

# VENTILATION

**A new centre of excellence is aimed at assisting underground mine operators better plan for the future. Jamie Wade writes.**

## now centre of attention

**I**ndustry attitudes to mine ventilation and energy management are set to change – and dramatically.

As underground mining in Australia goes deeper, many mine operators can expect to face infrastructure constraints and higher capital and service costs.

In particular, mine ventilation and energy management will be the focus of increasing attention in Australia, according to Steven Bluhm CEO of the South African mine ventilation, refrigeration and cooling consulting engineering group BBE.

BBE has joined technical consulting services provider Snowden to provide an integrated mine ventilation and energy management centre-of-excellence based in Perth and serving the Australasian mining sector.

The problems with in-

adequate infrastructure to deal with ventilation, says Bluhm, will become more complex as mines get deeper, equipment fleets become larger and regulations become more onerous.

“Mine operators often run into ventilation problems because they don’t always consider the extent of where they want to go in their long term planning,” Bluhm told *Australian Mining*.

Senior ventilation consultant with the centre Leon van den Berg agrees, and adds that cooling and energy management in underground mining also requires forethought in planning.

“Ventilation engineers design for 20 years ahead because that’s when a mine’s going to need most of its ventilation air and cooling and when the mine

will experience higher system resistance. It’s critical to ensure that ventilation fans and refrigeration equipment can meet the mine’s ultimate requirements,” van den Berg told *Australian Mining*.

### Health and safety

Increasing attention to health and safety has been one of the most significant changes in underground mining, says Bluhm, and one of the biggest drivers for technological advances in managing hazardous emissions and heat stress.

“The emphasis on safety is the biggest change I’ve observed and not just in how stringent safety standards are becoming. People are starting to realise that there’s more than just the obvious things that could harm a person over a long period,” Bluhm said.



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"A recent study out of the US that measured the exposure of diesel particulate matter on the human body over a long time showed strong links to cancer.

"Contaminants from the equipment used in underground mining also put more strain on the ventilation system and how ventilation networks are managed." Another health and safety area in underground mining that has seen significant improvements, adds Bluhm, is heat stress management.

"Heat stress or heat index is directly related, statistically, to accident rates; it's also directly related to productivity. There's quite a clear relationship between the two. Being able to model a mine to cool it with software simulation tools such as VUMA has made it possible to reduce work temperatures," Bluhm said.

"While it's possible to design an underground mine for a certain air temperature so people can safely do their job, there are certain



Proper ventilation is crucial, with high DPM levels linked strongly to incidences of cancer.

areas outside that temperature range that are difficult to control through design. That's where it becomes dangerous because that's where heat stress cases are found."

## Computing power

Another area of significant change in mine ventilation and energy management is in computing power and how it can model different situa-

tions and scenarios within a ventilation network.

"In terms of ventilation planning it's a lot easier these days to run a number of 'what if' scenarios and simulations within a short period of time," Bluhm said.

"That provides much more flexibility in risk management and hazard management. With the modelling technology available today, there's no excuse for

not considering a situation or scenario."

In particular, major advances in fire simulations can be used as an input tool into risk assessments.

"Exploring potential scenarios in an underground mine such as fires in certain areas and regions can feed back into emergency preparedness planning and emergency response planning," Bluhm said.

## Energy management

Simulation technology is also delivering significant efficiencies and cost savings in energy management for underground mines, adds van den Berg.

"We've been able to achieve significant power savings by controlling the ventilation system to match the air flow of certain work times during the operations," he said.

"In a large gold mining application, for example, an 18 megawatt load was taken from the power grid during a two hour shift change.

"Effectively managing the temperature of an underground mine through the use of simulation software not only avoids heat stress it optimises cooling equipment and air flow thereby achieving energy savings," van den Berg said.

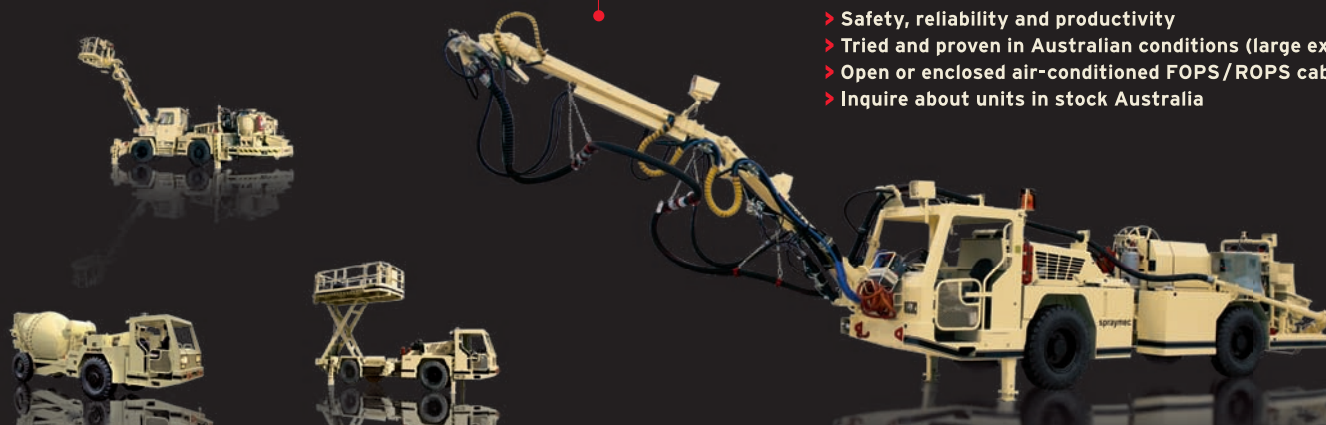
Effectively applying simulation technology to power use in an underground mine not only reduces consumption and improves the bottom line, says van den Berg, it reduces the carbon footprint.

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