

# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: PB-8      Max. Charge Weight: 500      Date of Blast: 9 26 12  
 Northing: 37° 59' 10 N      Blast Duration: 3.19 ms      Time of Blast: 11:32  
 Easting: 122° 27' 14 W      Blast Number: 1587

Seismograph Model	Serial Number	Last Calibration Date	Micro	Micro	Micro
2000	4181	5 17 12	4550	450	4676
			5 17 12	5 17 12	5 17 12

Location	North	East	Scale	Scale	Scale
37° 59' 10 N	122° 27' 14 W	103	37° 59' 31 N	122° 27' 30 W	103
122° 27' 14 W	122° 27' 14 W	103	122° 27' 30 W	122° 27' 30 W	103
412	412	103	127	103	87

VIBRATION INFORMATION	
Longitudinal Peak Particle Velocity (ips)	0.14
Longitudinal Peak Frequency (Hz)	30.0
Transverse Peak Particle Velocity (ips)	0.29
Transverse Peak Frequency (Hz)	30.0
Vertical Peak Particle Velocity (ips)	0.37
Vertical Peak Frequency (Hz)	30.0
Peak Vector Sum (ips)	0.39
Peak Air Overpressure (db)	120

Seismograph Operator: Veron Lopez      Signature: Veron Lopez

# SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA:**

Location: PB-8      Date: 9 26 12  
 Northing: 37° 54 10 N      Time: 11:32  
 Easting: 122° 20 19 W      Blast Number: 1587  
 Designed Bench Height (ft): 45  
 Rock Density (t/yard<sup>3</sup>): 2.22  
 Relative Rock Hardness: 7

**DESIGN DATA:**

Number of Holes Shot: 11      Hole Dia. (in.): 6 3/4      Loading Time Required (min hrs): 6      Deck Type: \_\_\_\_\_  
 Ave. Hole Depth (ft): 48      Burden (ft): 15      Stemming (ft): 18      Staggered Pattern (y or n): N      Length (ft): \_\_\_\_\_  
 Relative Confinement: \_\_\_\_\_      Spacing (ft): 16      Subdrill (ft): 3      Number of Lost Holes: 0      Tons Shot: 16948

**EXPLOSIVES DATA:**

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units	Max (lb/hole):	Blast Duration (sec):
Titan 10000	3860	450 gao	12	80 det	11			500	219
				50 det	11				
				42 det	7				

**VIBRATION DATA:**

Nearest Structure: Highway      Temperature: 71      Max. Chrg. (lb/8ms): 300      Total Charge Wt.: 3890  
 Northing: 37° 54 10 N      Sky Condition: Cloudy      RPPV: 2.5  
 Easting: 122° 20 19 W      Wind Direction: S      Frequency: \_\_\_\_\_  
 Distance Away: 150      Wind Speed: 5-10 mph      Airblast: 20

**PERFORMANCE DATA:**

Powder Factor (lb/ton): 5      Displacement: great      Crashability: \_\_\_\_\_  
 l./yard<sup>3</sup>: 1.25      Vibration: great      Fines: \_\_\_\_\_  
 Fragmentation: great      Dig ability: \_\_\_\_\_  
 Comments: \_\_\_\_\_      Blaster in Charge: [Signature]

Change

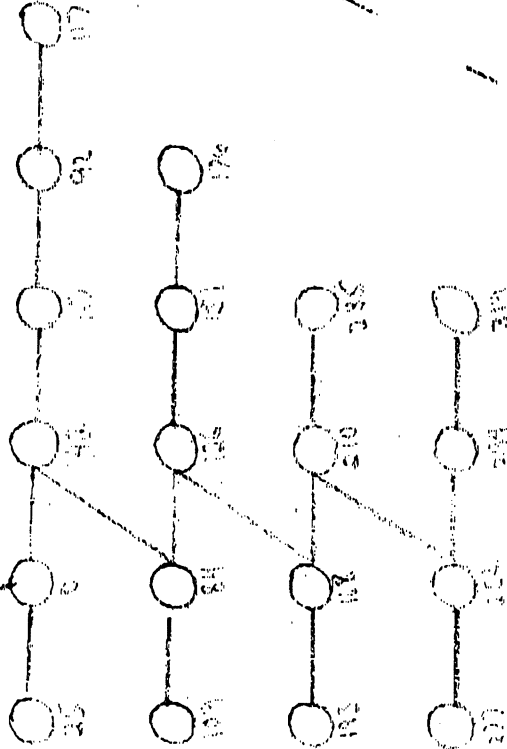
PB-9 Floor

9 26 12

PB-8  
#1587

POI

Face 45'



