

# SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: P.B-7      Max. Charge Weight: 420      Date of Blast: 6.29.12  
 Northing: 37° 59' 12 N      Blast Duration: 343ms      Time of Blast: 11:30  
 Easting: 12227.12 W      Blast Number: 1581

SEISMOGRAPH INFORMATION		UNIT		UNIT	
Seismograph Model	2000	Micro	Micro	Micro	Micro
Serial Number	2481	4550	4550	4570	4570
Last Calibration Date	5.17.12	5.17.12	5.17.12	5.17.12	5.17.12

LOCATION INFORMATION		UNIT		UNIT	
Location	Micro Dig	Via. Pionterbella	San. Marino Jr	M. W. Park	
Northing	37° 59' 12 N	37° 59' 18 N	37° 59' 31 N	37° 59' 30 W	
Easting	12227.22 W	12227.53 W	12227.30 W	12227.16 W	
Distance from Blast	1109	3326	2482	1848	
Scaled Distance	54	121	121	90	

VIBRATION INFORMATION		UNIT		UNIT	
Longitudinal Peak Particle Velocity (ips)	.06		.06		
Longitudinal Peak Frequency (Hz)	25.0		6.2		
Transverse Peak Particle Velocity (ips)	.04		.04		
Transverse Peak Frequency (Hz)	14.7		5.0		
Vertical Peak Particle Velocity (ips)	.04		.06		
Vertical Peak Frequency (Hz)	35.7		0.8		
Peak Vector Sum (ips)	.08		.08		
Peak Air Overpressure (db)	119		112		

**GENERAL COMMENTS**  
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 \_\_\_\_\_  
 \_\_\_\_\_

Seismograph Operator: Delmar Lopez      Signature: [Signature]

# SAN RAFAEL ROCK QUARRY BLAST REPORT

**BASE DATA:**

Location: PR-7      Designed Bench Height (ft): 40      Date: 6-29-12  
 Northing: 37°59'12N      Rock Density (lb/ft<sup>3</sup>): 2.23      Time: 11:30  
 Easting: 122°27'22W      Relative Rock Hardness: 7      Blast Number: 1581

**DESIGN DATA:**

Number of Holes Shot: 25      Hole Dia. (in.): 6 3/4      Loading Time Required (man hrs): 5      Deck Type: -  
 Ave. Hole Depth (ft): 43      Burden (ft): 15      Stem Type: 2 1/2" Stem      Staggered Pattern (y or n): N      Length (ft): -  
 Relative Confinement: -      Spacing (ft): 15      Subdrill (ft): 3      Number of Lost Holes: 0      Tons Shot: 10,583

**EXPLOSIVES DATA:**

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc	Units	Max (lb/ftole)	Blast Duration (sec)	Total Charge Wt.
Futura 1000	9940	450	50	9002	25			420	343	9990
				5002	25					
				42MS	4					

