

(1)

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Paper Solution

Q# 01

Given Data:

Dead Load: $DL = 500 \text{ kN/m}$

Live Load: $L.L = 300 \text{ kN/m}$

depth : $D = 0.7 \text{ m}$

ϕ : $C = 0$

ϕ : $\phi = 40^\circ$

weight of sand above the W.T: $= 17 \text{ kN/m}^3$

Below the W.T saturated unit weight $= 20 \text{ kN/m}^3$

: $N_q = 81.3$

: $N_y = 100.4$

shape factor	strip footing
S_c	1
S_y	1

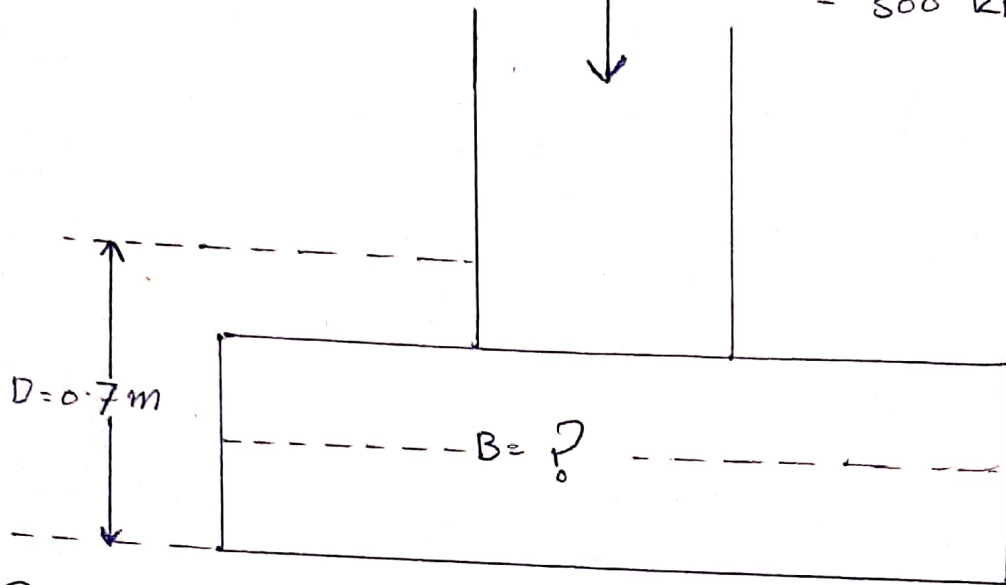
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(2)

Factor of safety : F.S = 3.0

$$D.L = 500 \text{ kN/m}$$

$$L.L = 300 \text{ kN/m}$$



Required :-

$$\text{width} = B = ?$$

Solution

$$\text{Factor of safety : FOS} = \frac{q_u}{q_{app}}$$

$$q_u = \text{FOS} \times q_{app}$$

Now put the values

$$= \frac{3 \times 800}{B} = 2400/B$$

For $\phi = 40$ the Terzaghi's B_c factor are

$$N_q = 81.3$$

$$N_y = 100.4$$

$$q_u = c N_c + \gamma D N_q + \frac{1}{2} \gamma B N_y$$

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(3)

use bulk weight (17 kN/m^3) 2nd Term
and submerged unit weight ($\gamma = \gamma_{\text{sat}} - \gamma_w =$
 $20 - 9.8 = 10.2 \text{ kN/m}^3$) in 3rd term of
Bc equation

$$\begin{aligned} q_u &= 0 + 17 \times 0.7 \times 81.3 + 0.5 \times 10.2 \times B \times 100.4 \\ &= \frac{2400}{B} \times B = (967.5 + 512B) \times B \\ &= 2400 = 967.5B + 512B^2 \end{aligned}$$

$$B = 2.8 \text{ m}$$

End