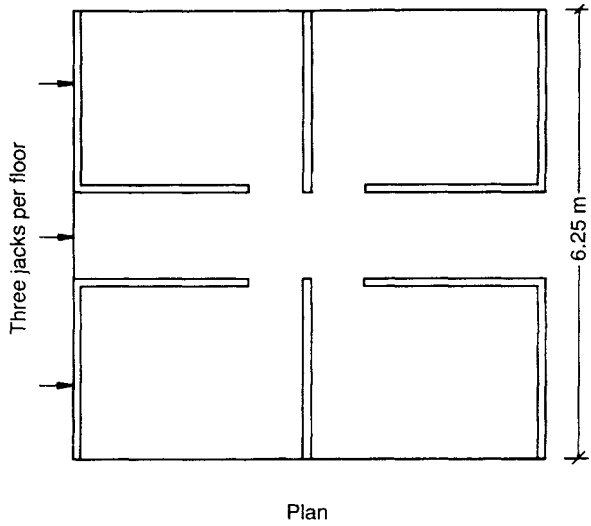

Fig. 6.4 (b) Test structure.

were applied by jacking at each floor level against the quarry face, which had been previously lined with concrete to give an even working face. The deflections and strains were recorded at various loads. The threedimensional structure was replaced by an equivalent two-dimensional wall and beam system having the same areas and moments of inertia as the actual structure and analysed by the various methods described in this chapter. The theoretical and experimental deflections are compared in Fig. 6.5. The strain and thus the stress distribution across the shear wall near ground level was nonlinear, as shown in Fig. 6.6. Most theoretical methods, with the exception of finite elements, assume a linear variation of stress across the shear wall and thus did not give accurate results. The comparisons between the various analytical methods considered (namely, simple cantilever, frame, wide column frame and shear continuum method) with experimental results strongly suggest that the best approximation to the actual behaviour of a masonry structure of this type is obtained by replacing the actual structure by an equivalent rigid frame in which the columns have the same sectional properties as the walls with interconnecting slabs spanning between the axes of the columns. The continuum or wide column frame methods do not seem to give satisfactory results for brickwork structures, and hence their use is not advisable. Finite element analysis may be justified only in special cases, and will give the nonlinear stress distribution, which cannot be reproduced by other methods.

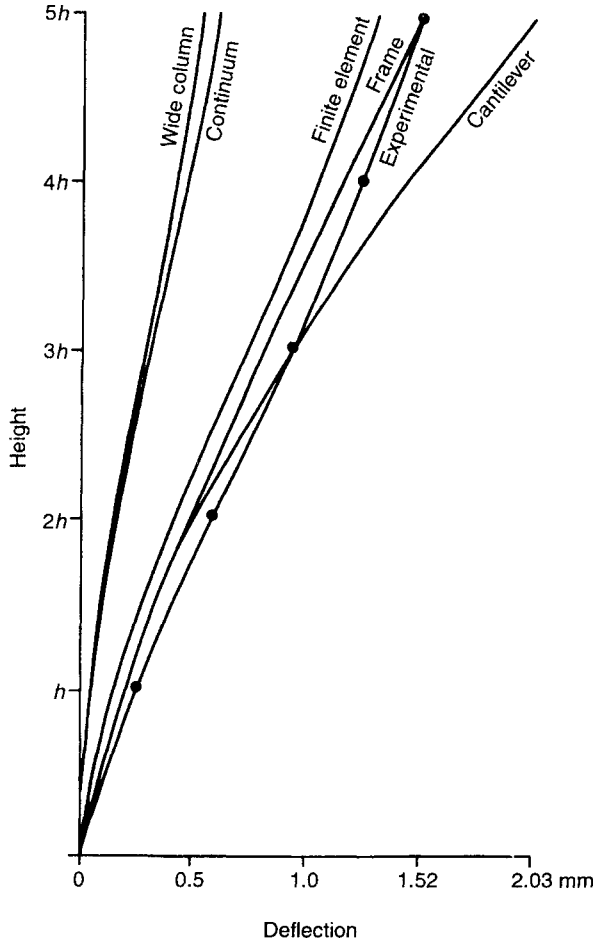

Fig. 6.5 Comparison of experimental and theoretical deflection results for an equivalent uniform load of 894 N/m^2 over the loaded face of the building.

The cantilever method of analysis is an oversimplification of the behaviour and is very conservative. For this reason, and because it is simple to carry out, it may be used for preliminary estimates of the bending moments and shearing forces in the walls of a building arising from wind loads. It should be noted, however, that this procedure neglects bending of the interconnecting beams or slabs, and this may require consideration.