

SAN RAFAEL ROCK QUARRY VIBRATION REPORT

SEISMIC INFORMATION
 Location: PB-2 Max. Charge Weight: 120 Date of Blast: 8.22.13
 Northing: 37° 59' 19" N Blast Duration: 4.76 sec Time of Blast: 11:33
 Easting: 122° 27' 22" W Blast Number: 1597

SEISMOGRAPH INFORMATION		LOCATION INFORMATION	
Seismograph Model	MICRO	Micro	MICRO
Serial Number	4330	4330	4330
Last Calibration Date	5/3/13	5/3/13	5/3/13
LOCATION INFORMATION		LOCATION INFORMATION	
Location	ME Mount	Site Mark	M ¹ MEAS POINT
Northing	37° 59' 19" N	37° 59' 31" N	37° 59' 30" N
Easting	122° 27' 22" W	122° 27' 30" W	122° 27' 15" W
Distance from Blast	3643	2574	1742
Scaled Distance	98	271	188

VIBRATION INFORMATION	
Longitudinal Peak Particle Velocity (ips)	.06
Longitudinal Peak Frequency (Hz)	23.8
Transverse Peak Particle Velocity (ips)	.06
Transverse Peak Frequency (Hz)	25.0
Vertical Peak Particle Velocity (ips)	.06
Vertical Peak Frequency (Hz)	13.8
Peak Vector Sum (ips)	.08
Peak Air Overpressure (db)	114

GENERAL COMMENTS
 Seismograph Operator: Deon Lopes Signature: V. deon Lopes

SAN RAFAEL ROCK QUARRY BLAST REPORT

BASE DATA:

Location: 3B-7 Designed Bench Height (ft): 21 Date: 8 27 13
 Northing: 37°59'19N Rock Density (pdyd³): 2.23 Time: 11:33
 Easting: 122°27'07W Relative Rock Hardness: 7 Blast Number: 1597

DESIGN DATA:

Number of Holes Shot: 13 Hole Dia. (in.): 3 1/2 Stemming (ft): 13 Loading Time Required (man hrs): 2 Deck Type: _____
 Ave. Hole Depth (ft): 25 Burden (ft): _____ Stem Type: Stem Staggered Pattern (y or n): N Length (ft): _____
 Relative Confinement: _____ Spacing (ft): 15 Subdrift (ft): _____ Number of Lost Holes: 0 Tons Shot: 10317

EXPLOSIVES DATA:

Bulk Explosive	Weight	Boosters	Units	Delays	Units	Misc.	Units	Max (lb/hole):
<u>122°27'07W</u>	<u>7820</u>	<u>450 grams</u>	<u>43</u>	<u>50.82</u>	<u>43</u>			<u>180</u>
				<u>87ms</u>	<u>3</u>			<u>476ms</u>

