

# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: PB-7      Max. Charge Weight: 220      Date of Blast: 1-13-12  
 Northing: 37°59'02" N      Time of Blast: 11:30  
 Easting: 122°27'14" W      Blast Duration: 417ms      Blast Number: 1565

SEISMOGRAPH INFORMATION		UNIT		UNIT	
Seismograph Model	2000	MICRO	MICRO	MICRO	MICRO
Serial Number	2481	4550	4567	4570	
Last Calibration Date	5/24/11	5/26/11	5/26/11	5/26/11	
LOCATION INFORMATION		UNIT		UNIT	
Location	MICRO	Via Micro Bell	Sat. Micro	M <sup>c</sup> Micro	Point
Northing	37°57'19" N	37°59'18" N	37°59'31" N	37°59'30" N	
Easting	122°27'22" W	122°27'53" W	122°27'30" W	122°27'16" W	
Distance from Blast	1745	3484	3220	2745	
Scaled Distance	121	234	217	185	
VIBRATION INFORMATION		UNIT		UNIT	
Longitudinal Peak Particle Velocity (ips)	.10	/			
Longitudinal Peak Frequency (Hz)	17.8	/			
Transverse Peak Particle Velocity (ips)	.15	/			
Transverse Peak Frequency (Hz)	20.0	/			
Vertical Peak Particle Velocity (ips)	.16	/			
Vertical Peak Frequency (Hz)	55.5	/			
Peak Vector Sum (ips)	.19	/			
Peak Air Overpressure (db)	106	/			

Seismograph Operator: Perun Lopez      Signature: Perun Lopez

# SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA:**

Location: 3B-7      Designed Bench Height (ft): 40      Date: 1-13-12  
 Northing: 37° 59' 02 N      Rock Density (γyd<sup>3</sup>): 2.23      Time: 11:30  
 Easting: 122° 27' 14 W      Relative Rock Hardness: 7      Blast Number: 1565

**DESIGN DATA:**

Number of Holes Shot: 16      Hole Dia. (in.): 6 3/4      Stemming (ft): 1.5      Loading Time Required (man hrs): 6      Deck Type: 3/4' stops  
 Avg. Hole Depth (ft): 43      Burden (ft): 15      Stem Type: 3/4' stops      Staggered Pattern (y or n): N      Length (ft): 5  
 Relative Confinement: \_\_\_\_\_      Spacing (ft): 15      Subdrill (ft): 0      Number of Lost Holes: 0      Tons Shot: 11,843

**EXPLOSIVES DATA:**

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units
1-1000 <sup>99</sup> Sand	<u>4470</u>	<u>450</u>	<u>22</u>	<u>2032</u>	<u>16</u>		
				<u>5032</u>	<u>16</u>		
				<u>4205</u>	<u>1</u>		
				<u>1705</u>	<u>1</u>		

**VIBRATION DATA:**

Nearest Structure: Maxim Gas      Seismograph Loc.: Same      Temperature: 63°      Max. Chrg. (lb/8ms): 220  
 Northing: 37° 59' 19 N      Northing: \_\_\_\_\_      Sky Condition: Clear      RPPV: .19  
 Easting: 122° 27' 22 W      Easting: \_\_\_\_\_      Wind Direction: North      Frequency: 55.5  
 Distance Away: 1795      Distance Away: \_\_\_\_\_      Wind Speed: 0.4 mph      Airblast: 106

**PERFORMANCE DATA:**

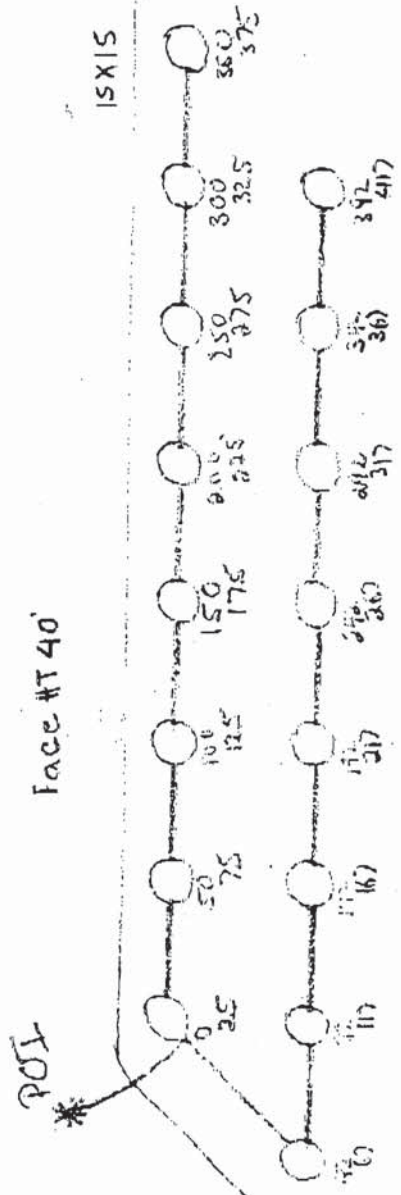
Powder Factor (lb/ton): .5      Displacement: Good      Crushability: \_\_\_\_\_  
 γ/γyd<sup>3</sup>: 1.26      Vibration: Good      Fines: \_\_\_\_\_  
 Fragmentation: Good      Dig ability: \_\_\_\_\_  
 Comments: Deck loaded      Blaster in Charge: Alan Lopez

