1.250 (0.80)	0.0189	2.000 (0.50)	2.8503	1.000 (1.00)	0.3065
				0.625 (1.60)	0.0149	2.500 (0.40)	2.4954	1.250 (0.80)	0.2980
				0.417 (2.40)	0.0149	1.250 (0.80)	2.4322	1.818 (0.55)	0.2280
				0.714 (1.40)	0.0131	0.714 (1.40)	2.3021	2.500 (0.40)	0.1525
				1.000 (1.00)	0.0124	3.333 (0.30)	2.1147		
						1.000 (1.00)	2.0459		
	UP	96.0	7.54	3.333 (0.30)	0.0290	2.500 (0.40)	1.3899	0.143 (7.00)	1.1354
				2.500 (0.40)	0.0215	0.556 (1.80)	1.3427	0.357 (2.80)	0.4956
				1.818 (0.55)	0.0119	3.333 (0.30)	1.3249	0.500 (2.00)	0.3853
				1.250 (0.80)	0.0061	0.667 (1.50)	1.3082	0.625 (1.60)	0.3237
				0.667 (1.50)	0.0056	0.400 (2.50)	1.2562	1.667 (0.60)	0.0923
				0.833 (1.20)	0.0048	1.667 (0.60)	1.1418	2.500 (0.40)	0.0842
				0.500 (2.00)	0.0039	0.143 (7.00)	1.0941	3.333 (0.30)	0.0642
				0.250 (4.00)	0.0012	1.333 (0.75)	0.8630		
				0.182 (5.50)	0.0011	0.227 (4.40)	0.7963		
Q236	SOUTH	167.0	9.50	5.000 (0.20)	0.0518	0.769 (1.30)	3.5009	0.182 (5.50)	1.8830
				2.500 (0.40)	0.0477	0.667 (1.50)	3.1927	0.714 (1.40)	0.7046
				1.818 (0.55)	0.0217	2.500 (0.40)	2.9574	1.429 (0.70)	0.2060
				1.429 (0.70)	0.0171	0.263 (3.80)	2.5719	2.222 (0.45)	0.2042
				1.111 (0.90)	0.0166	0.313 (3.20)	2.5381	1.818 (0.55)	0.1616
				0.769 (1.30)	0.0164	0.476 (2.10)	2.4849	5.000 (0.20)	0.0509
				0.417 (2.40)	0.0055	1.111 (0.90)	2.4838		
				0.263 (3.80)	0.0044	0.208 (4.80)	2.4803		
						1.818 (0.55)	2.0961		
						1.429 (0.70)	1.9431		
						5.000 (0.20)	1.5548		
	EAST	122.0	5.20	5.000 (0.20)	0.0491	0.208 (4.80)	2.1313	0.167 (6.00)	1.6206
				2.500 (0.40)	0.0163	0.143 (7.00)	1.8171	0.500 (2.00)	0.2977
				1.667 (0.60)	0.0103	4.000 (0.25)	1.5661	0.714 (1.40)	0.2288
				1.250 (0.80)	0.0087	1.000 (1.00)	1.2703	1.000 (1.00)	0.1667

Record	Instrument Direction	Peak Acceleration cm/sec^2	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
Q236	EAST	122.0	5.20	0.833 (1.20)	0.0054	1.333 (0.75)	1.1634	2.222 (0.45)	0.0712
				0.278 (3.60)	0.0032	0.556 (1.80)	1.1288	3.333 (0.30)	0.0590
				0.417 (2.40)	0.0031	0.714 (1.40)	1.0815		
						2.500 (0.40)	1.0471		
	UP	73.20	5.36	3.333 (0.30)	0.0325	0.833 (1.20)	2.0475	0.217 (4.60)	0.5604
				6.667 (0.15)	0.0218	1.111 (0.90)	1.6979	0.111 (9.00)	0.4010
				1.538 (0.65)	0.0137	3.333 (0.30)	1.4906	0.769 (1.30)	0.3893
				1.818 (0.55)	0.0130	1.538 (0.65)	1.3221	0.556 (1.80)	0.2991
				1.111 (0.90)	0.0117	0.455 (2.20)	1.1216	1.111 (0.90)	0.2352
				0.909 (1.10)	0.0108	0.167 (6.00)	1.0368	3.333 (0.30)	0.0727
				0.400 (2.50)	0.0014	0.263 (3.80)	0.9679		
				0.250 (4.00)	0.0012				
				0.111 (9.00)	0.0002				
Q239	SOUTH	119.0	11.40	5.000 (0.20)	0.0385	0.182 (5.50)	5.0952	0.182 (5.50)	4.0248
				2.857 (0.35)	0.0353	2.000 (0.50)	2.6372	0.357 (2.80)	1.0591
				2.000 (0.50)	0.0346	1.429 (0.70)	2.5354	0.625 (1.60)	0.5942
				1.111 (0.90)	0.0148	0.667 (1.50)	2.4315	0.769 (1.30)	0.3949
				0.667 (1.50)	0.0096	0.385 (2.60)	2.3666	1.000 (1.00)	0.3370
				0.385 (2.60)	0.0063	1.111 (0.90)	2.3539	1.429 (0.70)	0.2540
				0.208 (4.80)	0.0060	4.000 (0.25)	1.4599		
	EAST	161.0	7.98	3.333 (0.30)	0.0493	0.217 (4.60)	4.2941	0.200 (5.00)	3.0782
				6.667 (0.15)	0.0444	0.769 (1.30)	2.8580	0.714 (1.40)	0.6702
				1.667 (0.60)	0.0217	2.500 (0.40)	2.5613	1.667 (0.60)	0.1940
				1.429 (0.70)	0.0187	1.111 (0.90)	2.4584	2.500 (0.40)	0.1665
				1.250 (0.80)	0.0185	1.538 (0.65)	2.0974		
				0.714 (1.40)	0.0138				
				0.263 (3.80)	0.0065				
				0.476 (2.10)	0.0047				
Q241	N37°E	86.8	7.86	4.000 (0.25)	0.0393	0.714 (1.40)	4.3779	0.125 (8.00)	3.1609
				1.250 (0.80)	0.0350	1.111 (0.90)	3.8393	0.400 (2.50)	1.0832
				2.222 (0.45)	0.0338	0.182 (5.50)	3.1846	0.556 (1.80)	1.0068
				1.538 (0.65)	0.0263	2.222 (0.45)	2.3251	0.769 (1.30)	0.8960
