

# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: PB-7      Max. Charge Weight: 400      Date of Blast: 7-1-11  
 Northing: 37° 59' 10 N      Blast Duration: 495ms      Time of Blast: 12:35  
 Easting: 122° 27' 16 W      Blast Number: 1551

SEISMOGRAPH INFORMATION		UNIT	UNIT	UNIT
Seismograph Model:	2000	Micro	Micro	Micro
Serial Number	2481	4550	4567	4570
Last Calibration Date	5/11/11	5/26/11	5/26/11	5/26/11

LOCATION INFORMATION		UNIT	UNIT	UNIT
Location	Marin ag	Via Montebello	San Marin	M <sup>c</sup> Near Park
Northing	37° 59' 19 N	37° 59' 13 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	1056	875	2487	2165
Scaled Distance	53	155	124	108

VIBRATION INFORMATION		UNIT	UNIT	UNIT
Longitudinal Peak Particle Velocity (ips)	.16	.08		
Longitudinal Peak Frequency (Hz)	17.2	11.9		
Transverse Peak Particle Velocity (ips)	.11	.09		
Transverse Peak Frequency (Hz)	30.0	16.6		
Vertical Peak Particle Velocity (ips)	.12	.08		
Vertical Peak Frequency (Hz)	20	16.1		
Peak Vector Sum (ips)	.16	.11		
Peak Air Overpressure (db)	114	107		

GENERAL COMMENTS:

Seismograph Operator: Deron Lopez      Signature: [Signature]

# SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA:**

Location: PB-7      Designed Bench Height (ft): 40      Date: 7-1-14  
 Northing: 37° 59' 10 N      Rock Density (lb./ft.<sup>3</sup>): 7      Time: 12:35  
 Easting: 122° 27' 16 W      Relative Rock Hardness: 2.7      Blast Number: 1551

**DESIGN DATA:**

Number of Holes Shot: 30      Hole Dia. (in.): 6 3/4      Stemming (ft): 17      Loading Time Required (min hrs): 6      Deck Type: -  
 Ave. Hole Depth (ft): 613      Burden (ft): 15      Stem Type: 3/4" S.H.S.      Staggered Pattern (y or n): Y      Length (ft): -  
 Relative Confinement: -      Spacing (ft): 16      Subdrill (ft): 3      Number of Lost Holes: 10      Tons Shot: 28,860

**EXPLOSIVES DATA:**

Bulk Explosive	Weight	Boosters	Units	Delays	Misc.	Units
Titan 1000 G	11,800	450g	60	80' 22' 1	30	
				50' 22' 1	30	
				42AS 5216	9	
				Dns 221	3	
						Max (lb./hole): <u>400</u>
						Blast Duration (sec): <u>415 fls</u>
						Total Charge WL: <u>11,860</u>

**VIBRATION DATA:**

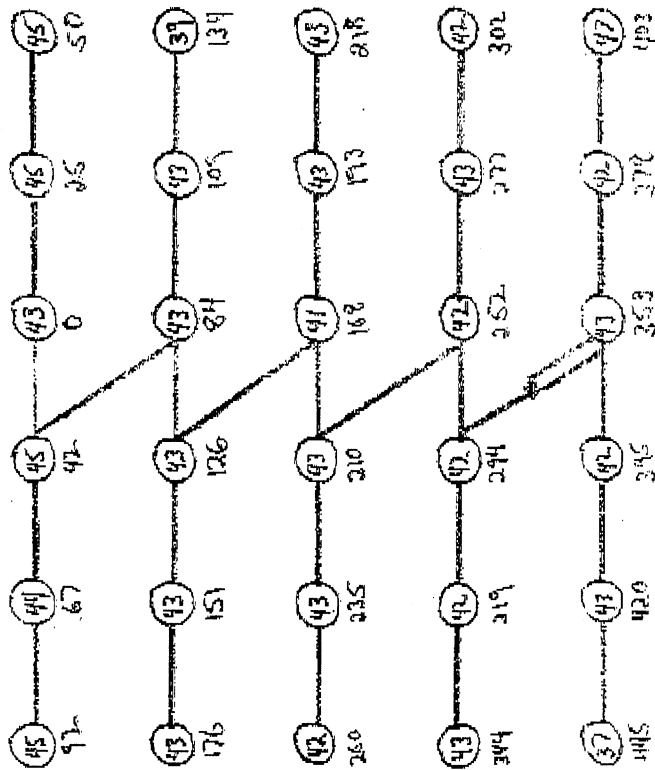
Nearest Structure: 1000' 200'      Seismograph Loc.: 1000'      Temperature: 80°      Max. Chrg. (lb./8ins): 1100  
 Northing: 37° 59' 10 N      Easting: 122° 27' 16 W      Sky Condition: clear      RPPV: 16  
 Distance Away: 1056      Wind Direction: N.E.      Frequency: 60      Airblast: 114

