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VENTILATION THE LIFELINE UNDERGROUND

Efficient ventilation systems are critical for safe underground working conditions, providing fresh breathable air as well as diluting and removing flammable and exhaust gases.

Without proper ventilation, methane and other gases build up, potentially resulting in explosions and fatalities.

According to mine ventilation specialists, Howden, there are a multitude of factors impacting and, potentially compromising, the quality of air underground for workers, including small spaces, minimal ventilation and vehicle emissions.

It is more important than ever to recognise the role that fans play in ensuring safe operations by expelling pollutants and heat to the atmosphere, while also adhering to noise attenuation requirements.

CONTINUED ON PAGE 104



DISCOVER THE
MSA GALLET F2XR
MULTIPURPOSE
FIRE HELMET

See more on page 140

ENVIROMIST DUST SUPPRESSION TECHNOLOGY

Exposure to respirable dust in mining environments has been shown to lead to lung diseases such as pneumoconiosis (i.e. silicosis), and cancer as well as pulmonary diseases. The Occupational Health and Safety Act and associated regulations - both state and federal - put the onus on mine owners to reduce the risk to both workers and the environment from dust emissions.

EnviroMist is a leading developer and supplier of High Pressure Dust Suppression Systems capable of significantly reducing dust in difficult environments such as ROM Bins and Coarse Ore Stockpiles without affecting ore moisture levels. EnviroMist utilises its R&D findings to implement systems that determine the actions/mechanisms which cause dust creation and then develop solutions to suppress the dust by injecting billions of micron sized droplets to the most appropriate locations. In ROM Bins this normally involves creating a pressure curtain which resists penetration by the air generated during truck dumping operations. COS systems involve positioning the sprays

and increasing the nozzle exit velocity to intersect falling material streams at a location where the material stream separates due to gravitational acceleration. The challenge with COS systems is to design the system to operate efficiently in adverse wind conditions which render low pressure dust suppression systems ineffective.

Research has shown that to effectively capture an airborne dust particle with a water droplet the water droplet diameter needs to be of similar size to the dust particle. When water droplets are much larger than dust particles, the dust particles are less likely to be captured. Most low pressure dust suppression systems cannot reduce the droplet size sufficiently for efficient dust capture, and therefore require the injection of large volumes of water to improve dust capture efficiency. This leads to downstream material handling issues, as ore streams become oversaturated. EnviroMist high pressure systems create an average droplet size of approximately 38 micron - meaning that these systems produce 7 trillion water

droplets in a standard truck dump cycle, yet only consume approximately 200 litres of water per dump cycle. The large number of droplets produced, along with their positioning within the confines of ROM Bins significantly increases the chance of dust capture therefore reducing fugitive dust emissions from the Bin.

Design developments from a recent project have shown that EnviroMist spray bars and nozzles can also operate on much lower pressures without significantly increasing droplet sizes. The main advantage of lower pressure systems is that energy consumption is reduced compared to high pressure systems, but as the exit velocity (or energy) of the water is significantly reduced, lower pressure systems require a higher number of nozzles to resist the air flows from dumping operations and still effectively capture dust emissions.

A recent project at Peabody Energy's Wambo mine resulted in significant reductions in respirable dust around the working areas of the longwall. An existing spray system was replaced with a custom

designed EnviroMist spray arrangement which utilised existing pumps on the longwall for spray water supply. Water consumption levels for the design limited water consumption to a maximum of 63 l/min at the highest operating pressure. After installation and adjustments during commissioning of the system, an independent testing company determined respirable dust level reduction of between 60-80% when compared to the original spray system operations. The impressive results are a result of the combined efforts of the Mine Engineering Team and EnviroMist Engineers.

EnviroMist systems have been applied to many types of ore and operations - from longwalls and other Coal handling equipment in underground mines, ROM Bins and COS stockpiles in Coal surface mines, Iron Ore mines in the Pilbara region, and materials handling equipment within hard rock mining operations.

For more information visit
<https://www.enviro-mist.com.au/>

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