

SAN RAFAEL ROCK QUARRY VIBRATION REPORT

Location: PB-7

Northing: 37° 59' 11" N

Easting: 122° 27' 18" W

Max. Charge Weight: 200

Date of Blast: 12.20.11

Blast Duration: 417 ms

Time of Blast: 11:40:50

Blast Number: 1569

SEISMIC INFORMATION		UNIT		UNIT		UNIT	
Seismograph Model	2000	Micro	Micro	Micro	Micro		
Serial Number	04181	4550	4567	4570			
Last Calibration Date	5.24.11	5.26.11	5.26.11	5.26.11			

LOCATION INFORMATION		UNIT		UNIT		UNIT	
Location	Marin Ave	Via Montebello	San Marino Dr	MCNear Park			
Northing	37° 59' 19" N	37° 59' 18" 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	950	2957	2323	1954			
Scaled Distance	67	209	164	138			

VIBRATION INFORMATION		UNIT		UNIT		UNIT	
Longitudinal Peak Particle Velocity (ips)	.16		.07				
Longitudinal Peak Frequency (Hz)	26.2		12.1				
Transverse Peak Particle Velocity (ips)	.12		.08				
Transverse Peak Frequency (Hz)	23.8		12.1				
Vertical Peak Particle Velocity (ips)	.14		.06				
Vertical Peak Frequency (Hz)	55.5		4.0				
Peak Vector Sum (ips)	.19		.10				
Peak Air Overpressure (db)	109		106				

Seismograph Operator: Peren Lopez Signature: [Signature]

SAN RAFAEL ROCK QUARRY BLAST REPORT

BASE DATA:

Location: PB-7 Designed Bench Height (ft): 40 Date: 12 20 11
 Northing: 37° 59' 11" N Rock Density (Wyd³): 2.23 Time: 11:40
 Easting: 122° 27' W Relative Rock Hardness: 7 Blast Number: 1564

DESIGN DATA:

Number of Holes Shot: 18 Hole Dia. (in.): 6 3/4 Stemming (ft): 15 Loading Time Required (man hrs): 7
 Ave. Hole Depth (ft): 43 Burden (ft): 15 Stein Type: 3/4" S1000 Slaggered Pattern (y or n): N
 Relative Confinement: - Spacing (ft): 15 Subdrill (ft): 3 Number of Lost Holes: 0
 Deck Type: 3/4" S1000 Length (ft): - Tons Shot: 13,380

EXPLOSIVES DATA:

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units	Max (lb/hole):
<u>P1000</u>	<u>6,060</u>	<u>450 gds</u>	<u>36</u>	<u>80 EZ</u>	<u>18</u>			<u>360</u>
				<u>50 EZ</u>	<u>18</u>			
				<u>42ms</u>	<u>1</u>			
				<u>17ms</u>	<u>3</u>			
								Blast Duration (sec): <u>417</u>
								Total Charge Wt.: <u>6,016</u>

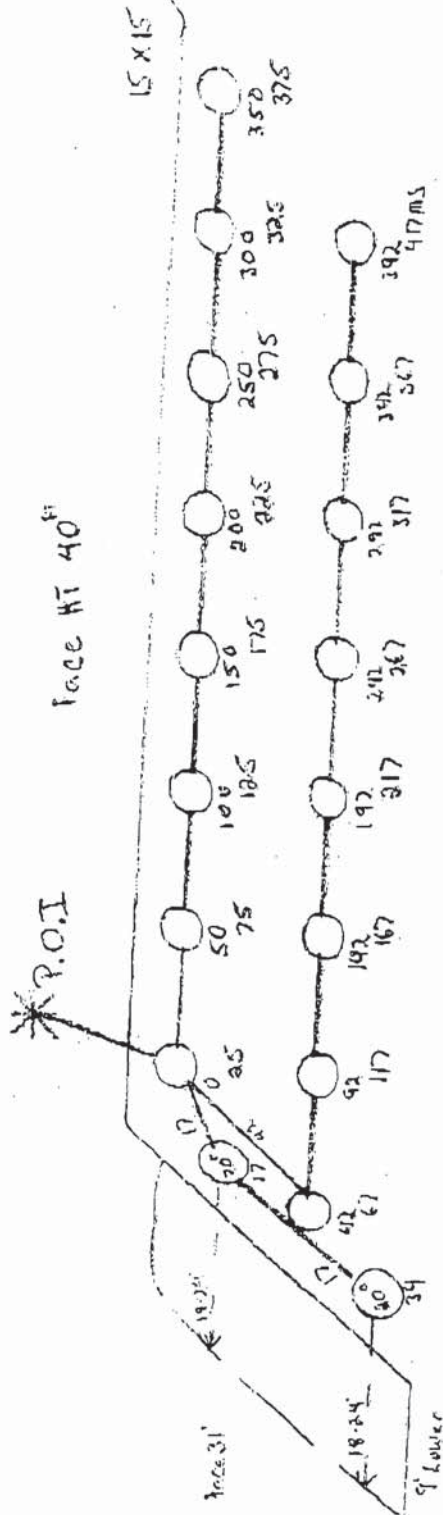
VIBRATION DATA:

