

# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: 33-7 holes      Max. Charge Weight: 300      Date of Blast: 12 12 11  
 Northing: 37° 59' 11 N      Blast Duration: 251 ms      Time of Blast: 11:42  
 Easting: 122° 27' 15 W      Blast Number: 1563

SEISMOGRAPH INFORMATION		UNIT #1		UNIT #2		UNIT #3	
Seismograph Model	2000	MICRO	MICRO	MICRO	MICRO		
Serial Number	2481	4570	4261	4570	4570		
Last Calibration Date	5 24 11	5 26 11	5 26 11	5 26 11	5 26 11		
<b>LOCATION INFORMATION</b>							
Location		Vertical Station	Station Elev	Station Elev	Station Elev	Station Elev	Station Elev
Northing	37° 59' 11 N	37° 59' 18 N	37° 59' 31 N	37° 59' 30 N	37° 59' 30 N		
Easting	122° 27' 22 W	122° 27' 53	122° 27' 30 W	122° 27' 16 W	122° 27' 16 W		
Distance from Blast	950	3062	2376	1901	1901		
Scaled Distance	54	176	137	109	109		
<b>VIBRATION INFORMATION</b>							
Longitudinal Peak Particle Velocity (ips)	.12	/					
Longitudinal Peak Frequency (Hz)	23.8	/					
Transverse Peak Particle Velocity (ips)	.08	/					
Transverse Peak Frequency (Hz)	217	/					
Vertical Peak Particle Velocity (ips)	.09	/					
Vertical Peak Frequency (Hz)	217	/					
Peak Vector Sum (ips)	.13	/					
Peak Air Overpressure (db)	114	/					
<b>GENERAL COMMENTS</b>							

Seismograph Operator: Deon Lopez      Signature: [Signature]



# SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA:**

Location: BB-7 lower      Designed Bench Height (ft): 32      Date: 12-12-11  
 Northing: 37° 59' 11 N      Rock Density (lb/ft<sup>3</sup>): 2.7      Time: 11:42  
 Easting: 122° 27' 15 W      Relative Rock Hardness: 7      Blast Number: 1563

**DESIGN DATA:**

Number of Holes Shot: 35      Hole Dia (in.): 3 1/4 - 3 1/2      Stemming (ft): 16      Loading Time Required (man hrs): 7      Deck Type: ---  
 Ave. Hole Depth (ft): 37 ± 1'      Burden (ft): 14      Stem Type: 3/4" + 3/8"      Staggered Pattern (y or n): N      Length (ft): ---  
 Relative Confinement: ---      Spacing (ft): 15      Subdrill (ft): 2      Number of Lost Holes: 0      Tons Shot: 11,985

**EXPLOSIVES DATA:**

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units	Max (lb/hole)
<u>Pitco 1000</u>	<u>9420</u>		<u>54</u>	<u>8082</u>	<u>88</u>	<u>1003</u>	<u>7</u>	<u>300</u>
<u>Dyno AP 2 1/2 x 15</u>	<u>* 78</u>		<u>23</u>	<u>5082</u>	<u>27</u>			<u>35 lbs</u>
				<u>42MS</u>	<u>3</u>			
				<u>17MS</u>	<u>8</u>			
								<u>Total Charge Wt.: 7570</u>

