CI250 - Soil Mechanics and Engineering Geology
- Geotechnical analysis -

Tutorial sheet 2

1. Calculate the Rankine active and passive earth pressure for the soil profile shown in Figure 1, with:
   a) zero pore water pressure;
   b) a static ground water table 2m below the ground surface.

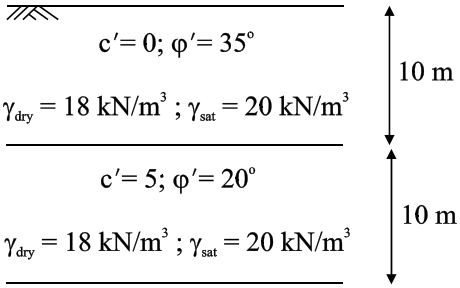

Figure 1

2. Derive the active and passive earth pressure coefficients for sloping ground in cohesionless soil (c′=0). Assume the slope is infinite in extent and has an inclination β to the horizontal.

Steps:
Consider the element of soil shown in Figure 2. By symmetry, the resultant stresses on the vertical side are equal in magnitude and act in a direction parallel to the slope inclination, β. From the weight of the soil calculate the resultant stress on the inclined surfaces of the element. This stress can be resolved into components normal to, and tangential to, the inclined surface.

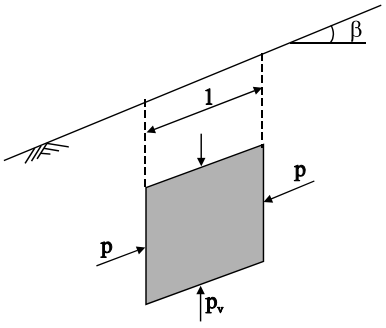

Figure 2

This stress state can be represented as the point A on the active and passive Mohr's circles shown in Figure 3. Use the geometry of the Mohr's circles to obtain expression for the Rankine active, K_a, and passive, K_p, coefficients.

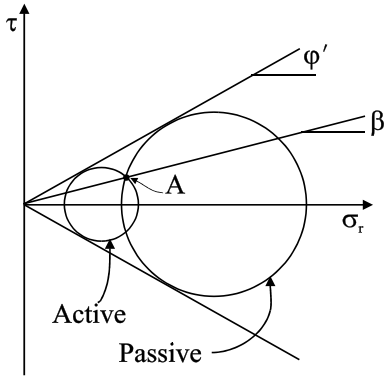

Figure 3