

BLAST MONITORING REPORT

HM22 Hard Stone Quarry at Wied Filep, l/o Naxxar

15th December 2015

Details

Date	15-12-2015
Quarry number	HM22 – Victoria Lines l/o Naxxar
Quarry operator	Ballut Blocks Ltd.
ANFO Supplier	Framegrip Ltd.
Police escort	PS1393 – K Farrugia

Location and Time of Blasting

Eight blasts were carried out between 12:11 and 12:32 at the points as approximately indicated on the attached site diagram.

Summary of Blasting Conditions

Maximum charge per delay: upper area: 12.5 Kg, lower area: 25 Kg

Vibration limit: 4 mm/s (20 to 40Hz) at the nearest residential areas within 200 metres.

Air overpressure limit: 120 dB(L).

Site Specific Permit

All holes were within quarry boundaries and within the maximum depth allowed. Maximum charge per delay was not exceeded. Blasting is carried out according to site specifications.

Weather Conditions

Humidity ^[1]	Wind ^[1]	Temp. ^[1]	Atm. Pressure ^[1]	Cloud Cover ^[2]
82%	3 Knots ENE	13C	1026 hPa	100% Low cloud

[1] As reported by weather.maltairport.com on 15 Dec 2015 at 12:10 at Luqa Airport [2] Our observation

Comments

All holes are at middle shelves of the quarry in their respective areas.

All the eight blasts were organised as four pairs and each pair was detonated by means of two short-circuit exploders in very quick sequence and captured as one event by the seismograph.

Notes about Monitoring

The seismograph was placed at monitoring point M2 (Triq Brydone). The seismograph used is MiniMate Plus, serial number BE9488.

Readings

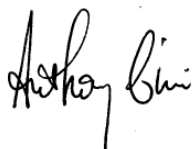
Blast Number	1	2	3	4	5	6	7	8
Time	12:11		12:17		12:24		12:32	
No. of Holes	8	8	8	8	5	5	8	8
No. of Delays	8	8	8	8	5	5	8	8
Depth of Holes (m)	10.5	10.5	10.5	10.5	7.5	7.5	10.5	10.5
Max. Charge/Delay (kg)	22	22	22	22	20	20	22	22
Total Charge (kg)	175	175	175	175	100	100	175	175
Dist. from Seismo. (m)	150	150	170	170	160	160	120	120
PPV (mm/s)	1.33		0.68		1.86		0.71	
Frequency (Hz)	19.1		20.7		19.1		25.6	
Air Overpressure (dB L)	100.0		105.5		106.5		98.8	
Scaled Dist. (m kg^{-1/2})	32.0	32.0	36.2	36.2	35.8	35.8	25.6	25.6

Burden is an average of 2 metres, and distance between holes is an average of 2.5 metres.

Weights in kilograms are rounded-up to the nearest ½ unit, and depth in metres is rounded to the nearest ½ unit. The plotting of the position of the holes on the attached site-diagram in relation to quarry shape and other landmarks is not accurate and no site survey was carried out to plot these. Displacement between the holes (as plotted on the diagram) and the seismograph is measured using the online version of MEPA’s Map Server and is accurate to the nearest 10 metres. Number of holes, their depth, burden, and the amount of ANFO used are as given by the quarry operator (signed document attached). Scaled distance and maximum charge per delay are calculated from the primary data. Weights are rounded-up to the nearest kilogram and the depth is rounded to the nearest ½ meter.

Observations

There was no flyrock outside the quarry boundaries. No damage to the surroundings was observed after the blast. The ground vibration and air overpressure measured for all blasts are within the limits.



**Anthony
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DATA COLLECTION SHEET

BLASTING SESSION DETAILS

Quarry Name & Number:	HM22 - Wied Fieq, l/o Naxos	Quarry Operator:	Ballut Blocks Services Ltd.
Date:	15/12/2015	MIC for HM22 is 25Kg	
Quarry personnel charging:	David Muscat		
Police Escort:	No: PS1393	Name:	R. Farrugia
ANFO suppliers:	Company: FRAME GRIP	Chief on site:	M. Calleja
Seismograph readings by:	Tony Cim		

BLAST DETAILS

Blast No.	Time	Holes	Delays	Dist. (m)	Depth		Total charge		Max. Chrg.	PPV mm/s	Freq. (Hz)	Air (dB)
					(ft)	(m)	Bags	(kg)				
1	12:11	8	8	150	35	10.5	7	175	22	1.33	19.1	100.0
2	—	8	8	150	35	10.5	7	175	22	—	—	—
3	12:17	8	8	170	35	10.5	7	175	22	0.68	20.7	105.5
4	—	8	8	170	35	10.5	7	175	22	—	—	—
5	12:24	5	5	160	25	7.5	5.4	100	20	1.86	19.7	106.5
6	—	5	5	160	25	7.5	5.4	100	20	—	—	—
7	12:32	8	8	120	35	10.5	6.7	175	22	0.71	25.6	95.8
8	—	8	8	120	35	10.5	6.7	175	22	—	—	—
9	—	58	—	—	—	—	50	1250	—	—	—	—
10	/											
11	/											
12	/											
13	/											
14	/											
15	/											

