4.9.1 Slenderness ratio

Vertically loaded walls and columns can fail by crushing due to direct compression or, if they are slender, by lateral buckling. A measure of the tendency to fail by buckling before crushing is the slenderness ratio (SR).

In accordance with BS 5628 the slenderness ratio of a wall should be calculated as follows:

$$\text{SR wall} = \frac{\text{effective height}}{\text{effective thickness}} \quad \text{or} \quad \frac{\text{effective length}}{\text{effective thickness}}$$

$$= \frac{h_{ef}}{t_{ef}} \quad \text{or} \quad \frac{l_{ef}}{t_{ef}}$$

The effective length is only used when this would give a lesser slenderness ratio value.

For masonry columns the effective height is always used when calculating the slenderness ratio:

$$\text{SR column} = \frac{\text{effective height}}{\text{effective thickness}} = \frac{h_{ef}}{t_{ef}}$$

The slenderness ratio of a member should generally not exceed 27. However, should the thickness of a wall be less than 90 mm, in a building of two storeys, then the slenderness ratio value must not exceed 20.

4.9.2 Lateral support

The effective height and the effective length are influenced by the degree of any lateral support that may be provided. With respect to the height this will be provided in the horizontal direction by the floors or roof. In the case of the length it will be provided in the vertical direction by any intersecting or return walls.

BS 5628 defines the degree of resistance to lateral movement as either 'simple' or 'enhanced' depending on the construction details adopted. Examples of horizontal lateral support that only provide simple resistance are illustrated in Figure 4.4; those capable of providing enhanced resis-
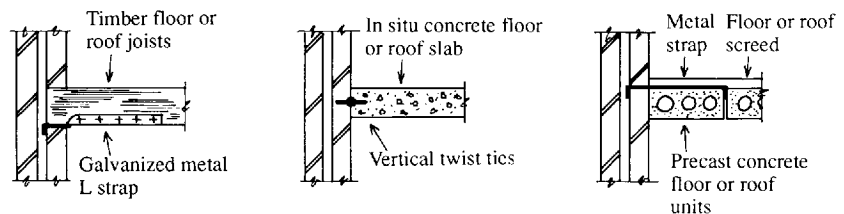

Figure 4.4 *Examples of horizontal lateral support only capable of providing simple resistance*

tance are illustrated in Figure 4.5. Similarly, examples of vertical lateral support that only provide simple resistance are shown in Figure 4.6; those that provide enhanced resistance are shown in Figure 4.7.
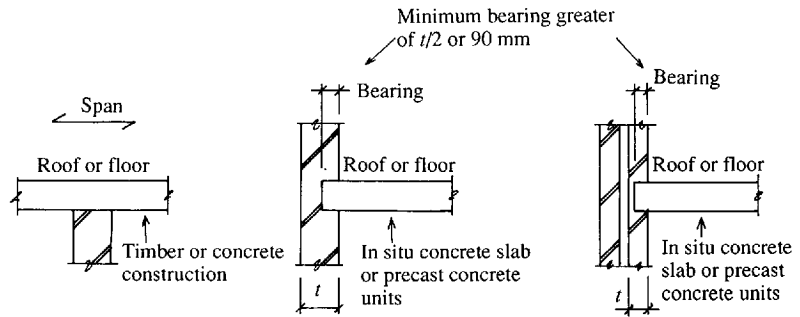

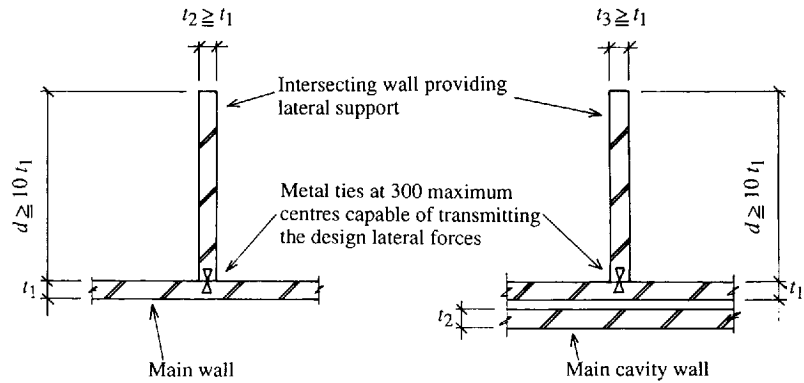**Figure 4.5**   *Examples of horizontal lateral support capable of providing enhanced resistance*

Figure 4.6   *Examples of vertical lateral support only capable of providing simple resistance*
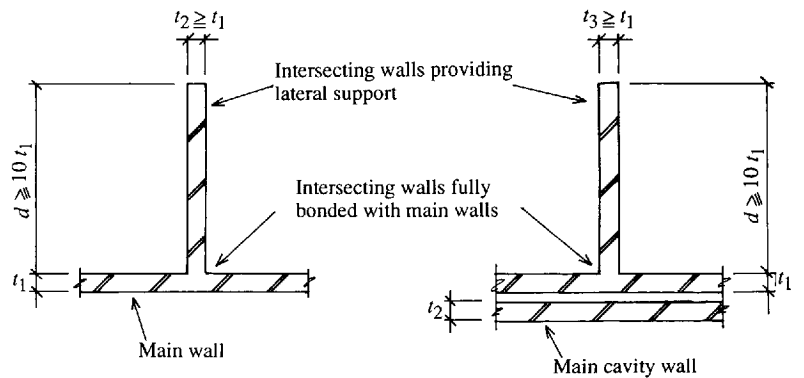

Figure 4.7   *Examples of vertical lateral support capable of providing enhanced resistance*