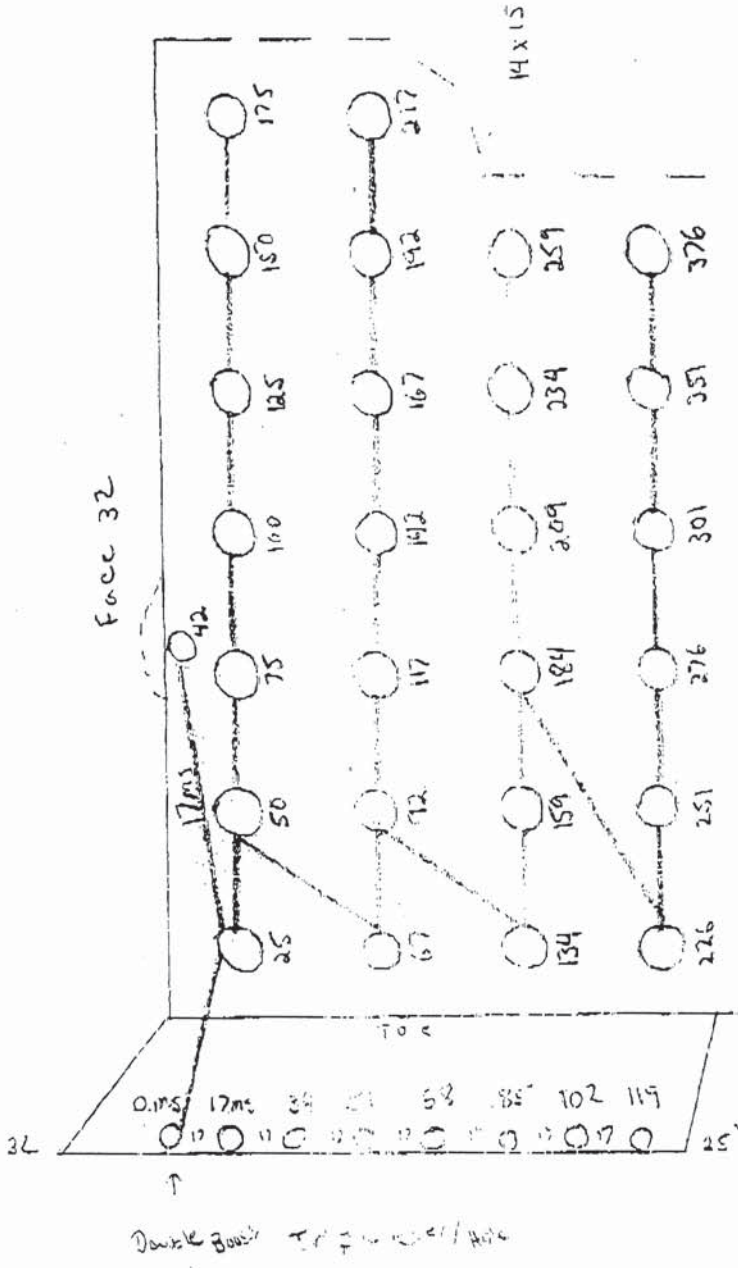
**VIBRATION DATA:**

Nearest Structure: Maria's      Seismograph Loc.: Same      Temperature: 52°      Max. Chrg. (lb/8ms): 300  
 Northing: 37° 59' 19 N      Nothing: ---      Sky Condition: overcast      RPPV: .13  
 Easting: 122° 27' 22 W      Easting: ---      Wind Direction: NW      Frequency: 23.8  
 Distance Away: 950      Distance Away: ---      Wind Speed: 0-5      Airblast: 114

**PERFORMANCE DATA:**

Powder Factor (lb/ton): .5      Displacement: good      Crushability: ---  
 Lb/yard<sup>3</sup>: 1.2      Vibration: Good      Fines: ---  
 Fragmentation: good      Dig ability: ---  
 Comments: 8-3 1/2 snake holes on left side      Blaster in Charge: Rm dejes

12.12.11  
 PB7 lower  
 #1563



Face 32

4x15

main 950  
 via M 3062  
 SM 2376  
 M<sup>N</sup> 1901  
 37° 59' 11" N  
 122° 27' 15" W

Depth 34  
 1/2 5/8 inches  
 300 lbs force per

27 Hole  
 27 = 80' E2  
 27 = 50' E2  
 3 = 42 MS  
 1 = 17 MS  
 54 = 150 gram

# 7420 Titan 1000

26 0ms 12ms 25 50 75 100 125 150 175 226 251 276 301 326 351 376 25'

Double Boss

3 1/2 in. Groove Holes 410° 14.5°  
 8 Holes

1 = 80' E2  
 7 = 16 MS  
 7 = 17 MS E2TL  
 78 = 16 2 1/2 x 16 Dyko AP  
 3 sticks per hole  
 23 = 350 gram

Appl. Road

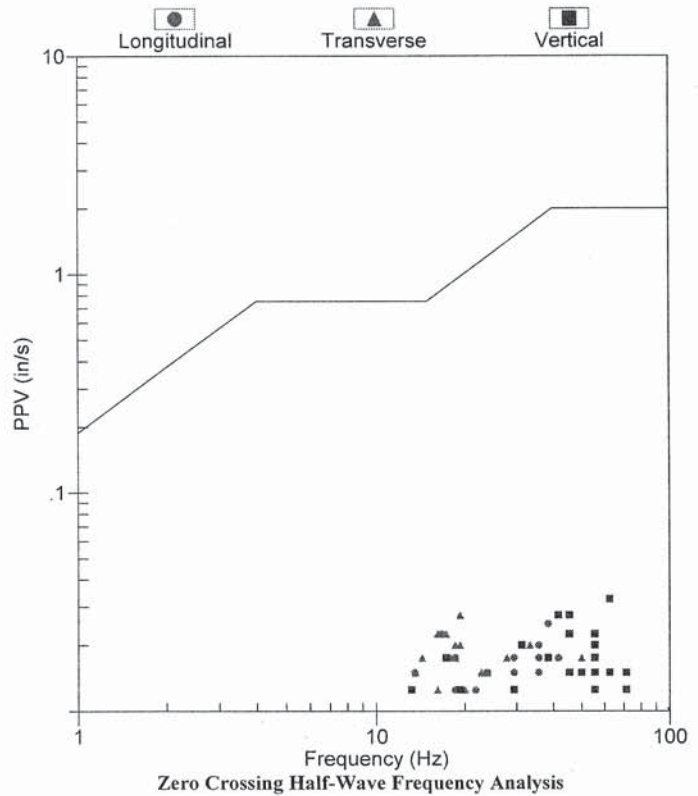
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 7155 v3.23  
**Date:** 12/12/2011 11:44:58 (UTC-8)  
**Event No:** 10  
**Record Time:** 5.0 s  
**Client:** COUNTY OF MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** 16 MARIN BAY PARK CT.  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:** WILLIAM HOSKEN RESIDENC  
**Seismic Trigger:** 0.030 in/s