BLAST CHARACTERISTICS

Burden	Distance between boreholes: 2.5 m		Distance from rock face (burden): 2 m
Levels of holes: (top/mid/low shelves)	Middle Shelf		
Any horizontal holes?	No		[if yes, which? why?]
Any blast has holes of varying depths?	No		[if yes, which? why?]
Any grouping of blasts?	Yes as indicated to reduce no of blasts and speed up process		[if yes, which? why?]
Notes			

[expand on any of the above]

WEATHER CONDITIONS

Weather conditions observation:	[100] % cloud cover	[High / <u>Low</u>] Cloud	Rain: [no / <u>light</u> / medium / heavy] showers
	Wind [<u>calm</u> / light breeze / strong wind]	Approx. direction: [N / S / E / W] <u>N/E</u>	

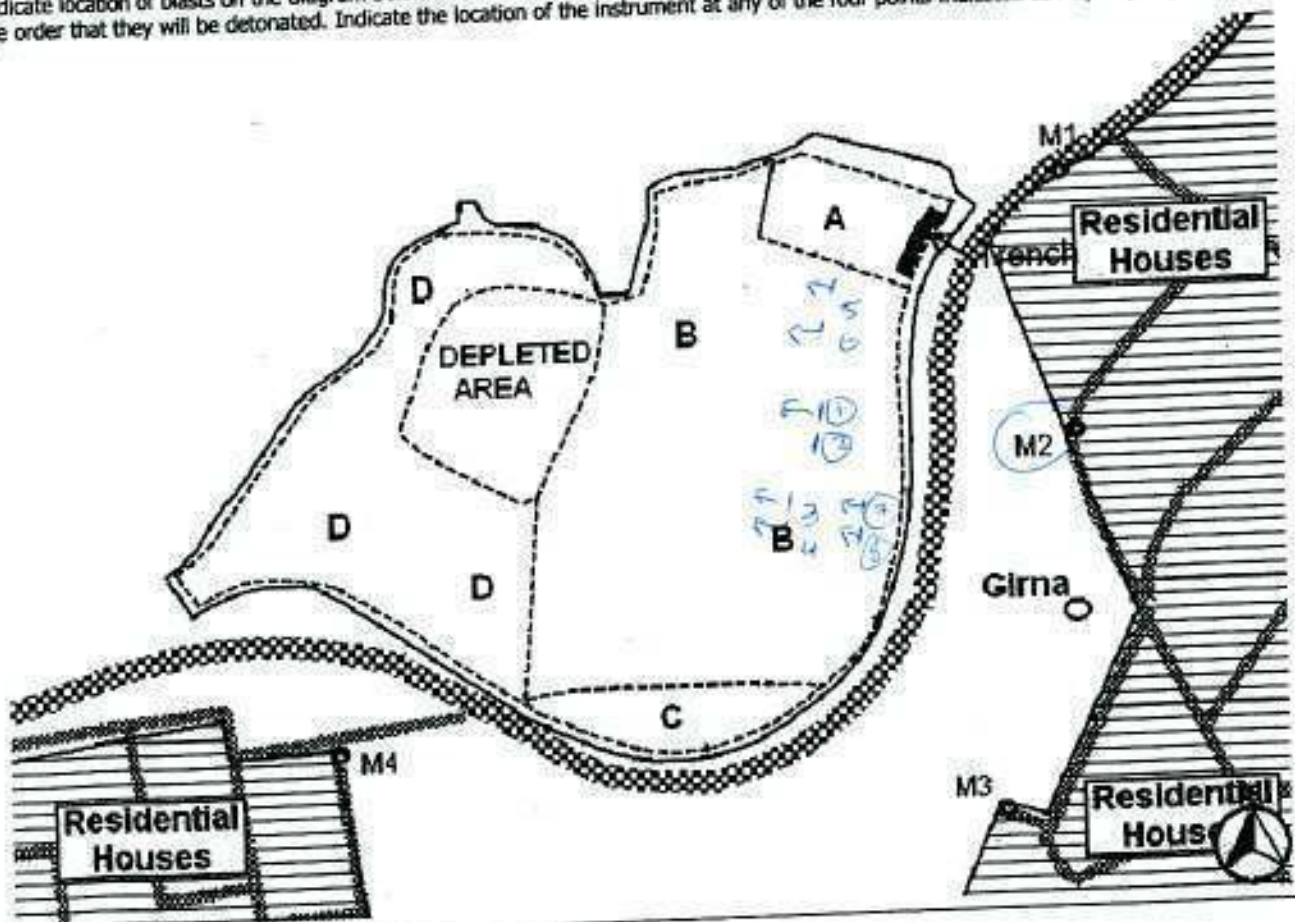
OTHER

Any visitors before/during/after blasts?	<u>Nobody.</u>	[if yes, who? Why?]
Any complaints from neighbours?	<u>None Reported to us</u>	[names/organizations]

MONITORING DETAILS

Location of Seismograph	<input type="checkbox"/> M1: Front of Villa Nordani, Triq id-Difiza Ovil	<input checked="" type="checkbox"/> M2: Corner of Triq Brydone
	<input type="checkbox"/> M3: Front of No. 7, Melita hse, Triq Sir Arturo Merdaca	<input type="checkbox"/> M4: Triq-I-imsaqqin

Indicate location of blasts on the diagram below after having observed their location in relation to the quarry boundaries. Number them in the order that they will be detonated. Indicate the location of the instrument at any of the four points indicated as M1, M2, M3, or M4.



