

ROCK MECHANICS GLY 364

Test Friday 30 Oct 2001

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Time:-

Total Marks:- 75

Question 1.1 Explain the meaning of :

Q 1.1.1 Residual Stresses (residuele spannings): [4] ... is the stress on the rock mass due to the geological processes over a geological time

Q 1.1.2 Induced Stresses (geïnduseerde spannings): [4] is the stress caused or induced by man activities ^{or excavation} on rock mass e.g. Tunnels, mining excavation, surface excavation and foundations

Question 1.2 Name at least 5 factors causing residual stresses in rock [5]

1. Tectonic Stresses
2. Topographical environments
3. ~~Subduction stress~~
4. Atmospheric Stress
5. Weathering processes
6. Sedimentation processes

Q 2.1 Estimate the gravitational vertical stress in rock at a depth of 2000m [4]

$$\begin{aligned}\sigma_v &= \rho \cdot g \cdot H \quad \text{where } \rho = \text{density}; g = \text{gravity force}, H = \text{height} \\ &= 2700 \times 9.81 \times 2000 \quad \text{density} = 2700 \text{ kg/m}^3 \\ &= 52.97 \text{ MPa}\end{aligned}$$

Question 2.2 List at least 4 important assumptions you are making for Q 2.1 [4]

1. The ^{av} density of a rock is 2700 kg/m^3
2. The gravitational force is 9.81 m/s^2
3. The tectonic stresses are neglected
4. The Induced stresses are also not considered
5. The effect of topography is not considered