Nirma University
Institute of Technology
Civil Engineering Department

CL506 Foundation Engineering

Assignment: 2
Earth Pressure and Retaining Structure

1. Discuss application of Rankineôs earth pressure theory for the design of retaining structures.

2. A wall with a smooth vertical back, 10 m height, supports a purely cohesive soil with c = 9.81 kN/m^2 and ɔ = 17.66 kN/m^3. Determine (a) Rankine active pressure against wall (b) Distance of the point of action of pressure above the base and (c) Position of zero pressure.

3. A counterfort wall of 10 m height retains non-cohesive backfill. The void ratio and angle of internal friction are 0.70 and 30°, respectively, in the loose state while the same are equal to0.40 and 40°in the dense state. Calculate and compare active and passive earth pressure in both the states. Take G_s = 2.7. Give your comments on results.

4. A masonry retaining wall 5 m height retains backfill with a granular soil having an angle of internal friction of 34°. The backface of wall is inclined at an angle of 76° to the horizontal, and the backfill is slopping upward from top of wall at a slope of 1:10. Assuming the angle of wall friction as 18°, calculate the total active earth pressure on the wall per meter length by coulomb earth pressure theory. Consider backfill is having G_s = 2.7, and has got 20% moisture content at 72% saturation.

5. A vertical retaining wall 10 m high supports a cohesionless soil. The upper surface of back fill rises from the crest of wall at an angle of 15° with horizontal. Determine the total active pressure by Culmannôs graphical method. Consider ɔ = 18 kN/m^3, φ = 30° and δ = 20°.

6. The soil condition adjacent to a sheet pile are shown in Figure 1 below. Plot pressure distribution for the wall.

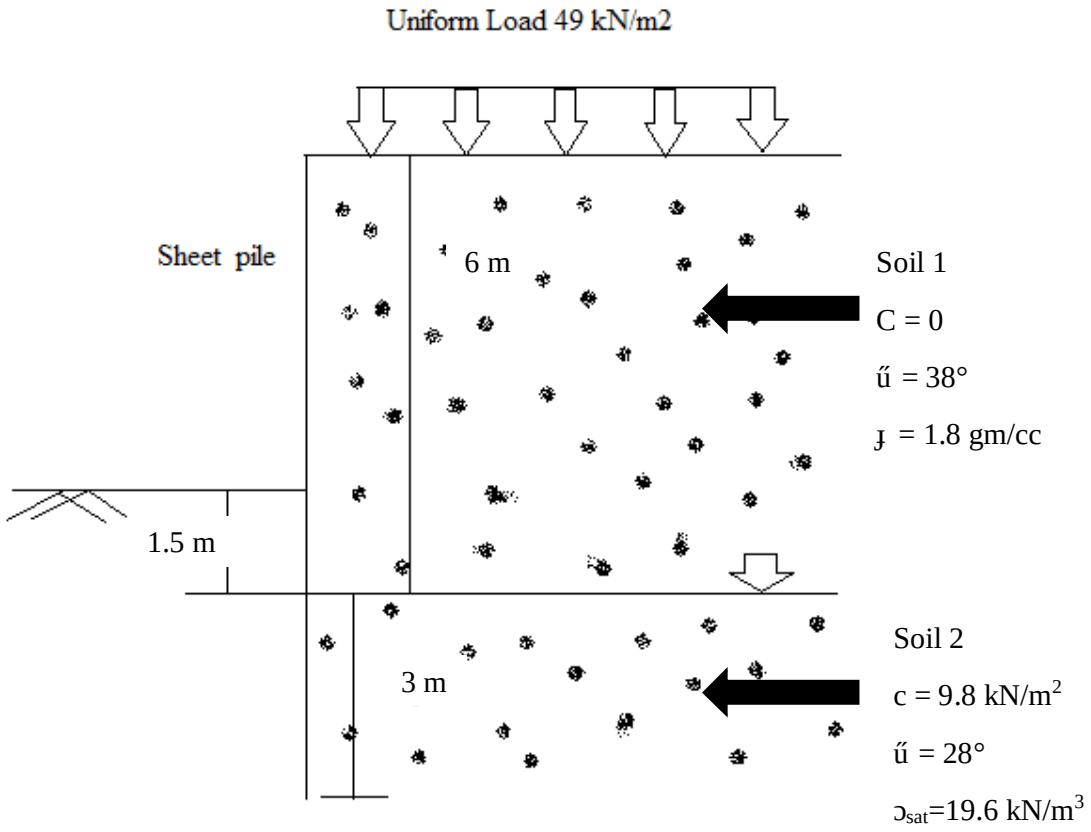

Figure 1

7. Determine required depth of penetration, D, for the cantilever sheet pile wall shown in Figure 2 below:

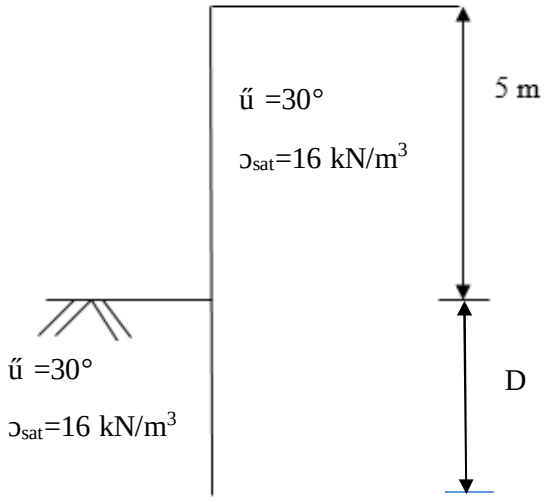

Figure 2