**VIBRATION DATA:**

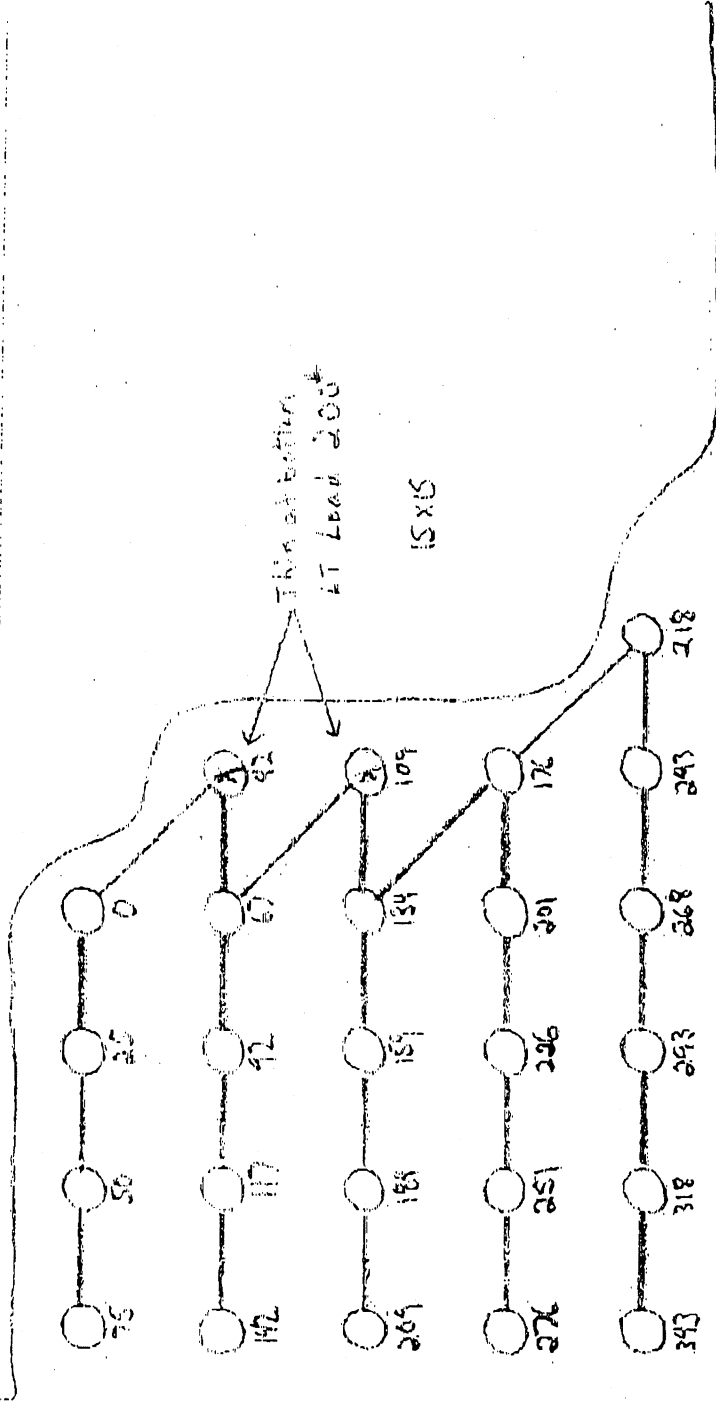
Nearest Structure: Marlin Dig      Seismograph Loc.: 50.115      Temperature: 78°      Max Chg. (lb/8ms): 420  
 Northing: 37°59'19N      Northing: -      Sky Condition: Clear      RPPV: .08  
 Easting: 122°27'22W      Easting: -      Wind Direction: S      Frequency: 35.7  
 Distance Away: 1109      Distance Away: -      Wind Speed: 2-5      Airblast: 119

**PERFORMANCE DATA:**

Powder Factor (lb/ton): .5      Displacement: Great      Crushability: -  
 Lb/yard<sup>3</sup>: 1.20      Vibration: Great      Fines: -  
 Fragmentation: Great      Dig ability: -  
 Comments: -      Blaster in Charge: R. Lopez

6.29.12  
 P.B.7  
 #1581

Face 40'



Main: 1109  
 Viam 3326  
 Sam M 2982  
 P.C.N 1898  
 30° 51' 12" N  
 122° 27' 12" W

Depth: 43  
 18 Stem  
 420 lbs per

25 Holes  
 25° 80' E Z det  
 25° 50' E Z det  
 41° 42ms E Z L  
 50° 450 gram  
 9,940 lbs titan

# Seismic Analysis

## Velocity Waveform Analysis

**Serial Number:** 8030  
**Firmware Version:** 08-03.23  
**Event Date:** 06/29/2012 11:30:34 (UTC -07:00)  
**Event number:** 3  
**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**

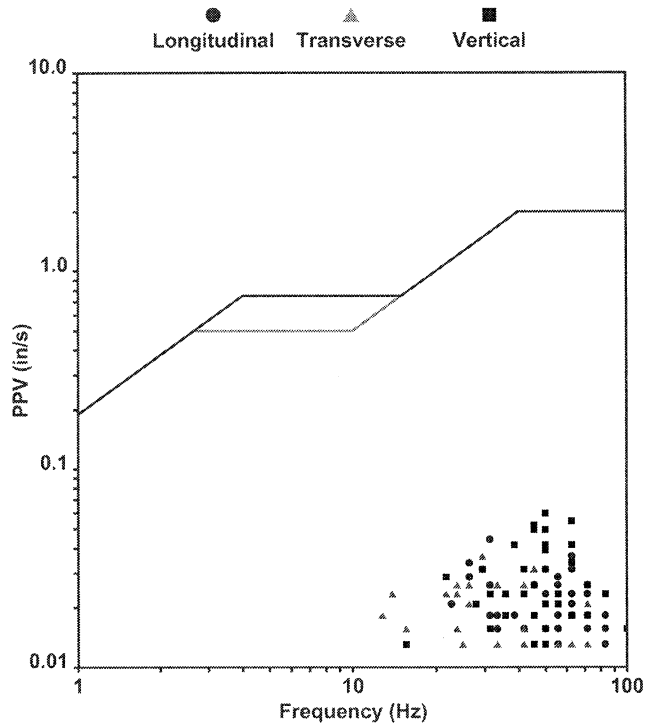
	L	T	V
PPV (in/s):	0.0425	0.035	0.0575
FREQ (HZ):	31.3	29.4	50
PD (.001"):	0.275	0.4575	0.21
PPA (g):	0.03906	0.02604	0.05859