Nearest Structure: airfield Seismograph Loc.: Surf Temperature: 54° Max. Chrg. (lb/8ms): -
 Northing: 37° 59' 11" N Nothing: - Sky Condition: Clear RPPV: 17
 Easting: 122° 27' W Easting: - Wind Direction: 140 Frequency: -
 Distance Away: 150 Distance Away: - Wind Speed: 1-5 mph Airblast: 109

PERFORMANCE DATA:

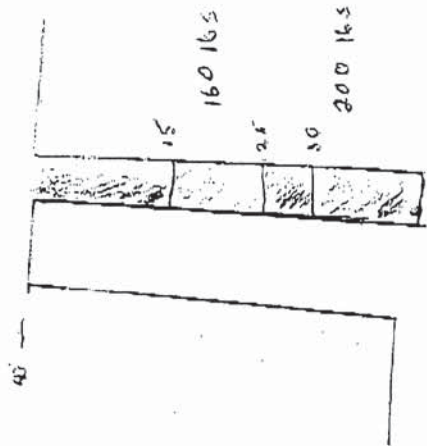
Powder Factor (lb/ton): 1.08 Displacement: Great Crushability: -
 Lb/yard³: 4 Vibration: Great Fines: -
 Fragmentation: Great Dig ability: -
 Comments: 2-20° Angle holes with no sub-drill deck loaded Blaster in Charge: [Signature]

P. 20.11
#1564
PB-7



Mean 450
V_{max} 2957
S_{max} 2323
W_{max} 1954
37.5° 11 N
122° 27' 18 W

Depth = 43 ft



- 18 Holes
- 18-60 RZ
- 18-50 E2
- 1-42ms
- 5 17ms
- 36-450 g

2 of the Hole 20° Angle
17 and 34ms. 43ft deep
O. sub-drill.
200 lbs per

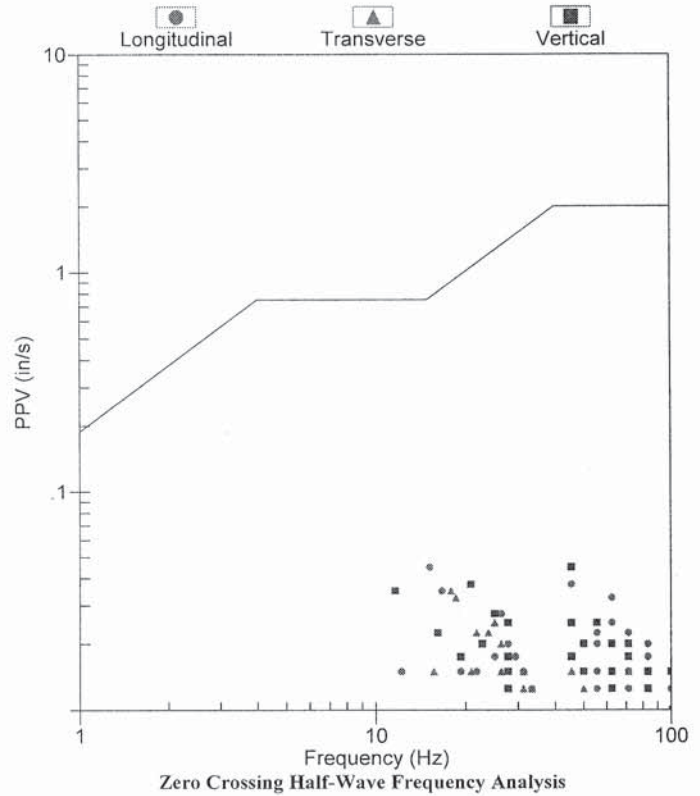
Seismic Analysis

Velocity Waveform Analysis

Serial No: 9856 v3 23
Date: 12/20/2011 11:42:01 (UTC-8)
Event No: 10
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: 10



