

# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: PB-7      Max. Charge Weight: 200      Date of Blast: 9.7.11  
 Northing: 37°59'11 N      Blast Duration: 351 ms      Time of Blast: 11:31  
 Easting: 122°27'17 W      Blast Number: 1555

Seismograph Model	Serial Number	Last Calibration Date	micro	micro	micro
2000	2481		4550	4567	4570
Location	Micro	Micro	Micro	Micro	Micro
Marin Ag	San Marino	M' near Park			
37°59'14 N	37°59'31 N	37°59'30 N			
122°27'22 W	122°27'30 W	122°27'16 W			
1003	3010	2054			
70	212	168			415
Distance from Blast					
Scaled Distance					

Longitudinal Peak Particle Velocity (ips)	.09	.07	.06
Longitudinal Peak Frequency (Hz)	9.6	0.6	11.6
Transverse Peak Particle Velocity (ips)	.15	.08	.04
Transverse Peak Frequency (Hz)	18.5	0.6	16.1
Vertical Peak Particle Velocity (ips)	.16	.07	.06
Vertical Peak Frequency (Hz)	12.1	8.7	20.8
Peak Vector Sum (ips)	.20	0	.08
Peak Air Overpressure (db)	112	106	106

Seismograph Operator: Teron Lopez      Signature: [Signature]

# SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA**

Location: PB-7      Designed Bench Height (ft): 40      Date: 9.7.11  
 Northing: 37°59'11W      Rock Density (lb/ft<sup>3</sup>): 2.7      Time: 11:31  
 Easting: 122°27'17W      Relative Rock Hardness: 7      Blast Number: 1555

**DESIGN DATA**

Number of Holes Shot: 21      Hole Dia. (in.): 6 3/4      Stemming (ft): 15      Loading Time Required (man hrs): 8      Deck Type: 3/4" stone  
 Ave. Hole Depth (ft): 43      Burden (ft): 15      Stem Type: 1/4" stone      Staggered Pattern (y or n): N      Length (ft): 5  
 Relative Confinement: -      Spacing (ft): 16      Subdrill (ft): 3      Number of Lost Holes: 0      Tons Shot: 20.10

**EXPLOSIVES DATA**

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units
Titan 1000	7900	450 gram	42	80' E2	21		
				50' E2	21		
				42ms E2TL	5		

Max (lb/hole): 380  
 Blast Duration (sec): 351 ms

**VIBRATION DATA**

Nearest Structure: Marina      Seismograph Loc.: Same      Temperature: 78°      Max. Chrg. (lb/8ms): 360  
 Northing: 37°59'19N      Northing: \_\_\_\_\_      Sky Condition: Clear      RPPV: 20  
 Easting: 122°27'22W      Easting: \_\_\_\_\_      Wind Direction: SE      Frequency: 18.5  
 Distance Away: 1003      Distance Away: \_\_\_\_\_      Wind Speed: 0-1      Airblast: 112

