



# Dealing with the fine particles

*When it comes to complying with standard dust suppression practices, there is no cutting corners. Mines in South Africa have to up the ante by utilising methods that are cost effective, efficient and environmental friendly.*

"It's costly. It's an extravagance. It's cumbersome." What other 'convincing' reasons do mines have to come up with to rationalize poor compliance or sheer noncompliance with standard dust suppression and management practices? If only they knew the real cost of their negligence. To get to the bottom of the matter, African Mining Brief has gathered expert perspectives from the leading suppliers of dust suppression systems to mines in South Africa and other African countries.

### Negative consequences

Patrick Schoutens, CEO of Soil Solutions (International), says mines pay a much higher price for inefficient dust suppression than they imagine. He mentions some of the negative consequences as: increased liabilities due to safety and health issues that affect employees, increased expenditure with little to no positive result, increased vehicle and aircraft maintenance, and decreased tyre life due to poor rolling resistance which effects the driver with poor ride conditions, as well as decreasing work cycle efficiencies.

He adds: "Other experiences that mines may encounter are unnecessary operating expenditures should the dust management system not be implemented in a cost effective and sustainable manner, increased closure liabilities that can impact the financial rating of a mining operation, particularly with the use of hydrocarbon based products and other "waste" products which are not "purpose fit" for dust abatement, and have adverse environmental implications.

Adding to the list, Howard Behrmann, Managing Director of Dakota Equipment, cites increased wear and tear on equipment; potential of fire hazard; drift of dust to neighbouring properties; complaints and law suits from neighbours; respiratory danger to humans who breath in dust both on your site and also neighbour's sites; fines from Department of Mineral Resources (section 58); lawsuits by site

personnel, DMR and neighbours; and potential insurance complications.

### Typical dust suppression challenges

One of the most overlooked facts when it comes to implementing dust control measures is the obligation mines face to create a balance between efficiency, safety and environmental impact against cost and a profitable investment and business model. All the more, the fact that they have to deal with, not dust from a single source, but several complicates the task. Schoutens mentions the main sources as underground, mine tailings, mine haul roads and active points of transfer.

### What solutions are suitable?

With growing water scarcity and the burden for mines to ensure that their operations are environmentally friendly, traditional methods that incorporate the use of products that require large use quantities of water, waste water and increase leaching of chemicals into the ground water have become obsolete. However, one should bear in mind that there is never a single intervention for all dust management challenges, as there are different sectors for which effective dust control is required. As a result, each challenge has to be treated according to its merits. But how do mines deal with them? Leading suppliers have solutions that mines could exploit.

The following are some of them:

#### (i) Mine tailings

EBS Soil Stabilizer, a product from Soil Solutions has proved highly effective. Allowing for one application, it performs for 8-10 years. It has eliminated the need for expensive and maintenance intensive irrigation systems and water, in some cases rock cladding.

#### (ii) Mine haul roads

The construction and maintenance of mine haul

roads is one of the largest capital expenditures of a mine. Soil Solutions' EBS Surface application for Effective Dust control on Mine Haul roads reduces operational costs, maintenance and water demand. This is very important as the efficiency in work cycle and productivity of the mine depends on its roads. EBS Surface application prolongs tyre life and leads to decreased carbon emissions. Its usage saved a mine in the DRC one million of litres of water per day while on a mine located in Tanzania, it reduced the life cycle cost of the haul road by over 240 million Rands.

#### (iii) At points of transfer

When dealing with dust at points of transfer mines can make use of the following products:

##### 1. Industrial dust machines

At points of transfer, Industrial Dust Machines from Soil Solutions have proved reliable in capturing dust particles in a moist blanket while airborne, significantly reducing environmental impact.

##### 2. Dust dominator

There are a few solutions on the market, from huge water blowers powered by pumps to sprinkler systems that get installed all over the plant. Dakota Equipment has devised a cost effective and flexible solutions for suppressing dust called a dust dominator, which uses water as the main ingredient to suppress dust.

The dust dominator is a 800mm diameter ring with nozzles fitted on the inner ring. The nozzles spray a fine mist and can be aimed directly on the dust effected area. The ring is split into four quarters and can be manipulator in various ways to create the ideal dust suppression solution. Behrmann explains that the dust dominator is water and energy efficient, making its running costs affordable. Recommending it to mines, he says: "Twenty years of knowledge goes into this



machine, ensuring reliability and durability in the harshest conditions."

#### (iv) CO2 assessment

Soil Solutions has systems that can assess the CO2 emissions when its dust abatement technologies are implemented, thus providing not only significant cost savings but reduced carbon emission and the associated Carbon Tax liability.

