BLAST MONITORING REPORT
HM26 Hard Stone Quarry at Tal-Maċina, Nigret, l/o Żurrieq
21st October 2013

Details

<table>
<thead>
<tr>
<th>Date</th>
<th>21-10-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarry number</td>
<td>HM26 – Tal-Maċina, Nigret, l/o Żurrieq</td>
</tr>
<tr>
<td>Quarry operator</td>
<td>C J C Camilleri Bros. Ltd.</td>
</tr>
<tr>
<td>ANFO Supplier</td>
<td>Framegrip Ltd.</td>
</tr>
<tr>
<td>Police escort</td>
<td>PC1150 – M Schembri</td>
</tr>
</tbody>
</table>

Location and Time of Blasting
Three blasts were carried out between 12:03 and 12:06 at the points as approximately indicated on the attached site diagram.

Summary of Blasting Conditions
Maximum charge per delay: 50Kg
Vibration limits: 4 mm/s (20 to 40Hz) at the nearest sensitive point within 200m.
Air overpressure limit: 120 dB (L).

Site Specific Permit
Holes were within quarry boundaries and within the permitted depths. Blasts were carried out according to the site specific conditions, and no blast exceeded the maximum permitted charge of 50Kg per delay.

Weather Conditions

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>67%</td>
<td>12 Knots SE</td>
<td>25C</td>
<td>1024 hPa</td>
<td>100% low cloud</td>
</tr>
</tbody>
</table>

[1] As reported by weather.maltaairport.com on 21 October 2013 at 11:50 at Luqa Airport
[2] Our observation

Comments
All holes are at the middle shelf of the quarry.
Notes

Seismograph was placed in front of the Nigret booster which is also close to the water reservoir. Seismograph was set to trigger at 0.50 mm/s. Seismograph used is MiniMate Plus s/n BE9488.

Readings

<table>
<thead>
<tr>
<th>Blast number</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>12:03</td>
<td>12:04</td>
<td>12:06</td>
</tr>
<tr>
<td>No. of holes</td>
<td>13</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>No. of delays</td>
<td>13</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Depth of holes (m)</td>
<td>12</td>
<td>10.5</td>
<td>18</td>
</tr>
<tr>
<td>Max. Charge per delay (kg)</td>
<td>27</td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td>Total charge (kg)</td>
<td>350</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>Dist. From Seismograph (m)</td>
<td>190</td>
<td>190</td>
<td>170</td>
</tr>
<tr>
<td>PPV (mm/s)</td>
<td>1.87</td>
<td>1.38</td>
<td>3.70</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>26.6</td>
<td>23.0</td>
<td>27.3</td>
</tr>
<tr>
<td>Air Overpressure (dB)</td>
<td>106.5</td>
<td>103.5</td>
<td>111.5</td>
</tr>
<tr>
<td>Scaled Distance (m kg^-1/2)</td>
<td>36.6</td>
<td>38.0</td>
<td>25.3</td>
</tr>
</tbody>
</table>

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 half-unit, and depth in metres is rounded to the nearest ½ unit. Displacement between holes 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. 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 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 Cini
B.Sc.
**DATA COLLECTION SHEET**

- **Date:** 21-10-13
- **MIC for HM26 is 50Kg**
- **Quarry Name & Number:** HM26 – Tal-Macina, Nigret, I/o Zurrieq
- **Quarry Operator:** C J C Camilleri Bros. Ltd.
- **Police Escort:** No: PC 1150 Name: MARCO SCHEMBRI
- **Blasting carried out by:** Company: Framegrip Ltd. Name: MARIO CALETTA
- **Seismograph readings by:** RAFAEL MICALLEF

<table>
<thead>
<tr>
<th>Blast</th>
<th>Time</th>
<th>Holes</th>
<th>Delays</th>
<th>Dist. (m)</th>
<th>Depth (m)</th>
<th>Total charge Bags</th>
<th>Max. Chrg.</th>
<th>PPV mm/s</th>
<th>Freq. (Hz)</th>
<th>Air (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12:03:46</td>
<td>13</td>
<td>13</td>
<td>190</td>
<td>40</td>
<td>14</td>
<td>350</td>
<td>27</td>
<td>1.87</td>
<td>26.6</td>
</tr>
<tr>
<td>2</td>
<td>12:04:28</td>
<td>14</td>
<td>14</td>
<td>190</td>
<td>35</td>
<td>14</td>
<td>350</td>
<td>25</td>
<td>1.38</td>
<td>22.0</td>
</tr>
<tr>
<td>3</td>
<td>12:06:48</td>
<td>9</td>
<td>9</td>
<td>170</td>
<td>60</td>
<td>16</td>
<td>400</td>
<td>45</td>
<td>3.70</td>
<td>27.3</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td>44</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Location of Seismograph:** (✓ Front of the WSC Nigret booster (this is also next to water reservoir), ( ) Other location: [Blank]

- **Burden:** Distance between boreholes: 2.5 m Distance from rock face (burden): [Blank]

- **Notes:**
  - Any horizontal holes: No. Any blast made up of holes of different-depth? No. Why?...
  - Any blasts grouped together and detonated using multiple (almost simultaneous) short-circuit exploders? No. Why?...
  - Any visitors before/during/after blast? Nobody. (note names and organizations)
  - Any complaints from neighbours? None Reported. (note names, number of persons/households)
  - Note levels of holes: (143) Middle Shelf. (2) None Outside. (Blank)
  - Flyrock observations: [Blank]... Any damage to quarry surroundings? None observed...

