

Determination of Safe Ore Extraction Methodology beneath Permanent Extraction in a Lead Zinc Mine with the Help of FLAC3D Numerical Model

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Abstract : Structure and tectonics play a vital role in ore genesis and deposition. The existence of a swelling structure below the current level of a mine leads to the discovery of ores below some permeant developments of the mine. The discovery and the extraction of the ore body are very critical to sustain the business requirement of the mine. The challenge was to extract the ore without hampering the global stability of the mine. In order to do so, different mining options were considered and analysed by numerical modelling in FLAC3d software. The constitutive model prepared for this simulation is the improved unified constitutive model, which can better and more accurately predict the stress-strain relationships in a continuum model. The IUCM employs the Hoek-Brown criterion to determine the instantaneous Mohr-Coulomb parameters cohesion (c) and friction (ϕ) at each level of confining stress. The extra swelled part can be dimensioned as north-south strike width 50m, east-west strike width 50m. On the north side, already a stope (P1) is excavated of the dimension of 25m NS width. The different options considered were (a) Open stoping of extraction of southern part (P0) of 50m to the full extent, (b) Extraction of the southern part of 25m, then filling of both the primaries and extraction of secondary (S0) 25m in between. (c) Extraction of the southern part (P0) completely, preceded by backfill and modify the design of the secondary (S0) for the overall stability of the permanent excavation above the stoping.

Keywords : extraction, IUCM, FLAC 3D, stoping, tectonics

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