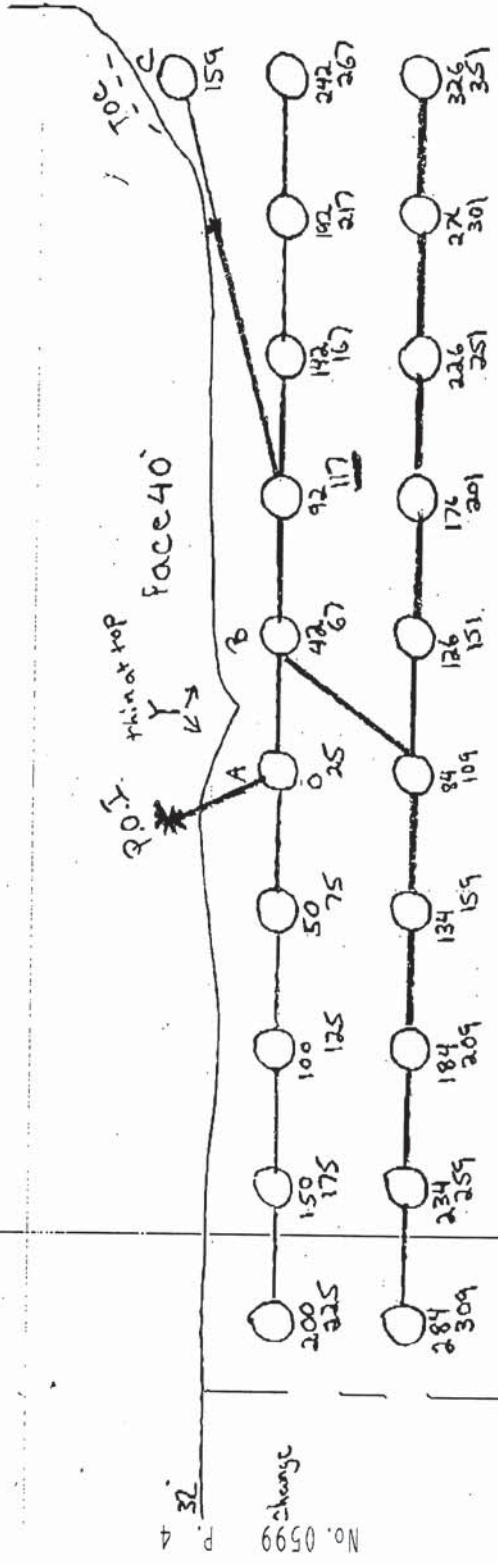
**PERFORMANCE DATA**

Powder Factor (lb/ton): 1.06      Displacement: good      Crushability: \_\_\_\_\_  
 Lb/yard<sup>3</sup>: 3      Vibration: Collect      Fines: \_\_\_\_\_  
 Fragmentation: good      Dig ability: \_\_\_\_\_  
 Comments: Deck loaded      Blaster in Charge: [Signature]



9.7.11  
PB.7  
#1555

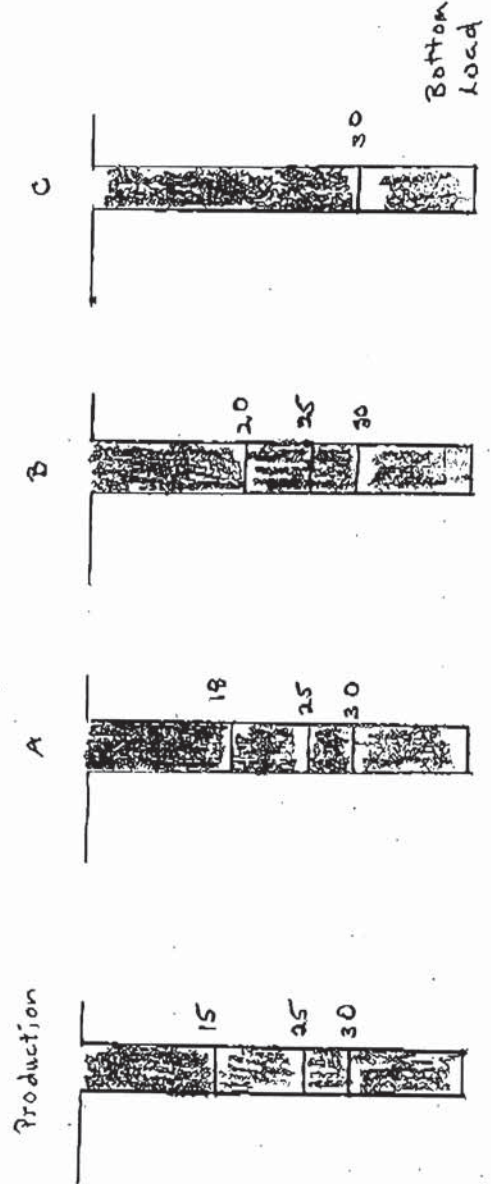
15 x 16



20.5  
thin at top  
A  
B  
C

depth 43  
Main 1003  
Via M 3010  
Scan M 2376  
M Near 2059  
37°S 911N  
122° 27 17 W

21=Holes  
21=80 E2 det  
21=50 E2 det  
S=42ms E2TL  
42=450 gram  
#7,900 Ti Tan