**PERFORMANCE DATA:**

Powder Factor (lb./ton): 64      Displacement: -      Crushability: -  
 Libbyrd<sup>3</sup>: 112      Vibration: 600d      Fines: -  
 Fragmentation: good      Dig ability: -  
 Comments: -      Blaster in Charge: R. M. Joffe

7-1-11  
P.B-7  
#1551

Face



30 holes  
30-80'EZ  
30-50'EZ  
9-42ms  
3-17ms  
60-450 gram  
11,800 lbs. fitment

depth 43-45 actual 37-46  
17<sup>ft</sup> stemming  
400 lbs per

lock plug 10' from 10'  
@ hole 134ms

Main 10266  
Via Mond 2115  
Scam 2487  
M/N 2165  
3789 10M  
122.33 16W

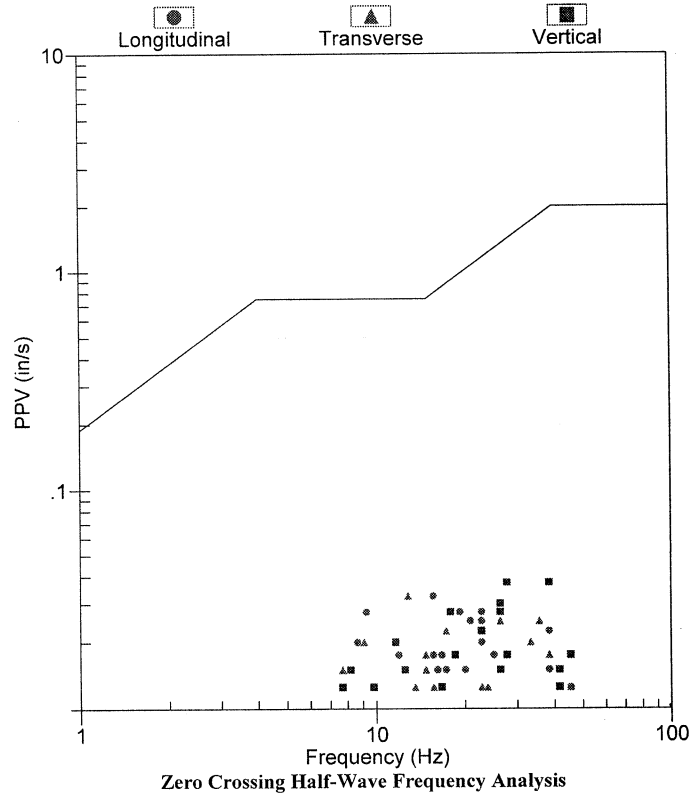
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 7155 v3.23  
**Date:** 07/01/2011 12:33:56 (UTC-7)  
**Event No:** 3  
**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: 3



	Summary Data		
	L	T	V
PPV (in/s)	0.033	0.033	0.038
FREQ (Hz)	15.6	12.8	27.8
PD (.001")	0.33	0.29	0.30
PPA (g)	0.020	0.020	0.026
Peak Vector Sum :	0.040 in/s		
Peak Air Pressure:	109 db		
	0.00082 PSI @ 3.3 Hz		