### USBM Safe Blasting Levels

SN: 7155 Event: 10



	Summary Data		
	L	T	V
PPV (in/s)	0.025	0.028	0.038
FREQ (Hz)	38.5	19.2	33.3
PD (.001")	0.17	0.26	0.20
PPA (g)	0.020	0.020	0.039
Peak Vector Sum :	0.040 in/s		
Peak Air Pressure:	107 db		
	0.00070 PSI @ 1.2 Hz		

**Additional Info:**

j-GEO-01252  
N37 59.524, W122 27.373

**Shaketable Calibrated:** 01/26/2011

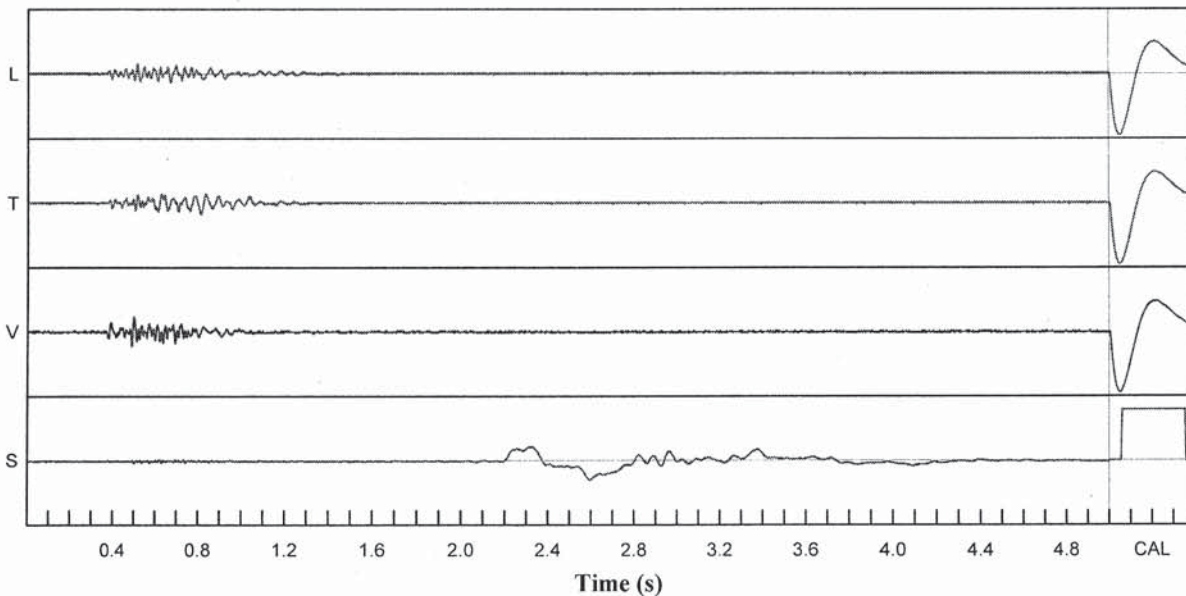
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40299 U.S.A.  
 TEL: 502.240.9900 FAX: 502.240.9902

