Table 7.1 Comparison of the value k

Number of returns	*Value of k*			
	$L/h = 0.75$	1.0	2.0	3.0
1	1.6(1.8)[a]	1.5(1.5)	1.1(1.2)	1.0(1.1)
2	4.0 (–)	3.0(3.0)	1.5(1.5)	1.2(1.28)

[a]Theoretical values in brackets.

some cases have been slightly adjusted in the light of experimental results which are shown in Fig. 7.6. Because of the simplified assumption that the return will not fail before the wall, the curves (Fig. 7.6) for q_1/q_0 and q_2/q_0 at lower L/h ratio become asymptotic to the Y-axis which is physically not possible; hence the code has used a cut-off point on the evidence of experimental results.

7.4 EFFECT OF VERY HIGH PRECOMPRESSION

From equation (7.3) it can be seen that the lateral pressure varies directly with precompression; this is perfectly true for an ideal rigid body. In masonry walls with high precompression, as the two blocks rotate (Fig. 7.7) on top of each other resulting in a reduced effective cross-sectional area with very high local stress approaching ultimate strength in crushing, the failure will be earlier than predicted by the straight-line theory of equation (7.3). At a precompression equal to the ultimate strength of masonry, the wall will fail without resisting any lateral pressure. From Fig. 7.8, which has been derived analytically taking into account the deformation of the wall, it can be seen that the maximum capacity of resisting lateral pressure for any strength of brickwork is reached at a precompression equal to approximately half of the ultimate strength. After this value of precompression, the lateral load-resisting capacity of a wall decreases. As the design stress in compression utilizes only a fraction of the ultimate masonry strength and will never exceed half of the ultimate strength, in almost all practical cases the failure condition will be in the linear range of Fig. 7.8; hence the simplified approximate analysis can accurately and safely be applied. This may also be assumed in the case of blockwork walls subjected to precompression.

7.5 LATERAL LOAD DESIGN OF PANELS WITHOUT PRECOMPRESSION

Masonry panels which resist out-of-plane lateral loading may be supported as follows:

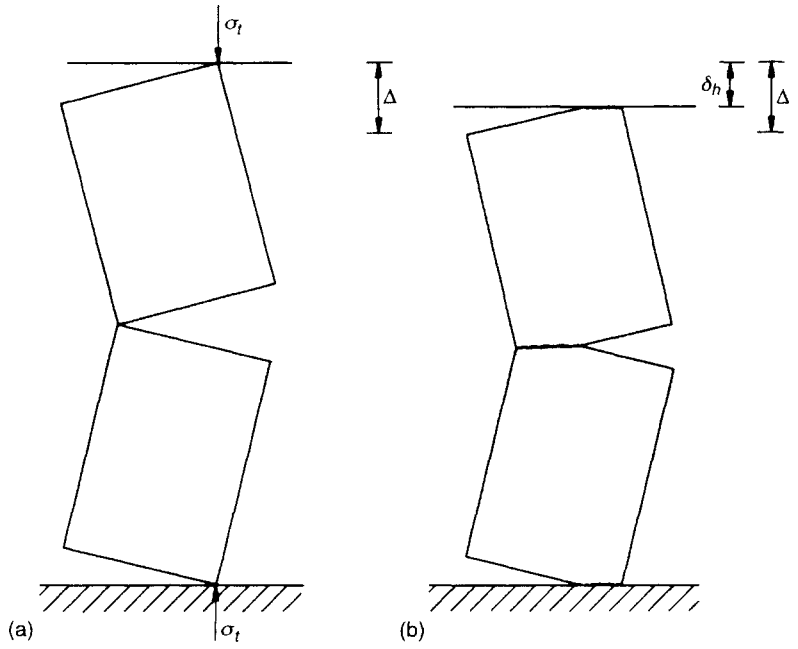

Fig. 7.7 Effect of wall rotation: (a) basic rotation; (b) modified rotation (with high precompression). σ=precompression; Δ=half maximum uplift of wall with no corner deformations; δ_h=elastic shortening.

- Simply supported top and bottom, i.e. vertically spanning panel.
- Simply supported on two edges, i.e. horizontally spanning panel.
- Simply supported or continuous on three or four sides, i.e. panels supported on more than two sides of various boundary conditions.

It will of course be realized that simple supports are an idealization of actual conditions which will usually be capable of developing some degree of moment resistance.

7.5.1 Vertically or horizontally spanning panels

The maximum moments per unit width for a wall spanning vertically or horizontally can be calculated from:

vertically spanning panel

$$M_y = wh^2/8 \tag{7.10}$$

horizontally spanning panel

$$M_x = wL^2/8 \tag{7.11}$$