High Low

14 Holes  
16 to 165  
PB-8  
7-42-12  
38-450 (w)

8860 lbs Titan

depth 108

500 lbs per  
6 string

1000 lbs per 10 ft

Mo. 450  
PB-8 2301  
Sant 2325  
W-M 1954

3759 10 M  
121° 27' RW

# Seismic Analysis Velocity Waveform Analysis

**Serial Number:** 8056  
**Firmware Version:** 08-03.23  
**Event Date:** 09/26/2012 11:31:58 (UTC -07:00)  
**Event number:** 6  
**Recording Time:** 5 s  
**Client:** COUNTY OF MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** 16 MARIN BAY PARK CT.  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:** WILLIAM HOSKEN RES.  
**Seismic Trigger:** 0.03 in/s  
**Sound Trigger:** 75.9 DB

**Additional Info:**

j-GEO-01252  
 N37 59.524, W122 27 373

**Summary Data**

	L	T	V
PPV (in/s):	0.0725	0.055	0.0925
FREQ (HZ):	33.3	45.5	45.5
PD (.001"):	0.36	0.3	0.3425
PPA (g):	0.04557	0.04557	0.07812

**Peak Vector Sum:** 0.1 in/s  
**Peak Air Pressure:** 112.8 DB  
 0.001372 psi @ 2.1 HZ

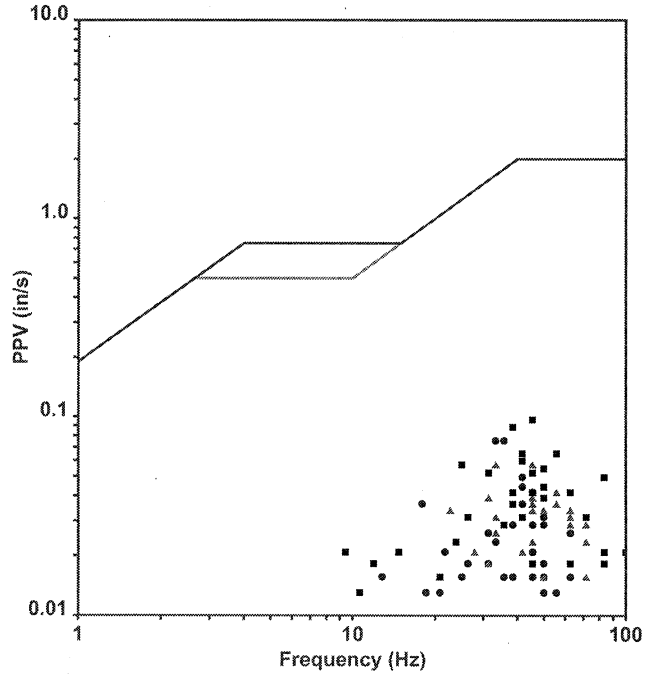
**Shaketable Calibrated**

**On:** 05/16/2012 (UTC -07:00)  
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40203 U.S.A.

**USBM Safe Blasting Levels**

SSN: 8056 Event: 6

● Longitudinal    ▲ Transverse    ■ Vertical



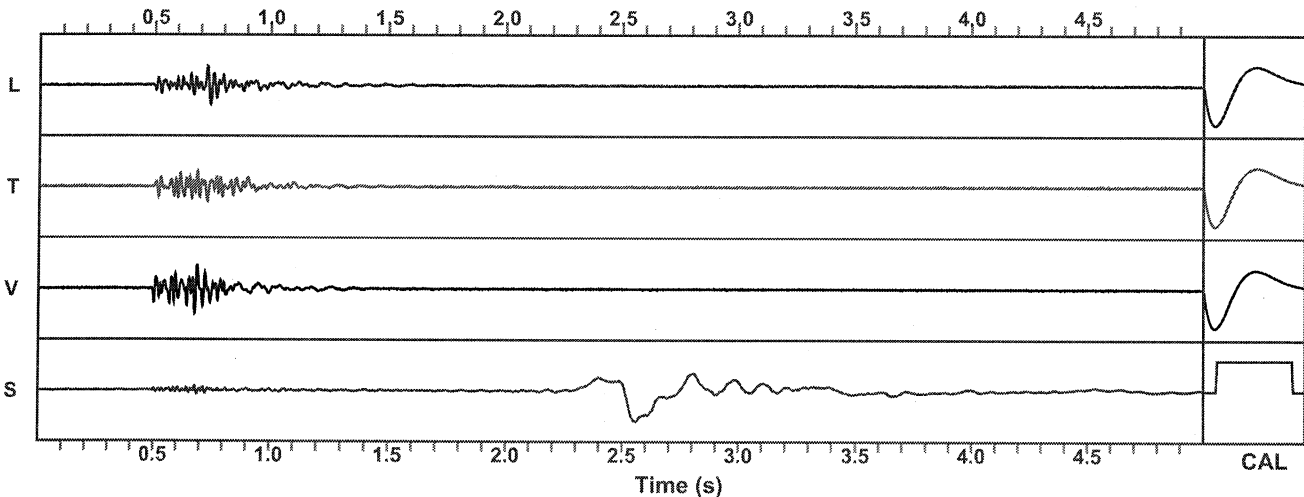
Zero Crossing Half-Wave Frequency Analysis