Total Charge Wt.: 6712

Max (lb/hole): 436

Blast Duration (sec): 417 ms

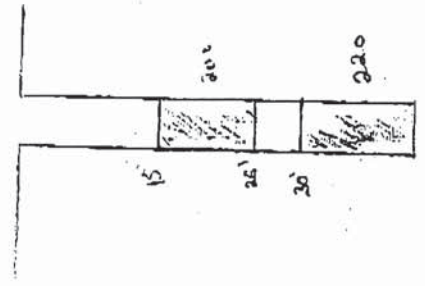
1-13-12  
# 1565  
PB-7



- 16 Holes
- 16-80 EZ
- 16-50 EZ
- 1-42 EZ TL
- 1-17.5 EZ TL
- 32-450 gram

Titan 1000 80/20%

depth 43



main . 1795  
Via Mont 3481  
Sam M . 3220  
M<sup>c</sup>N . 2745  
37° 59' 02  
122° 27' 14

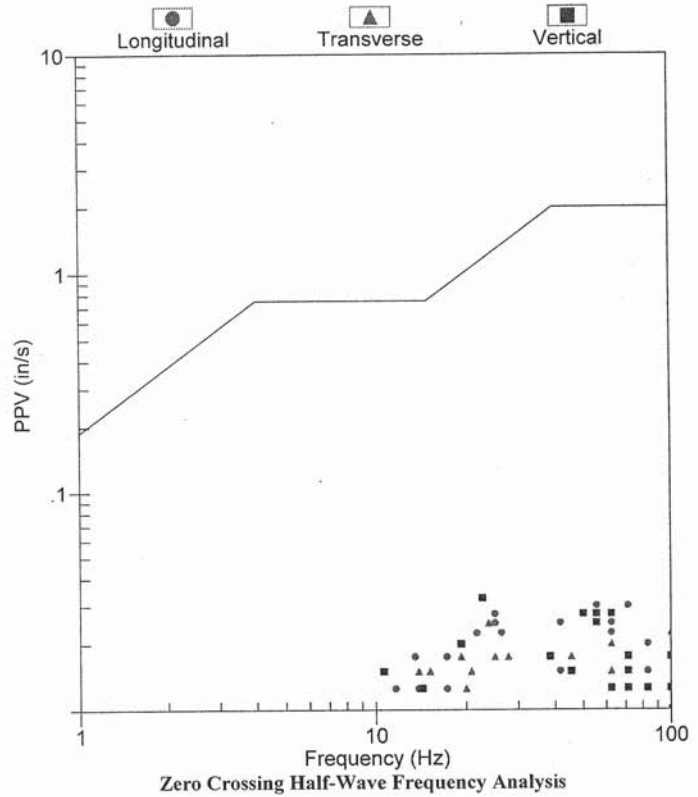
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 9856 v3.23  
**Date:** 01/13/2012 11:33:03 (UTC-8)  
**Event No:** 11  
**Record Time:** 5.0 s  
**Client:** COUNTY MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** ON QUARRY PROPERTY  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:**  
**Seismic Trigger:** 0.030 in/s

### USBM Safe Blasting Levels

SN: 9856 Event: 11



	Summary Data		
	L	T	V
PPV (in/s)	0.035	0.025	0.045
FREQ (Hz)	55.6	62.5	62.5
PD (.001")	0.34	0.18	0.23
PPA (g)	0.033	0.026	0.046
Peak Vector Sum :	0.050 in/s		
Peak Air Pressure:	103 db		
	0.00050 PSI @ 9.6 Hz		