#### Gauging compliance

While there is high level of compliance with dust suppression standards in mining in first world countries, Schoutens describes the industry in most developing countries like South Africa as being on a learning curve" stage. Behrmann says the main cause of low compliance is high level of laxity in mines, characterised by instances where dust control has been reactive rather proactive. "Sometimes it is only when the big stick is looming that action takes place," he bemoans.

But Schoutens sees strong indications of a turning point. He firmly believes the two factors of recent and ongoing class action court cases and the growing demand for mineral resources - should eventually lead to an attitudinal change. "Hopefully the heavy financial penalties being implemented and the positive incentives from efficient dust control should lead to a turnaround."

Behrmann finds the recent development encouraging. "All actions of increased compliance resulting in reduced levels of danger and/or liability are very welcome. If the pendulum has swung from reactive to proactive, this is a good thing." Additionally, he states that while, historically mines have attached more importance to safety than dust control there is a change of attitude is noticeable. "The significance of dust control has been underestimated for many years. However, in today's world of increased awareness and increased potential liability, it has thankfully moved higher up the list."

#### Raising awareness

Stressing the significance of raising awareness on compliance, Schoutens says the market and mining management need to be educated concerning the environmentally compliant solutions that do exist, as well as the life cycle cost benefits as opposed to traditional methods. Schoutens urges dust

suppression and control solutions suppliers to lead the way by raising awareness. Revealing that Soil Solutions is playing its part by educating industry professionals about the alternatives available that are cost effective, sustainable solutions, he says: "We work directly with each client to ascertain their particular needs, objectives and challenges and then develop specifically tailored solutions to be implemented which result in guaranteed substantial cost savings, water savings and reduced environmental impact."

#### Enormous benefits

Describing the advantages of compliance as a "no brainer", Schoutens says whereas legal and environmental compliance might seem convoluted, it has been substantially established that it leads to higher profitability, better safety records, decreased worker absenteeism, higher work cycle efficiency, better public image and reduction in closure liabilities.

#### Institution, monitoring and enforcement

Schoutens says compliance has to be examined from two angles - on the one hand the public and shareholders (and stock exchanges); the ability of government to institute, monitor and enforce the legislation on the other. He laments that, unfortunately, in South Africa the government has not been able to police the industry effectively.

But he is hopeful that the Carbon tax legislation being implemented should help change this, as it will compel the mining industry to look at its impact more carefully as now it will be affecting their bottom-line. "As it has been proved in other countries only effective policing and monitoring can bring about change."

#### Informed product choice

These days mines are spoilt for choice what with an influx of products from all corners of the world. This has also brought a major inevitable challenge: questions about of the products. And considering this situation, Schoutens' sage advice to mines is to only choose solutions that would serve their objectives reliably.

He says: "By and large, the dust suppression solutions should have the following qualities: easy to implement or apply; able to reduce water

consumption (not increase it); can be applied without the need for specialized or dedicated equipment or vehicles; have a high performance level, thus requiring applications on a annual not daily basis; have the ability to perform under the weather conditions; no requirement for expensive and maintenance intensive irrigation systems; UV and water resistant; and most importantly they should be environmentally compliant and that will ensure a reduced environmental footprint, as several of the large mining operations operate near eco sensitive areas."

Schoutens says it is futile to cling to obsolete means of the past. "Technology and improved and simplified application methods have made compliance easy, now the mining industry as the decision makers, must change the old way of thinking and implement the new and improved technologies that are now available." On the other hand, on the importance of investing in effective solutions, Behrmann emphasises: "Mistakenly, some people will perceive dust control to be a random water spray being propelled into the air by a large fan. This cannot be more removed from the truth. Dust control is a science incorporating many engineering factors to ensure maximum efficiencies for minimum costs."

#### Confronting a different kind of beast

Doug Hutson, Managing director of Colliery Dust Control, which is a company that mainly supplies dust control solutions to mines, confirms that the effects of poor or inadequate compliance are also experienced in an underground coal colliery scenario. He says suppressing dust in an underground coal mine scenario where the board and pillar extraction is used is a different kind of beast altogether. "The main challenges are poor compliance by workers operating the equipment and design challenges as seams get lower and space is at a premium."

Hutson says new technology has enabled the easy management of dust in an underground mine where the board and pillar extraction is used. "Current technology for board and pillar extraction monitors scrubber performance and reduces noise levels. In addition, it improves fan performance, reducing power requirements."