# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

**LOCATION INFORMATION**

- **Location:** PB-7.5
- **Max. Charge Weight:** 160
- **Date of Blast:** 6/3/14
- **Northing:** 37°59'12" N
- **Time of Blast:** 11:34
- **Easting:** 122°27'09" W
- **Blast Duration:** 604 ms
- **Blast Number:** 1609

<table>
<thead>
<tr>
<th>Seismograph Model</th>
<th>2000</th>
<th>M.000</th>
<th>M.000</th>
<th>M.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>2481</td>
<td>4550</td>
<td>4567</td>
<td>4570</td>
</tr>
<tr>
<td>Last Calibration Date</td>
<td>5/7/14</td>
<td>5/7/14</td>
<td>5/7/14</td>
<td>5/7/14</td>
</tr>
</tbody>
</table>

**LOCATION INFORMATION**

- **Location:** Marin Co., Via Marziale, San Mariano, McNear, Fort Kennedy
- **Northing:** 37°59'19" N, 37°59'18" N, 37°59'31" N, 37°59'38" N
- **Easting:** 122°27'22" W, 122°27'30" W, 122°27'30" W, 122°27'16" W
- **Distance from Blast:** 1320, 3590, 2640, 1900
- **Scaled Distance:** 104, 280, 208, 150

**VIBRATION INFORMATION**

<table>
<thead>
<tr>
<th>Longitudinal Peak Particle Velocity (ips)</th>
<th>0.05</th>
</tr>
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<tbody>
<tr>
<td>Longitudinal Peak Frequency (Hz)</td>
<td>0.1</td>
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<tr>
<td>Transverse Peak Particle Velocity (ips)</td>
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<tr>
<td>Transverse Peak Frequency (Hz)</td>
<td>0.3</td>
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<tr>
<td>Vertical Peak Particle Velocity (ips)</td>
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<tr>
<td>Vertical Peak Frequency (Hz)</td>
<td>0.8</td>
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<tr>
<td>Peak Vector Sum (ips)</td>
<td>0.07</td>
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<tr>
<td>Peak Air Overpressure (db)</td>
<td>116</td>
</tr>
</tbody>
</table>

**GENERAL COMMENTS**

Seismograph Operator: [Signature]

Seismograph Operator: [Signature]
## SAN RAFAEL ROCK QUARRY BLAST REPORT

### BASE DATA:
- Location: PB 7.5
- Northing: 37°54'12" N
- Easting: 122°27'09" W
- Designed Bench Height (ft): 10
- Rock Density (yds³): 2.23
- Date: 6.3.19
- Time: 11:34
- Relative Rock Hardness: 7
- Blast Number: 1609

### DESIGN DATA:
- Number of Holes Shot: 48
- Hole Dia. (in.): 6.34
- Stemmaing (ft): 13
- Loading Time Required (man hrs): 9
- Deck Type:
- Ave. Hole Depth (ft): 2.5
- Burden (ft): 14
- Stem Type: 34 Stwe
- Staggered Pattern (y or n): N
- Length (ft):
- Relative Confinement: 
- Spacing (ft): 15
- Subdrill (ft): 15
- Number of Lost Holes: 0
- Tons Shot: 11650

### EXPLOSIVES DATA:

<table>
<thead>
<tr>
<th>Explosive</th>
<th>Weight</th>
<th>Boosters</th>
<th>Units</th>
<th>Delays</th>
<th>Units</th>
<th>Misc.</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>-1-ton 10'00</td>
<td>6840</td>
<td>950 gram</td>
<td>96</td>
<td>80'€2</td>
<td>48</td>
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<td></td>
<td></td>
<td>50'€2</td>
<td>48</td>
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<tr>
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<td>42'€5</td>
<td>13</td>
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<td>17'€5</td>
<td>1</td>
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</tbody>
</table>

- Max (lb/hole): 160
- Blast Duration (sec): 604

### VIBRATION DATA:
- Nearest Structure: MOUND
- Seismograph Loc.: Scam
- Temperature: 62°
- Max. Chrg. (lb/8ms): 160
- Northing: 37°54'12" N
- Northing: 
- Sky Condition: Clear
- RPPV:.07
- Easting: 122°27'22" W
- Easting: 
- Wind Direction: 5-8
- Frequency: 3.6
- Distance Away:
- Distance Away: 
- Wind Speed: 3.5
- Airblast: 106

### PERFORMANCE DATA:
- Powder Factor (lb/ton): 4
- Displacement: 600
- Crashability:
- Lb/yd³: 1.03
- Vibration: And
- Fines:
- Fragmentation: 50%
- Dig ability:
- Comments:

- Blaster in Charge: [Signature]
Seismic Analysis

Velocity Waveform Analysis

Serial Number: 9668
Firmware Version: 0C-05.18
Event Date: 06/03/2014 11:30:51 (UTC -07:00)
Event number: 2
Recording Time: 5 s
Client: COUNTY OF MARIN
Operation: SAN RAFAEL ROCK QUARRY
Location: ON QUARRY PROPERTY
Distance: 
Operator: VIBRA-TECH IP2
Comment: 
Seismic Trigger: 0.03 in/s
Sound Trigger: OFF
Additional Info: 
j-GEO-01253
M37 59.481, W122 27.256

Summary Data
PPV (in/s):
L 0.0375 0.0325 0.0425
T 45.5 50 62.5
V 0.1775 0.1775 0.185
Peak Vector Sum: 0.0525 in/s
Peak Air Pressure: 100.5 dB
0.0003208 psi @ 3.3 HZ

Shaketable Calibrated
On: 01/29/2014 (UTC -07:00)
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40203 U.S.A.

Waveform Graph Scale
Time Scale: 0.1 s
Seismic Scale: +/- 0.16 in/s
Sound Scale: +/- 0.0023 psi

Velocity Waveform
SSN: 9668 Event: 2

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The seismograph located at 16 Marin Bay Park Court (S/N 8154) did not trigger during the shot on June 3, 2014 at approximately 11:30 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.