



Web page summary

**Mine Health and Safety Council  
Research project name SIM 14 02 01**

SIM 14 02 01	<i>Training extension for the adoption of a risk-based approach to support design in Bushveld underground mines</i>		
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<b>Category:</b>	Technology Transfer	<b>Applied Research</b>	SIM 14 02 01

**Summary**

Technology transfer of a risk based support design methodology was carried out during 2015. The technology is intended to assist with mitigating the risk of falls of ground in Bushveld underground mines.

**Background**

The project was commissioned as an extension of the previous technology transfer project, SIM 12 02 01 to apply research outcomes of the risk based support design study, SIM 06 02 01 Track B, to the industry. The purpose of the technology is to provide a scientific tool to rock engineering practitioners for the design of suitable support systems to minimise, with the view to eliminating, the risk of falls of ground in Bushveld underground mines.

**Objectives of the Study**

Following the outcomes of the first technology transfer initiative, completed in 2013, it was revealed that an extended programme was required to equip a wider field of rock engineering practitioners and improve the understanding of risk based support design. To this end, the training and review programme was revised to include additional courses and facilitate hands-on review of the results to promote the completion of risk based support designs by the participating practitioners.

**Methodology**

Risk based support design comprises three basic elements:

1. Preparation of input data, i.e. geotechnical, production and support data. This entails underground data gathering through rock mass characterisation, quantitative support compliance auditing and data gathering across multiple departments to obtain the additional information. Data is then processed and interpreted for input into the risk analysis.
2. Hazard quantification, i.e. rock fall analysis using JBlock.
3. Risk evaluation, i.e. integration of rock fall hazard distribution with consequential economic and safety outcomes to quantify a risk profile for the

operation

The programme consisted of five training courses presented in the western and eastern limbs of the Bushveld mining industry.

**Results**

74 rock engineering practitioners participated in the programme, resulting in the completion of 17 risk based support design project reports. This constituted a marked improvement in understanding, participation, data collection and interpretation following from the first technology transfer project (SIM 12 02 01).

Results indicated that participants were variably equipped with the necessary resources in terms of hardware, software, data, time and skills, hence revealing a need within the industry to promote and troubleshoot obstacles preventing the optimum development and implementation of the technology.



Figure 1.

**Underground data capture illustrating the use of simple mapping tools**

**Conclusions**

The SIM 14 02 01 technology transfer project was successfully completed with substantial improvement over SIM 12 02 01. Potential for further development of the technology and continued training in skills was revealed. The principles of risk based support design were suitably well applied by several practitioners such that fall of ground risk mitigation using the technology will be possible on their respective operations going forward.

**Recommendation**



**MHSC**

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Several significant challenges remain within the industry which need to be addressed to achieve successful fall of ground risk mitigation using this technology. The role of rock engineering practitioners needs to be addressed, while technology development needs to continue.