**Velocity Waveform Graph Scale**

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

### Velocity Waveform

SN: 7155 Event: 10





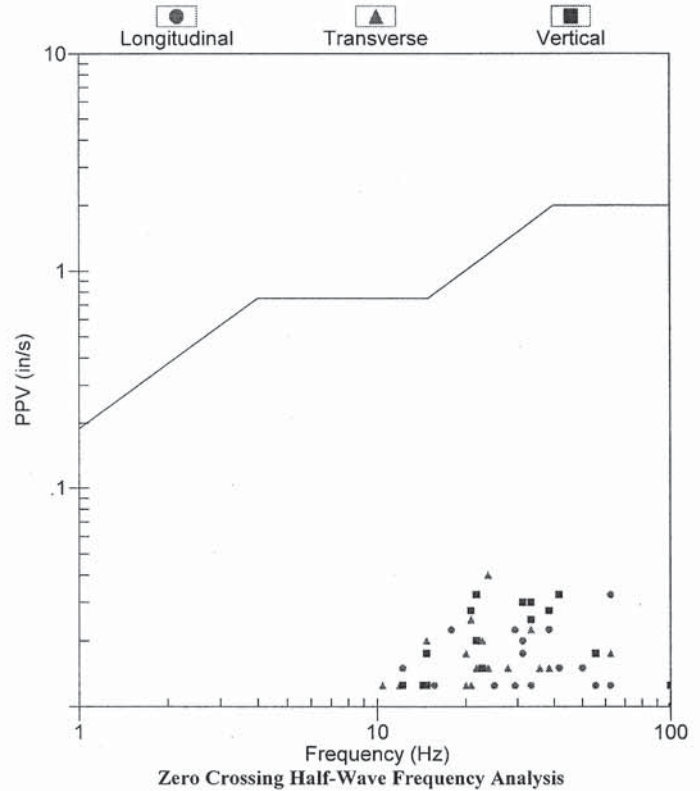
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 9856 v3.23  
**Date:** 12/12/2011 11:44:59 (UTC-8)  
**Event No:** 9  
**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: 9



	Summary Data		
	L	T	V
PPV (in/s)	0.033	0.040	0.040
FREQ (Hz)	62.5	23.8	41.7
PD (.001")	0.18	0.35	0.27
PPA (g)	0.039	0.026	0.039
Peak Vector Sum :	0.050 in/s		
Peak Air Pressure:	107 db		
	0.00070 PSI @ 2.6 Hz		

**Additional Info:**

j-GEO-01253  
N37 59.481, W122 27.256

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

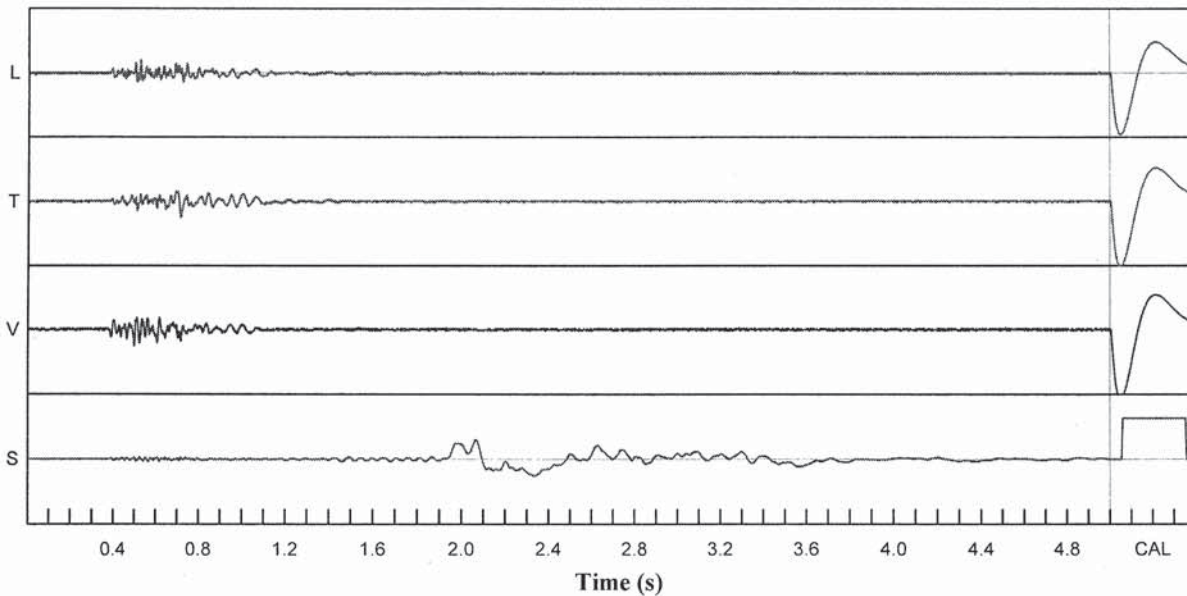
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40299 U.S.A.  
 TEL: 502.240.9900 FAX: 502.240.9902

**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: 9



# 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:** 12/12/2011 07:00:50 (UTC-8)  
**End Date:** 12/12/2011 12:28:58 (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:** 8.9

### 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 December 12, 2011 at approximately 11:44 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.