>0.05t the design load resistance is given by $(\beta t f_k)/\gamma_m$, with β=1.1(1-2e_m/t).

5.6.2 Design vertical load resistance of columns

For columns the design vertical load resistance is given in BS 5628 as $(\beta t f_k)/\gamma_m$, but for this case the rules in Table 5.2 apply to the selection of β from Fig. 4.4.

If the eccentricities at the top of the column about the major and minor axes are greater than 0.05b and 0.05t respectively, then the code recommends that the values of β can be determined from the equations given in Appendix B of BS 5628. The method can be summarized as follows (Fig. 5.12):

1. About XX axis

   - The design eccentricity e_m about XX is defined as the larger value of e_x and e_t, where

$$e_t = 0.6\,e_x + t\ [\,(1/2400)\,(h_{ef}/t)^2 - 0.015\,]$$

   and (h_{ef}/t) is the slenderness ratio about the minor axis.
   - The value of β is calculated from

$$\beta = 1.1\,(1 - 2e_m/t)$$

Table 5.2 Rules for selecting β for columns

Eccentricity at top of column about major axis	*Eccentricity at top of column about minor axis*	*Selection of* β
$<0.05b$	$<0.05t$	Use upper curve of Fig. 4.4 with t_{ef} appropriate to minor axis
$<0.05b$	$>0.05t$	Use Fig. 4.4 with both eccentricity and slenderness ratio appropriate to minor axis
$>0.05b$	$<0.05t$	Use Fig. 4.4 with eccentricity appropriate to major and slenderness ratio to minor axis
$>0.05b$	$>0.05t$	See text

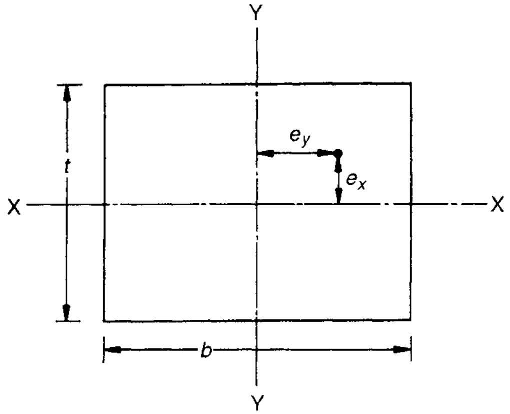

Fig. 5.12 Column cross-section.

2. About YY axis

- Use a similar procedure using e_y and the slenderness ratio about the major axis. Note that no slenderness effect need be considered when the slenderness ratio is less than 6 (see example below).

Example

Determine the values of *ß* for a solid brickwork column of cross-section 215 mm×430 mm (Fig. 5.13) and effective height about both axes of 2500 mm if the eccentricities at the top of the columns about the major and minor axes are (a) 25 mm and 10 mm and (b) 60 mm and 20 mm respectively.

Solution (a)

$$e_x=10=0.046t \text{ i.e. } <0.05t$$

$$e_x=25=0.058t \text{ i.e. } >0.05b$$

Therefore use Fig. 4.4 with eccentricity appropriate to major axis YY (25 mm) and slenderness ratio appropriate to minor axis. Slenderness ratio $SR=2500/215=11.63$. Using Fig. 4.4, $ß\approx0.93$.

Solution (b)

$$e_x=20=0.093t \text{ i.e.} >0.05t$$

$$e_y=60=0.139b \text{ i.e. } >0.05b$$