Table 10.2 Values of α for biaxial bending of a short column

N/N_{dz}	α
0	1.00
0.1	0.88
0.2	0.77
0.3	0.65
0.4	0.53
0.5	0.42
>0.6	0.30

Note that Table 10.2 and the above equations are different from those given in the code as originally published.

10.5.4 Slender columns

Columns which have a slenderness ratio between 12 and 27 are considered to be slender. Such columns might have an appreciable horizontal deflection due to the vertical load (Fig. 10.11) and this can be allowed for in design by increasing the eccentricity.

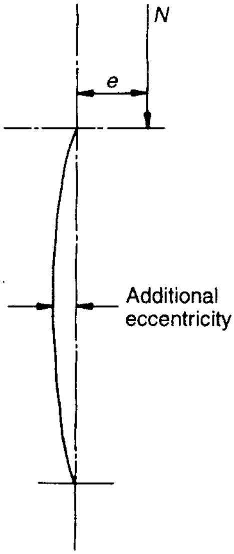

Fig. 10.11 Additional eccentricity for slender columns.

The moment due to this additional eccentricity is given by the equation

$$M_a = N(h_{ef})^2/(2000t) \tag{10.16}$$

For uniaxial bending slender columns can be designed using the method outlined in section 10.5.3 but allowing for the additional moment M_a given above.

As stated in section 10.5.1 very little guidance is given in the code for the design of slender columns subjected to biaxial bending although it states that it is essential to take account of such cases. Design can be carried out using similar methods to those used for reinforced concrete columns but applying the assumptions given in sections 10.5.1 and 10.5.2.

10.5.5 Example

A brickwork column of section 460mm×460mm is to carry an axial load of 800kN and a moment of 50kNm. Assuming that the reinforcement is placed such that d_2=d_1=130mm design the colum
n for (1) an effective height of 4.5m and (2) an effective height of 6.0m. Take f_k=13N/mm², f_y=460N/mm², γ_{mm}=2.3.

Case 1
In this case

slenderness ratio=4.5/0.46=9.8 i.e. short column

resultant eccentricity=800=0.0625m

Using equation (10.9)

$$N_d = f_k b(t-2e_x)/\gamma_{mm}$$
$$= 13 \times 460(460-125)/2.3$$
$$= 871\,000 = 871 \text{ kN}$$

Since $N<N_d$, case (a) applies and only a minimum amount of reinforcement is required.

Design in accordance with BS 5628: Part 1 might be more appropriate.

Case 2
In this case

slenderness ratio=6.0/0.46=13 i.e. slender column

$$\text{additional moment } M_a = N(h_{ef})^2/(2000t)$$
$$= 800 \times 6^2/(2000 \times 0.46)$$
$$= 31.3 \text{ kN m}$$