**Peak Vector Sum:** 0.065 in/s  
**Peak Air Pressure:** 109.6 DB  
 0.0008733 psi @ 3.5 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: 3



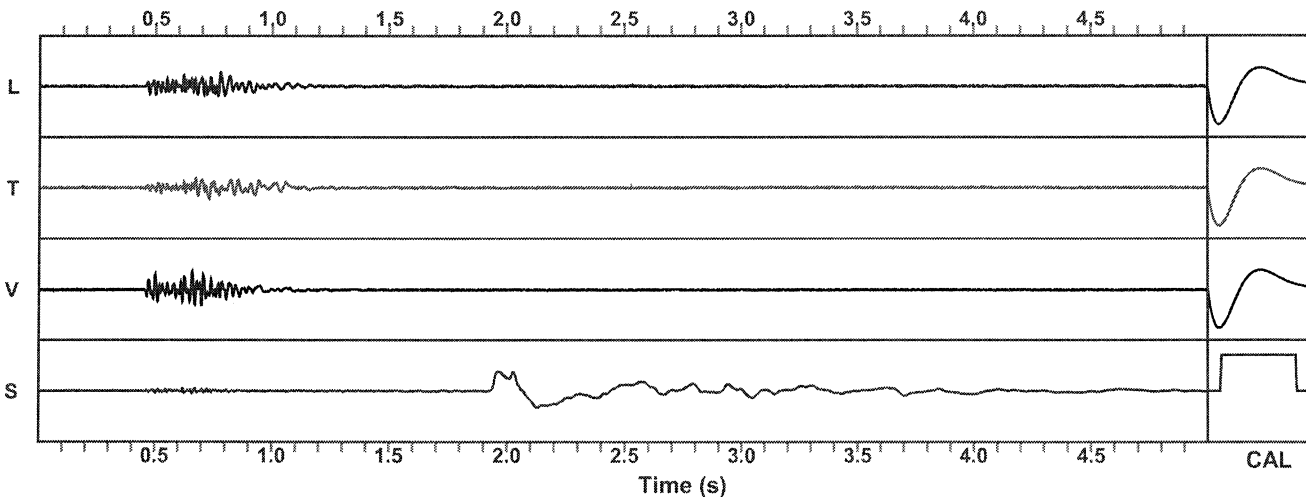
Zero Crossing Half-Wave Frequency Analysis

**Waveform Graph Scale**

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

**Velocity Waveform**

SSN: 8030 Event: 3



# GeoSonics Inc. Seismic Analysis

## Stop Event Report

**Serial No:** 8056 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 RES.

**Begin Date:** 06/29/2012 07:00:50 (UTC-7)  
**End Date:** 06/29/2012 12:03:46 (UTC-7)  
**Events over Trigger:** 0 (3-2)  
**Record Time:** 5.0 s  
**Seismic Trigger:** 0.030 in/s  
**Sound Trigger:** N/A  
**Battery Level:** 8.9

**Additional Info:**

j-GEO-01252  
N37 59.524, W122 27 373

**Shaketable Calibrated:** 05/16/2012  
**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 8056) did not trigger during the blast on June 29, 2012 at approximately 11:30 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.

# GeoSonics Inc. Seismic Analysis

## Stop Event Report

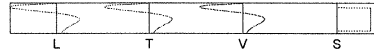
**Serial No:** 8021 v3.23  
**Client:** COUNTY OF MARIN  
**Operation:** SAN RAFAEL ROCK QUARRY  
**Location:** 114 SAN MARINO DRIVE  
**Distance:**  
**Operator:** VIBRA-TECH GSM  
**Comment:** VERONIQUE RASKIN\*

**Begin Date:** 06/29/2012 06:00:46 (UTC-7)  
**End Date:** 06/29/2012 12:06:41 (UTC-7)  
**Events over Trigger:** 0 (15-14)  
**Record Time:** 5.0 s  
**Seismic Trigger:** 0.030 in/s  
**Sound Trigger:** N/A  
**Battery Level:** 8.8

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

**Shaketable Calibrated:** 05/11/2012  
**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 8021) did not trigger during the shot on June 29, 2012 at approximately 11:30 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.