Observations after blast:	<u>No damage observed.</u>	[Flyrock/damage to surroundings]
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Signatures - By signing here you are agreeing with the information given by you above. Please check the information again before signing.





f/ Quarry operator

Blast monitoring agent

Date/Time Long at 12:11:54 December 15, 2015
Trigger Source Geo: 0.510 mm/s
Range Geo: 31.75 mm/s
Record Time 2.0 sec at 4096 sps

Serial Number BE9488 V 10.72-8.17 MiniMate Plus
Battery Level 6.0 Volts
Unit Calibration August 20, 2015 by Datum Monitoring
File Name K488G5K4.JU0

Notes

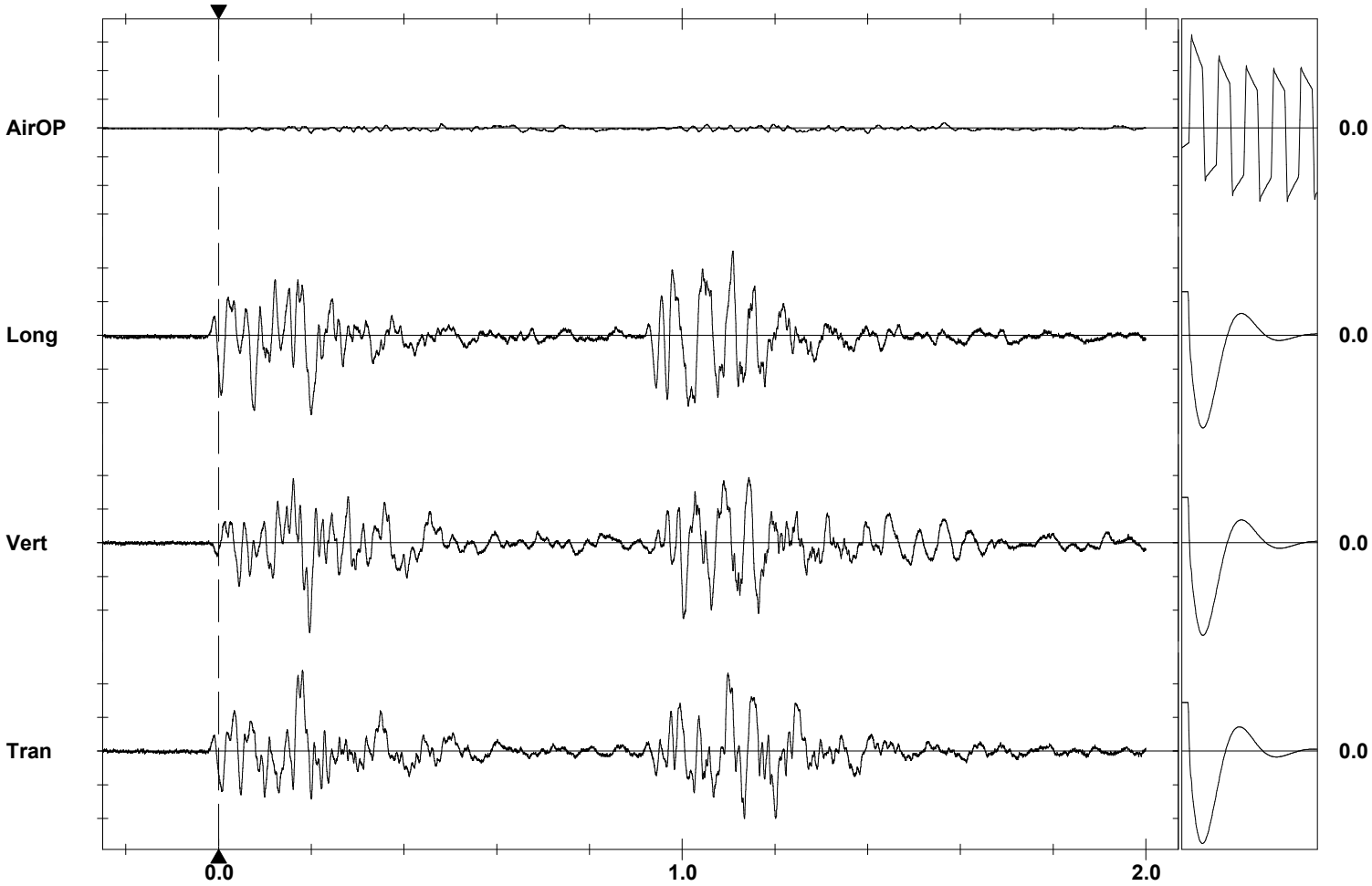
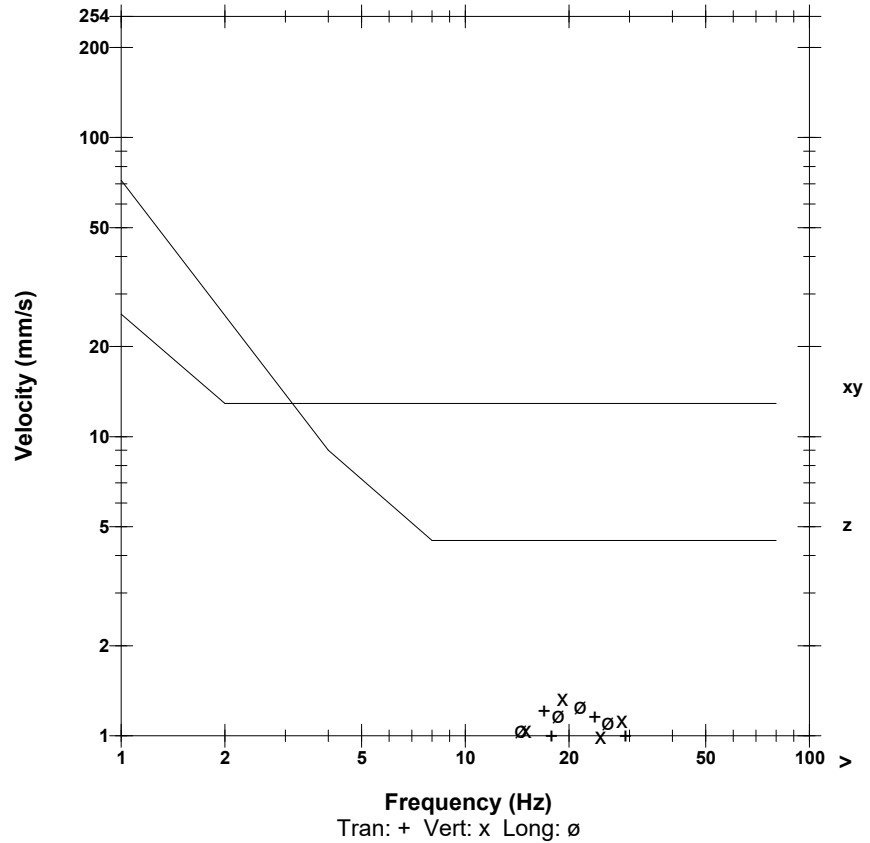
Location: Quarry Blasting
 Client:
 User Name: ems
 General:

