PRELIMINARY STRONG-MOTION RESULTS FROM THE
FERNDALE AREA EARTHQUAKE OF 7 JUNE 1975

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A magnitude 5.2 earthquake occurred on 7 June 1975 at a depth of 9 km
approximately 20 km southeast of Ferndale at 40.44° N and 124.13° W (University
of California Seismograph Station). Minor damages primarily broken plate glass
windows, fallen stock in stores and damaged chimneys were reported at several
communities in the most heavily shaken area including at Ferndale, Fortuna, Rio
Dell and Scotia.

The U. S. Geological Survey has operated strong-motion accelerographs
for recording the ground motions of significant earthquakes at Ferndale and
Eureka for more than 40 years. Recently the network in this region of California
has been implemented by the installation of instruments by the California Divi-
sion of Mines and Geology and the University of California. As a result 7 acce-
leration records were recovered at ground sites located between 19 and 87 km of the
epicenter (Figure 1). The maximum accelerations ranging between 0.19g and 0.23g
were recorded at 3 sites located between 19 and 21 km of the epicenter. Table I
presents a summary of the results including: "epicentral distances", general
site geology, peak recorded accelerations, and in the last column, the time dura-
tion during which amplitudes equalled or exceeded 0.1g. Figure 2 and 3 show
copies of the more significant records obtained from Ferndale and Petrolia. Note
the S-wave minus trigger interval of 4 to 4-1/2 seconds exhibited by the two
records obtained at Petrolia. No such interval is shown on the Ferndale record

since it is triggered by a mechanical contact horizontal starter that does not respond to P-wave motion. There also appears to be a significant difference in the character of record obtained at the two Petrolia sites. The general store, situated on alluvium, shows considerably longer period motion than does the Cape Mendocino site that rests directly on Franciscan rock. The 3 accelerograms with the largest peak amplitudes are being digitized for further processing.

Three seismoscope records were obtained in the area, two at Ferndale and one at Eureka. A fourth instrument is located at 9 km south of Eureka but due to limited access the record could not be recovered at this time. The maximum relative displacement response values of 2.3 cm and 2.6 cm were recorded at the two Ferndale sites. All three seismoscope records showed prominent maximum amplitudes aligned NNE to NE.
TABLE I

SUMMARY OF ACCELEROGRAPH RECORDS FROM THE EARTHQUAKE OF 7 JUNE 1975

<table>
<thead>
<tr>
<th>STATION</th>
<th>OWNER*</th>
<th>EPICENTRAL DISTANCE (km)</th>
<th>SITE GEOLGY</th>
<th>PEAK ACCELERATION (g)</th>
<th>DURATION (&gt;1g (sec))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butler Valley #1</td>
<td>UC</td>
<td>41</td>
<td>Soft mudstone</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Butler Valley #2</td>
<td>UC</td>
<td>44</td>
<td>Sandstone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eureka</td>
<td>USGS</td>
<td>40</td>
<td>Poorly consolidated sand and gravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferndale</td>
<td>USGS</td>
<td>19</td>
<td>Alluvium</td>
<td>.23</td>
<td>1.6</td>
</tr>
<tr>
<td>Petrolia, Cape Mendocino</td>
<td>CDMG</td>
<td>21</td>
<td>Cretaceous rock</td>
<td>.22</td>
<td>1.0</td>
</tr>
<tr>
<td>Petrolia, General Store</td>
<td>CDMG</td>
<td>19</td>
<td>Alluvium</td>
<td>.19</td>
<td>1.7</td>
</tr>
<tr>
<td>Rockport</td>
<td>CDMG</td>
<td>87</td>
<td>Cretaceous rock</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>Shelter Cove #1</td>
<td>CDMG</td>
<td>45</td>
<td>Cretaceous rock</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Shelter Cove #2</td>
<td>CDMG</td>
<td>46</td>
<td>Franciscan rock</td>
<td>.11</td>
<td>single peak</td>
</tr>
</tbody>
</table>

* Owner codes: UC (University of California), USGS (U. S. Geological Survey), and CDMG (California Division of Mines and Geology).

** The Butler Valley #2 accelerograph was shorted out by excessive condensation on the counter. At Eureka the battery failed after a few seconds of operation.
Figure 1. Strong-motion instruments in the extended Eureka-Ferndale area.
Figure 2. Tracing of the accelerograph record from Ferndale.
Cape Mendocino (CM)

East

Down

North

S-wave minus trigger time

General Store (SM)

N 75 E

Down

N 15 E W

Figure 3. Tracing of acceleration records from Petrolia. The nominal sensitivity of the 6 data traces is 1.85 cm/g.