

**DESIGN OF SHALLOW FOUNDATION**  
**BEARING CAPACITY**

**QUESTION 1**

A continuous foundation is 1.5 m wide. Given :  $D_f = 1.2$  m,  $\gamma = 17.2$  kN/m<sup>3</sup>,  $\phi = 26^\circ$ , and  $c = 30$  kN/m<sup>2</sup>. Using Terzaghi's bearing capacity equation, determine the gross ultimate load that the foundation can carry. Assume general shear failure occurs in soil.

**QUESTION 2**

(a) A square column foundation is 2.1 m  $\times$  2.1 m in plan. Given :  $D_f = 1.4$  m and the properties of the soil are :  $\gamma = 15.9$  kN/m<sup>3</sup>,  $\phi = 34^\circ$ , and  $c = 0$ . Determine the gross allowable vertical load that the foundation can carry using:

- (i) Terzaghi's bearing capacity equation.
- (ii) The general bearing capacity equation.

Assume general shear failure and use  $F_s = 3$ .

(b) For the foundation given in (a), what will be the gross allowable load if the load is inclined at an angle  $10^\circ$  to the vertical?

**QUESTION 3**

An eccentrically loaded foundation is shown in Figure 1. Determine the maximum allowable load that the foundation could carry ( assume  $F_s = 4$  )

**QUESTION 4**

Determine the gross ultimate load that the foundation (shown in Figure 2) can carry.

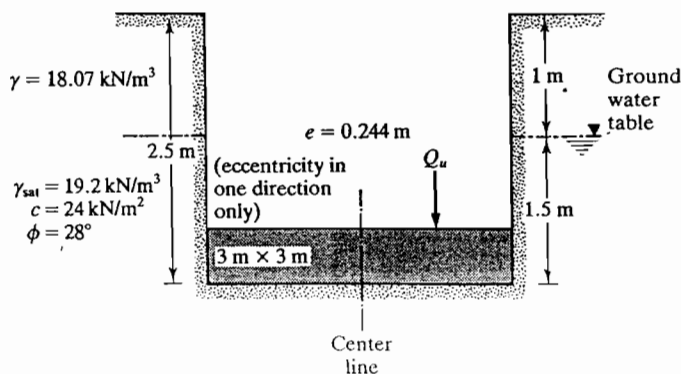


Figure 1

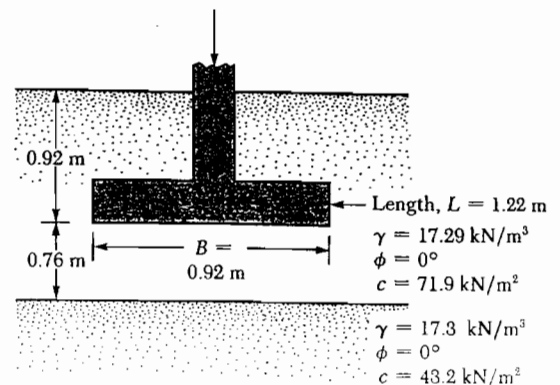


Figure 2