**Additional Info:**

j-GEO-01253  
N37 59.481, W122 27.256

**Shaketable Calibrated:** 01/27/2011

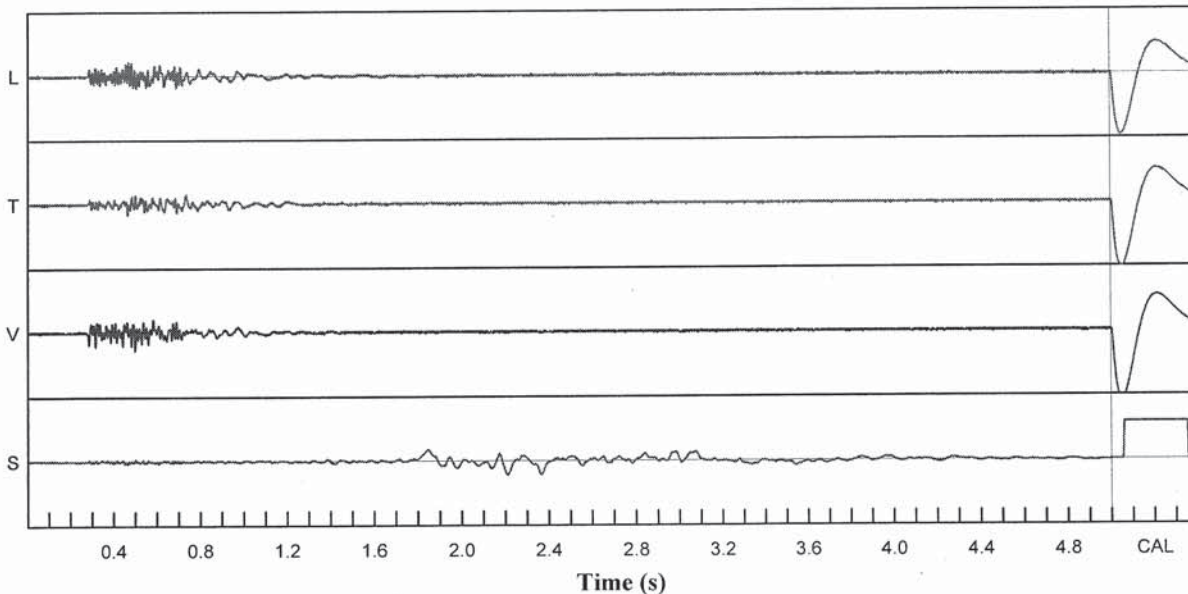
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40299 U.S.A.  
 TEL: 502.240.9900 FAX: 502.240.9902

**Velocity Waveform Graph Scale**

**Time Scale:** 0.100 s  
**Seismic Scale:** +/- 0.160 in/s  
**Sound Scale:** +/- 0.0023 PSI

### Velocity Waveform

SN: 9856 Event: 11



# GeoSonics Inc. Seismic Analysis

## Stop Event Report

**Serial No:** 9669 v3.23  
**Client:** COUNTY MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** 114 SAN MARINO DRIVE  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:** VERONIQUE RASKIN

**Begin Date:** 01/13/2012 07:05:12 (UTC-8)  
**End Date:** 01/13/2012 19:00:00 (UTC-8)  
**Events over Trigger:** 0 (2-1)  
**Record Time:** 5.0 s  
**Seismic Trigger:** 0.030 in/s  
**Sound Trigger:** N/A  
**Battery Level:** 8.7

### Additional Info:

j-GEO-01254  
N37 59.395, W122 27.700

**Shaketable Calibrated:** 01/26/2011  
**By:** Vibra-Tech, Inc.  
2700 Holloway Road - Suite 113  
Louisville, KY 40299 U.S.A.  
TEL: 502.240.9900 FAX: 502.240.9902

Dynamic Calibration Graph:



### Cal Test Results:

Longitudinal:	Pass
Transverse:	Pass
Vertical:	Pass
Sound:	Pass

The seismograph at 114 San Marino Drive (S/N 9669) did not trigger during the shot on January 13, 2012 at approximately 11:33 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.

# GeoSonics Inc. Seismic Analysis

## Stop Event Report

**Serial No:** 7155 v3.23  
**Client:** COUNTY OF MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** 16 MARIN BAY PARK CT.  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:** WILLIAM HOSKEN RESIDENC

**Begin Date:** 01/13/2012 07:00:50 (UTC-8)  
**End Date:** 01/13/2012 13:32:16 (UTC-8)  
**Events over Trigger:** 0 (12-11)  
**Record Time:** 5.0 s  
**Seismic Trigger:** 0.030 in/s  
**Sound Trigger:** N/A  
**Battery Level:** 8.8

### Additional Info:

j-GEO-01252  
N37 59.524, W122 27.373

**Shaketable Calibrated:** 01/26/2011  
**By:** Vibra-Tech, Inc.  
2700 Holloway Road - Suite 113  
Louisville, KY 40299 U.S.A.  
TEL: 502.240.9900 FAX: 502.240.9902

### Dynamic Calibration Graph:



### Cal Test Results:

Longitudinal:	Pass
Transverse:	Pass
Vertical:	Pass
Sound:	Pass

The seismograph located across the street from 16 Marin Bay Park Court (S/N 7155) did not trigger during the blast on January 13, 2012 at approximately 11:33 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.