Numerical modelling of staged stope extraction in a tabular steeply dipping deposit

Wael R. Abdellah, Haitham M. Ahmed & Mohammed A. Hefni

Abstract:

ABSTRACT Stope stability is a key factor for the success of a mining operation. To optimise ore productivity while maintaining stope stability, the mining block/stope must be extracted in stages. Ore dilution will occur if the stope is not properly excavated/blasted. This study examines stope stability during mining in three stages, where the height of each stage stope is 10 m. The paper also presents simulation analysis of a typical steeply dipping tabular orebody at 1200 m depth below the surface, which is common in many Canadian underground hard rock mines. Numerical modelling analysis was conducted using the finite element program, RS2D, where the non-linear elasto-plastic Mohr-Coulomb failure criterion was adopted. The rock reinforcement system (i.e. cable bolts) was modelled/installed in the stope footwall after each mining stage to strengthen access drifts and stabilise the rock mass around the stope that was disturbed by mining activity. Results are discussed in terms of depth of failure zones, total deformation and axial forces in cable bolts with respect to mining stage.

Keywords:

Steeply dipping tabular deposit; numerical modelling; depth of failure zones; axial forces in cable bolts

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