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Lateral load analysis of masonry panels

7.1 GENERAL

In any typical loadbearing masonry structure two types of wall panel resist lateral pressure, which could arise from wind forces or the effect of explosion. These panels can be classified as follows:

- Panels with precompression, i.e. panels subjected to both vertical and lateral loading.
- Panels without precompression, i.e. panels subjected to self-weight and lateral loading.

7.2 ANALYSIS OF PANELS WITH PRECOMPRESSION

The lateral strength of panels with precompression depends on the following factors:

- Flexural tensile strength
- Initial precompression
- Stiffness of the building against upward thrust
- Boundary conditions.

7.2.1 Flexural tensile strength

The flexural tensile strength of masonry normal to the bed joint is very low, and therefore it may be ignored in the lateral load design of panels with precompression without great loss of accuracy.

7.2.2 Initial precompression

As will be shown in section 7.3, the lateral strength of a wall depends on the vertical precompression applied to it. Normally this is taken to be the dead load of the structure supported by it, but if settlement occurs, it is

possible for a proportion of this load to be redistributed to other parts of the structure. This is explained in simplified terms in Fig. 7.1. Relative settlement of the right-hand wall shown in the diagram will induce bending moments in the floor slabs which, in turn, will reduce the loading on this wall. The quantitative significance of this effect is shown in Fig. 7.2 which is based on measurements taken on an actual structure. As may be seen from this, relative settlement of only 1 or 2 mm can reduce the precompression by a large percentage.

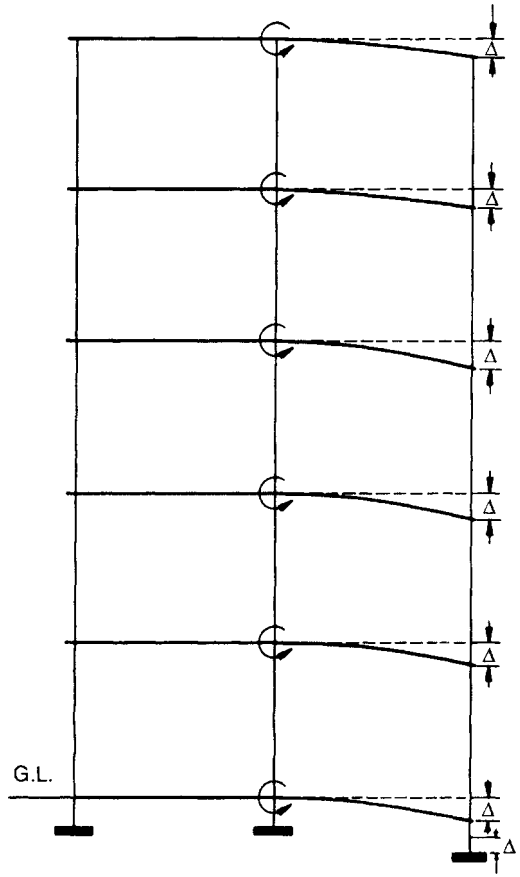

Fig. 7.1 Redistribution of load due to settlement.