Aalto University
School of Engineering
Geoengineering/EMC

Rak-32.3510 APPLIED ROCK MECHANICS FOR HARD ROCK MINING
Exam 2012-10-05

Part 2. Use of course material, your own notes, exercise papers, general dictionary and calculator allowed

5 . A stope with rectangular cross-section, with vertical walls and horizontal roof is planned in the depth of 500 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 2.1 and the longitudinal axis of the stope is to the north. There are three joint sets (dip direction/dip):

255/55
80/45
350/15

Joint surfaces are closed, 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 105 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. (15 p)

b) Design cablebolting for the roof and sidewalls, if needed. (3 p)

c) Design reinforcement for 7 m wide and 5 m high main haulage level drift at 500 m depth. (6 p)