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DUST SUPPRESSION TEST REPORT

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INTRODUCTION

Idwala approached Benmarc in early 2013 to provide a solution for the dust problems experienced at the Secondary and Tertiary buildings. Following a site visit, Benmarc proposed the installation of a test dust suppression unit at the Tertiary building to demonstrate its ability to effectively suppress the dust in an isolated test.

A preliminary test report by Mr Jerry Wolf of Benmarc, dated 3 April 2013 was submitted to Idwala, and a further report was submitted at a later date.

Idwala had subsequently decided to place an order for two systems – one at the Secondary building, and one at the Tertiary building. Due to the long lead time required to approve the funds for the new systems, Idwala had elected to rent the already installed test unit at the Tertiary building until the official purchase order could be placed.

Currently it is our understanding that the funds have been approved and a final controlled test was required in order to convince Idwala officials of the effectiveness of the dust suppression test unit.

TEST SYSTEM INSTALLATION

The installation of a test dust suppression system presents a major challenge for Benmarc as the manifolds are often installed in positions that are not conducive of optimal performance, due to the nature of temporary installations. Furthermore, tests are often (as in the case at Idwala) conducted in an isolated area. This means that all accumulated dust promoting conditions has to be addressed in a single area, without the benefit of pre-treatment points upstream of the test installation.

A further negative factor with test installations is that, at the time of requesting a demonstration, all or most of the permanent dust retention/prevention measures (such as belt skirting and extraction systems) have already failed, or are in a state of disrepair – hence the renewed attention given to the rising dust problems.

CONTAMINATION OF TEST RESULTS

The Tertiary building equipment is not in a condition that may minimize dust emissions. Several material spills occur frequently that produce dust outside of the controlled area. The spills happen throughout the building and often filters down in a very fine form to floor level and sampling points.

Although every effort was made to minimize the effect of these spills, it is nevertheless displayed as peaks of high levels on the result charts.

As this was a temporary installation, the manifolds are also not protected from wind as would be the case with permanent installations. Therefore wind plays another significant part in the results. It is also a factor for the monitoring instrument in that dust is randomly directed by the wind.

INTEGRITY OF RESULTS

Notwithstanding the factors that influenced the tests, the results are a cross section of every day emissions. The measuring probe was placed close enough to the emission points not to be influenced to such an extent that the results cannot be used in this report.

Furthermore, the probe was placed in exactly the same positions during the individual test samples. Therefore, factors that could influence system-*on*-results, would also have influenced system-*off*-results.

TEST EQUIPMENT

A single TSI Sidepak AM510 Aerosol Monitor with serial number 10907023 was used. The certificate of calibration is attached to this report.

TESTING PROCEDURE

Sampling was only done while the crusher delivers. This is the stage when most of the emission occurs. As BC6 is the area that causes most of the dust emissions, 3 individual positions were selected for the placement of the dust monitor:

1. BC6 tail – crusher 1 discharge
2. BC6 mid – crusher 2 discharge
3. BC6 mid – fines bypass discharge

The sampling probe was set up at approximately 1.2m from ground level and 2m from points of emission – downwind.

The sequence of testing was as follows:

1. Verify calibration certificate
2. Verify correct date and time on instrument

3. Zero-calibrate instrument
4. Set instrument at the 3 identified positions and take readings when crusher delivers – without dust suppression
5. Set instrument at the 3 identified positions and take readings when crusher delivers – with dust suppression
6. Get Idwala representative to witness instrument date and time, zero-calibration, instrument serial number and testing procedure.

Six individual readings were taken while the crusher was actively discharging material onto BC6 – three readings with the suppression off, and three readings with suppression on. As the crushers only work for about 2 minutes and 30 seconds or less at a time, this is the sampling duration for each test.

