

4.10 Eccentrically Loaded Foundations

In several instances, as with the base of a retaining wall, foundations are subjected to moments in addition to the vertical load, as shown in Figure 4.17a. In such cases, the distribution of pressure by the foundation on the soil is not uniform. The nominal distribution of pressure is

$$q_{\max} = \frac{Q}{BL} + \frac{6M}{B^2L} \quad (4.44)$$

and

$$q_{\min} = \frac{Q}{BL} - \frac{6M}{B^2L} \quad (4.45)$$

where

Q = total vertical load

M = moment on the foundation

Figure 4.17b shows a force system equivalent to that shown in Figure 4.17a. The distance

$$e = \frac{M}{Q} \quad (4.46)$$

is the eccentricity. Substituting Eq. (4.46) into Eqs. (4.44) and (4.45) gives

$$q_{\max} = \frac{Q}{BL} \left(1 + \frac{6e}{B} \right) \quad (4.47)$$

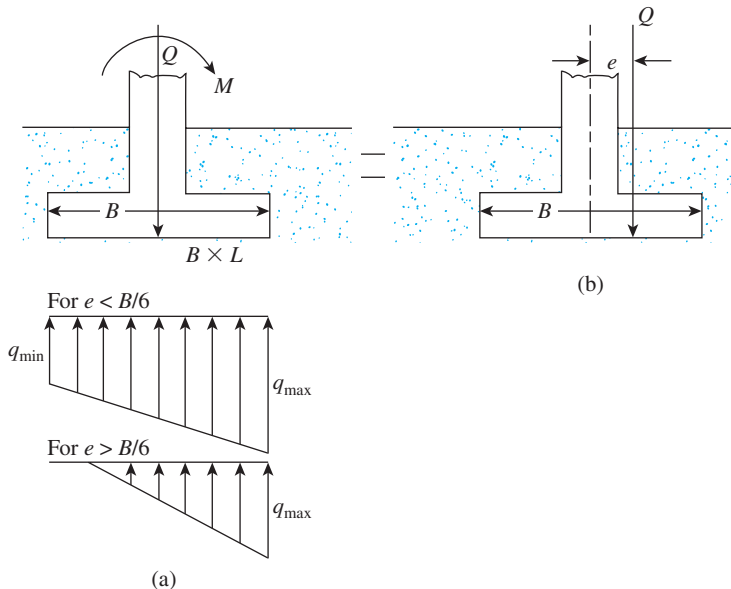


Figure 4.17 Eccentrically loaded foundations