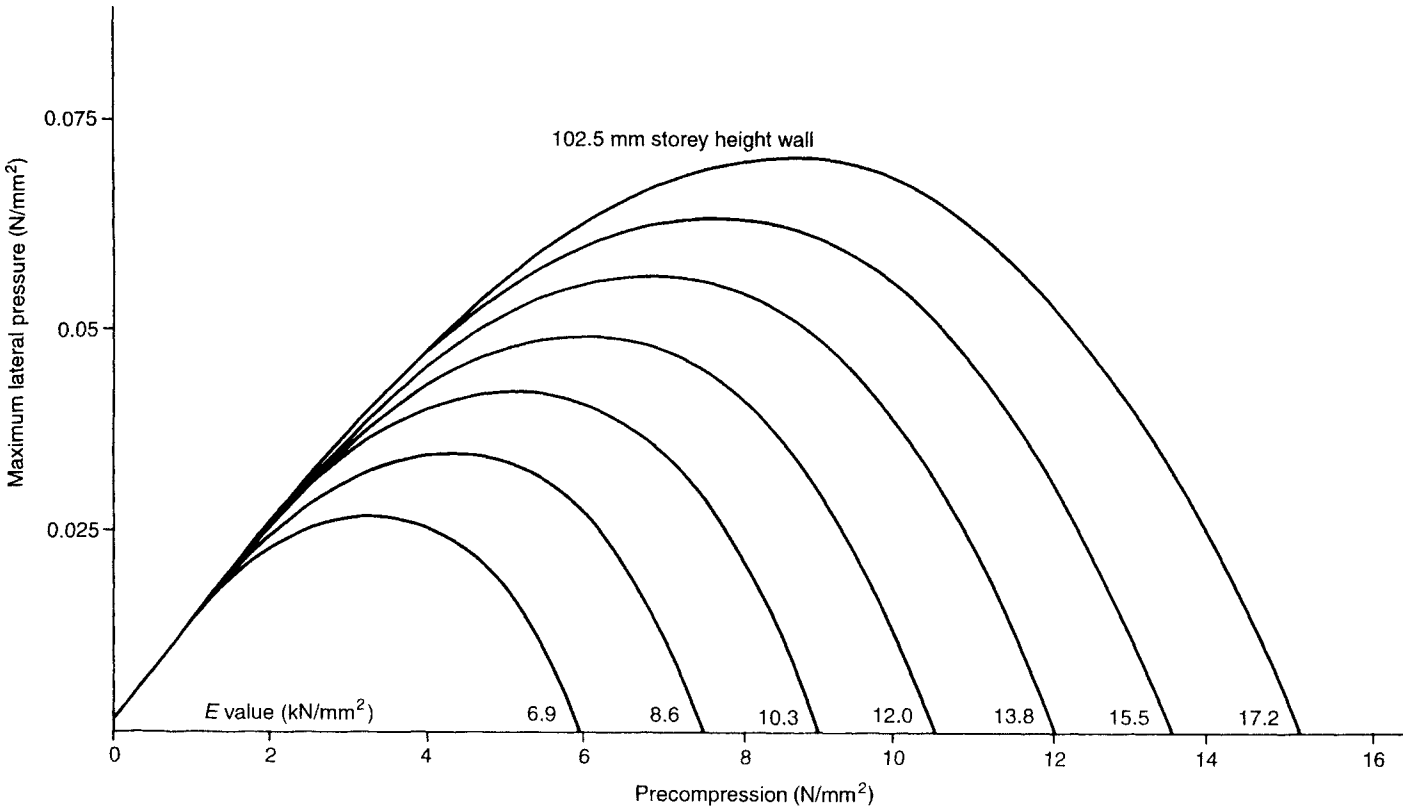

Fig. 7.8 Prccompression versus maximum lateral pressure on 102.5mm wall of storey height.

where w=design pressure, M_x and M_y=maximum moments per unit width at midspan on strips of unit width and span h and L.

Similarly, the moment of resistance per unit width of the panel can be calculated from the known value of the flexural tensile strengths in respective directions as:

$$M_y = f_{ty} Z \tag{7.12}$$

$$M_x = f_{tx} Z \tag{7.13}$$

where f_{ty}=allowable tensile strength perpendicular to the bed joint, f_{tx}=allowable tensile strength parallel to the bed joint and Z=sectional modulus for unit width.

In case of limit state design, the design bending moments per unit width in two directions will be

$$M_y = w_k \gamma_f h^2/8 \tag{7.14}$$

$$M_x = w_k \gamma_f L^2/8 \tag{7.15}$$

where w_k=characteristic wind load per unit area and γ_f=partial safety factor for loads.

The moment of resistance of the panel spanning vertically and horizontally will be given by

$$M_y = f_{ky} Z/\gamma_m \tag{7.16}$$

$$M_x = f_{kx} Z/\gamma_m \tag{7.17}$$

where f_{ky} and f_{kx} are characteristic tensile strength normal and parallel to bed joints.

7.5.2 Panels supported on more than two sides with various boundary conditions

The lateral load analysis of masonry panels of various boundary conditions is very complicated since masonry has different strength and stiffness properties in two orthogonal directions. Some typical values of brickwork moduli of elasticity on which the stiffness depends are given in Table 7.2.

The British limit state code BS 5628 recommends bending moment coefficients for the design of laterally loaded panels. The code does not indicate the origin of these coefficients, but they are numerically equal to those given by yield-line analysis as applied to under-reinforced concrete slabs with corresponding boundary conditions. Strictly speaking, yield-line analysis is not applicable to a brittle material like masonry which cannot develop constant-moment hinges as occur in reinforced concrete