

DESIGN OF MAT FOUNDATION

QUESTION 1

The plan of a mat foundation with column loads is shown in the figure below:

(i) Calculate the soil pressure at points A,B,C,D,E, and F.

(all columns are 0.50 m x 0.5 m in plan).

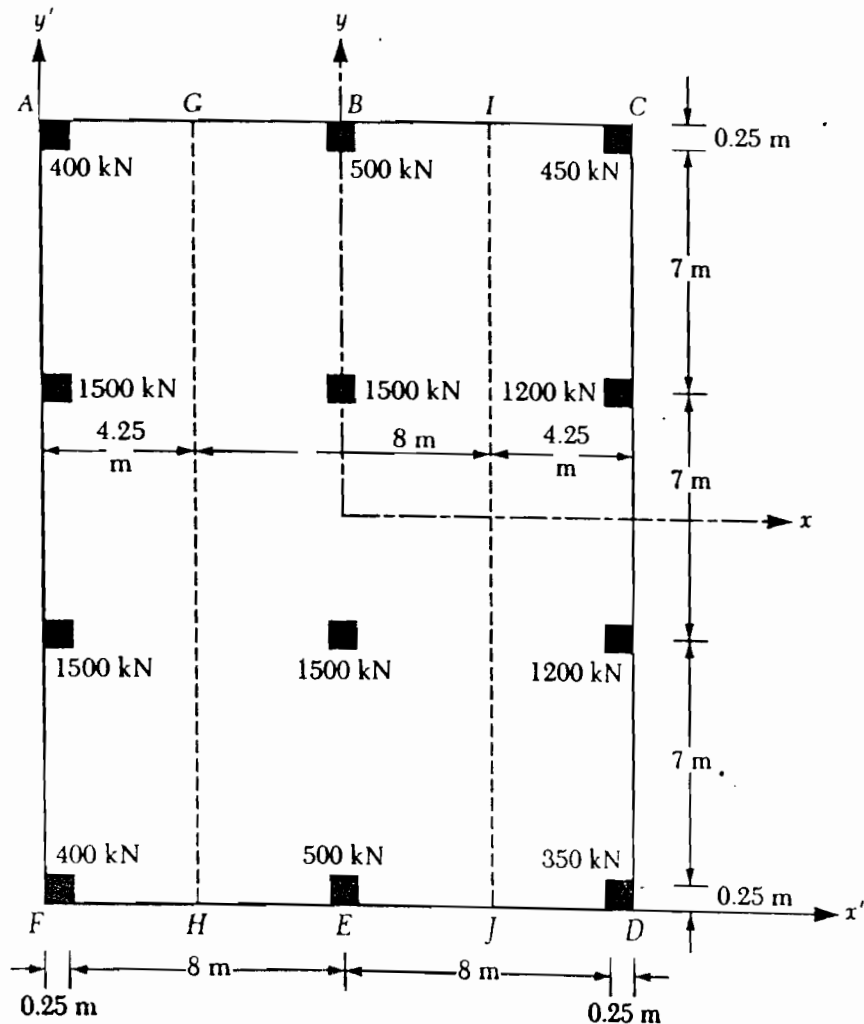
(ii) Divide the mat into three strips, such as AGHF ($B_1 = 4.25$ m), GLJH ($B_1 = 8$ m), and ICDJ ($B_1 = 4.25$ m) and determine the reinforcement requirements in the y-direction.

Given:

$$f'_c = 20.7 \text{ MN/m}^2$$

$$f_y = 413.7 \text{ MN/m}^2$$

$$\text{load factor} = 1.7$$



QUESTION 2

A mat foundation (15 m x 7.5 m) is shown in the figure below.

Given:

$$\begin{aligned} Q &= 35 \text{ MN} \\ D_f &= 3.0 \text{ m} \\ x_1 &= 2.5 \text{ m} \\ x_2 &= 2.75 \text{ m} \\ x_3 &= 4.0 \text{ m} \\ p_c &= 105 \text{ kN/m}^2 \end{aligned}$$

Estimate the consolidation settlement under the center of the mat.