change  
P 32  
No. 0599

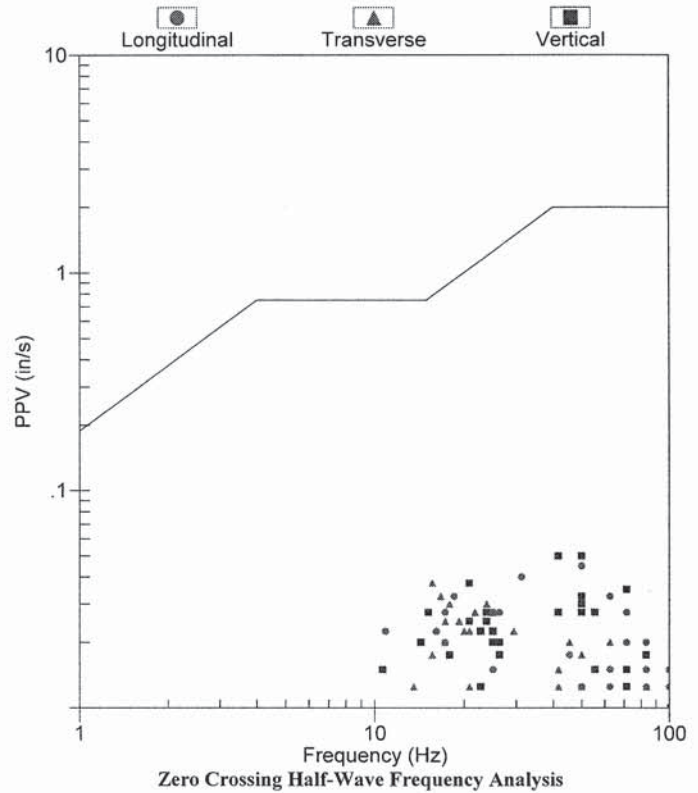
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 9856 v3.23  
**Date:** 09/07/2011 11:31:07 (UTC-7)  
**Event No:** 4  
**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: 4



	Summary Data		
	L	T	V
PPV (in/s)	0.045	0.038	0.050
FREQ (Hz)	50.0	15.6	41.7
PD (.001")	0.29	0.34	0.40
PPA (g)	0.039	0.026	0.046
Peak Vector Sum :	0.058 in/s		
Peak Air Pressure:	108 db		
	0.00078 PSI @ 2.2 Hz		

**Additional Info:**

j-GEO-01253  
N37 59.481, W122 27.256

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

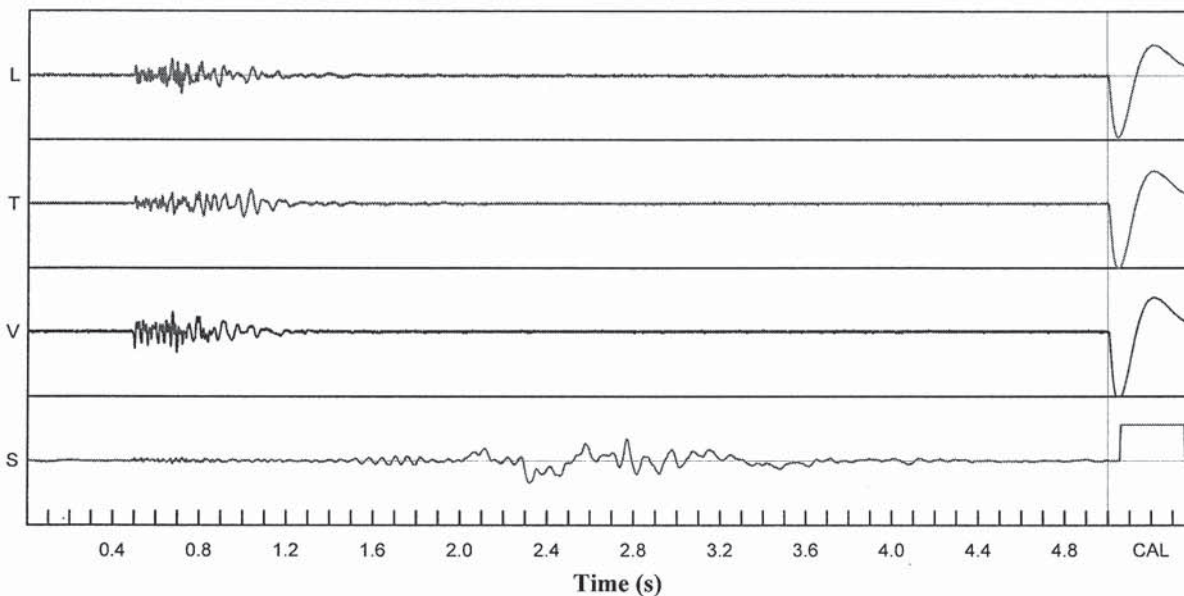
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40299 U.S.A.  
 TEL: 502.240.9900 FAX: 502.240.9902

