ON PAGE 7:

$$\sigma_z = \frac{q}{\pi}\{\alpha + \sin\alpha\cos(\alpha+2\beta)\} \quad (1.10)$$

$$\sigma_x = \frac{q}{\pi}\{\alpha - \sin\alpha\cos(\alpha+2\beta)\} \quad (1.11)$$

$$\tau_{xz} = \frac{q}{\pi}\{\sin\alpha\sin(\alpha+2\beta)\} \quad (1.12)$$

where, α and β are in radians.

Contours of equal vertical stress in the vicinity of a strip area carrying a uniform pressure are plotted in Fig.1.4(a). The zone lying inside the vertical stress contour of value 0.2q is described as the bulb of pressure.

ON PAGE 52:

For a given intensity of load, q_o

$$S_F = S_P \frac{B_F}{B_P} \text{ (for clayey soil)} \quad (2.12)$$

and

$$S_F = S_P\left(\frac{2B_F}{B_F+0.3}\right)^2 = S_P\left(\frac{B_F(B_P+0.3)}{B_P(B_F+0.3)}\right)^2 \text{(for sandy soil)} \quad (2.13)$$

Where S_F and S_P are settlements of foundation and test plate, respectively. In Eq.(2.13), the unit of B_F and B_P is meters.

ON PAGE 56:

3. SETTLEMENT OF STRUCTURES

3.1. GENERAL

Settlement is the main criterion in the design of foundations at the serviceability limit state or in assessing allowable bearing pressure. It is the vertical displacement of ground under **net foundation loading**. It also occurs due to effective stress increase

ON PAGE 57:

over current consolidation stress) which is called over consolidation ratio (OCR), soils are categorized as normally consolidated soils (NC, OCR=1.0), lightly overconsolidated soils (OCR≈1-2) or heavily overconsolidated soils (OCR≈7-8 or more). A heavily overconsolidated soil will experience small settlements compared to a normally consolidated soil.

ON PAGE 65: (Delete the statements at the front of the Equations 3.3 and 3.4)

3.5 CONSOLIDATION SETTLEMENT

The consolidation mechanism was explained in CE 363. Laboratory oedometer (consolidation) testing and the concept of one-dimensional consolidation will not be repeated here. A review is expected to be made by the student. One - dimensional compression (S_{oed}) of cohesive soils is calculated on the basis of parameters obtained in the oedometer test. Following expressions are recommended:

$$S_{oed} = \sum H.m_v.\Delta\sigma' \tag{3.3}$$

$$S_{oed} = \sum \left[H \frac{C_c}{1+e_0} \log\left(\frac{\sigma_0' + \Delta\sigma'}{\sigma_0'}\right) \right] \tag{3.4}$$

ON PAGE 72:

N_c factor for rectangular foundations may be calculated by multiplying the factor (1 + 0.2 B/L) or (0.84 + 0.16 B/L) with the bearing capacity (N_c) factor for strip or square foundations, respectively. Dead and short term (live) loads are considered for calculations of ultimate bearing capacity, factor of safety and immediate settlement. Sustained loading (dead loads +) should be considered for consolidation settlement. Settlements of foundations on normally consolidated clays are excessive. Overconsolidated clays settle only if sum of the present overburden pressure and the

ON PAGE 80:

$$I_c = \frac{1.71}{N_{60}^{1.4}} \quad (4.17)$$

The N values should not be corrected for effective overburden pressure as this has a major influence on both standard penetration resistance and compressibility: this influence should not therefore be eliminated from the correlation. The results of the analysis tend to confirm Meyerhof's conclusion that the influence of water table level is reflected in the measured N values. However, the position of the water table does influence settlement and if the level were to fall subsequent to the determination of the N values then a greater settlement would be expected. Equation 2.2 should be applied in the case of very fine sands and silty sands below the water table. It was further proposed that in the case of gravels or sandy gravels the measured N values should be increased by 25%.

ON PAGE 82:

$$S_e = C_1 C_2 q \sum_0^{Z_2} \frac{I_z}{E_s} \Delta z \quad (4.22)$$

where

I_z = strain influence factor

C_1 = a correction factor for the depth of foundation embedment = 1-0.5 [$\sigma'_{v,o}$ / q]

C_2 = a correction factor to account for creep in soil = 1 + 0.2 log (time in years/0.1)

q = net foundation pressure

$\sigma'_{v,o}$ = initial effective overburden pressure at depth of foundation

E_s = Elastic modulus = $2q_c$

ON PAGE 100:

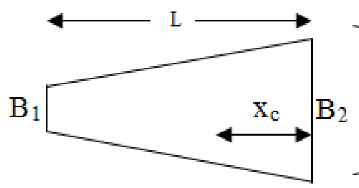
ΣM=0; (Moment taken about centroid of base)

$[3000 \times (14 - x_c)] + 600 + [2000 \times (8 - x_c)] - [4000 \times (x_c - 2)] + 800 - 1200 + [(\text{Weight of Footing}) \times 0] = [(\text{uniform base pressure}) \times 0] \rightarrow$ $\mathbf{x_c = 7.36m}$