Total Charge Wt.: 7868

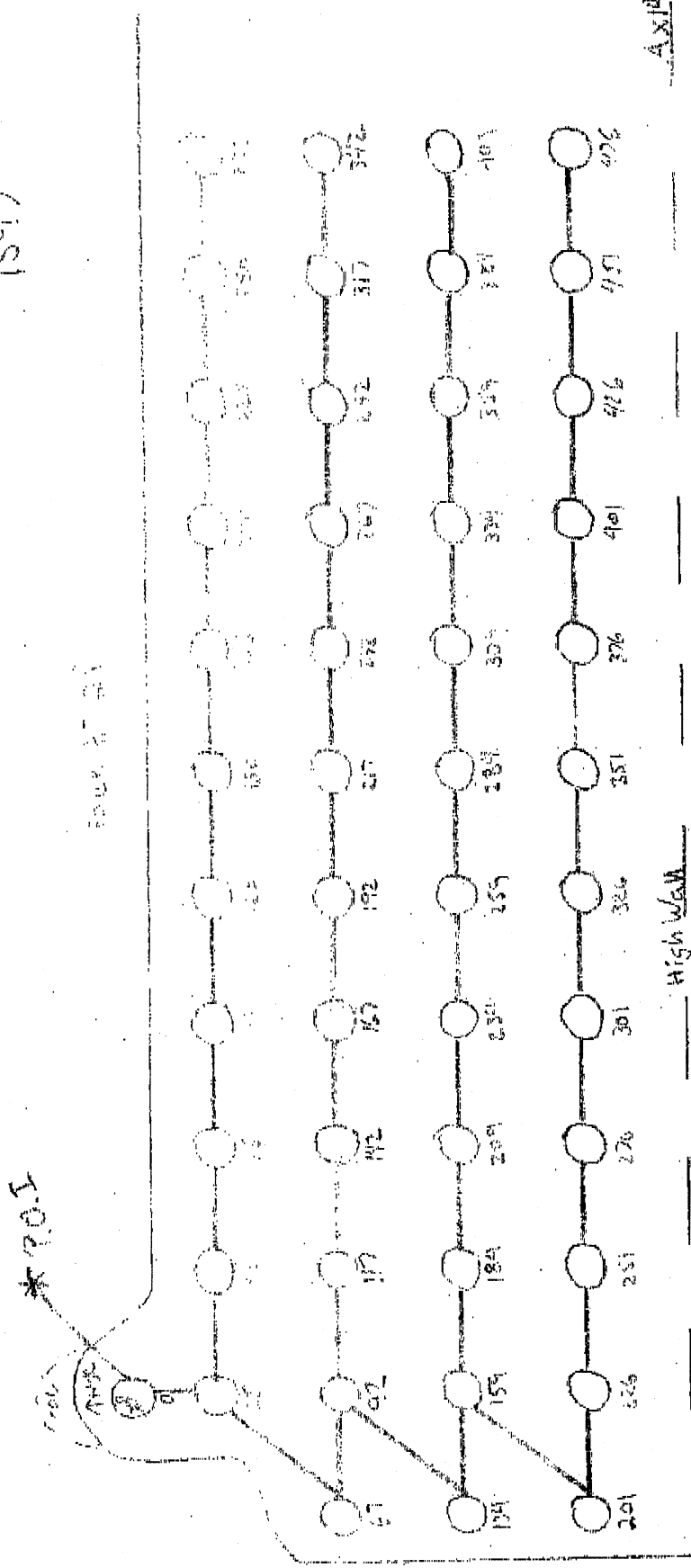
VIBRATION DATA:

Nearest Structure: McFarlane Seismograph Location: McFarlane Temperature: 78 Max. Chrg (lb/8ms): 360
 Northing: 37°59'19N Nothing: _____ Sky Condition: Clear RPPV: 08
 Easting: 122°27'07W Easting: _____ Wind Direction: S 25 E Frequency: 25.0
 Distance Away: 1320 Distance Away: _____ Wind Speed: 2 mph Airblast: N

PERFORMANCE DATA:

Powder Factor (lb/ton): .5 Displacement: Great Crushability: _____
 Lb/yd³: 118 Vibration: Great Fines: _____
 Fragmentation: Great Dig ability: _____
 Comments: ± 20' Angle Blaster in Charge: Phon

8.27.13
 PB.7
 1517



depth = 25'
 18' spacing
 180 lbs per
 7820 lbs Titan
 48 Holes
 48 x 50 E2 diet
 3 = 42 mg
 48 = 450 gram
 180 lbs per
 7820 lbs Titan

depth = 25'
 18' spacing
 180 lbs per
 7820 lbs Titan

48 Holes
 48 x 50 E2 diet
 3 = 42 mg
 48 = 450 gram
 180 lbs per
 7820 lbs Titan

⊙ Angle 80 lbs

M^cN = 1742
 37° 59' 14" N
 122° 27' 07" W

AXIS

Seismic Analysis

Velocity Waveform Analysis

Serial Number: 9808
 Firmware Version: 08-03.23
 Event Date: 08/27/2013 11:32:44 (UTC -07:00)
 Event number: 20
 Recording Time: 5 s
 Client: COUNTY OF MARIN
 Operation: SAN RAFAEL ROCK QRY
 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):	0.0575	0.0425	0.06
FREQ (HZ):	45.5	50	50
PD (.001"):	0.33	0.2575	0.25
PPA (g):	0.05208	0.03906	0.05208