	Summary Data		
	L	T	V
PPV (in/s)	0.045	0.035	0.045
FREQ (Hz)	15.2	17.9	45.5
PD (.001")	0.42	0.31	0.36
PPA (g)	0.033	0.026	0.046
Peak Vector Sum :	0.053 in/s		
Peak Air Pressure:	104 db		
	0.00052 PSI @ 2.1 Hz		

Additional Info:

j-GEO-01253
N37 59.481, W122 27.256

Shaketable Calibrated: 01/27/2011

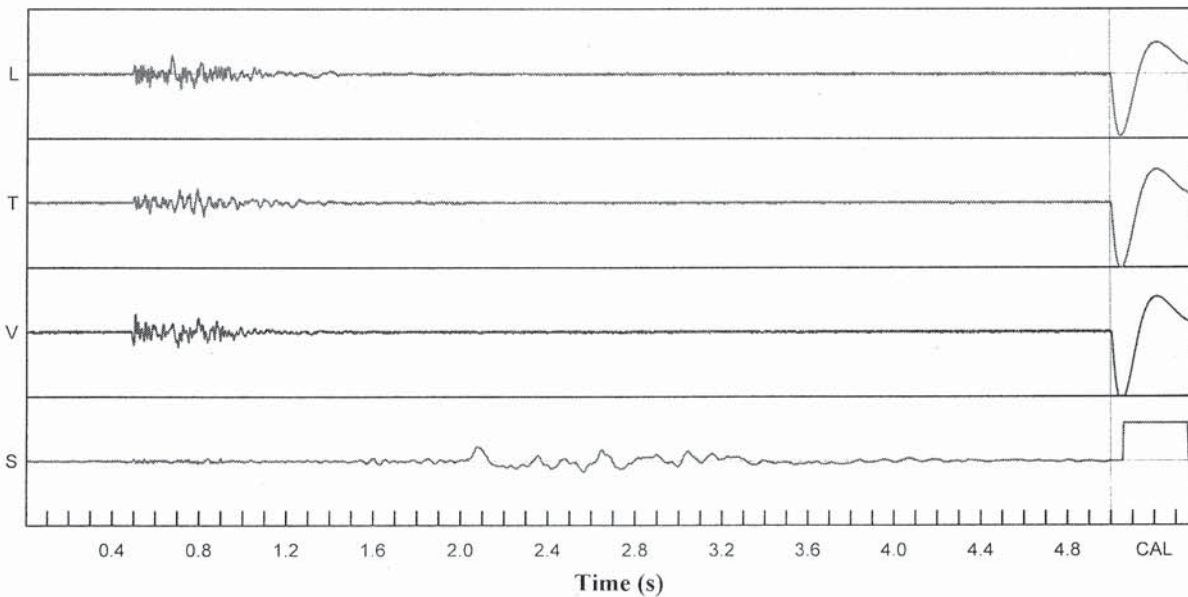
By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40299 U.S.A.
 TEL: 502.240.9900 FAX: 502.240.9902