Microphone Linear Weighting
PSPL 100.0 dB(L) 2.000 pa.(L) at 1.400 sec
ZC Freq 34.1 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 575 mv)

	Tran	Vert	Long	
PPV	1.206	1.333	1.254	mm/s
PPV	52.63	53.50	52.97	dB
ZC Freq	16.9	19.1	21.6	Hz
Time (Rel. to Trig)	0.181	0.197	1.109	sec
Peak Acceleration	0.040	0.040	0.046	g
Peak Displacement	0.011	0.009	0.012	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.3	7.3	Hz
Overswing Ratio	3.9	4.1	4.3	

Peak Vector Sum 1.759 mm/s at 0.199 sec

BS 6472:1992 CURVE 32



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 12:17:23 December 15, 2015
Trigger Source Geo: 0.510 mm/s
Range Geo: 31.75 mm/s
Record Time 2.0 sec at 4096 sps

Serial Number BE9488 V 10.72-8.17 MiniMate Plus
Battery Level 6.0 Volts
Unit Calibration August 20, 2015 by Datum Monitoring
File Name K488G5K4.SZ0

Notes

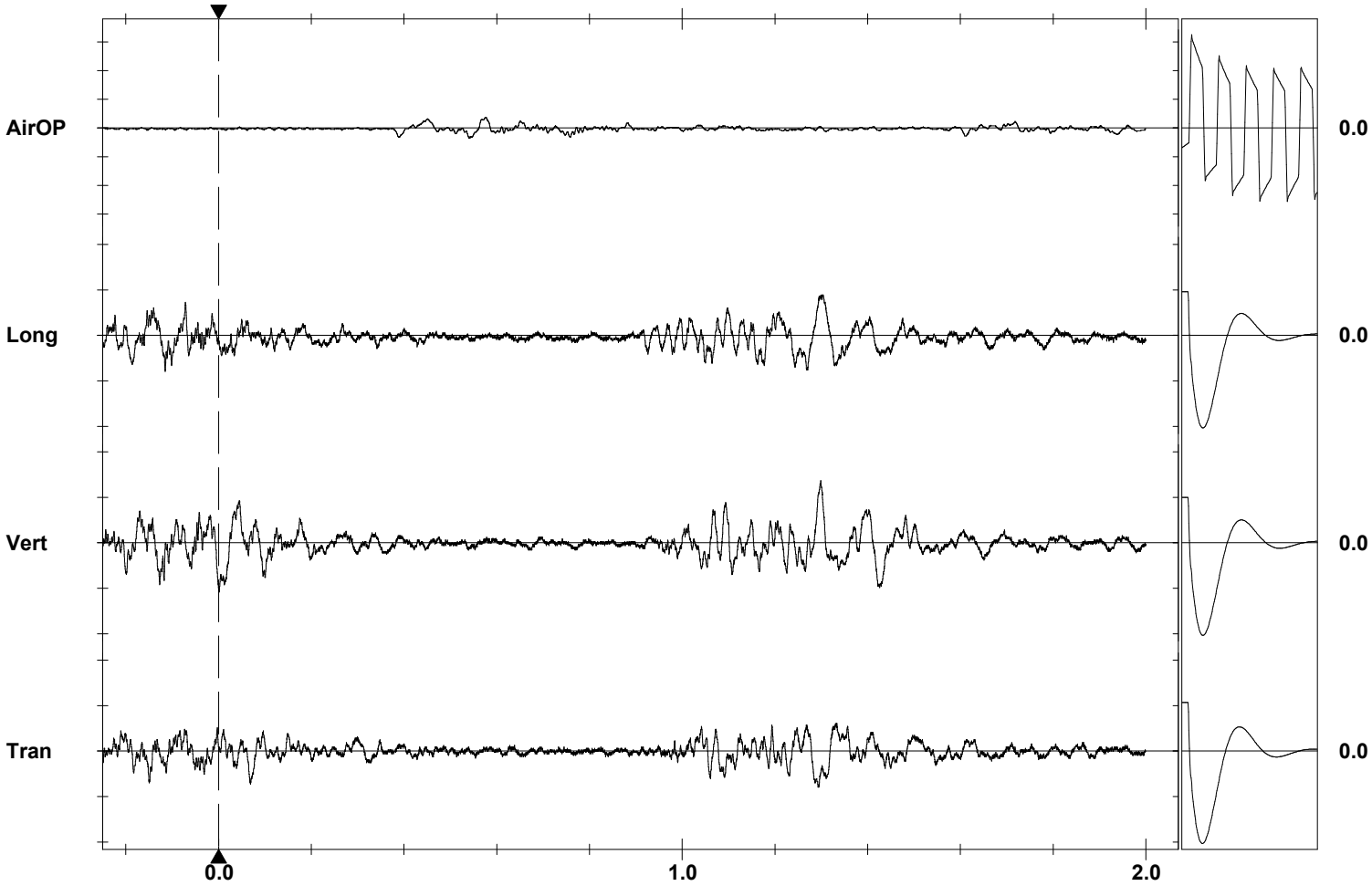
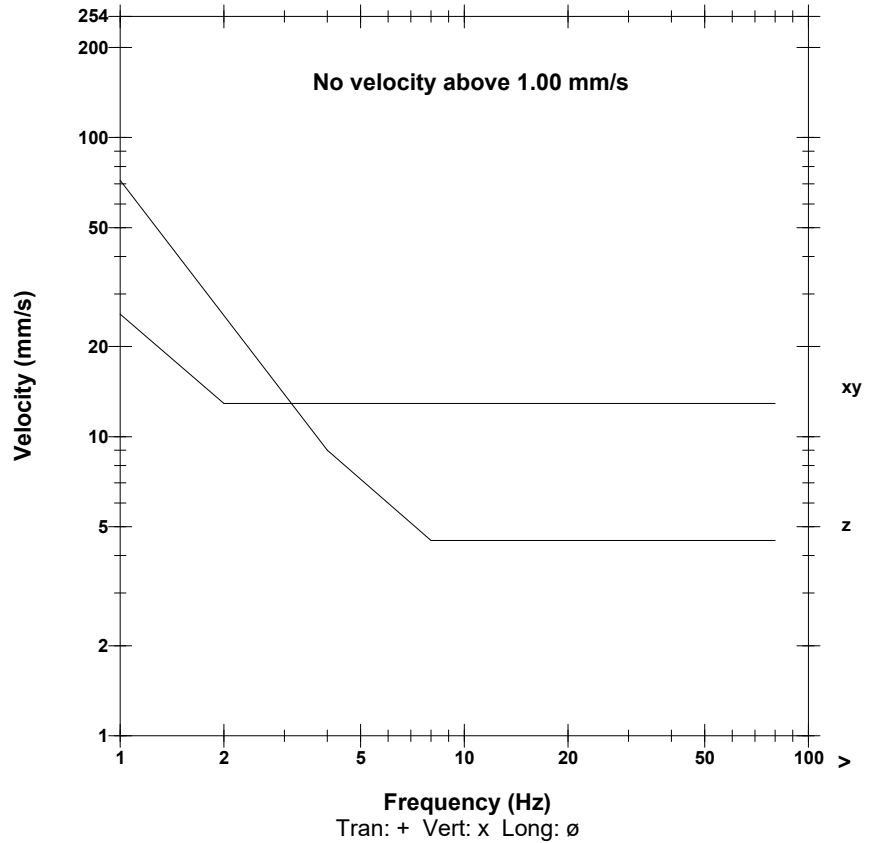
Location: Quarry Blasting
 Client:
 User Name: ems
 General:

Microphone Linear Weighting
PSPL 105.5 dB(L) 3.750 pa.(L) at 0.575 sec
ZC Freq 21.1 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 575 mv)

	Tran	Vert	Long	
PPV	0.397	0.683	0.444	mm/s
PPV	42.97	47.68	43.96	dB
ZC Freq	12.6	20.7	13.9	Hz
Time (Rel. to Trig)	1.293	1.298	1.299	sec
Peak Acceleration	0.020	0.033	0.027	g
Peak Displacement	0.005	0.005	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.3	7.3	Hz
Overswing Ratio	3.9	4.1	4.3	