**Additional Info:**

j-GEO-01252  
N37 59.524, W122 27.373

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

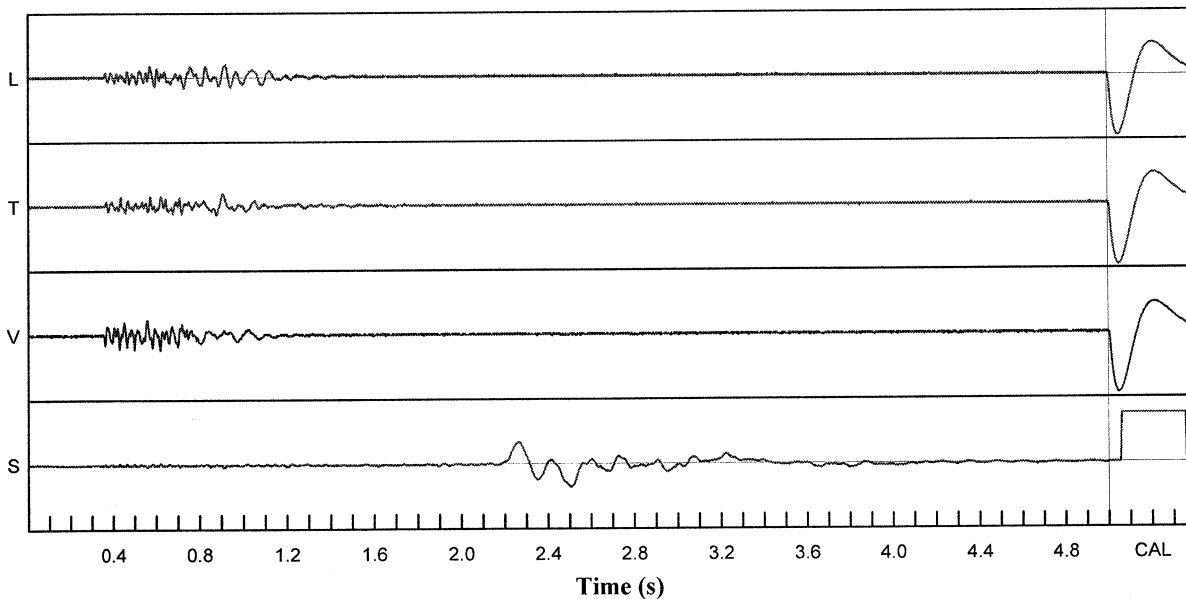
By: Vibra-Tech, Inc.  
2700 Holloway Road - Suite 113  
Louisville, KY 40299 U.S.A.  
TEL: 502.240.9900 FAX: 502.240.9902

**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: 3



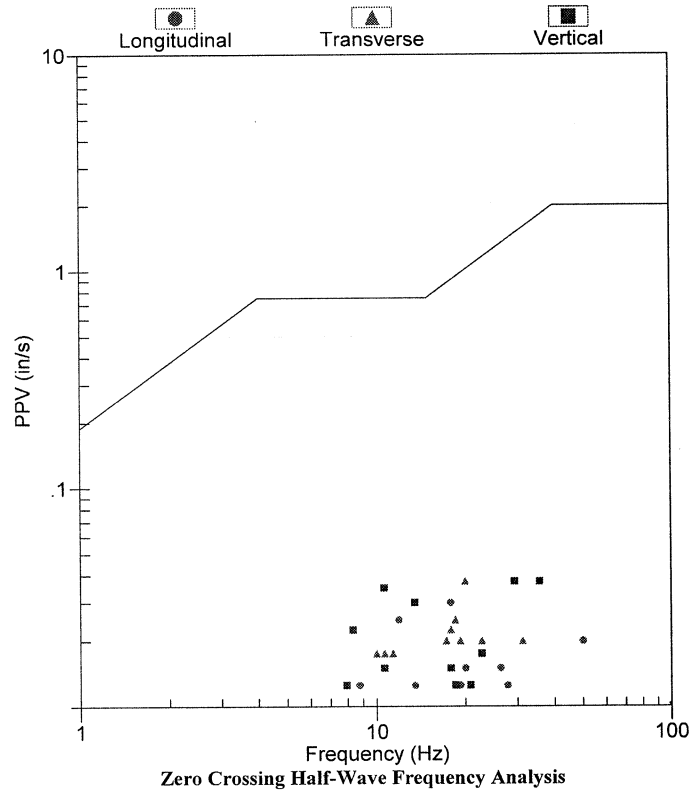
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 9856 v3.23  
**Date:** 07/01/2011 12:33:56 (UTC-7)  
**Event No:** 3  
**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: 3