				0.833 (1.20)	0.0234			1.250 (0.80)	0.5502
				0.435 (2.30)	0.0080			2.222 (0.45)	0.1672
				0.294 (3.40)	0.0056				
	N53°W	138.0	5.66	4.000 (0.25)	0.0463	0.667 (1.50)	5.7652	0.143 (7.00)	3.3175
				2.222 (0.45)	0.0372	1.000 (1.00)	4.4046	0.714 (1.40)	1.1804
				1.000 (1.00)	0.0313	0.111 (9.00)	3.7354	0.625 (1.60)	1.1360
				0.769 (1.30)	0.0249	1.818 (0.55)	2.3324	1.000 (1.00)	0.7710
				0.167 (6.00)	0.0032	2.857 (0.35)	1.9596	1.667 (0.60)	0.2479
				0.278 (3.60)	0.0031				
	UP	60.8	0.16	6.667 (0.15)	0.0189	0.167 (6.00)	1.8679	0.167 (6.00)	1.4128
				1.818 (0.55)	0.0109	0.833 (1.20)	1.3183	0.111 (9.00)	1.4082
				1.250 (0.80)	0.0092	1.111 (0.90)	1.3079	0.435 (2.30)	0.3332
				0.476 (2.10)	0.0029	0.476 (2.10)	0.8936	0.625 (1.60)	0.2731
				0.250 (4.00)	0.0025	1.667 (0.60)	0.8217	1.667 (0.60)	0.0875
						2.500 (0.40)	0.7708		
						3.333 (0.30)	0.6095		
R244	N53°W	149.0	8.16	2.500 (0.40)	0.0513	0.714 (1.40)	5.4146	0.167 (6.00)	4.2405
				1.667 (0.60)	0.0336	1.143 (7.00)	4.8999	0.769 (1.30)	1.0609
				1.000 (1.00)	0.0317	1.000 (1.00)	4.8086	0.625 (1.60)	1.0597
				1.333 (0.75)	0.0273	0.227 (4.40)	4.6146	2.222 (0.45)	0.2410
				0.769 (1.30)	0.0256	1.538 (0.65)	3.2736		
				0.333 (3.00)	0.0063	2.222 (0.45)	3.1379		
				0.208 (4.80)	0.0057				
	S37°W	126.0	9.54	3.333 (0.30)	0.0536	0.217 (4.60)	6.0337	0.200 (5.00)	4.0158
				1.250 (0.80)	0.0297	0.714 (1.40)	4.6319	0.625 (1.60)	0.9246
				1.818 (0.55)	0.0296	0.143 (7.00)	4.5617	1.250 (0.80)	0.4655
				1.429 (0.70)	0.0279	0.909 (1.10)	4.0909		
				0.909 (1.10)	0.0205	1.250 (0.80)	3.3965		
				0.385 (2.60)	0.0121	2.857 (0.35)	2.6333		
				0.333 (3.00)	0.0120	1.818 (0.55)	2.2836		
R246	SOUTH	115.0	9.04	3.333 (0.30)	0.0330	0.227 (4.40)	4.0067		
				5.000 (0.20)	0.0323	1.000 (1.00)	3.5210	0.200 (5.00)	2.6539
				2.500 (0.40)	0.0261	0.313 (3.20)	2.7035	0.435 (2.30)	0.9318
				1.429 (0.70)	0.0233	0.417 (2.40)	2.4999	1.000 (1.00)	0.5479
				1.000 (1.00)	0.0221	1.429 (0.70)	2.2939	1.429 (0.70)	0.2833
				0.455 (2.20)	0.0073	0.625 (1.60)	1.8106	3.333 (0.30)	0.0733
				0.556 (1.80)	0.0062	2.222 (0.45)	1.7405		
				0.238 (4.20)	0.0055	3.333 (0.30)	1.4002		
						5.000 (0.20)	0.8652		
	EAST	106.0	10.72	5.000 (0.20)	0.0422	0.250 (4.00)	5.3173	0.208 (4.80)	3.3157
				1.111 (0.90)	0.0233	0.182 (5.50)	4.0858	0.556 (1.80)	0.9905
				0.909 (1.10)	0.0210	0.357 (2.80)	3.5253	0.909 (1.10)	0.6274
				0.556 (1.80)	0.0124	0.909 (1.10)	3.4719	1.111 (0.90)	0.4673
				0.714 (1.40)	0.0111	0.556 (1.80)	3.4562	2.222 (0.45)	0.1114
				0.435 (2.30)	0.0096	1.111 (0.90)	3.2128		
				0.278 (3.60)	0.0087	2.500 (0.40)	1.6547		
				0.313 (3.20)	0.0087				
	UP	74.1	5.20	6.667 (0.15)	0.0229	0.909 (1.10)	1.3941	0.200 (5.00)	0.5455
				4.000 (0.25)	0.0174	1.667 (0.60)	1.1070	0.769 (1.30)	0.2492
				1.667 (0.60)	0.0126	0.238 (4.20)	0.9458	0.500 (2.00)	0.2100
				2.500 (0.40)	0.0120	0.435 (2.30)	0.7619	0.400 (2.50)	0.1831
				0.909 (1.10)	0.0075	0.143 (7.00)	0.7522	1.667 (0.60)	0.1124
				0.417 (2.40)	0.0013	4.000 (0.25)	0.7421	4.000 (0.25)	0.0267
				0.294 (3.40)	0.0011	2.500 (0.40)	0.5708		
				0.238 (4.20)	0.0011	6.667 (0.15)	0.5280		
R248	SOUTH	184.0	9.70	6.667 (0.15)	0.0524	1.000 (1.00)	4.6195	0.200 (5.00)	2.4731
				3.333 (0.30)	0.0441	0.238 (4.20)	3.8821	0.435 (2.30)	0.8817
				2.500 (0.40)	0.0386	0.200 (5.00)	3.3298	1.000 (1.00)	0.6960
				1.667 (0.60)	0.0325	0.167 (6.00)	3.0685	0.769 (1.30)	0.5504
				1.111 (0.90)	0.0285	0.313 (3.20)	2.9503	1.429 (0.70)	0.2985
				0.625 (1.60)	0.0080	1.538 (0.65)	2.8681		
				0.455 (2.20)	0.0070	0.435 (2.30)	2.4706		
				0.250 (4.00)	0.0054	0.111 (9.00)	2.4461		
				0.333 (3.00)	0.0046	2.222 (0.45)	2.2588		
						3.333 (0.30)	2.2128		
