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Research on Supporting Technology for Production Level Roadways of Block Caving in Pulang Copper Mine

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ABSTRACT

Pulang Copper Mine, being China's largest newly built mine using block caving, boasts an annual production capacity of 12.5 million tons. Production level and roadway stability hold the key to the successful application of block caving. However, with Tong Kuangyu being the only mine in China which has applied such a method, we currently lack relevant experience in the successful application of the method. This paper has studied the influence of different rock mass zonings, fault thickness, fault dip angles and on-site construction quality on the production level and roadway stability of block caving through numerical simulation and analyzed the roadway stability in different kinds of support solutions so as to ensure the successful application of block caving in Pulang Copper Mine. The results have shown that the existing support method in Pulang Copper Mine can meet the requirement of roadway support in zone II and III, but could not satisfy the demand in terms of support strength in the relatively fragmented zone I area. When roadway passes through the fault, the deformation of surrounding rock and plastic zone of roadway will gradually decrease with the increase of fault dip angle; what's more, the deformation of surrounding rock and plastic zone of roadway will gradually increase with the increase of fault thickness. An ideal support effect can be achieved through the joint support of grouting and bolting when roadway passes through the fault. In the measured model of on-site construction, there is stress concentration in the intersection between the access and transverse drift of ore removal. The smaller the tip area of the pillar is, the more evident the stress concentration is. Therefore, we can improve the roadway stability through enhancing the construction quality.