

عنوان مقاله:

Physical modelling of caving propagation process and damage profile ahead of the cave-back

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خلاصه مقاله:

The cavability assessment of rock mass cavability and indicating the damage profile ahead of a cave-back is of great importance in the evaluation of a caving mine operation, which can influence all aspects of the mine operation. Due to the lack of access to the caved zones, our current knowledge about the damage profile in caved zones is very limited. Among the different approaches available, physical modelling can provide a useful tool for assessment of the cave propagation and understanding the cave-back mechanism. Despite the general belief of the continuous damage profile ahead of a cave, the recent studies have shown a different mechanism of banding fracture. In order to investigate the caving mechanism ahead of a cave, a base friction apparatus is designed in this work. The base friction powder is used as the modelling material for physical testing, where its strength properties is significantly dependent on its unit weight. The effects of the material's unit weight and the undercutting process on the cavability and cave-back height are studied. The experimental results undertaken in this research work clearly confirm the banding fracture mechanism in the caved zone, rather than continuous yielding. The effect of the undercutting sequence on the cave-back height is investigated through three different scenarios of symmetric undercutting with a gradual increase in span, symmetric undercutting with a sudden increase in span, and asymmetric undercutting. The results obtained show that the ground deformation is significantly dependent on the undercutting sequence, where choosing a greater undercutting span results in a faster cave propagation and smaller accessible undercut spans.

کلمات کلیدی:

Physical modelling, Cave mining, Cavability assessment, Banding fracture, Damage profile

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