**Waveform Graph Scale**

**Time Scale:** 0.1 s  
**Seismic Scale:** +/- 0.185 in/s  
**Sound Scale:** +/- 0.0023 psi

**Velocity Waveform**

SSN: 8056 Event: 6



# Seismic Analysis Velocity Waveform Analysis

**Serial Number:** 8021  
**Firmware Version:** 08-03.23  
**Event Date:** 09/26/2012 11:31:59 (UTC -07:00)  
**Event number:** 16  
**Recording Time:** 5 s  
**Client:** COUNTY OF MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** 114 SAN MARINO DRIVE  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:** VERONIQUE RASKIN\*  
**Seismic Trigger:** 0.03 in/s  
**Sound Trigger:** 75.9 DB

**Additional Info:** \*RESIDENCE  
 j-GEO-01254  
 N37 59.395, W122 27.700

### Summary Data

	L	T	V
PPV (in/s):	0.025	0.0375	0.0275
FREQ (HZ):	45.5	29.4	31.3
PD (.001"):	0.1825	0.2125	0.1875
PPA (g):	0.02604	0.01953	0.02604

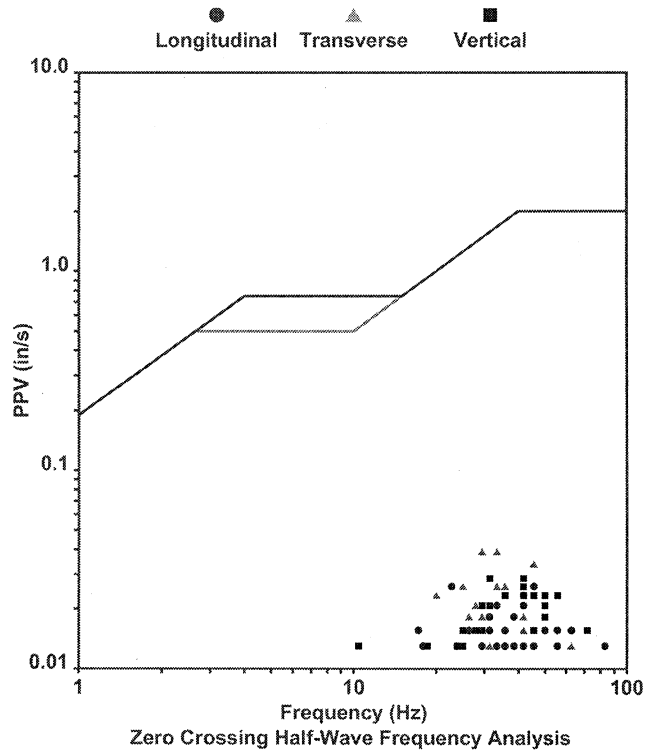
**Peak Vector Sum:** 0.0425 in/s  
**Peak Air Pressure:** 111.2 DB  
 0.001105 psi @ 3 HZ

