Processed Data for

Pacoima - Upper Left Abutment

from the Northridge Earthquake

of 17 January 1994

by

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The processed data plots are presented in the following order:

1. Phase 1 (Vol. 1) data: uncorrected accelerations. Acceleration for the first 22 seconds are plotted with a common scaling factor for all channels; three channels are plotted on one page. This plot is followed by another plot of the full processed length (60 seconds) with each channel individually scaled.

2. Phase 2 (Vol. 2) data: instrument, tilt and baseline-corrected acceleration, velocity and displacement. The data for the full processed length are plotted with equal scaling for all channels. The filter frequencies used in the processing (0.08-0.16 to 23.0-25.0 Hz) are indicated on the plots (see definition of Usable Data Bandwidth).

3. Phase 3 (Vol. 3) data: response spectra. The pseudo-velocity spectra (PSV), the pseudo-acceleration spectra (PSA), the displacement spectra (SD), and the Fourier amplitude spectra (FS) are presented on a tripartite logarithmic plot for each channel. The spectra are plotted for periods within the filter bandwidth used in the Vol. 2 processing. In addition, the absolute acceleration spectra (SA) for 0%, 2%, 5%, 10%, and 20% dampings are plotted against period for periods from 0 to 4 seconds with linear-linear scaling.

Note: The tilt-correction applied to the acceleration is documented in Report OSMS 94-13, which is available upon request.

6/8/94
The filter bands for each record are indicated on the plots for the Phase 2 and Phase 3 data. In standard processing, the digitized data are processed and filtered using Ormsby filters. The data are first low-pass filtered using a high-frequency filter with a corner frequency of 23 Hz and a roll-off termination frequency of 25 Hz. Then the data are high-pass filtered using a low-frequency filter with a corner frequency of 0.07 Hz and a roll-off termination of 0.05 Hz. Therefore, the Phase 2 data is the result of the digitized data being filtered by the bandpass filter \( H(f) \) with ramps as shown in the figure:

![Diagram](https://via.placeholder.com/150)

The **Usable Data Bandwidth** is defined as the band between frequencies \( f_\text{lo} \) and \( f_\text{hi} \), where \( f_\text{hi} \) and \( f_\text{lo} \) are the -3 dB points on the high-frequency and low-frequency ramps, respectively. The value of \( H(f) \) is approximately equal to 0.7 for -3 dB (see Notes). The user should only use these data for analyses within this bandwidth.

Notes:

1) The values of \( f_\text{hi} \) and \( f_\text{lo} \) can be calculated from the corner frequencies \( (f_\text{hi}, f_\text{lo}) \) and the roll-off termination frequencies \( (f_\text{ht}, f_\text{lt}) \) used in the processing by using the formulas:

\[
\begin{align*}
\text{fhi} &= f_\text{hi} - 0.3 \times (f_\text{hi} - f_\text{lo}) \\
\text{flo} &= f_\text{lo} - 0.3 \times (f_\text{hi} - f_\text{lo})
\end{align*}
\]

For example, the Usable Data Bandwidth for data bandpass-filtered with ramps at 0.30 to 0.60 Hz and 23.0 to 23.6 Hz is 0.51 Hz to 23.6 Hz (0.042 to 2.0 seconds period).

2) It is common in signal processing to plot 20 \( \log_{10}[H(f)] \) versus frequency, and express the ordinate value in decibels (abbreviated dB). Accordingly, 0 dB corresponds to a value of \( H(f) \) equal to 1; 20 dB is equivalent to \( H(f) = 10 \), and -20 dB corresponds to \( H(f) = 0.1 \). Thus, at the -3 dB frequency point, the amplitude of the transfer function, \( H(f) \), is reduced to 0.7, while the power transmitted by the filter, \( H^2(f) \), is reduced to 0.5.
NORTHRIDGE EARTHQUAKE  JANUARY 17, 1994 24:31 PST
PACOIMA DAM - UPPER LEFT ABUTMENT  CHN 1: 194 DEG
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BANDS: 0.08-.16 TO 23.0-25.0 Hz.  24207-52485-94021.02  050884.0912-GN94A207 TT

MAX = -1259.9

MAX = 104.5

MAX = 21.8

TIME (SEC)
NORTHRIDGE EARTHQUAKE  JANUARY 17, 1994 04:31 PST
PACOIMA DAM - UPPER LEFT ABUTMENT
CHM 1. 194 DEG
ACCELEROMETER BANDPASS-FILTERED WITH RAMPS AT .08-.18 TO 23.0-25.0 HZ.
24207-SE405-94021.02  060894.0918-QM04A207

RESPONSE SPECTRA: PSV, PSA & SD — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%
NORTHRIDGE EARTHQUAKE  JANUARY 17, 1994 04:31 PST
PACOIMA DAM - UPPER LEFT ABUTMENT
CHN 2: UP
ACCELEROMETER BANDPASSED-FILTERED WITH RAMPS AT .08-.16 TO 23.0-25.0 Hz.
24207-92485.940.02  060894.0918.094A207

RESPONSE SPECTRA: PSV, PSA & SD  --- FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%