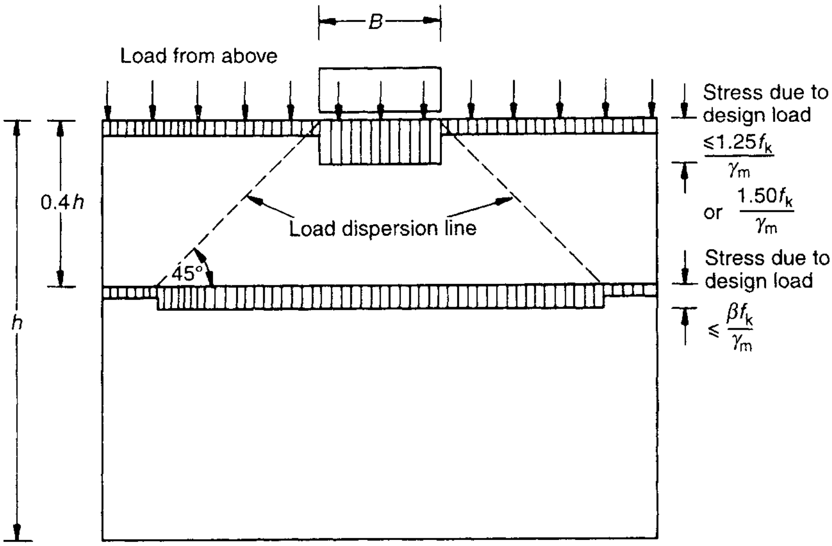

Fig. 5.14 Stress distribution due to concentrated load (BS 5628).

but not less than f_k/γ_m nor greater than either 1.25 f_k/γ_m or 1.5 f_k/γ_m depending on the type of bearing. Here $x=2a_1/H$ but $x<1.0$, a_1 is the distance from the end of the wall to the nearer edge of the bearing, H is the height of the wall to the level of the load, A_b is the bearing area of load but $A_b<0.45A_{ef}$ and A_{ef} is the effective area of wall $L_{ef}t$.

For Groups 2a, 2b and 3 masonry units, the design strength should not exceed f_k/γ_m.

- At a distance of 0.5H below the bearing the design strength is assumed to be $\Phi f_k/\gamma_m$ and the requirements of section 5.6.1 should be met. The concentrated load is assumed to be dispersed within a zone contained by lines extending downwards at 60° from the edges of the loaded area.

The code also makes reference to the special case of a spreader beam of width t, height greater than 200 mm and length greater than three times the bearing length of the load. For this case the maximum stress beneath the loaded area should not exceed 1.5 f_k/γ_m.

5.7 VERTICAL LOADING

Details about characteristic dead and imposed loads and partial safety factors have been given in Chapter 4, and values of the design vertical loads will already have been determined for the calculation of the eccentricities. The design process for vertical loading is completed by equating the design vertical loading to the appropriate design vertical load resistance and using the resulting equation to determine the value of the characteristic compressive strength of the masonry f_k. Typically the equation takes the form

$$\Sigma W \text{ kN/m} = (\beta t f_k)/\gamma_m \quad (5.11)$$

Generally the calculation of ΣW involves the summation of products of the partial safety factor for load (γ_f) with the appropriate characteristic load (G_k and Q_k). This is discussed in Chapter 4 and illustrated in Chapter 10. For design according to the Eurocode, ß in equation (5.11) would be replaced by Φ.

Using standard tables or charts and modification factors where applicable, the compressive strength of the masonry units and the required mortar strength to provide the necessary value of f_k can be obtained.

Examples of the calculation for an inner solid brick wall and an external cavity wall are given in section 5.9.

5.8 MODIFICATION FACTORS

The value of f_k used in Fig. 4.1, in order to determine a suitable masonry/mortar combination, is sometimes modified to allow for the effects of small plan area or narrow masonry walls.

5.8.1 Small plan area

(a) BS 5628

If the horizontal cross-sectional area *(A)* is less than 0.2 m^2 then the value of f_k determined from an equation similar to (5.11) is divided by a factor (0.70+1.5A).

(b) ENV 1996–1–1

If the horizontal cross-sectional area *(A)* is less than 0.1 m^2 then the value of f_k determined from an equation similar to (5.11) is divided by a factor (0.70+3A).

5.8.2 Narrow masonry walls

In BS 5628 a modification factor is also given for narrow walls. If the thickness of the wall is equal to the width of the masonry then the value of f_k determined from an equation similar to (5.11) is divided by 1.15.