The official recorded samples used for this report are as follows:

Test #1 – BC6 Tail Crusher 1 Discharge with suppression OFF

Test #2 – BC6 Mid Crusher 2 Discharge with suppression OFF

Test #3 – BC6 Mid Fines Discharge with suppression OFF

Test #5 – BC6 Tail Crusher 1 Discharge with suppression ON

Test #6 – BC6 Mid Crusher 2 Discharge with suppression ON

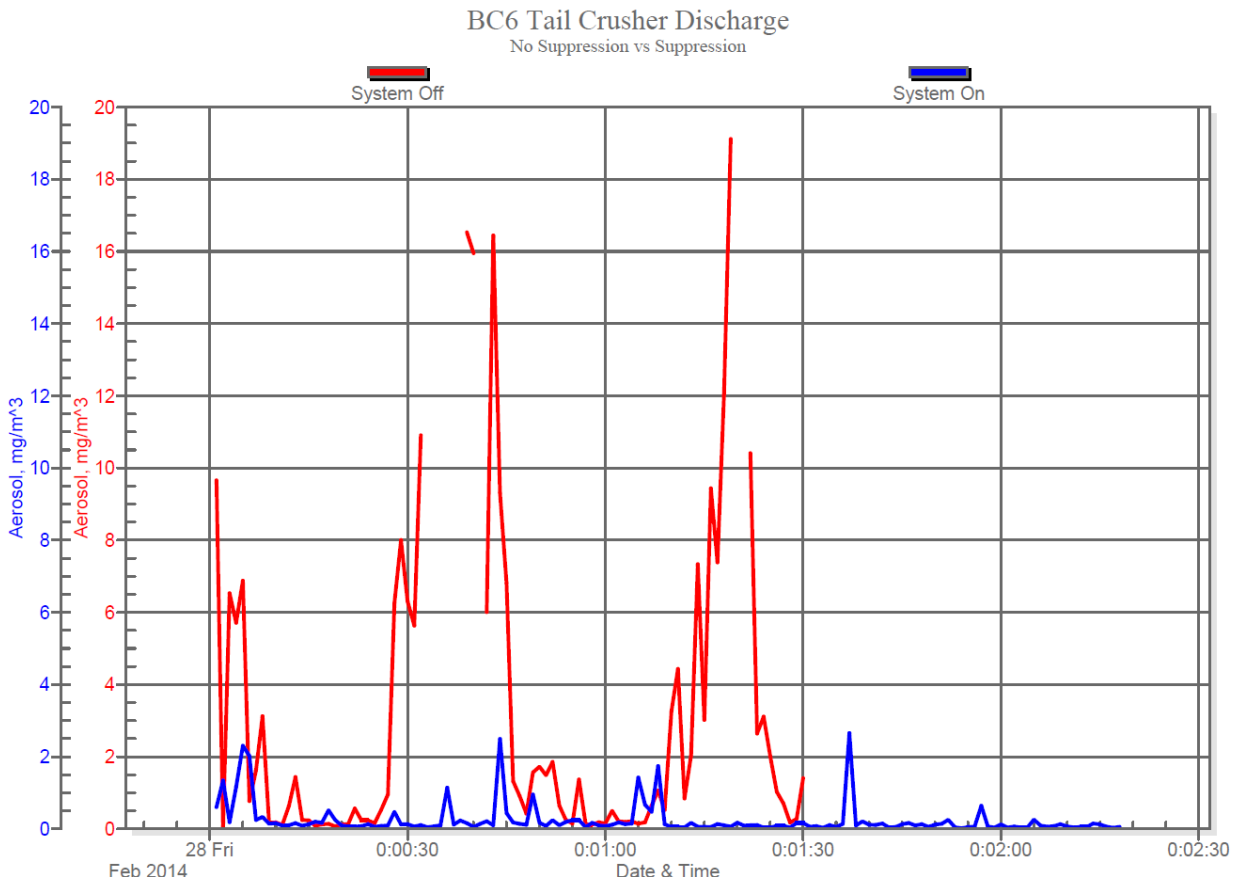
Test #7 – BC6 Mid Fines Discharge with suppression ON