						0.625 (1.60)	2.0654		

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks		Predominant Velocity Peaks		Predominant Displacement Peaks	
				Frequency (Period) Hz (sec)	Amplitude (g)	Frequency (Period) Hz (sec)	Amplitude cm/sec	Frequency (Period) Hz (sec)	Amplitude cm
R248	EAST	174.0	10.68	5.000 (0.200)	0.0614	0.250 (4.00)	5.3620	0.227 (4.40)	3.2370
				2.500 (0.40)	0.0407	0.182 (5.50)	4.0262	0.556 (1.80)	0.9932
				1.111 (0.90)	0.0230	0.556 (1.80)	3.5945	0.909 (1.10)	0.6578
				0.909 (1.10)	0.0220	0.909 (1.10)	3.5431	1.111 (0.90)	0.4609
				1.667 (0.60)	0.0187	0.357 (2.80)	3.3537	2.500 (0.40)	0.1624
				1.429 (0.70)	0.0175	0.435 (2.30)	3.2290		
				0.556 (1.80)	0.0124	1.111 (0.90)	3.1891		
				0.278 (3.60)	0.0087	2.500 (0.40)	2.6089		
				0.313 (3.20)	0.0085	1.667 (0.60)	1.8481		
	UP	88.9	10.78	6.667 (0.15)	0.0284	0.714 (1.40)	1.7571	0.125 (8.00)	0.7817
				1.818 (0.55)	0.0166	0.238 (4.20)	1.7089	0.217 (4.60)	0.7314
				2.500 (0.40)	0.0136	1.818 (0.55)	1.2784	0.263 (3.80)	0.6864
				0.909 (1.10)	0.0089	0.357 (2.80)	1.0187	0.357 (2.80)	0.4186
				1.429 (0.70)	0.0081	0.143 (7.00)	0.9728	0.714 (1.40)	0.3683
				1.250 (0.80)	0.0074	0.111 (9.00)	0.9397	0.500 (2.00)	0.2493
				0.357 (2.80)	0.0022	2.500 (0.40)	0.8994	1.818 (0.55)	0.1243
				0.278 (3.60)	0.0020	1.429 (0.70)	0.8642	1.429 (0.70)	0.0974
						1.250 (0.80)	0.8441	2.500 (0.40)	0.0539
						5.000 (0.20)	0.7095	5.000 (0.20)	0.0223
R249	N44°E	79.8	4.24	3.333 (0.30)	0.0278	0.143 (7.00)	2.2802	0.111 (9.00)	3.1540
				1.667 (0.60)	0.0155	0.111 (9.00)	2.2779	0.625 (1.60)	0.4899
				2.222 (0.45)	0.0153	0.714 (1.40)	1.8437	1.667 (0.60)	0.1381
				1.250 (0.80)	0.0107	0.625 (1.60)	1.8077	3.333 (0.30)	0.0621
				0.909 (1.10)	0.0098	1.667 (0.60)	1.5353		
				0.250 (4.00)	0.0029	3.333 (0.30)	1.2329		
				0.208 (4.80)	0.0029	1.250 (0.80)	1.2245		
	S46°E	84.1	6.10	3.333 (0.30)	0.0310	1.000 (1.00)	2.0711	0.125 (8.00)	1.3580
				6.667 (0.15)	0.0262	0.556 (1.80)	2.0154	0.278 (3.60)	0.7805
				1.667 (0.60)	0.0144	2.500 (0.40)	1.6765	0.556 (1.80)	0.4342
				1.111 (0.90)	0.0128	0.278 (3.60)	1.6720	0.455 (2.20)	0.3334
				0.769 (1.30)	0.0065	0.357 (2.80)	1.4395	1.000 (1.00)	0.2937
				0.667 (1.50)	0.0062	0.125 (8.00)	1.3852	1.667 (0.60)	0.1281
				0.333 (3.00)	0.0030	1.667 (0.60)	1.2689	1.429 (0.70)	0.1177
				0.143 (7.00)	0.0010	0.208 (4.80)	1.0676	2.500 (0.40)	0.1054
						6.667 (0.15)	0.5153		
R251	N37°E	195.0	7.64	3.333 (0.30)	0.0941	2.857 (0.35)	4.6883	0.143 (7.00)	3.2773
				1.818 (0.55)	0.0407	0.833 (1.20)	4.5577	0.435 (2.30)	1.0877
				1.250 (0.80)	0.0297	0.714 (1.40)	4.0566	0.625 (1.60)	0.8268
				0.833 (1.20)	0.0210	1.818 (0.55)	4.0259	0.769 (1.30)	0.7422
				0.455 (2.20)	0.0088	0.625 (1.60)	3.9566	1.250 (0.80)	0.4657
				0.313 (3.20)	0.0068	1.333 (0.75)	3.9473	1.667 (0.60)	0.3347
						0.278 (3.60)	3.5883	2.857 (0.35)	0.2593
						0.182 (5.50)	3.5624		
						0.385 (2.60)	2.7238		
	S53°E	188.0	6.76	2.222 (0.45)	0.0657	1.000 (1.00)	5.8928	0.143 (7.00)	4.7805
				1.667 (0.60)	0.0430	0.714 (1.40)	5.8054	0.667 (1.50)	1.2179
				1.250 (0.80)	0.0425	0.556 (1.80)	5.4487	0.909 (1.10)	0.9494
				1.000 (1.00)	0.0385	1.250 (0.80)	4.9518	2.222 (0.45)	0.3283
				0.200 (5.00)	0.0056	0.143 (7.00)	4.7232		
						1.538 (0.65)	4.4308		
						2.222 (0.45)	4.2304		
						0.333 (3.00)	3.0438		
R253	N30°W	242.0	8.40	4.000 (0.25)	0.0583	0.909 (1.10)	5.0800	0.167 (6.00)	3.5352
				2.222 (0.45)	0.0473	0.556 (1.80)	3.9826	0.500 (2.00)	0.8301
				1.000 (1.00)	0.0279	1.667 (0.60)	3.7521	0.909 (1.10)	0.8168
				0.278 (3.60)	0.0048	0.182 (5.50)	3.6401	0.714 (1.40)	0.6919
				0.385 (2.60)	0.0043	2.222 (0.45)	3.0254	1.538 (0.65)	0.3391
				0.182 (5.50)	0.0040	4.000 (0.25)	2.1579		