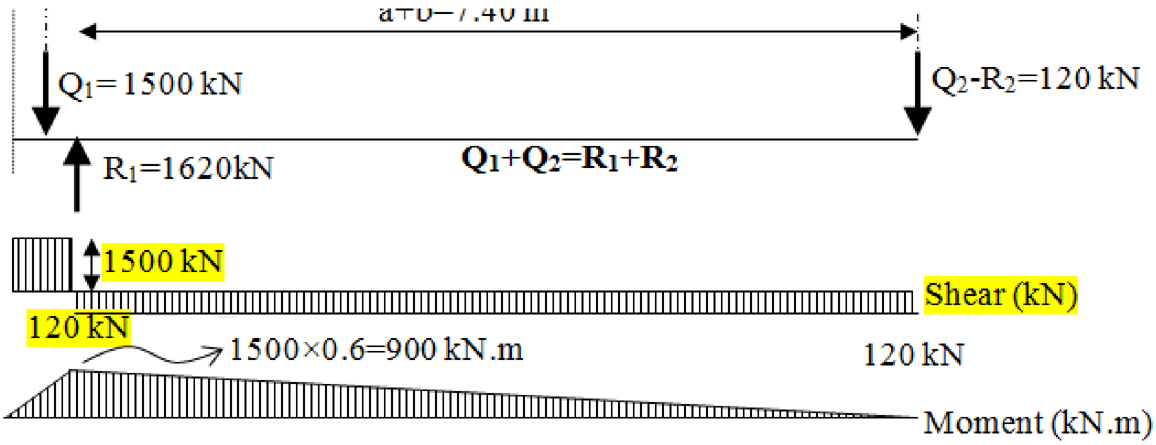
$x_c = 7.36m = (1/3) \times 16 \times (2B_1 + B_2) / (B_1 + B_2) \longrightarrow$ $\mathbf{B_2 = 1.63\ B_1}$ **.............(2)**

From (1) and (2); $B_1 = 1.55$ m, $B_2 = 2.52$ m.

$$\left\{ x_c = \frac{1}{3} L \frac{2B_1 + B_2}{B_1 + B_2} \right.$$



ON PAGE 103:



Strap beam does not take soil reaction !

Locate $\Sigma Q = Q_1 + Q_2$

$b = (1500 \times 8) / 4000 = 3$ m

Select $B_1 = 2$ m;

We find $a = 4.40$ m

$R_1 = (3 / 7.4) \times 4000 = 1620$ kN

$R_2 = 4000 - 1620 = 2380$ kN

Determine,

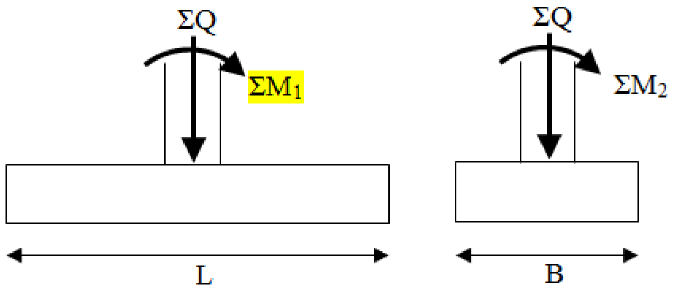
$B_2 = (1620) / (200 \times 2) = 4$ m

$$B = \sqrt{\frac{2380}{200}} = 3.45 \text{ m}$$

ON PAGE 106:

$$I_{1-1} = \frac{8 \times 6^3}{12} - \left[\frac{3 \times 1.5^3}{12} + (4.5 \times 2.25^2)\right] - 43.5 \times 0.22^2 = 118\ m^4$$

ON PAGE 107:



ON PAGE 119:

Sliding of base

If backfill is level $\quad F.S._{sliding} = \frac{R_v \cdot \tan\delta}{R_h}$ (6.2)

where δ is the angle of friction between the soil and the base of the wall.

$$F.S._{sliding} = \frac{F_{resisting}}{F_{driving}} = \frac{c_{wall-soil2}B + \Sigma V \tan\delta + P_p}{P_{ah}} \geq 1.5$$

(6.3)

where, $c_{wall-soil2} \approx (0.50 - 0.67)c_2$

$(\Sigma V = R_v,\ P_{ah} = R_h)$ (Fig.6.4) Driving force: P_{ah}

Resisting force: R

ON PAGE 145:

where, $c_2 = \sqrt{\frac{2 \text{ x } W_r \text{ x } H \text{ x} L}{A \text{ x } E}}$

Herein;

W_r = Weight of Rammer (Hammer)

H =Height of Drop of Hammer (Stroke)

s =Average Set which may be taken as an average of last 30 blows in mm., in mm/blow

E =Elasticity Modulus of Pile Material

L = Length of pile

ON PAGE 146:

$$Q_d = \frac{W_r h}{s + \frac{1}{2} c_2} \qquad c_2 = \sqrt{\frac{2 \text{ x } W_r \text{ x } H \text{ x } L}{A \text{ x } E}}$$

ON PAGE 164:

2) *Terzaghi-Peck:*

$A = 4x2.8 = 11.2\, m^2$

$P = 2x(4 + 2.8) = 13.6\, m$

$D_f = 12\, m$

Since shape of foundation is rectangle:

$$N_{c,rect} = (0.84 + 0.16(B/L))N_{c,square}$$

For square foundation having D/B = 12/4 = 3 form Figure 4.6 → $N_{c,square}$ =8.82

$$N_{c,rect} = \left(0.84 + 0.16\left(\frac{2.8}{4.0}\right)\right) 8.82 = 8.4$$

$Net\ q_{ult} = c_u N_c = 50x8.4 = 420\, kN/m^2$

$Q_{ult(group)} = cD_f P + q_{ult} A = 50x12x13.6 + 420x11.2 = 12864\, kN$

$Q_a = \frac{1}{2.5} x \frac{1}{12} x12864 = 429\, kN > 255\, kN$ (3)