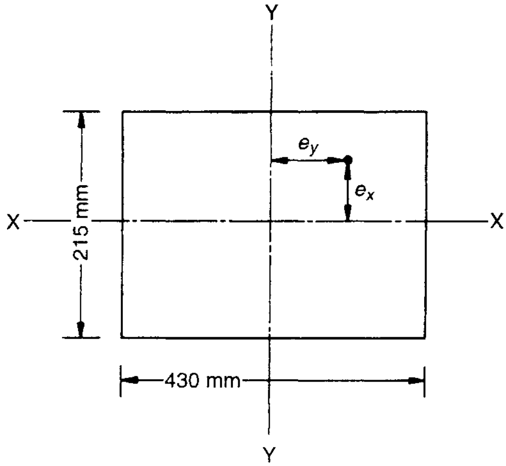

Fig. 5.13 Dimensions of worked example.

About XX axis

$$e_m = e_x = 20 \text{ mm}$$

or

$$e_m = e_t = 0.6 \times 20 + 215\,[\,(1/2400)(2500/215)^2 - 0.015\,]$$
$$= 12 + 8.89 = 20.89 \text{ mm}$$

So

$$\beta_{XX} = 1.1\,[1 - (2 \times 20.89 / 215)\,] = 0.89$$

About YY axis

$$e_m = e_y = 60 \text{ mm}$$

or

$$e_m = e_t = 0.6 \times 60 + 430\,[(1/2400) \times (2500/430)^2 - 0.015\,]$$
$$= 36 + 430\,(0.014 - 0.015)$$

For this case the bracketed term is negative, because the slenderness ratio is less than 6, and therefore no additional term due to slenderness effect is required. That is e_m=60 mm and

$$\beta_{YY} = 1.1\,[1 - (12 \times 60/430)] = 0.79$$

Note that the design vertical load resistance for the above example would be

(a) $(\beta t f_k)/\gamma_m = 0.93 \times 215 \times 430 \times f_k/\gamma_m$
(b) $(\beta t f_k)/\gamma_m = 0.89 \times 215 \times 430 \times f_k/\gamma_m$

That is, the largest value of β_{XX} and β_{YY} is used in order to ensure that the smaller value of f_k will be determined when the design vertical load resistance is equated to the design vertical load.

No specific references to the design of columns are given in the Eurocode although a similar approach to that outlined above but replacing β with Φ would be possible.

5.6.3 Design vertical load resistance of cavity walls or columns

The design vertical load resistance for cavity walls or columns can be determined using the methods outlined in sections 5.6.1 and 5.6.2 if the vertical loading is first replaced by the statically equivalent axial load on each leaf. The effective thickness of the cavity wall or column is used for determining the slenderness ratio for each leaf of the cavity.

5.6.4 Design vertical strength for concentrated loads

Increased stresses occur beneath concentrated loads from beams and lintels, etc. (see Fig. 4.5), and the combined effect of these local stresses with the stresses due to other loads should be checked. The concentrated load is assumed to be uniformly distributed over the bearing area.

(a) BS 5268

In BS 5628 two design checks are suggested:

- At the bearing, assuming a local design bearing strength of either $1.25f_k/\gamma_m$ or $1.5f_k/\gamma_m$ depending on the type of bearing.
- At a distance of 0.4h below the bearing, where the design strength is assumed to be $\beta f_k/\gamma_m$. The concentrated load is assumed to be dispersed within a zone contained by lines extending downwards at 45° from the edges of the loaded area (Fig. 5.14).

The code also makes reference to the special case of a spreader beam located at the end of a wall and spanning in its plane. For this case the maximum stress at the bearing, combined with stresses due to other loads, should not exceed $2.0\,f_k/\gamma_m$.

(b) ENV 1996–1–1

In ENV 1996–1–1 the following checks are suggested:

- For Group 1 masonry units, the local design bearing strength must not exceed the value derived from

$$(f_k/\gamma_m)\,\{(1+0.15x)\,[1.5-1.1\,(A_b/A_{ef})]\} \tag{5.10}$$