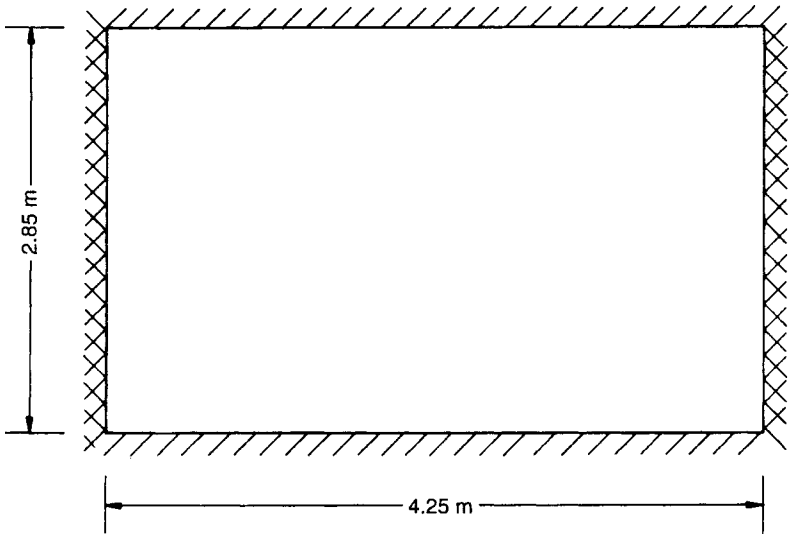

Fig. 12.10 Panel, simply supported top and bottom and fixed at its vertical edges.

12.8.1 Limiting dimension: clause 36.3, BS 5628: case B

The dimensions $h \times 1$ of panels supported on four edges should be equal to or less than $2025\,(t_{ef})^2$:

$$\text{area} = 2.85 \times 4.25 = 12.12\,\text{m}^2$$

$$t_{ef} = \tfrac{2}{3} \times 205 = 137\,\text{mm}$$

$$2025 \times (137)^2/10^6 = 38\,\text{m}^2 > 12.12\,\text{m}^2 \quad \text{(satisfactory)}$$

$$50 \times t_{ef} = 6.85 > 4.25 \quad \text{(satisfactory)}$$

12.8.2 Characteristic wind load W_k

The corner panel is subjected to local wind suctions. From CP 3, Chapter V, total coefficient of wind pressure,

$$C_p - C_{pi} = -1.1 - (+0.2) = (-)1.3$$

The design wind velocity

$$V_s = V S_1 S_2 S_3$$

where $S_1 = S_3 = 1$.

Using ground roughness Category (3), Class A, and height of the building=21m, therefore

$$S_3 = 0.956$$

Therefore

$$V_s = 50 \times 1 \times 1 \times 0.956 = 47.8\,\text{m/s}$$

and

$$\text{dynamic wind pressure} = [0.613 \times (47.8)^2]/10^3 = 1.4\,\text{kN/m}^2$$

Now

$$W_k = 1.4 \times 1.3 = 1.82\,\text{kN/m}^2 \quad \text{(suction)}$$

$$\text{design moment in panel} = \alpha W_k \gamma_f L^2 \quad \text{(clause 36.4.1)}$$

$$\text{aspect ratio of panel} = 2.85/4.25 = 0.67$$

therefore

$$\alpha = 0.032 \quad \text{(table 9)}$$

$$\mu = 0.33 \quad \text{(from table 3)}$$

$$\text{design moment} = 0.032 \times 1.82 \times 1.4 \times (4.25)^2 = 1.47\,\text{kN m/m}$$

Note that γ_f is taken as 1.4 since inner leaf is an important loadbearing element. The designer may, however, use γ_f=1.2 in other circumstances.

$$\text{design moment/leaf} = 1.47/2 = 0.736\,\text{kNm/m}$$

(since both leaves are of equal stiffness)

$$\text{design moment of resistance} = f_{kx} Z/\gamma_m \quad (\text{where } \gamma_m = 3.5)$$

$$= f_{kx}(1000 \times 102.5^2)/(6 \times 3.5)$$

$$= 500\,298 f_{kx}\,\text{mm}^3/\text{m}$$

Therefore

$$f_{kx} = (0.736 \times 10^6)/(500\,298) = 1.47\,\text{N/mm}^2 < 1.5\,\text{N/mm}^2$$

Use bricks having water absorption less than 7% in 1:1:6 mortar.

12.9 DESIGN FOR ACCIDENTAL DAMAGE

12.9.1 Introduction

The building which has been designed earlier in this chapter falls in Category 2 (table 12, BS 5628) and hence the additional recommendation of clause 37 to limit the extent of accidental damage must be met over and above the recommendations in clause 20.2 for the preservation of structural integrity.