

Rak-32.317 APPLIED ROCK MECHANICS FOR HARD ROCK MINING
Examination 18.10.2005, 13:00 - 16:00, Hall V1

Part 1, questions without course material

1. Select suitable rock bolt type for a rectangular 6 x 4 m (W x H) drift which will be used about 3 years.
 - rock is horizontally bedded limestone, layer thickness 25 cm
 - no vertical or subvertical joints
 - some instant support preferred
 - dry, locally damp conditions

Explain the reasons for your selection.

Describe the structure and installation procedure of the selected bolt (12 p)

2. a) Explain the three modes of support of mine backfill. (9 p)
- b) Why it is advantageous to fill the stopes as completely as possible? (3 p)

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Part 2, questions with course material

3. A stope with rectangular cross-section, with vertical walls and horizontal roof is planned in the depth of 400 m. The stope width is 18 m, height 27 m and length 60 m. The rock is gabbro-type, coarse grained with density of 3300 kg/m^3 . The in-situ horizontal/vertical stress ratio is 2 and the longitudinal axis of the stope is to the north. There are three joint sets (dip direction/dip):
- 250/55 east-wall
 - 80/45 west-wall
 - 350/20

Joint surfaces are planar, rough and slightly altered. Joint spacing is about 0.5 m and joint length is 1 - 2 m. Only minor local groundwater inflow has been observed. The RQD is 92%. The UCS for intact rock samples is 70 MPa.

- a) Estimate the stability of roof and sidewalls with Stability Graph -method. In this case, you can omit the short endwalls of the stope. (18 p)
- b) Design the cablebolting for the roof and sidewalls, if needed. (6 p)
- c) Calculate the modulus of elasticity, Poisson's ratio, uniaxial compressive strength, tensile strength, cohesion and friction angle of the rock mass. (12 p)