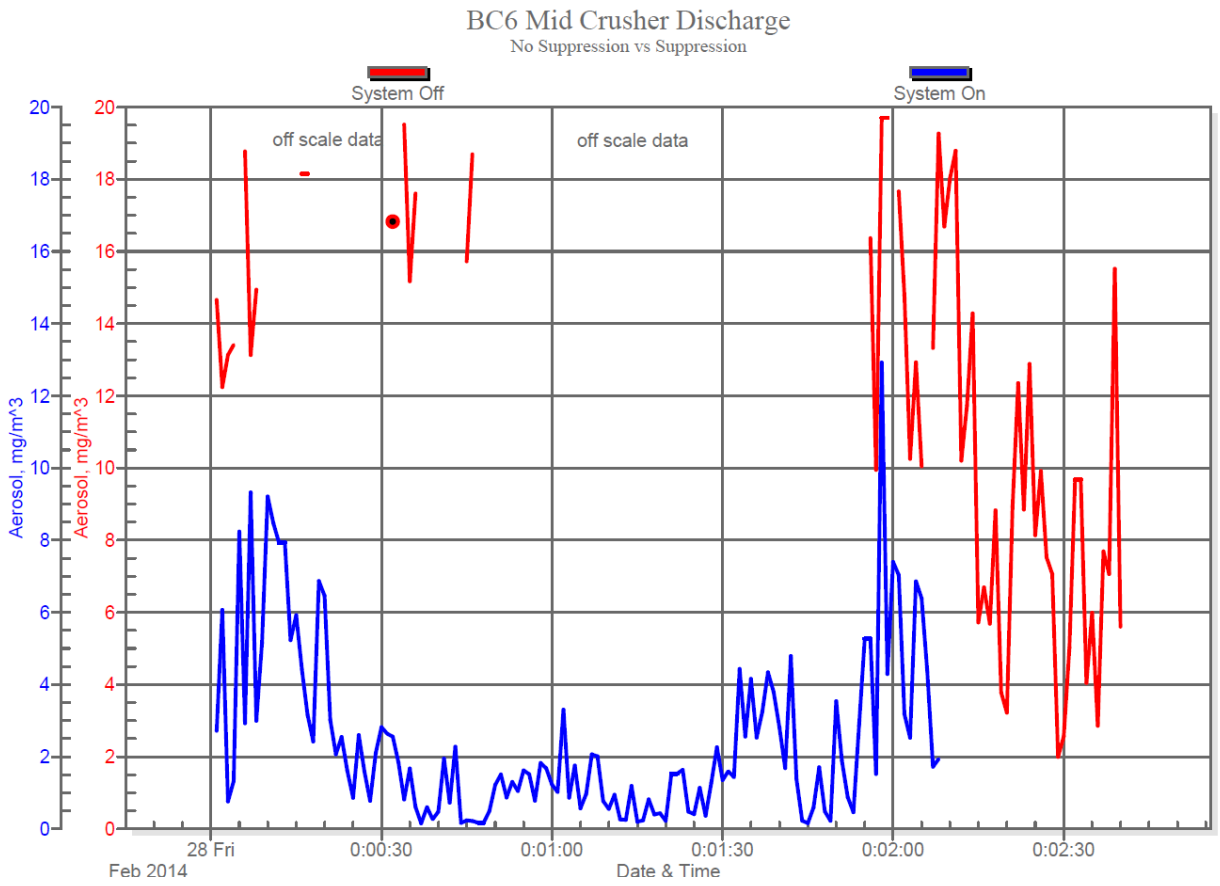
The Pictures below show the placement of the sampling instrument and probe:

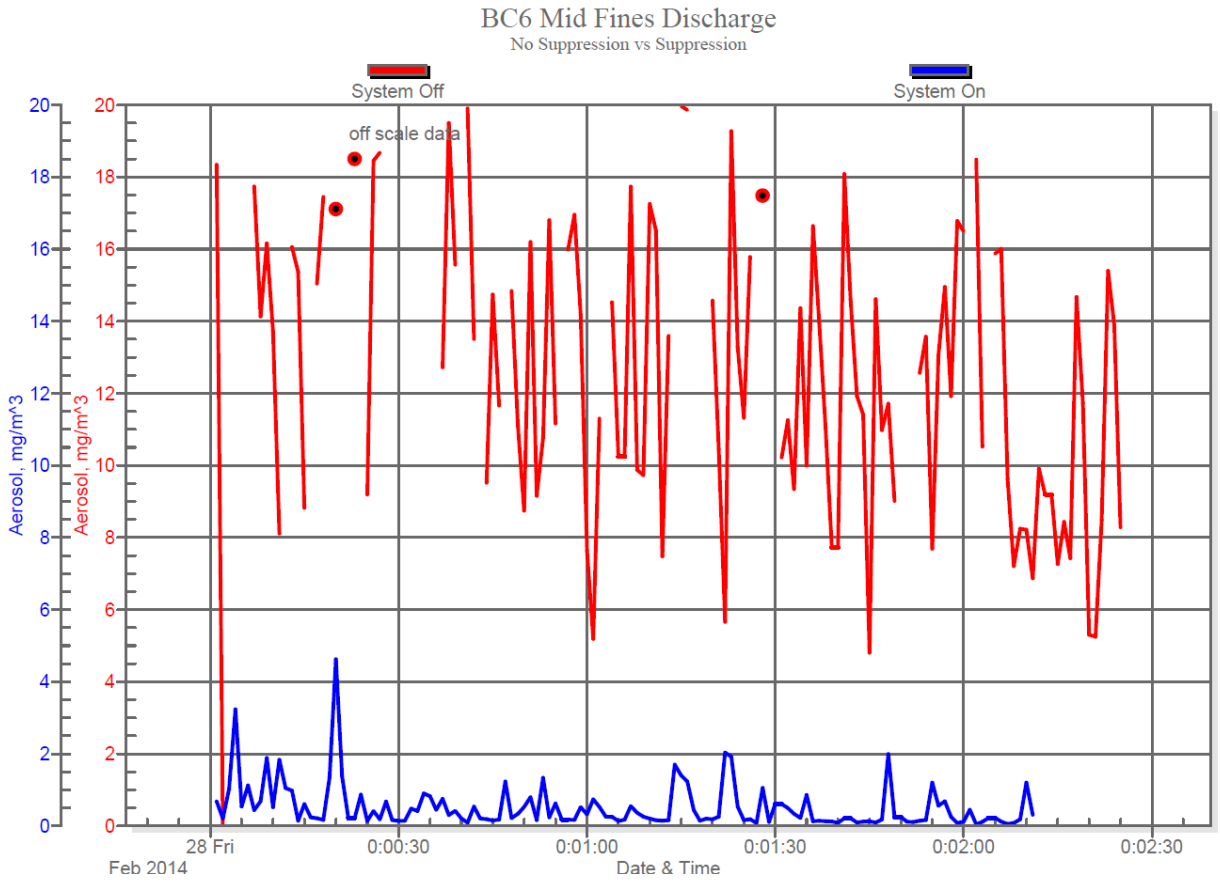


TEST RESULTS

The results show a clear and dramatic reduction of measured and visible dust levels at all three positions. The effect is most visible on the three comparison graphs and accompanying pictures as displayed on the following 3 pages:


BC6 Tail Crusher Discharge
No Suppression vs Suppression
System Off
System On
Aerosol, mg/m^3
Aerosol, mg/m^3
0
2
4
6
8
10
12
14
16
18
20
28 Fri
Feb 2014
0:00:30
0:01:00
0:01:30
0:02:00
0:02:30
Date & Time


BC6 Mid Crusher Discharge
No Suppression vs Suppression
System Off
System On
off scale data
off scale data
Aerosol, mg/m^3
Aerosol, mg/m^3
0
2
4
6
8
10
12
14
16
18
20
28 Fri
Feb 2014
0:00:30
0:01:00
0:01:30
0:02:00
0:02:30
Date & Time


BC6 Mid Fines Discharge
No Suppression vs Suppression
System Off
System On
off scale data
Aerosol, mg/m^3
Aerosol, mg/m^3
0
2
4
6
8
10
12
14
16
18
20
28 Fri
Feb 2014
0:00:30
0:01:00
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0:02:00
0:02:30
Date & Time

Of further significance is the benefit at downstream transfers as the pictures below indicate.

SUPPORTING EVIDENCE

Attached to this report, the reader will find the actual captured data in raw format. This data is in its original format and can be correlated with the relative graphs.

A further break-down of results is presented in the form of data statistics for each sample. The statistics pages highlights calculated averages, minimum and maximum levels recorded during each sample.

We have also taken several pictures that could be made available.

PROBLEMS EXPERIENCED DURING THE TEST

The system was set up with the minimum of outside control from the plant. Manifolds at the crushers did not react to starting and stopping and was dependent on permissives related to BC6 running with material on belt. Therefore these manifolds were constantly on, whether the crushers were discharging or not. This caused some degree of water spillage at times and excessive belt wetting.

These problems are not experienced on permanent installations as each treatment point reacts to the starting and stopping signals from the relative plant equipment.

CONCLUSION

Although the test system is slightly undersized for the application in this case, it is clear that it did significantly reduce dust levels during the test.

If anything in this report remains unclear, or if the reader requires more information, please do not hesitate to contact me.

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