- **Further Comments:** Cloud cover 100% low clouds

- **Signatures:**
  - Police escort
  - f/ Quarry operator
  - f/ ems
Malta Environment & Planning Authority

Hardstone (LC) Quarry Site Plan

Quarry No. :- HM 26

Location :- Tal-Macina, Nigret, l/o Zurrieq
Permitted Quarry Area :- 47605.41 sqm
Permitted Quarry Depth :- 80 m amsl

Scale :- 1:5000

Part of Survey Sheet(s): 5063 5064 5263 5264

Date :- 6/5/03
Date/Time: Long at 12:03:46 October 21, 2013
Trigger Source: Geo: 0.510 mm/s, Mic: 119 dB(L)
Range: Geo: 31.7 mm/s
Record Time: 2.0 sec at 4096 sps
Notes:
Location: Quarry Blasting
Client: User Name: ems
General:

Microphone: Linear Weighting
PSPL: 106.5 dB(L) 4.25 pa.(L) at 1.215 sec
ZC Freq: 4.3 Hz
Channel Test: Passed (Freq = 20.5 Hz Amp = 525 mv)

PPV
ZC Freq
Time (Rel. to Trig)
Peak Acceleration
Peak Displacement
Sensor Check
Frequency
Overswing Ratio
Passed
Passed
Passed

Peak Vector Sum: 1.94 mm/s at 0.322 sec

Graphs of AirOP, Long, Vert, and Tran show the waveforms and sensor checks.

BS 6472:1992 CURVE 32
Date/Time: Long at 12:04:29 October 21, 2013
Trigger Source: Geo: 0.510 mm/s, Mic: 119 dB(L)
Range: Geo: 31.7 mm/s
Record Time: 2.0 sec at 4096 sps
Notes:
Location: Quarry Blasting
Client: 
User Name: ems
General:

Microphone: Linear Weighting
PSPL: 103.5 dB(L) 3.00 pa.(L) at 0.888 sec
ZC Freq: 7.1 Hz
Channel Test: Passed (Freq = 20.5 Hz Amp = 525 mv)

PPV | Tran | Vert | Long | mm/s
--- | ---: | ---: | ---: | ---
0.65 | 1.38 | 1.00 | 0.651 | 1.38 | 1.00 | 0.651
ZC Freq | 13.5 | 23.0 | 33.0 | Hz
Time (Rel. to Trig) | 0.233 | 0.328 | 0.176 | sec
Peak Acceleration | 0.0331 | 0.0530 | 0.0398 | g
Peak Displacement | 0.00594 | 0.00704 | 0.00684 | mm
Sensor Check | Check | Passed | Passed
Frequency | 4.5 | 7.3 | 7.6 | Hz
Overswing Ratio | 3.1 | 3.8 | 4.0 |
Peak Vector Sum: 1.44 mm/s at 0.199 sec

Sensor Check: 4.5 3.1 7.6
Tran: +  Vert: x  Long: ø

Amplitude Scale: Geo: 0.500 mm/s/div Mic: 10.00 pa.(L)/div
Time Scale: 0.20 sec/div

Printed: November 9, 2013 (V 10.40 - 10.40)
Date/Time: Long at 12:06:48 October 21, 2013
Trigger Source: Geo: 0.510 mm/s, Mic: 119 dB(L)
Range: Geo: 31.7 mm/s
Record Time: 2.0 sec at 4096 sps
Notes:
Location: Quarry Blasting
Client: ems
User Name: ems
General:

Microphone: Linear Weighting
PSPL: 111.5 dB(L) 7.50 pa.(L) at 1.030 sec
ZC Freq: 4.9 Hz
Channel Test: Passed (Freq = 20.5 Hz Amp = 525 mv)

<table>
<thead>
<tr>
<th>PPV</th>
<th>Tran</th>
<th>Vert</th>
<th>Long</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.13</td>
<td>3.70</td>
<td>2.24</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZC Freq</th>
<th>Time (Rel. to Trig)</th>
<th>Peak Acceleration</th>
<th>Peak Displacement</th>
<th>Sensor Check</th>
<th>Frequency</th>
<th>Overswing Ratio</th>
<th>Peak Vector Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.6</td>
<td>0.175</td>
<td>0.0398</td>
<td>0.00687</td>
<td>Passed</td>
<td>4.5</td>
<td>3.1</td>
<td>4.0</td>
</tr>
<tr>
<td>27.3</td>
<td>0.154</td>
<td>0.0862</td>
<td>0.0213</td>
<td>Passed</td>
<td>7.3</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>25.9</td>
<td>0.119</td>
<td>0.0530</td>
<td>0.0140</td>
<td>Passed</td>
<td>7.6</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>

BS 6472:1992 CURVE 32

Frequency (Hz)
Tran: + Vert: x Long: ø

Time Scale: 0.20 sec/div
Amplitude Scale: Geo: 1.000 mm/s/div Mic: 10.00 pa.(L)/div
Sensor Check