

Design of underground infrastructures in deep and discontinuous rock masses Application to large section caverns

Abstract:

Block stability during excavations is a major and recurring issue of the digging process of underground structures. It is even more important in case of conventional excavation (Drill and blast or mechanical) which involve workers within immediate proximity of the tunnel face. In order to ensure workers and structure safety, engineers have to study carefully the support design and the excavation sequence with appropriate tools.

Based on those considerations, methods of design use three recognizable approaches: classifications of rock mass (GSI, RMR, MRi), analytical approaches of "key block" (based on a limit equilibrium approach), and multi-blocs methods.

The isobloc method developed in Rima Ghazal thesis, is an analytical method based on a rigorous resolution of blocks mechanic problem. It requires entry parameters: geometry of the block, initial state of stress on its faces and geomechanical parameters of joints.

This thesis consists in a study of the representation of a discontinuous rockmass and current design approaches. Then, the principles of the isobloc method and the way to use it in the engineering process are exposed. New developments are explained in order to design sustainment with Isobloc method. Then, applications are expected on an engineering project.