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STABILITY ANALYSIS OF UNDERGROUND CAVERNS IN SOFT ROCK AREA

TRACK NUMBER (1200)

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The stability of underground caverns in soft rock area has become one of the main research topics in engineering. Taking underground caverns of a pumped storage power station in the soft rock area as an example, based on the elastoplastic finite element method, a three-dimensional finite element model of mountain, cavern and soft rock was established, then the ABAQUS was used for the finite element calculation. According to the excavation process, the deformation results with or without support were compared. In the unsupported condition, the right angle area formed by the face to air surface at soft and hard rock intersection and contact surface of soft and hard rock has larger tensile stress, and the corner and intersection of cavern and the main plant downstream abutment has larger compressive stress; The development of the plastic zone of the soft rock region is deeper, and the hard rock region between soft rock also has plastic zone. In the supported condition, the deformation form of surrounding rock is similar to that of no support, but the whole displacement is reduced. The tensile stress value of each key point is reduced, and the tensile stress area is obviously reduced. The distribution of plastic zone is also the same as that without support, and the distribution range is reduced in varying degrees. Part of the soft rock area, where the deformation is large and the plastic zone develops deeper, so the load of the bolt is too large, and some bolts yield. It is necessary to strengthen the monitoring of the displacement of these parts and the stress of the bolt, and the local bolt should be encrypted when necessary.

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