KINEMATICS AND DISCREET MODELLING FOR RAMP INTERSECTIONS

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ABSTRACT

Geotechnical work was conducted in order to identify the required support length and other important parameters in ramp intersections at a deep level gold mine. The investigation included detailed scanline and joint mapping. Discreet models were constructed and eight different excavation orientations were analyzed in order to obtain a worst case scenario of mining direction. A sensitivity analysis was conducted and the effect of clamping stresses on the hanging wall was quantified. The probabilistic modeling program, JBlock, was utilized to quantify the probable maximum apex height of blocks forming in the ramp intersections. A geo-domain was constructed making use of all the data acquired and was analyzed. Eight excavations were constructed ranging in mining directions from 0 to 315 degrees. The excavations were assumed to have a dip of 8 degrees to ensure the largest blocks are created, subsequently catering for the worst case scenario. The output data created by the software was scrutinized for failed blocks, and cumulative distribution graphs created. In order to understand the effect of clamping stresses in the hanging wall, the worst case mining direction (180 degrees) was utilized and clamping stresses in the hanging wall were varied from 0 kPa to 30 kPa. A 32% reduction in the 50 percentile apex height was attained when the clamping stress increased to 5 kPa, a 43% reduction was attained when a clamping stress of 10 kPa was applied, and a 48% reduction in apex height was attained when the clamping stress was set to 30 kPa.