Mass Mining Technology Project: Seismic Imaging of Induced Fracture Network

CIVIL • ENVIRONMENTAL • MANUFACTURING • **MINING** • OIL & GAS • POWER GENERATION

PROJECT DESCRIPTION

MMT

InSite™

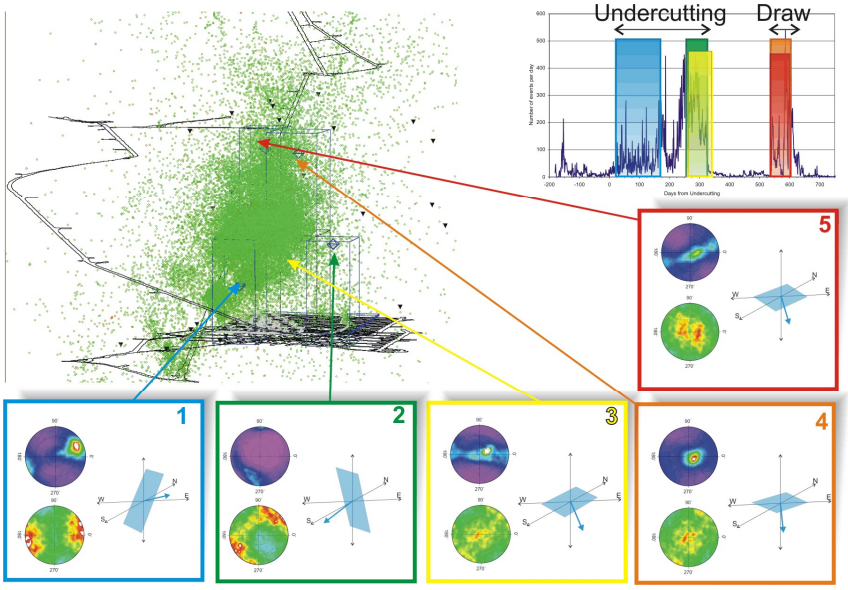
ICL participated in phases I and II of the Mass Mining Technology Project (MMT), an International Collaborative mining research project coordinated by the University of Queensland focused on critical reviews of conventional caving design approaches, collation of common caving practice, and advancing the understanding of the caving fundamentals. ICL role focused on enhancing the information extracted from MS data collected from case study mine to use MS events in the imaging of the fracture network as an essential validation tool for geomechanical models.

Innovative processing methodologies were developed to improve the understanding of the evolution of the fracture network as the rock mass undergoes undercutting and caving.

SRM (Synthetic Rock Mass) experiments were used to model the effects of undercutting and caving on the rock mass using the results from case studies (Northparkes mine, Palabora mine, Kiruna mine, Ridgeway mine) as a basis for the validation of the SRM approach.

The analysis of the evolution of the spatial distribution of MS events to was correlated to mining operations in the different identified domains to test the validity of using SRM tests as a means to predict rock mass response to undercutting and caving.

The mine was categorised into geomechanical domains, the seismic behaviour of each of the domains was used to characterise the difference in the nature fracturing and degree of yielding.



SRMs from each domain underwent tests resulting in the sample exhibiting over 100,000 cracks each. Statistical methods were applied to compare the fractures inferred from seismicity in the mine and those predicted by the SRM as a way of validating the predictive capabilities of SRM tests.

The results from the SRM investigations agreed well with the dominant structure inferred from seismic data analysis indicating that SRM testing may be used for prediction of rock mass response to undercutting and caving.

The study allowed to track the fragmentation of each SRM sample as it fractured which was similar to average fragmentation observed in the mine.

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