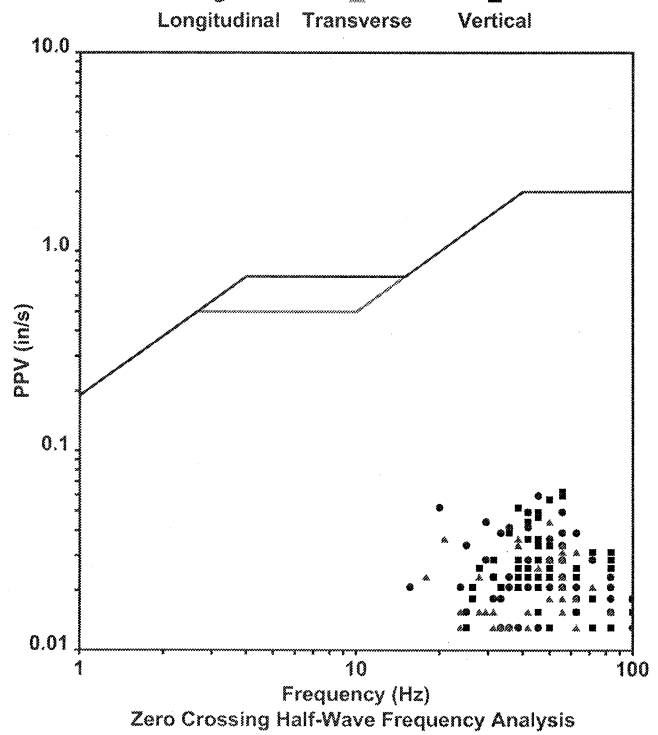
Peak Vector Sum: 0.0725 in/s
 Peak Air Pressure: 105.8 DB
 0.0006416 psi @ 2.1 HZ

Shaketable Calibrated

On: 02/20/2013 (UTC -07:00)
 By: Vibra-Tech, Inc.
 2700 Holloway Road - Suite 113
 Louisville, KY 40203 U.S.A.

USBM Safe Blasting Levels

SSN: 9808 Event: 20

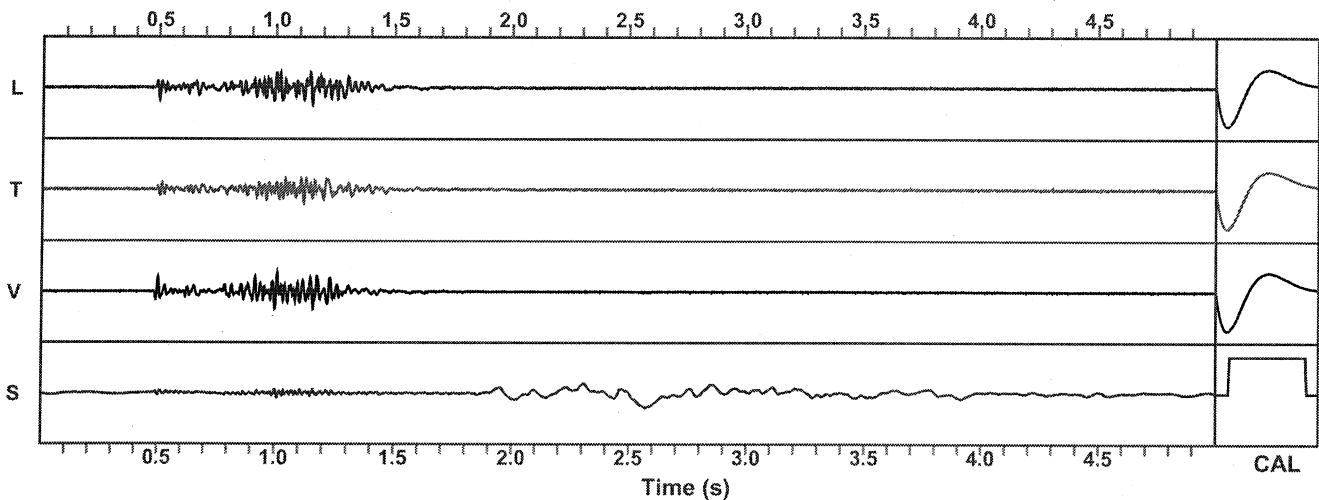


Waveform Graph Scale

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

Velocity Waveform

SSN: 9808 Event: 20





Vibra-Tech Inc. Seismic Analysis

Stop Event Report

Serial No: 9591 v3.23
Client: COUNTY OF MARIN
Operation: SAN RAFAEL ROCK QRY
Location: 16 MARIN BAY PARK CT.
Distance:
Operator: VIBRA-TECH GSM
Comment: WILLIAM HOSKEN RES.

Begin Date: 08/27/2013 07:00:50 (UTC-7)
End Date: 08/27/2013 20:00:00 (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: 8.6

Additional Info:

j-GEO-01252
N37 59.524, W122 27.373

Shaketable Calibrated: 02/20/2013
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 at 16 Marin Bay Park Court (S/N 9591) did not trigger during the shot on August 27, 2013 at approximately 11:32 indicating the ground vibrations produced were below the ground trigger level of 0.030 in/sec.