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# Understanding and Modelling Squeezing Ground Conditions at the Ballarat Gold Mine

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## ABSTRACT

When a highly anisotropic or weak rock mass is subjected to high-stress conditions, it can lead to large ongoing deformations or squeezing ground conditions. Squeezing ground conditions can impose increased support costs, delays associated with rehabilitation, and disruption to production schedules. Ultimately, in more severe cases, it may result in complete drive closure. Several recent case studies investigated the squeezing mechanism and measures to control squeezing ground in underground mines and also to design appropriate ground support systems.

Effective management of squeezing ground conditions requires a sound understanding of the failure mechanism and the driving forces. Once the failure mechanism is understood, the appropriate ground support system should be tailored to specifically manage the critical driving forces that control the squeezing mechanism. Support type, support stiffness, reinforcement length, support density, installation times and mining sequence all have important impact on the effectiveness of the support system.

This paper provides a case study at the Ballarat Gold Mine in Australia, where drive squeezing was associated with foliated ground conditions located below 700 m depth. Numerical modelling was used to better understand the failure mechanism and the driving forces that lead to squeezing conditions. The effectiveness of various support types was compared to installed ground support performance. This has provided a credible methodology for assessing and optimising the selection of reinforcement in squeezing ground conditions.