**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: 4



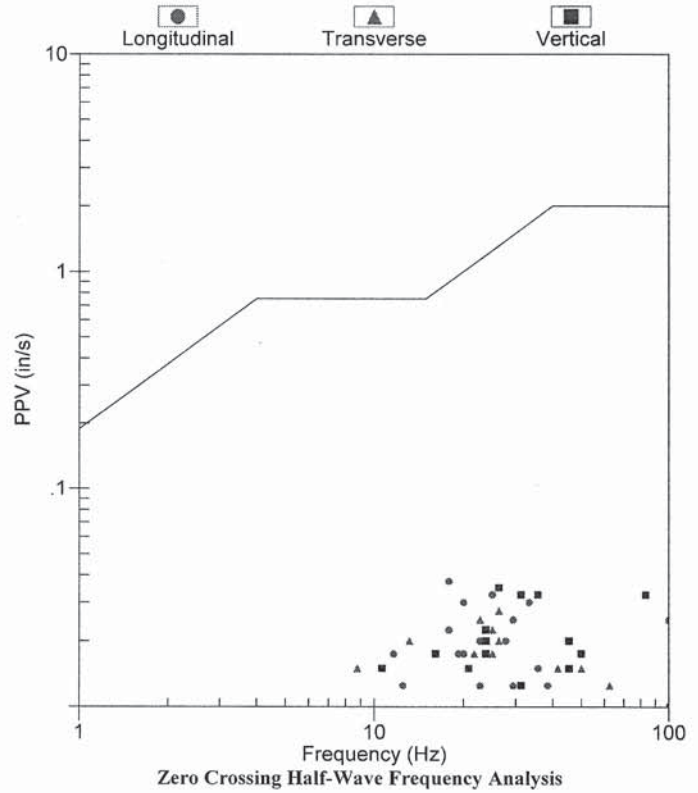
# Seismic Analysis

## Velocity Waveform Analysis

**Serial No:** 7155 v3.23  
**Date:** 09/07/2011 11:31:04 (UTC-7)  
**Event No:** 5  
**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: 5



	Summary Data		
	L	T	V
PPV (in/s)	0.038	0.028	0.038
FREQ (Hz)	17.9	26.3	35.7
PD (.001")	0.29	0.21	0.22
PPA (g)	0.020	0.026	0.033
Peak Vector Sum :	0.050 in/s		
Peak Air Pressure:	104 db		
	0.00052 PSI @ 2.1 Hz		

**Additional Info:**

j-GEO-01252  
N37 59.524, W122 27.373

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

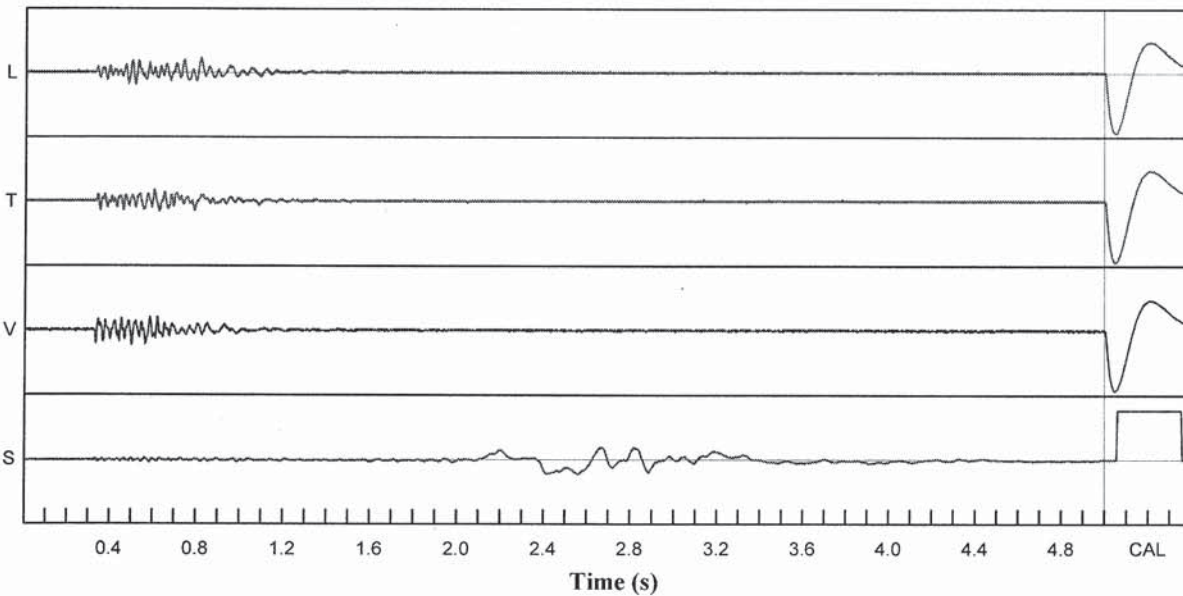
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40299 U.S.A.  
 TEL: 502.240.9900 FAX: 502.240.9902

**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: 5



# 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:** 09/07/2011 07:00:50 (UTC-7)  
**End Date:** 09/07/2011 12:22:31 (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:** 8.9

### 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:

<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 September 7, 2011 at approximately 11:31 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.