	S60°W	220.0	10.76	3.333 (0.30)	0.0488	0.167 (6.00)	4.5003	0.167 (6.00)	4.1130
				2.222 (0.45)	0.0413	0.238 (4.20)	4.3435	0.500 (2.00)	0.7840
				1.538 (0.65)	0.0284	0.833 (1.20)	3.9903	0.769 (1.30)	0.7096
				1.250 (0.80)	0.0234	1.250 (0.80)	3.0649	1.250 (0.80)	0.3713
				0.833 (1.20)	0.0187	1.429 (0.70)	3.0438	2.000 (0.50)	0.2297
				0.294 (3.40)	0.0079	2.222 (0.45)	2.6687		
				0.435 (2.30)	0.0069	0.455 (2.20)	2.4668		
						3.333 (0.30)	2.1270		
	UP	81.6	1.40	5.000 (2.20)	0.0200	2.000 (0.50)	1.3204	0.111 (9.00)	1.3552
				2.222 (0.45)	0.0188	0.143 (7.00)	1.2736	0.417 (2.40)	0.1830
				1.333 (0.75)	0.0067	0.182 (5.50)	1.1912	0.667 (1.50)	0.1802
				0.909 (1.10)	0.0045	3.333 (0.30)	0.9225	0.833 (1.20)	0.1500
				0.667 (1.50)	0.0032	1.429 (0.70)	0.8988	2.000 (0.50)	0.0951
				0.200 (5.00)	0.0016	1.000 (1.00)	0.8566	1.333 (0.75)	0.0933
				0.435 (2.30)	0.0013	0.833 (1.20)	0.7741	3.333 (0.30)	0.0408
				0.333 (3.00)	0.0012	0.667 (1.50)	0.7057		
						0.400 (2.50)	0.5054		
S255	N08°E	123.0	6.26	2.857 (0.35)	0.0597	0.143 (7.00)	3.7013	0.111 (9.00)	4.2439
				1.250 (0.80)	0.0199	2.222 (0.45)	3.4624	0.556 (1.80)	0.5914
				0.294 (3.40)	0.0067	0.250 (4.00)	3.4271	0.714 (1.40)	0.5318
				0.435 (2.30)	0.0063	2.857 (0.35)	3.1981	2.222 (0.45)	0.2260
						0.769 (1.30)	3.1316		
						1.250 (0.80)	0.5874		
						1.000 (1.00)	2.5096		
						0.500 (2.00)	2.1390		
						0.435 (2.30)	2.0896		
	N82°W	128.0	8.46	2.222 (0.45)	0.0492	0.200 (5.00)	5.5901	0.182 (5.50)	4.0185
				4.000 (0.25)	0.0487	0.625 (1.60)	4.3075	0.625 (1.60)	0.7832
				1.429 (0.70)	0.0299	1.818 (0.55)	4.0332	1.111 (0.90)	0.5126
				1.111 (0.90)	0.0257	0.111 (9.00)	3.9968	1.667 (0.60)	0.3315
				0.667 (1.50)	0.0136	1.111 (0.90)	3.5799		
				0.400 (2.50)	0.0085	0.435 (2.30)	3.1020		
				0.238 (4.20)	0.0072	1.429 (0.70)	2.9255		
S258	N29°E	56.3	4.02	2.857 (0.35)	0.0226	0.167 (6.00)	3.9778	0.143 (7.00)	3.8564
				1.818 (0.55)	0.0186	1.000 (1.00)	1.9075	0.435 (2.30)	0.5334
				1.111 (0.90)	0.0143	1.818 (0.55)	1.5674	1.000 (1.00)	0.3328
				1.429 (0.70)	0.0087	0.714 (1.40)	1.3841	0.769 (1.30)	0.2681
				0.217 (4.60)	0.0051	0.500 (2.00)	1.3460	1.818 (0.55)	0.1388
				0.625 (1.60)	0.0049	0.455 (2.20)	1.2774	2.857 (0.35)	0.0685

Record	Instrument Direction	Peak Acceleration cm/sec^2	Duration sec (Acc ≥ 0.05 g)	Predominant Acceleration Peaks Frequency (Period) Hz (sec)	Predominant Acceleration Peaks Amplitude (g)	Predominant Velocity Peaks Frequency (Period) Hz (sec)	Predominant Velocity Peaks Amplitude cm/sec	Predominant Displacement Peaks Frequency (Period) Hz (sec)	Predominant Displacement Peaks Amplitude cm
S258	N29°E	56.3	4.02	0.500 (2.00)	0.0047	0.400 (2.50)	1.2414		
				0.435 (2.30)	0.0041	2.857 (0.35)	1.1791		
						0.625 (1.60)	1.1212		
	S61°E	83.3	2.48	0.909 (1.10)	0.0227	0.714 (1.40)	4.4738	0.143 (7.00)	2.2802
				2.222 (0.45)	0.0218	0.909 (1.10)	3.9852	0.714 (1.40)	1.0340
				0.714 (1.40)	0.0214	0.111 (9.00)	2.7929	0.263 (3.80)	0.8411
				1.429 (0.70)	0.0206	0.435 (2.30)	2.5775	0.417 (2.40)	0.6621
				1.818 (0.55)	0.0194	0.182 (5.50)	2.0140	1.429 (0.70)	0.2496
				5.000 (0.20)	0.0172	1.538 (0.65)	1.8499	2.222 (0.45)	0.1094
				3.333 (0.30)	0.0159	2.222 (0.45)	1.1437		
				0.476 (2.10)	0.0053				
				0.167 (6.00)	0.0021				
	UP	54.5	0.00	3.333 (0.30)	0.0177	2.000 (2.50)	1.0523	0.227 (4.40)	0.6166
				2.000 (0.50)	0.0129	0.250 (4.00)	0.9912	0.111 (9.00)	0.4287
				1.111 (0.90)	0.0041	2.857 (0.35)	0.9136	0.500 (2.00)	0.2064
				0.714 (1.40)	0.0025	1.538 (0.65)	0.6597	0.625 (1.60)	0.1407
				0.500 (2.00)	0.0021	0.714 (1.40)	0.6438	1.111 (0.90)	0.0814
				0.263 (3.80)	0.0015	0.500 (2.00)	0.6131	2.000 (0.50)	0.0790
