HELSINKI UNIVERSITY OF TECHNOLOGY
Rock Engineering
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Mak-32.317 APPLIED ROCK MECHANICS FOR HARD ROCK MINING
Examination 9.3.2004, 13:00 - 16:00, Hall V2

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 20 m, height 20 m and length 45 m. The rock is gabbro-type, coarse grained with density of 3300 kg/m^3. The in-situ horizontal/vertical stress ratio is 1.5 and the longitudinal axis of the stope is to the north. There are three joint sets (dip direction/dip):
   250/55
   80/45
   350/20

   Joint surfaces are planar, rough and slightly altered. Joint spacing is about 0.5 m and length is 1-2 m. Only minor local groundwater inflow has been observed. The RQD is 91%. The UCS for intact rock samples is 75 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 roof and sidewalls, if needed. (6 p)

   c) Calculate the modulus of elasticity, Poisson's ratio, uniaxial compressive and tensile strength, cohesion and friction angle of the rock mass. (12 p)