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: 10



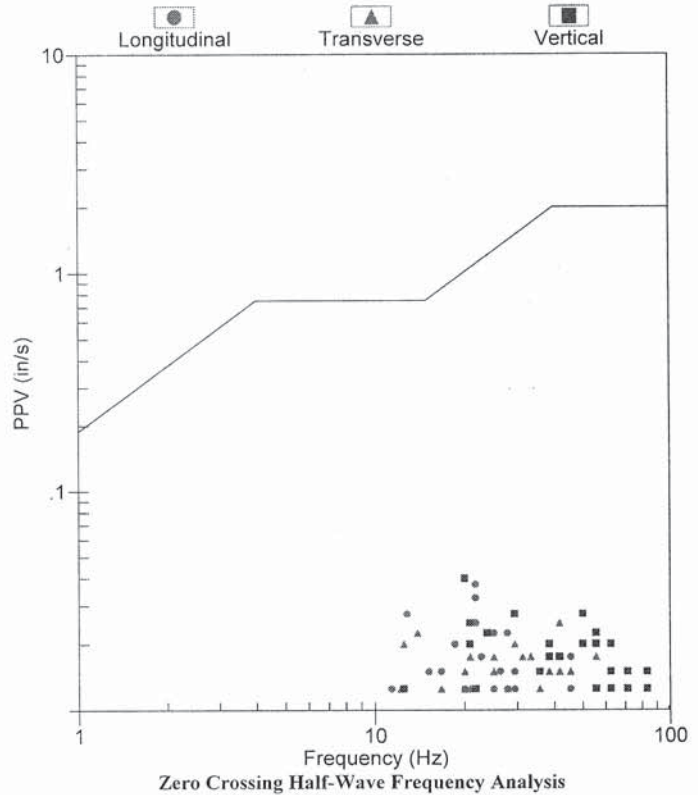
Seismic Analysis

Velocity Waveform Analysis

Serial No: 7155 v3.23
 Date: 12/20/2011 11:41:59 (UTC-8)
 Event No: 11
 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: 11



Additional Info:

j-GEO-01252
N37 59.524, W122 27.373

Shaketable Calibrated: 01/26/2011

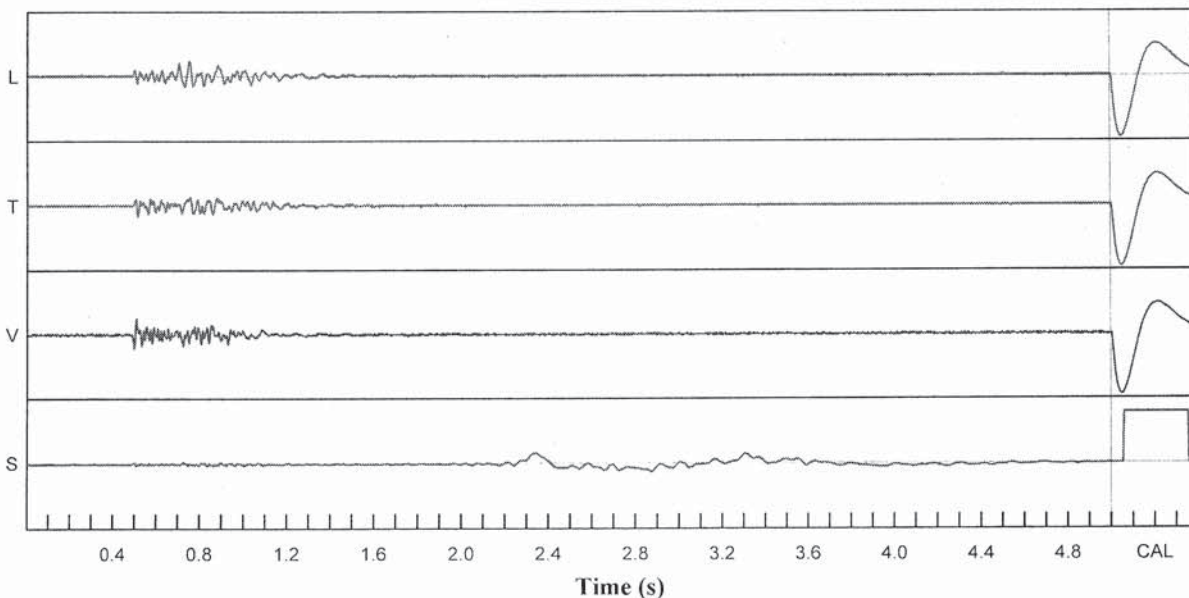
By: Vibra-Tech, Inc.
2700 Holloway Road - Suite 113
Louisville, KY 40299 U.S.A.
TEL: 502.240.9900 FAX: 502.240.9902

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: 11



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: 12/20/2011 07:00:50 (UTC-8)
End Date: 12/20/2011 12:16:22 (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 20, 2011 at approximately 11:42 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.