Peak Vector Sum 0.840 mm/s at 1.298 sec

BS 6472:1992 CURVE 32



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Long at 12:24:06 December 15, 2015
Trigger Source Geo: 0.510 mm/s
Range Geo: 31.75 mm/s
Record Time 2.0 sec at 4096 sps

Serial Number BE9488 V 10.72-8.17 MiniMate Plus
Battery Level 6.0 Volts
Unit Calibration August 20, 2015 by Datum Monitoring
File Name K488G5K5.460

Notes

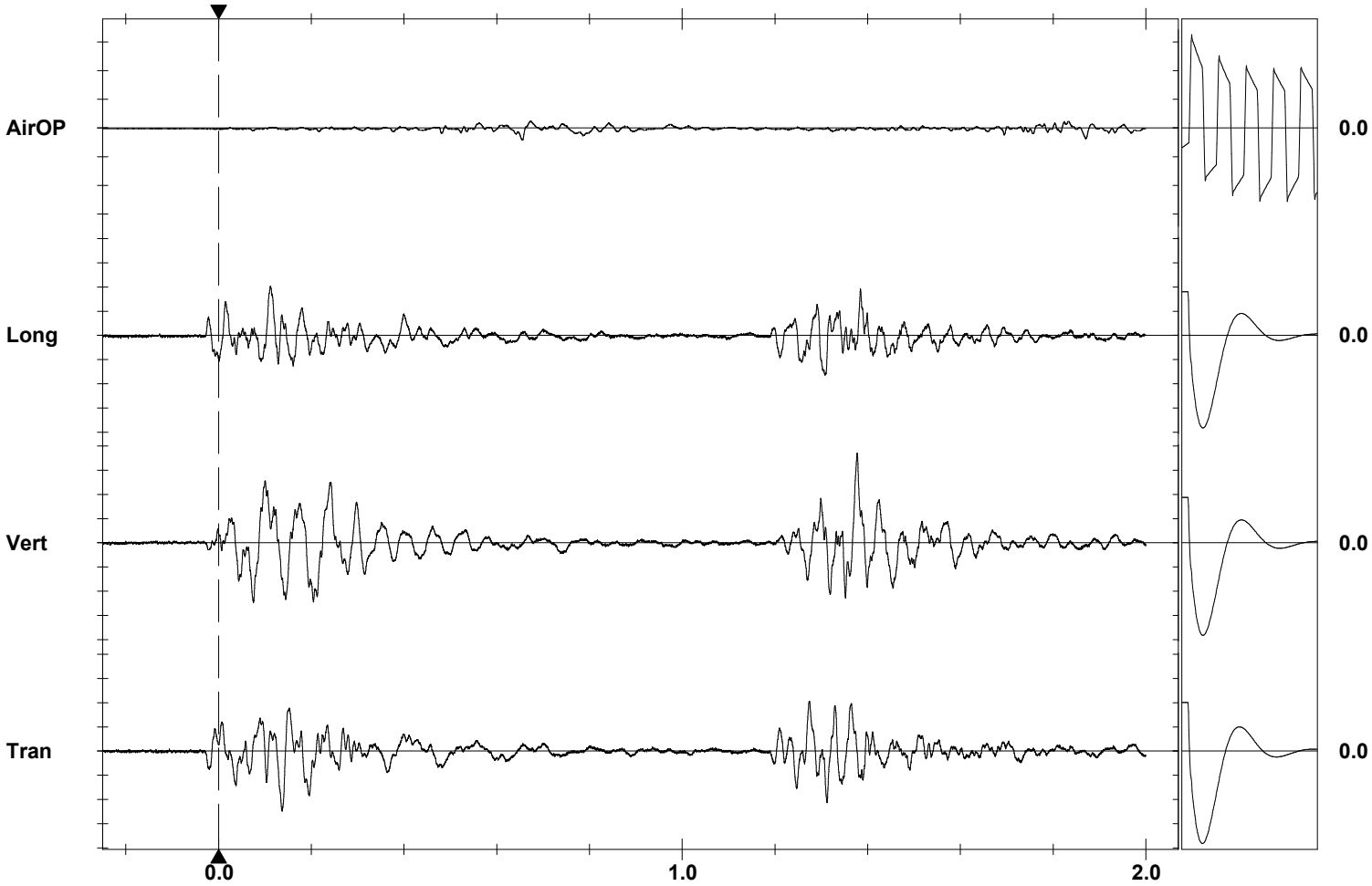
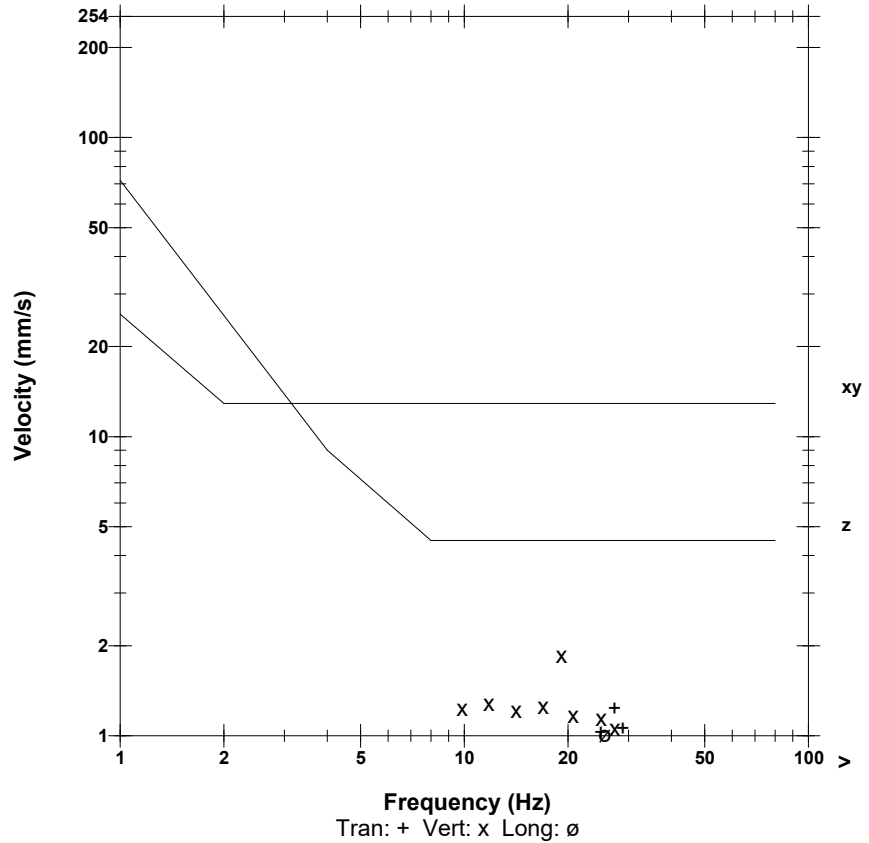
Location: Quarry Blasting
 Client:
 User Name: ems
 General:

Microphone Linear Weighting
PSPL 106.5 dB(L) 4.250 pa.(L) at 0.654 sec
ZC Freq 16.4 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 575 mv)

	Tran	Vert	Long	
PPV	1.238	1.857	1.016	mm/s
PPV	52.86	56.38	51.14	dB
ZC Freq	27.3	19.1	25.6	Hz
Time (Rel. to Trig)	0.137	1.377	0.112	sec
Peak Acceleration	0.046	0.040	0.040	g
Peak Displacement	0.007	0.014	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.3	7.3	Hz
Overswing Ratio	3.9	4.1	4.3	

Peak Vector Sum 1.862 mm/s at 1.377 sec

BS 6472:1992 CURVE 32



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 12:32:11 December 15, 2015
Trigger Source Geo: 0.510 mm/s
Range Geo: 31.75 mm/s
Record Time 2.0 sec at 4096 sps

Serial Number BE9488 V 10.72-8.17 MiniMate Plus
Battery Level 6.0 Volts
Unit Calibration August 20, 2015 by Datum Monitoring
File Name K488G5K5.HN0

Notes

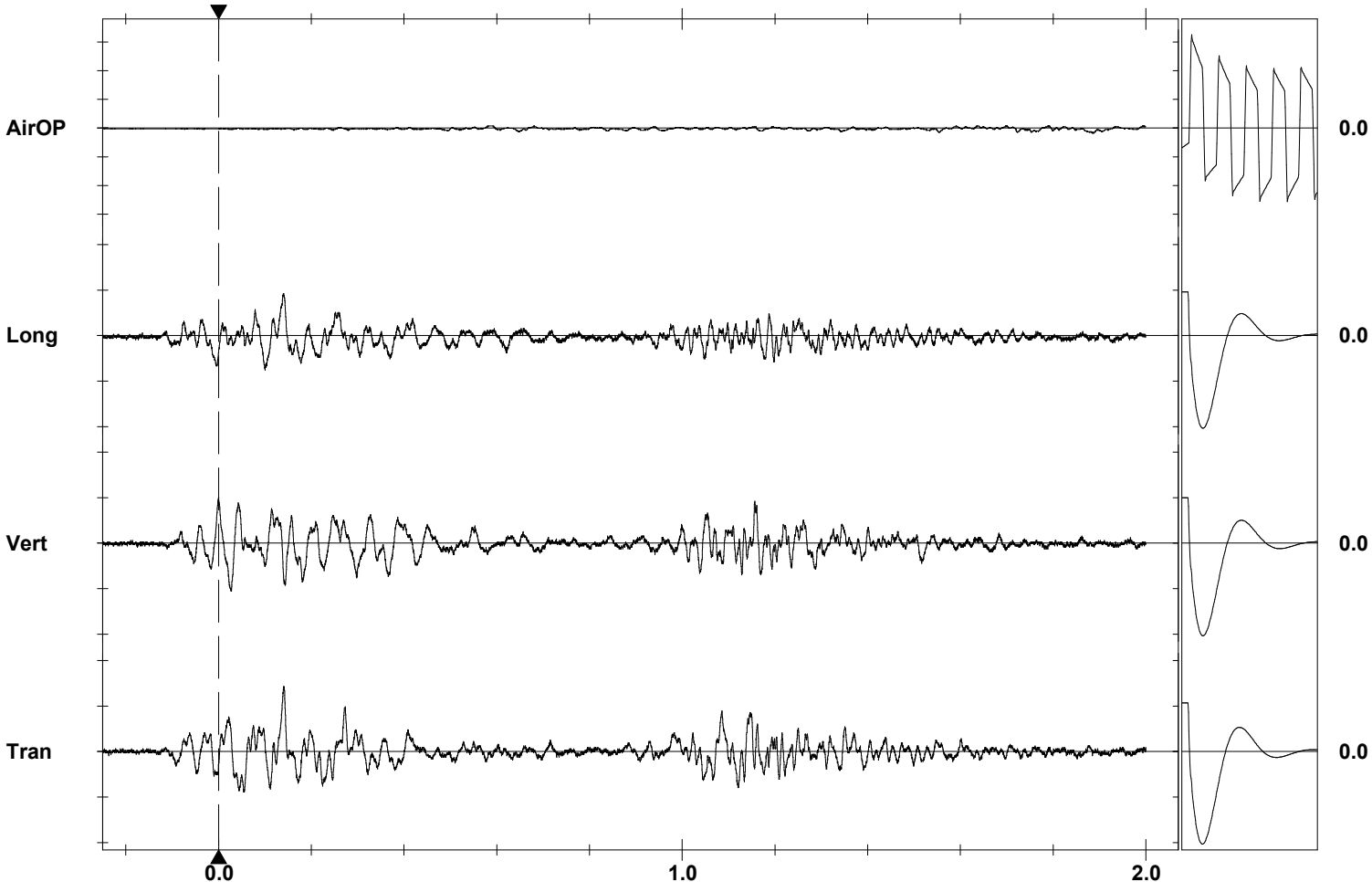
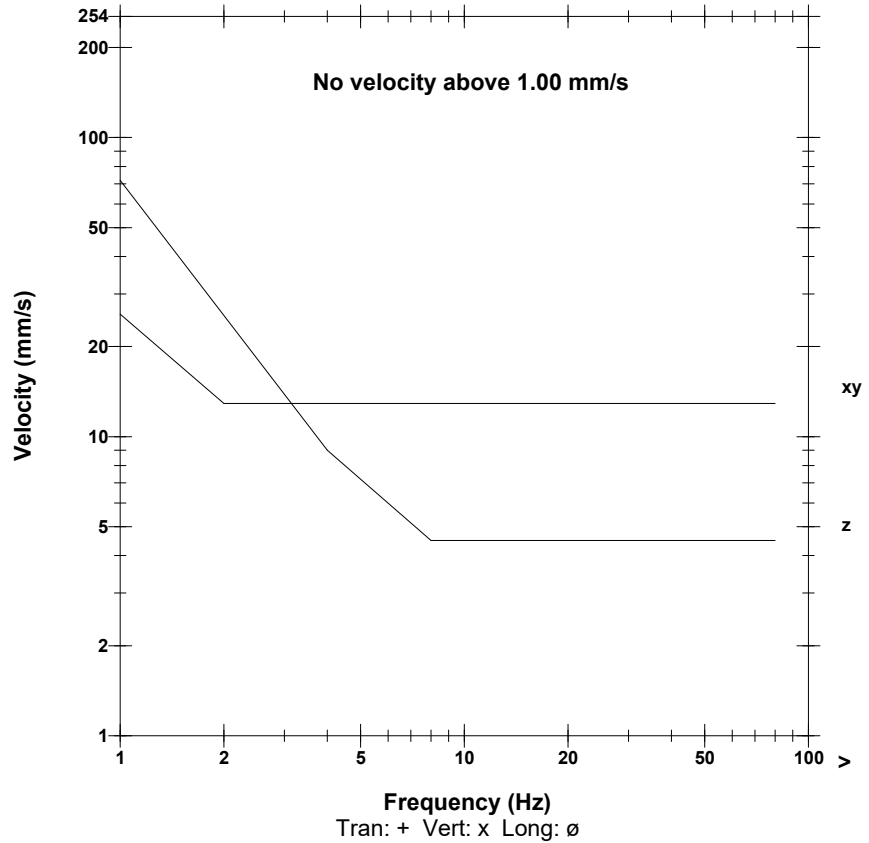
Location: Quarry Blasting
 Client:
 User Name: ems
 General:

Microphone Linear Weighting
PSPL 98.8 dB(L) 1.750 pa.(L) at 1.885 sec
ZC Freq 8.7 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 575 mv)

	Tran	Vert	Long	
PPV	0.714	0.524	0.460	mm/s
PPV	48.08	45.38	44.26	dB
ZC Freq	25.6	22.0	25.9	Hz
Time (Rel. to Trig)	0.140	0.026	0.140	sec
Peak Acceleration	0.027	0.027	0.027	g
Peak Displacement	0.005	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.3	7.3	Hz
Overswing Ratio	3.9	4.1	4.3	

Peak Vector Sum 0.937 mm/s at 0.141 sec

BS 6472:1992 CURVE 32



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check