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Rock Engineering awareness training and its benefits

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Exxaro's new rock engineering training centre – at Matla Colliery in Mpumalanga - is an extension of the existing Human Resources Training Centre but focuses on rock mechanics and the causes of rock failure in the underground environment. However, this state-of-the-art facility has taken training one step further and now, in a class of its own, brings rock failure mechanics to underground employees in a practical, visual and easy-to-understand way that is rarely seen in the mining industry. Training offered at the centre, which will be mandatory for all Exxaro underground workers, will be done with the use of over 60 models that have been carefully created over the past few years. These models are mechanised, using either electronics or hydraulics and simulate the consequences of rock mechanic failure in an underground environment.

The idea of the training centre, using models, came about after Danie Snyman took over as Chief Rock Engineer in 2008 at Matla and Arnot Coal. Faced with ongoing challenges related to underground personnel interpreting ground conditions incorrectly and implementing ineffective control measures, awareness training became a priority.

The first aim was to demonstrate that rock failure was not always as a result of gravity acting on the rock mass but that horizontal stress played a big role in strata control problems experienced in the underground workings. Through the combination of practical experience and theoretical background, Snyman's idea of using models in a training environment slowly evolved. It has however, taken about two years to reach this point, as each model had to be based on an actual event and/or happening underground and then slowly pieced together in a planning stage. Once the basics behind an event had been worked out, planning of the model could start.

Months of planning and deliberations went into this – and many sleepless nights transpired but finally one-by-one the models took shape using material and mechanisms that could closely resemble the strata behaviour. Electronics and hydraulics were added where needed and for the most part, these models are now easy to use, extremely visual and everyone who passes through the centre's doors will walk away with a better understanding of mechanics of rock failure and the effective control measures to combat rock fall accidents. By using models, everyone – from top management down to the lowest levels of workers – can see what the consequences are of any behaviour in the rock mass.

The benefits of the model based training are countless and among the key achievements is the significant improvement in the safety statistics at Arnot Colliery in Mpumalanga. Once, one of the most challenging underground coal mines in South Africa, the number of Fall of Ground related accidents have steadily declined up to the point where no accidents have been recorded since 2012.

This training facility is a work in progress and new models are added as new ground conditions are encountered. The short term planning for the centre is the introduction of models explaining the conditions related to pillar extraction. Also part of the planning is the introduction of virtual reality recreation and computer based training in order to assess the knowledge of the students before being sent to work in underground production sections.

Although this centre focuses on rock mechanics in the underground coal mining environment, it can serve as a corner stone for other commodities to follow.

