

# Improving mining H&S through collaboration

By  Danette Breitenbach

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Health & Safety (H&S) go hand in hand in the mining industry, but while there has been a huge improvement in safety, health has been largely ignored or left behind.

The Wits Mining H&S Safety Research Group has undertaken to fix this, by showcasing and sharing research in the various disciplines from mining to public health. “The hope is to promote cooperation and integration to generate ideas that will solve health problems in the mining industry,” says Fred Cawood, director: Wits Mining Institute.



Professor Fred Cawood

The group’s first seminar took place at the University of the Witwatersrand School of Public Health, where a number of post-graduate research project was showcased. Ventilation emerged as key theme.

## Foam-based dust control

While the mining Industry has adopted various water spray dust suppression systems to control dust, Norman Khoza, occupational hygiene specialist at Transnet and occupational health and safety specialist at Wits is examining the use of foam-based dust control technologies and its efficacy and efficiency as well as feasibility in the mining and railway industries.

“As smaller particles are more surface reactive, occupying a relatively larger surface area of the lungs, spray based dust suppression systems are not enough. Foam prevents the release of the dust before it is airborne,” he explains. This technology is already in use overseas, but not in South Africa.

In a video presentation Dr Tariq Feroze, senior lecturer at the University of Sciences and Technology, discussed how he overcame the problem of carrying out experiments underground as it disturbs the mine production cycles. “To date no mathematical models or empirical formulae exist to estimate the effect of associated system variables on the flow rates close to the face of the heading,” he says.

## **Face ventilation systems**

By using computational fluid dynamics (CFD) advanced numerical code ANSYS Fluent, the effect of a number of system variables associated with the face ventilation systems used in blind headings could be studied. The CFD model was validated using four validation studies.

The research reveals that the ANSYS numerical code is an appropriate tool to evaluate the face ventilation of a heading in 3D environment using full scale models he told the research group.

“While the South African coal industry can benefit from the outcome of this study in a number of ways, the research also has the potential to provide a significant step forward, by understanding airflow rates delivered by auxiliary devices close to the face of the heading and the air flow patterns inside the heading as a basis for improving the working environment for underground mine workers,” he adds.

## **Diesel exhaust emissions**

Amu Modau, SHEQ manager at Modikwa platinum mine and currently pursuing a PHD in public health, shared her plan for her studies on the burden of air pollution from diesel exhaust emissions in underground South African mines with the hope of developing a risk decision support system.

The monitoring of diesel exhaust emissions in underground mines remains a challenge in South Africa she says. “The exposure to diesel exhaust emissions in the underground setting is of great concern because of the confined spaces in this environment.”

## **Occupational lung disease**

Other presentations were by Zodwa Ndlovu, lecturer in epidemiology and biostatistics at Wits School of Public Health on her findings on occupational lung disease in South African miners.

Based on data for autopsies which is the only long term information on occupational lung disease in South African miners, her findings have led to improved practices, prompting a review of approaches to mesothelioma diagnosis and provide information for the monitoring of initiatives to control silicosis and TB.

## **Rock mass behaviour**

Seismic events, rock bursts and fault instabilities are prime concerns during the final phase of ore extraction at the deep Cooke 4 shaft in the West Rand gold mining district. Large seismic events often result in infrastructure damage and casualties.

Siyanda Mngadi, a PHD student in geophysics, seismic reflection and mine seismicity at Wits, undertook integrated petrographic, geo-mechanical and seismological studies of rock mass behaviour during the final phase of ore extraction at the shaft.

The shaft, which opened in 1960, closed in 2001, and then reopened in 2010 to exploit the upper Elsburg Reef in the shaft pillar. “Core analysis showed ubiquitous discing indicative of high stress and it was concluded that micro-seismicity is largely influenced by structural discontinuities and ore extraction operations and by rock composition and geo-mechanical properties in underground conditions,” he says.

The research group plans to meet twice a year to share and discuss issues in the health and mining space.

## ABOUT DANETTE BREITENBACH

Danette Breitenbach is a marketing & media editor at Bizcommunity.com. Previously she freelanced in the marketing and media sector, including for Bizcommunity. She was editor and publisher of AdVantage, the publication that served the marketing, media and advertising industry in southern Africa. She has worked extensively in print media, mainly B2B. She has a Masters in Financial Journalism from Wits.

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