Modification to characteristic strength for small plan areas

When the horizontal cross-sectional area of a loaded wall or column is less than $0.2\,m^2$, the value of f_k obtained from the tables should be multiplied by the following modification factor:

$$\text{Small plan area modification factor} = 0.7 + 1.5A$$

where A is the loaded horizontal cross-sectional area of the wall or column (m^2).

4.8.2 Partial safety factors for materials

The partial safety factor γ_m for materials in masonry design is obtained from BS 5628 Part 1 Table 4, reproduced here as Table 4.6.

Table 4.6 Partial safety factors for material strength γ_m (BS 5628 Part 1 1978 Table 4)

Category of manufacturing control of structural units	Category of construction control	
	Special	Normal
Special	2.5	3.1
Normal	2.8	3.5

The factor is related to the standard of quality control exercised during both the manufacture and construction stages. In each case two levels of control are recognized, normal category or special category, and these apply as follows.

Normal category of manufacturing control

This should be assumed when the materials to be supplied will simply comply with the compressive strength requirements of the relevant British Standard.

Special category of manufacturing control

This may be assumed when the manufacturer agrees to supply materials that comply with a specified strength limit. Furthermore, the supplier must operate a quality control system to provide evidence that such a limit is being consistently met.

Normal category of construction control

This should be assumed when the standard of workmanship is in accordance with the recommendations given in BS 5628 Part 3, and appropriate

site supervision and inspection will be carried out to ensure that this is so. Some of the construction aspects covered by these workmanship requirements are as follows:

(a) Setting out
(b) Storage of materials
(c) Batching, mixing and use of mortars
(d) Laying of masonry units
(e) Constructional details
(f) Protection during construction.

Special category of construction control

This may be assumed when, in addition to the normal category requirements, compliance testing of the mortar strength will be carried out in accordance with Appendix A of BS 5628 Part 1.

4.8.3 Ultimate compressive strength of masonry units

The ultimate compressive strength of masonry units, as mentioned earlier, is obtained by dividing the characteristic strength by the appropriate partial safety factor:

$$\text{Ultimate compressive strength} = \frac{\text{characteristic strength of units}}{\text{partial safety factor}} = \frac{f_k}{\gamma_m}$$

Having arrived at an ultimate compressive strength for the masonry units that are to be used, the next step is to determine the load bearing capacity of the particular member in which they are to be incorporated. In terms of masonry design such members will either be walls or columns.

4.9 Factors influencing the load bearing capacity of masonry members

There are a number of interrelated factors that influence the load bearing capacity of masonry walls and columns:

(a) Slenderness ratio
(b) Lateral support
(c) Effective height h_{ef}
(d) Effective length l_{ef}
(e) Effective thickness t_{ef}
(f) Capacity reduction factor for slenderness.

The principal factor is the slenderness ratio; all the others are related to it. Let us therefore consider the effect of each factor on walls and columns.