

DESIGN OF PILE FOUNDATIONS

QUESTION 1

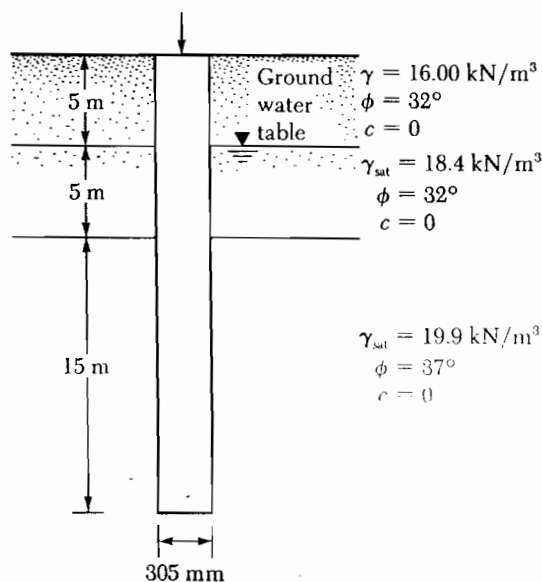
A prestressed concrete pile is 20 m long. The cross section of the pile is 460 mm x 460 mm. The pile is fully embedded in sand having $\phi = 32^\circ$ and $\gamma = 16.8 \text{ kN/m}^3$. Find:

- (a) the ultimate point load Q_p using:
- (i) Meyerhof's method.
 - (ii) Coyle and Castello's method.
 - (iii) Janbu's method ($\eta' = 90^\circ$).
 - (iv) Vesic's method ($I_r = I_{rr} = 75$).
- (b) the total frictional resistance Q_s using:
- (i) $K = 1.5$ and $\delta = 0.8 \phi$.
 - (ii) Coyle and Castello's method.

QUESTION 2

A pipe pile (closed end) is shown in the figure below. Calculate the following:

- (a) the ultimate point load by :
- (i) Meyerhof's method
 - (ii) Vesic's method.
- (b) an approximate ultimate point load on the basis of part (a).
- (c) the ultimate frictional resistance ($K = 1.4$ and $\delta = 0.7 \phi$).
- (d) the allowable load of the pile (F.S. = 5).



QUESTION 3

A concrete pile (405 mm x 405 mm in cross section) is shown in the figure below. All clays are normally consolidated (use $\phi_r = 25^\circ$).

Calculate the ultimate frictional resistance using:

- (a) the α method
- (b) the λ method
- (c) the β method

