Section-2

Given

Size of column = 500mm × 500mm
Distance b/w two column l = 5m
W = 1800 kN
Width restriction = 2.4 m
q_o = 200 kN/m²
f_{ck} = 25 N/m²
f_y = 415 N/mm²

Find = Design combined footing

Calculate Area of footing

(1) Total column load = 2 × 1800 = 3600 kN
(2) Assuming self weight of footing as 10% of total weight = 360 kN
(3) Total load W = 3960 kN
(4) Area of footing required = W/q_o = 3960/200
= 17.6 m²

(5) Available width of footing = 2.4 m
length of footing = 17.6/2.4 = 7.33 m

Hence adopting a length of 7.5m such that the cg of the load system coincides with the cg of the footing as shown in fig.

6. Upward soil pressure = $\frac{\text{total load}}{\text{Area of footing}}$

$$= \frac{600 \times 2}{7.5 \times 2.4}$$

$$= 177.8 \text{ kN/m}^2$$

7. Factored soil pressure = 1.5×177.8

$$= 266.72 \text{ kN/m}^2$$

(8) Upward soil pressure per unit length =

$$= 266.67 \times 2.4$$

$$= 640 \text{ kN/m}$$