						1.111 (0.90)	0.5492	1.538 (0.65)	0.0555
S261	N59°E	97.7	6.82	2.857 (0.35)	0.0360	0.227 (4.40)	4.0151	0.167 (6.00)	3.0926
				5.000 (0.20)	0.0278	0.769 (1.30)	3.2081	0.667 (1.50)	0.7548
				2.000 (0.50)	0.0208	0.667 (1.50)	3.1500	1.111 (0.90)	0.3275
				1.667 (0.60)	0.0183	0.143 (7.00)	3.1304	1.538 (0.65)	0.1680
				1.111 (0.90)	0.0164	1.111 (0.90)	2.3653	2.857 (0.35)	0.1091
				0.769 (1.30)	0.0141	2.857 (0.35)	1.8047		
				0.263 (3.80)	0.0058	1.538 (0.65)	1.6289		
				0.357 (2.80)	0.0051	2.000 (0.50)	1.3861		
						1.333 (0.75)	1.3855		
						5.000 (0.20)	0.8686		
	N31°W	107.0	4.78	2.857 (0.35)	0.0314	1.667 (0.60)	1.6830	0.125 (8.00)	1.2976
				5.000 (0.20)	0.0249	0.769 (1.30)	1.6719	0.500 (2.00)	0.3067
				1.538 (0.65)	0.0174	2.857 (0.35)	1.6486	0.714 (1.40)	0.2975
				0.909 (1.10)	0.0083	1.333 (0.75)	1.6091	1.250 (0.80)	0.2074
				0.263 (3.80)	0.0022	0.208 (4.80)	1.5805	1.429 (0.70)	0.1873
						0.111 (9.00)	1.5178	2.222 (0.45)	0.1040
						0.556 (1.80)	1.3429		
						5.000 (0.20)	0.6492		
	UP	64.0	4.50	2.500 (0.40)	0.0202	2.000 (0.50)	1.2644	0.182 (5.50)	0.4961
				2.000 (0.50)	0.0162	2.500 (0.40)	1.2220	0.435 (2.30)	0.1687
				5.000 (0.20)	0.0160	0.625 (1.60)	0.8130	0.556 (1.80)	0.1670
				1.111 (0.90)	0.0047	1.111 (0.90)	0.7889	2.000 (0.50)	0.1002
				0.667 (1.50)	0.0024	0.227 (4.40)	0.7515	1.111 (0.90)	0.0939
				0.769 (1.30)	0.0023	1.333 (0.75)	0.6979	2.500 (0.40)	0.0798
				0.263 (3.80)	0.0010	0.769 (1.30)	0.5944	1.538 (0.65)	0.0777
						0.476 (2.10)	0.5763		
						0.125 (8.00)	0.5628		
S262	N83°W	68.3	8.80	2.857 (0.35)	0.0260	0.208 (4.80)	8.2890	0.182 (5.50)	6.1968
				1.000 (1.00)	0.0255	0.769 (1.30)	4.4405	0.500 (2.00)	1.4734
				2.222 (0.45)	0.0232	0.556 (1.80)	4.3479	1.333 (0.75)	0.3118
				5.000 (0.20)	0.0229	1.333 (0.75)	2.3224		
				1.429 (0.70)	0.0226	1.667 (0.60)	1.4978		
				1.667 (0.60)	0.0218	2.857 (0.35)	1.1787		
				0.556 (1.80)	0.0175				
				0.250 (4.00)	0.0134				
	S07°W	93.6	4.10	2.222 (0.45)	0.0376	0.200 (5.00)	6.9539	0.167 (6.00)	5.9747
				1.538 (0.65)	0.0337	0.556 (1.80)	5.2556	0.556 (1.80)	1.5349
				0.625 (1.60)	0.0234	0.769 (1.30)	3.7463	2.222 (0.45)	0.1883
				0.833 (1.20)	0.0204	1.111 (0.90)	3.3630		
				0.313 (3.20)	0.0121	1.333 (0.75)	3.2762		
						2.222 (0.45)	2.5392		
S265	SOUTH	104.0	6.08	6.667 (0.15)	0.0475	1.000 (1.00)	4.1607	0.167 (6.00)	3.3686
				1.111 (0.90)	0.02[illegible]	0.667 (1.50)	3.8113	0.714 (1.40)	0.7602
				2.000 (0.50)	0.0284	0.167 (6.00)	3.8112	1.000 (1.00)	0.7085
				1.538 (0.65)	0.0244	0.769 (1.30)	3.7190	2.857 (0.35)	0.0862
				0.769 (1.30)	0.0180	1.538 (0.65)	2.2894		
				0.227 (4.40)	0.0048	0.357 (2.80)	2.1839		
						2.857 (0.35)	1.6391		
						5.000 (0.20)	1.1317		
	WEST	125.0	10.30	6.667 (0.15)	0.0556	0.167 (6.00)	6.7475	0.167 (6.00)	6.1523
				2.000 (0.50)	0.0202	0.769 (1.30)	3.8988	0.400 (2.50)	1.6490
				0.909 (1.10)	0.0195	0.400 (2.50)	3.7065	0.769 (1.30)	0.7422
				2.500 (0.40)	0.0192	1.538 (0.65)	1.7226	1.818 (0.55)	0.1393
				1.250 (0.80)	0.0159	5.000 (0.20)	1.2417	4.000 (0.25)	0.0530
				0.417 (2.40)	0.0111	2.500 (0.40)	1.1177		
				0.227 (4.40)	0.0082				
	UP	53.7	0.00	2.000 (0.50)	0.0050	0.714 (1.40)	0.6720	0.111 (9.00)	0.1396
				1.000 (1.00)	0.0033	0.909 (1.10)	0.5824	0.167 (6.00)	0.1376
				1.333 (0.75)	0.0022	2.000 (0.50)	0.4589	0.250 (4.00)	0.1351
						5.000 (0.20)	0.3799	0.625 (1.60)	0.1268
						0.385 (2.60)	0.3641	2.000 (0.50)	0.0308
						1.538 (0.65)	0.3600	1.538 (0.65)	0.0293
						0.200 (5.00)	0.3474	5.000 (0.20)	0.0126
S266	NORTH	153.0	5.76	3.333 (0.30)	0.0482	1.111 (0.900)	3.8563	0.167 (6.00)	1.7874
				2.500 (0.40)	0.0397	0.667 (1.50)	3.1389	0.714 (1.40)	0.6209
				6.667 (0.15)	0.0350	1.538 (0.65)	2.5398	1.000 (1.00)	0.5227