### Shaketable Calibrated

**On:** 05/11/2012 (UTC -07:00)  
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40203 U.S.A.

### USBM Safe Blasting Levels

SSN: 8021 Event: 16

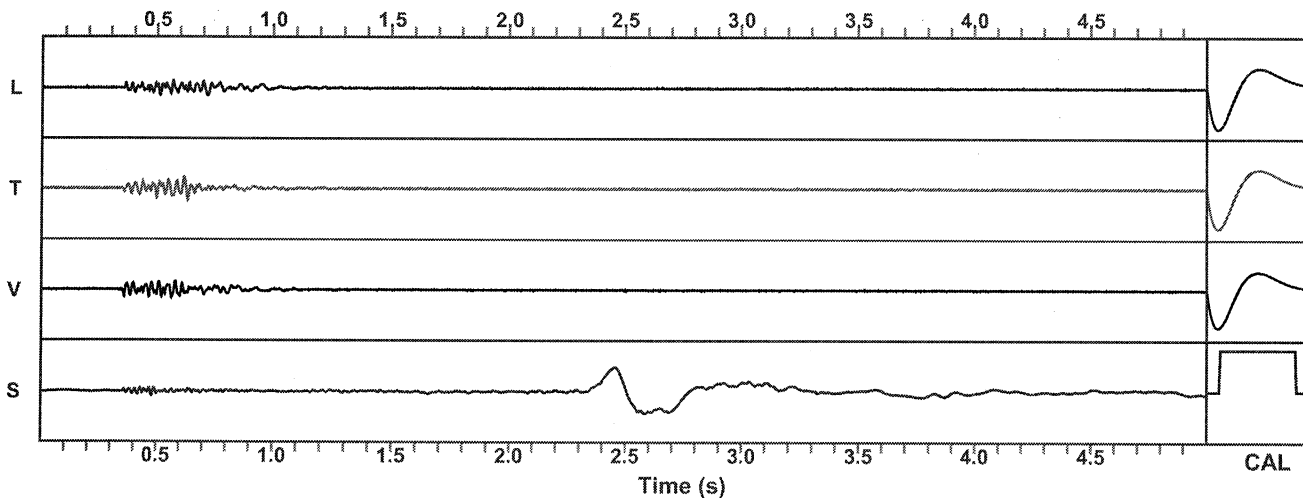


### Waveform Graph Scale

**Time Scale:** 0.1 s  
**Seismic Scale:** +/- 0.16 in/s  
**Sound Scale:** +/- 0.0023 psi

### Velocity Waveform

SSN: 8021 Event: 16



# Seismic Analysis Velocity Waveform Analysis

**Serial Number:** 8030  
**Firmware Version:** 08-03.23  
**Event Date:** 09/26/2012 11:31:58 (UTC -07:00)  
**Event number:** 8  
**Recording Time:** 5 s  
**Client:** COUNTY OF MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** ON QUARRY PROPERTY  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:**  
**Seismic Trigger:** 0.03 in/s  
**Sound Trigger:** 75.9 DB

**Additional Info:**  
 j-GEO-01253  
 N37 59.481, W122 27.256

### Summary Data

	L	T	V
PPV (in/s):	0.0875	0.0625	0.1
FREQ (HZ):	71.4	55.6	62.5
PD (.001"):	0.3175	0.385	0.4125
PPA (g):	0.09766	0.0651	0.09115

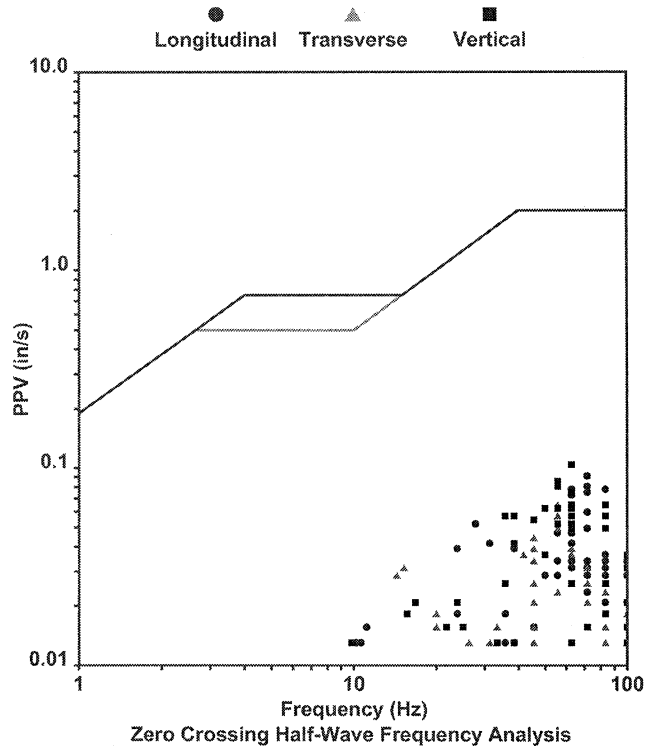
**Peak Vector Sum:** 0.125 in/s  
**Peak Air Pressure:** 114 DB  
 0.001568 psi @ 2.1 HZ

### Shaketable Calibrated

**On:** 05/14/2012 (UTC -07:00)  
**By:** Vibra-Tech, Inc.  
 2700 Holloway Road - Suite 113  
 Louisville, KY 40203 U.S.A.

### USBM Safe Blasting Levels

SSN: 8030 Event: 8



### Waveform Graph Scale

**Time Scale:** 0.1 s  
**Seismic Scale:** +/- 0.2 in/s  
**Sound Scale:** +/- 0.0023 psi

### Velocity Waveform

SSN: 8030 Event: 8

