Homework Assignment # 6A   **Due: Thursday, 30 October 2007**

Consider the mat foundation resting on a system of elastic springs. For the single column load shown, compute the moments M_r and M_θ, shear V and deflection δ as a function of position from the column load, at r = 0; h; 2h; 4h; 8h; 16h. The following formulae can be used <u>where the associated coefficients are provided in the figure on the following page</u>.

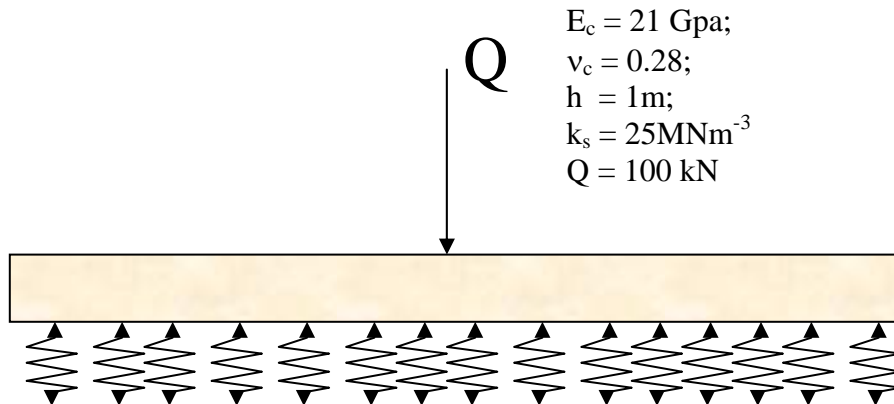$$M_r = \frac{-Q}{4}\left[Z_4 - \frac{(1-v_c)Z_3'}{(\frac{r}{L})} \right]$$

$$M_\theta = \frac{-Q}{4}\left[v_c Z_4 - \frac{(1-v_c)Z_3'}{(\frac{r}{L})} \right]$$

$$V = \frac{-Q}{4L}Z_4'$$

$$\delta = \frac{QL^2 Z_3}{4D}$$

$$D = \frac{E_c h^3}{12(1-v_c^2)}$$

$$L = \left(\frac{D}{k_s} \right)^{1/4}$$

Q

$E_c = 21$ Gpa;
$v_c = 0.28$;
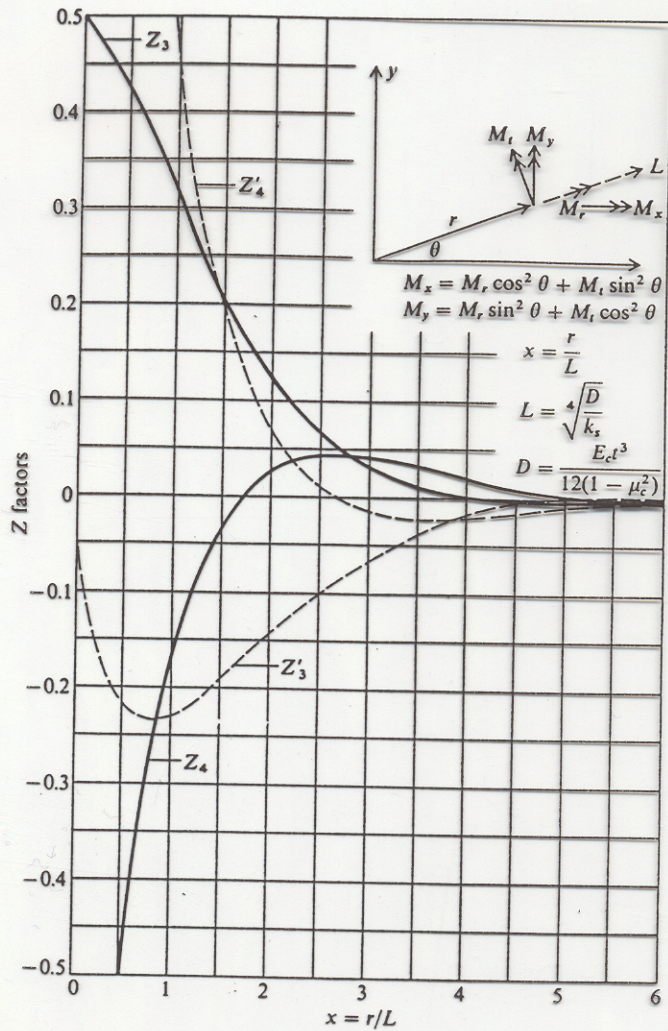$h = 1$m;
$k_s = 25$MNm^{-3}
$Q = 100$ kN

FIGURE 10-6 Z_i factors for computing deflections, moments and shears in a flexible plate. [*After Hetenyi (1946).*]

Taken From: Foundation Analysis and Design, 4th Ed.
              J. E. Bowles
                McGraw-Hill, 1988.