				1.111 (0.90)	0.0259	1.818 (0.55)	2.2678	1.429 (0.70)	0.2731
				1.538 (0.65)	0.0254	0.125 (8.00)	2.2668	2.500 (0.40)	0.1576
				0.714 (1.40)	0.0128	2.500 (0.40)	2.2558		
				0.417 (2.40)	0.0031	0.182 (5.50)	2.1193		
				0.333 (3.00)	0.0030	0.385 (2.60)	2.0554		
				0.208 (4.80)	0.0025	0.455 (2.20)	2.0295		
	WEST	129.0	10.30	4.000 (0.25)	0.0415	0.167 (6.00)	4.6819	0.143 (7.00)	4.5660
				1.818 (0.55)	0.0344	0.909 (1.10)	4.2990	0.400 (2.50)	1.2791
				2.500 (0.40)	0.0277	1.111 (0.90)	3.1670	0.833 (1.20)	0.7826
				0.833 (1.20)	0.0220	0.400 (2.50)	2.9811	0.556 (1.80)	0.7229
				1.111 (0.90)	0.0218	1.818 (0.55)	2.9382	1.111 (0.90)	0.4359
				0.417 (2.40)	0.0085	0.556 (1.80)	2.5528	1.429 (0.70)	0.2813
				0.217 (4.60)	0.0060	2.222 (0.45)	1.9162		
						3.333 (0.30)	1.6797		

Record	Instrument Direction	Peak Acceleration cm/sec²	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
S266	UP	54.2	2.30	6.667 (0.15)	0.0220	2.222 (0.45)	0.6409	0.143 (7.00)	0.4423
				2.857 (0.35)	0.0121	2.857 (0.35)	0.6278	0.476 (2.10)	0.1435
				1.111 (0.90)	0.0044	0.769 (1.30)	0.5943	0.769 (1.30)	0.1096
				1.429 (0.70)	0.0036	0.111 (9.00)	0.5771	1.111 (0.90)	0.0888
				0.833 (1.20)	0.0028	1.111 (0.90)	0.5744	2.000 (0.50)	0.0468
				0.667 (1.50)	0.0020	0.500 (2.00)	0.4990	6.667 (0.15)	0.0122
				0.263 (3.80)	0.0006	0.200 (5.00)	0.4679		
						6.667 (0.15)	0.4601		
						1.538 (0.65)	0.3887		
S267	NORTH	55.5	0.04	1.429 (0.70)	0.0165	0.143 (7.00)	2.8111	0.143 (7.00)	2.2301
				3.333 (0.30)	0.0156	1.111 (0.90)	1.7840	0.333 (3.00)	0.4187
				2.500 (0.40)	0.0134	0.667 (1.50)	1.7591	0.667 (1.50)	0.3855
				1.818 (0.55)	0.0130	1.429 (0.70)	1.6734	0.476 (2.10)	0.2556
				1.111 (0.90)	0.0116	0.357 (2.80)	1.1608	1.000 (1.00)	0.2363
				0.714 (1.40)	0.0073	0.500 (2.00)	1.0777	1.429 (0.70)	0.2004
				0.167 (6.00)	0.0020	1.818 (0.55)	1.0507	1.818 (0.55)	0.0967
				0.385 (2.60)	0.0020	0.263 (3.80)	0.9591		
				0.217 (4.60)	0.0015	3.333 (0.30)	0.6954		
	EAST	61.5	0.02	5.000 (0.20)	0.0124	0.714 (1.40)	1.1020	0.111 (9.00)	0.9209
				2.857 (0.35)	0.0123	0.625 (1.60)	1.0948	0.333 (3.00)	0.2456
				2.000 (0.50)	0.0088	0.143 (7.00)	0.8173	0.667 (1.50)	0.2423
				1.333 (0.75)	0.0065	1.667 (0.60)	0.7619	1.111 (0.90)	0.0920
				0.769 (1.30)	0.0047	1.111 (0.90)	0.7589	1.333 (0.75)	0.0906
				0.143 (7.00)	0.0006	1.333 (0.75)	0.6[illegible]01	2.857 (0.35)	0.0372
				0.182 (5.50)	0.0006	2.857 (0.35)	0.6277		
				0.263 (3.80)	0.0006	0.313 (3.20)	0.6058		
				0.227 (4.40)	0.0005	0.208 (4.80)	0.5367		
U297	EAST	83.0	0.42	5.000 (0.20)	0.0110	2.500 (0.40)	0.4679	0.111 (9.00)	0.3026
						1.818 (0.55)	0.3798		
						1.429 (0.70)	0.3706		
						5.000 (0.20)	0.3444		
						0.500 (2.00)	0.3223		
						0.833 (1.20)	0.3198		
						0.111 (9.00)	0.2947		
U299	N45°E	233.0	3.14	2.857 (0.35)	0.0661	2.222 (0.45)	3.8290	0.111 (9.00)	1.5165
						2.857 (0.35)	3.7434	0.333 (3.00)	0.6349
						1.818 (0.55)	3.6408	0.455 (2.20)	0.5359
						0.111 (9.00)	2.7325	1.429 (0.70)	0.3210
	S45°E	172.0	1.54	2.857 (0.35)	0.0538	1.429 (0.70)	4.5209	0.111 (9.00)	0.6611
				2.222 (0.45)	0.0513	1.667 (0.60)	4.5102	0.500 (2.00)	0.4844
				1.667 (0.60)	0.0471	0.833 (1.20)	2.7555	1.538 (0.65)	0.4722
				4.000 (0.25)	0.0395			0.385 (2.60)	0.4300
				6.667 (0.15)	0.0325			0.833 (1.20)	0.4101
	UP	68.5	0.00	6.667 (0.15)	0.0186	2.500 (0.40)	0.5742	0.111 (9.00)	0.4772
				2.857 (0.35)	0.0103	1.111 (0.90)	0.4609	0.909 (1.10)	0.0685
				0.435 (2.30)	0.0007	0.111 (9.00)	0.4422	1.667 (0.60)	0.0388
						5.000 (0.20)	0.4337	2.000 (0.50)	0.0375
						0.556 (1.80)	0.2635	5.000 (0.20)	0.0134
U301	N89°W	193.0	3.64	3.333 (0.30)	0.0631	2.857 (0.35)	3.0920	0.833 (1.20)	0.3655
