# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

**Location:** PR-7  
**Max. Charge Weight:** 200  
**Date of Blast:** 10/25/11  
**Northing:** 37°57'10"N  
**Blast Duration:** 301.5 s  
**Easting:** 122°27'19"W  
**Time of Blast:** 11:38  
**Blast Number:** 1561

<table>
<thead>
<tr>
<th>Seismograph Model</th>
<th>2000</th>
<th>micro</th>
<th>micro</th>
<th>micro</th>
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</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td>2129</td>
<td>G520</td>
<td>4562</td>
<td>4570</td>
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<tr>
<td>Last Calibration Date</td>
<td>5/24/11</td>
<td>6/26/11</td>
<td>5/26/11</td>
<td>5/26/11</td>
</tr>
</tbody>
</table>

**Location Information:**  
- **Location:** Marin, Ita, Mount, San Mateo, SF, Mend Park  
- **Northing:** 37°57'10"N, 37°59'18"N, 37°59'51"N, 33°54'50"N  
- **Easting:** 122°27'19"W, 122°27'53"W, 122°27'30"W, 122°27'14"W  
- **Distance from Blast:** 106, 261, 237, 168  
- **Scaled Distance:** 20, 261, 168, 141

**Vibration Information:**  
- **Longitudinal Peak Particle Velocity (ips):** 0.01, 0.05, 0.06  
- **Longitudinal Peak Frequency (Hz):** 20.0, 11.9, 15.8  
- **Transverse Peak Particle Velocity (ips):** 0.1, 0.05, 0.05  
- **Transverse Peak Frequency (Hz):** 31.2, 12.2, 12.2  
- **Vertical Peak Particle Velocity (ips):** 0.01, 0.04, 0.04  
- **Vertical Peak Frequency (Hz):** 23.2, 11.9, 12.1  
- **Peak Vector Sum (ips):** 1.2, 0.62, 0.8, 0.7  
- **Peak Air Overpressure (db):** 11, 10.6, 10.6

**Seismograph Operator:** Deon Hafes  
**Signature:** [Signature]
SAN RAFAEL ROCK QUARRY BLAST REPORT

BASE DATA:

Location: PB-7
Northing: 37°54' 10 N'
Easting: 122°27' 19 W
Designated Bench Height (ft): 4'0
Rock Density (lb/ft³): 2.23
Relative Rock Hardness: 7
Date: 10 25 11
Time: 11:38
Blast Number: 1561

DESIGN DATA:

Number of Holes Shot: 7
Hole Dia (in.): 3 3/4
Stemming (ft): 15
Loading Time Required (man hrs): 6
Ave. Hole Depth (ft): 43
Burden (ft): 15
Stem Type: 3 3/4 x 12x
Staggered Pattern (y or n): Y
Length (ft): 5
Relative Confinement:
Spacing (ft):
Subdrill (ft):
Number of Lost Holes:
Tons Shot: 12.436

EXPLOSIVES DATA:

Bulk Explosive Weight
Booster Units Delays Units Misc. Units
4,100 lb 1,040 lb 450 g 86 F 17 = Max (lb/hole): 380

VIBRATION DATA:

Nearest Structure: Min: 5 y
Seismograph Loc: 5 km
Northing: 37°54' 19 N'
Northing: 122°27' 19 W'
Easting: 122°27' 19 W'
Easting: 122°27' 19 W'
Distance Away: 160 y
Temperature: 24°
Max Clrg. (lb/sec): 580
Sky Condition: Overcast
RPPV: 13
Frequency: 31.7

PERFORMANCE DATA:

Powder Factor (lb/ton): 6
Lb/yd³: 1.14
Fragmentation: [empty]
Comments:
Displacement: [empty]
Vibration: [empty]
Crushability: [empty]
Wind Speed: 0-3
Airblast: 114

Blaster in Charge: [signature]
17 holes
17: 80° E
17: 50° E
34.42" vs
depth: 13
main: 1003
Vmin: 2851
Smin: 2376
Mmin: 3006
37° 59' 10" N
122° 27' 19" W
6,400 lbs titan
15
180 ft
25
30
200 ft
The seismograph on Quarry Property (S/N 9856) did not trigger during the shot on October 25, 2011 at approximately 11:41 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.
The seismograph located across the street from 16 Marin Bay Park Court (S/N 7155) did not trigger during the blast on October 25, 2011 at approximately 11:41 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.
The seismograph at 114 San Marino Drive (S/N 9669) did not trigger during the shot on October 25, 2011 at approximately 11:41 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.