	Summary Data		
	L	T	V
PPV (in/s)	0.030	0.038	0.038
FREQ (Hz)	17.9	20.0	12.8
PD (.001")	0.39	0.35	0.46
PPA (g)	0.020	0.020	0.033
Peak Vector Sum :	0.048 in/s		
Peak Air Pressure:	112 db		
	0.00118 PSI @ 3.9 Hz		

**Additional Info:**

j-GEO-01253  
 N37 59.481, W122 27.256

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

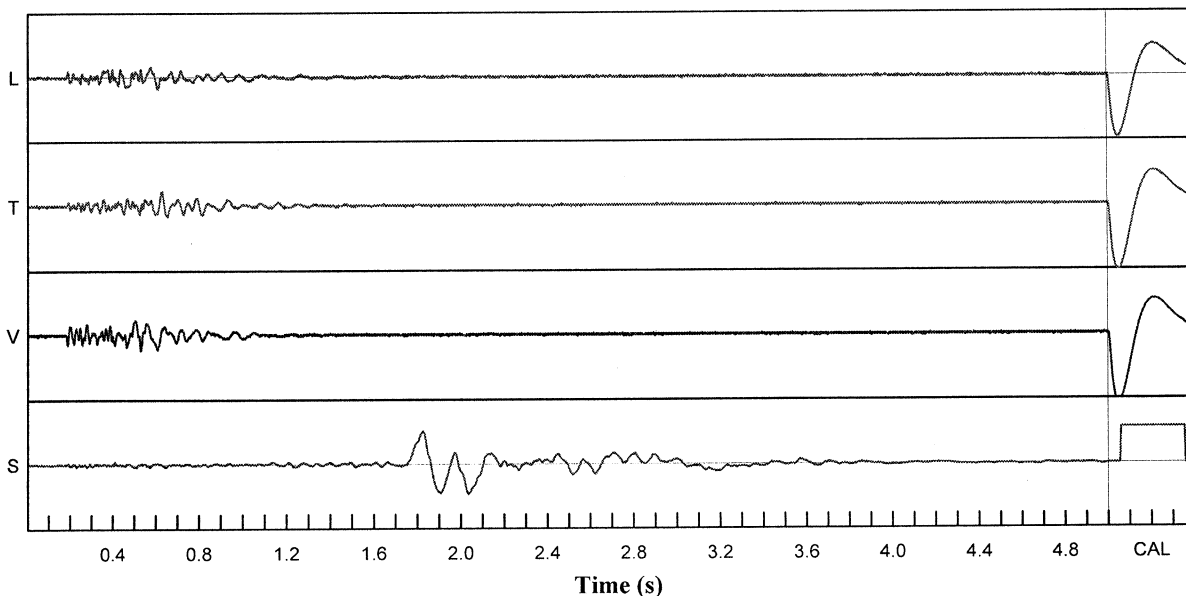
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40299 U.S.A.  
 TEL: 502.240.9900 FAX: 502.240.9902

**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: 3



# 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:** 07/01/2011 07:00:50 (UTC-7)  
**End Date:** 07/01/2011 13:44:52 (UTC-7)  
**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:

<b>Longitudinal:</b>	<b>Pass</b>
<b>Transverse:</b>	<b>Pass</b>
<b>Vertical:</b>	<b>Pass</b>
<b>Sound:</b>	<b>Pass</b>

The seismograph at 114 San Marino Drive (S/N 9669) did not trigger during the shot on July 1, 2011 at approximately 12:34 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.