				1.111 (0.90)	0.0139	1.000 (1.00)	2.5753	0.143 (7.00)	0.2326
				0.182 (5.50)	0.0003	0.714 (1.40)	2.3093	2.857 (0.35)	0.1792
						2.222 (0.45)	2.1392	1.818 (0.55)	0.1580
						0.167 (6.00)	1.3011		
	S01°W	119.0	5.00	2.857 (0.35)	0.0558	2.857 (0.35)	3.0350	0.111 (9.00)	0.2557
				2.000 (0.50)	0.0342	1.818 (0.55)	2.8311	1.111 (0.90)	0.2526
				6.667 (0.15)	0.0270	1.250 (0.80)	2.0058	1.818 (0.55)	0.2488
				1.250 (0.80)	0.0134	0.417 (2.40)	1.0254	0.455 (2.20)	0.1785
				0.476 (2.10)	0.0016	0.143 (7.00)	0.9326	2.857 (0.35)	0.1685
								0.357 (2.80)	0.1466
	UP	69.5	0.02	3.333 (0.30)	0.0257	2.857 (0.35)	1.3323	0.111 (9.00)	0.2421
				1.538 (0.65)	0.0036	1.538 (0.65)	0.5804	0.625 (1.60)	0.1071
				1.111 (0.90)	0.0028	0.476 (2.10)	0.5204	0.909 (1.10)	0.0814
				0.909 (1.10)	0.0027	0.909 (1.10)	0.4623	0.455 (2.20)	0.0751
				0.625 (1.60)	0.0017	1.250 (0.80)	0.4417	2.857 (0.35)	0.0724
				0.313 (3.20)	0.0004	0.111 (9.00)	0.3637	1.429 (0.70)	0.0412
U305	N89°W	52.00	0.00	1.538 (0.65)	0.0181	1.429 (0.700)	1.8146	0.111 (9.00)	0.6044
				2.000 (0.50)	0.0142	0.769 (1.30)	0.5892	1.538 (0.65)	0.1888
				5.000 (0.20)	0.0116	0.167 (6.00)	0.5800	0.385 (2.60)	0.1150
				0.455 (2.20)	0.0008	0.500 (2.00)	0.4785		
				0.200 (5.00)	0.0005	0.357 (2.80)	0.4414		
						0.278 (3.61)	0.4384		
						4.000 (0.25)	0.3471		
U308	N46°W	57.5	4.24	5.000 (0.20)	0.0171	2.000 (0.50)	0.8618	0.111 (9.00)	0.1466
				2.222 (0.45)	0.0116	1.667 (0.60)	0.8545	0.238 (4.20)	0.1144
				1.429 (0.70)	0.0065	1.111 (0.90)	0.7637	1.111 (0.90)	0.0957
				1.111 (0.90)	0.0048	3.333 (0.30)	0.6589	1.429 (0.70)	0.0789
				0.714 (1.40)	0.0012	0.313 (3.20)	0.5165	0.333 (3.00)	0.0744
				0.417 (2.40)	0.0004	0.625 (1.60)	0.4977	2.000 (0.50)	0.0640
				0.278 (3.60)	0.0003	0.111 (9.00)	0.4194	1.667 (0.60)	0.0635
								0.667 (1.50)	0.0577
	S44°W	73.5	0.26	4.000 (0.25)	0.0243	3.333 (0.30)	1.0066	0.167 (6.00)	0.1792
				1.667 (0.60)	0.0054	2.222 (0.45)	0.6383	0.111 (9.00)	0.1405
				1.250 (0.80)	0.0036	1.667 (0.60)	0.6231	0.435 (2.30)	0.1378
				0.909 (1.10)	0.0029	0.455 (2.20)	0.5878	0.714 (1.40)	0.0956
				0.476 (2.10)	0.0012	0.667 (1.50)	0.5810	1.250 (0.80)	0.0570
				0.238 (4.20)	0.0003	1.250 (0.80)	0.5772	1.429 (0.70)	0.0503
						0.909 (1.10)	0.5617	3.333 (0.30)	0.0470
						1.429 (0.70)	0.5545	2.222 (0.45)	0.0388
						0.143 (7.00)	0.5089		
						0.358 (2.80)	0.4698		
						0.238 (4.20)	0.4011		
U309	N89°W	168.0	8.60	2.857 (0.35)	0.0294	0.769 (1.30)	3.4940	0.111 (9.00)	0.8048
				4.000 (0.25)	0.0277	1.333 (0.75)	2.7054	0.769 (1.30)	0.6747
				1.429 (0.70)	0.0229	0.556 (1.80)	1.9752	0.200 (5.00)	0.5014
				1.667 (0.60)	0.0218	0.435 (2.30)	1.6581	0.455 (2.20)	0.4565

Record	Instrument Direction	Peak Acceleration cm/sec^2	Duration sec (Acc ≧ 0.05 g)	Predominant Acceleration Peaks: Frequency (Period) Hz (sec)	Predominant Acceleration Peaks: Amplitude (g)	Predominant Velocity Peaks: Frequency (Period) Hz (sec)	Predominant Velocity Peaks: Amplitude cm/sec	Predominant Displacement Peaks: Frequency (Period) Hz (sec)	Predominant Displacement Peaks: Amplitude cm
U309	N89°W	168.0	8.60	0.833 (1.20)	0.0170	2.857 (0.35)	1.5768	0.556 (1.80)	0.4478
				0.556 (1.80)	0.0056	0.313 (3.20)	1.4624	0.278 (3.60)	0.4402
				0.333 (3.00)	0.0016	0.111 (9.00)	1.2723	0.333 (3.00)	0.3439
				0.294 (3.40)	0.0015	0.182 (5.50)	1.2165	1.333 (0.75)	0.2914
				0.238 (4.20)	0.0010			2.222 (0.45)	0.1143
	S01°W	74.9	0.56	3.333 (0.30)	0.0274	1.429 (0.70)	1.8998	0.111 (9.00)	0.7073
				2.222 (0.45)	0.0183	2.000 (0.50)	1.3778	1.429 (0.70)	0.2078
				1.429 (0.[illegible]0)	0.0171	3.333 (0.30)	1.1967	0.313 (3.20)	0.1736
				0.417 (2.40)	0.0010	0.667 (1.50)	0.8156	0.909 (1.10)	0.1709
				0.200 (5.00)	0.0007	0.250 (4.00)	0.6739	0.385 (2.60)	0.1506
						0.385 (2.60)	0.6593	0.625 (1.60)	0.1099
						0.111 (9.00)	0.5948	2.857 (0.35)	0.0659
						0.476 (2.10)	0.5879		
						0.167 (6.00)	0.5763		
U312	N46°W	103.0	0.16	6.667 (0.15)	0.0257	1.333 (0.75)	2.2134	0.909 (1.10)	0.3403
				2.000 (0.50)	0.0247	0.909 (1.10)	2.0575	0.111 (9.00)	0.3281
				1.111 (0.90)	0.0151	1.111 (0.90)	2.0489	1.333 (0.75)	0.2713
				0.455 (2.20)	0.0019	0.357 (2.80)	1.3803	0.400 (2.50)	0.2615
						0.208 (4.80)	1.3710	0.625 (1.60)	0.2419
						6.667 (0.15)	0.5225	0.250 (4.00)	0.2402
	S44°W	232.0	0.70	6.667 (0.15)	0.0465	1.250 (0.80)	2.5090	1.250 (0.80)	0.2869
				1.429 (0.70)	0.0192	1.429 (0.70)	2.1212	0.111 (9.00)	0.2407
				1.250 (0.80)	0.0181	4.000 (0.25)	1.3903	0.455 (2.20)	0.2354
				0.714 (1.40)	0.0045	2.500 (0.40)	1.3719	0.909 (1.10)	0.2342
						0.217 (4.60)	1.2186	1.429 (0.70)	0.2316
						0.714 (1.40)	1.1909	0.250 (4.00)	0.2265
						0.111 (9.00)	1.1579	0.400 (2.50)	0.2206
						0.357 (2.80)	1.1249	0.667 (1.50)	0.2192
						0.435 (2.30)	1.1219	2.500 (0.40)	0.0879
V321	N26°E	88.[illegible]	9.32	0.833 (1.20)	0.0387	0.833 (1.20)	7.1605	0.833 (1.20)	1.3794
				4.000 (0.25)	0.0277	0.357 (2.80)	1.6927	0.385 (2.60)	0.4630
				1.818 (0.55)	0.0123	0.417 (2.40)	1.6700	0.111 (9.00)	0.3962
				0.400 (2.50)	0.0029	0.200 (5.00)	1.1402	0.182 (5.50)	0.3799
				0.455 (2.20)	0.0028	2.857 (0.35)	1.1322	1.667 (0.60)	0.0943
				0.208 (4.80)	0.0006	0.125 (8.00)	1.1210	2.857 (0.35)	0.0615
						4.000 (0.25)	1.0393		
						1.818 (0.55)	0.9033		
	N46°W	59.9	0.02	4.000 (0.25)	0.0311	4.000 (0.25)	1.2192	0.111 (9.00)	0.1201
				2.222 (0.45)	0.0079	2.500 (0.40)	0.6013	0.500 (2.00)	0.0895
				0.833 (1.20)	0.0017	2.000 (0.50)	0.5979	4.000 (0.25)	0.0482
						0.435 (2.30)	0.4586	1.818 (0.55)	0.0430
						0.769 (1.30)	0.4457		
	UP	96.4	1.80	5.000 (2.20)	0.0323	2.000 (0.50)	1.3025	0.111 (9.00)	0.1146
				2.857 (0.35)	0.0168	4.000 (0.25)	1.2038	2.000 (0.50)	0.0934
				2.000 (0.50)	0.0150	2.500 (0.40)	1.0409	0.182 (5.50)	0.0884
				0.500 (2.00)	0.0006	0.625 (1.60)	0.4502	0.435 (2.30)	0.0628
								4.000 (0.25)	0.0474

APPENDIX C: PERIODS AND FREQUENCIES OF THE RESPONSE SPECTRA

Period sec	Frequency Hz	Period sec	Frequency Hz
0.10	10.00	2.00	0.50
0.15	6.67	2.10	0.48
0.20	5.00	2.20	0.45
0.25	4.00	2.30	0.43
0.30	3.33	2.40	0.42
0.35	2.86	2.50	0.40
0.40	2.50	2.60	0.38
0.45	2.22	2.80	0.36
0.50	2.00	3.00	0.33
0.55	1.82	3.20	0.31
0.60	1.67	3.40	0.29
0.65	1.54	3.60	0.28
0.70	1.43	3.80	0.26
0.75	1.33	4.00	0.25
0.80	1.25	4.20	0.24
0.90	1.11	4.40	0.23
1.00	1.00	4.60	0.22
1.10	0.91	4.80	0.21
1.20	0.83	5.00	0.20
1.30	0.77	5.50	0.18
1.40	0.71	6.00	0.17
1.50	0.67	7.00	0.14
1.60	0.63	8.00	0.13
1.80	0.56	9.00	0.11

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Chang, Frank K
State-of-the-art for assessing earthquake hazards in the United States; Report 8: Duration, spectral content, and predominant period of strong motion earthquake records from western United States / by Frank K. Chang, Ellis L. Krinitzsky. Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1977.
58, [24] p. : ill. ; 27 cm. (Miscellaneous paper - U. S. Army Engineer Waterways Experiment Station ; S-73-1, Report 8)
Prepared for Office, Chief of Engineers, U. S. Army, Washington, D. C.
References: p. 56-58.

1. Earthquake engineering. 2. Earthquake hazards. 3. Earthquake resistant structures. 4. Earthquakes. 5. Ground motion. 6. State-of-the-art studies. I. United States. Army. Corps of Engineers. II. Krinitzsky, Ellis Louis, joint author. III. Series: United States. Waterways Experiment Station, Vicksburg, Miss. Miscellaneous paper ; S-73-1 Report 8.
TA7.W34m no.S-73-1 Report 8