

3rd floor

dead weight same as 5th
70% of 4 floors imposed load, 4×2.025
 $\times 0.7$ = 5.67 kN/m

	13.38	51.76	5.67
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2nd floor

dead weight same as 5th
60% of 5 floors imposed load, 5×2.025
 $\times 0.6$ = 6.08 kN/m

	13.38	65.14	6.08
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1st floor

dead weight same as 5th
60% of 6 floors imposed load, 6×2.025
 $\times 0.6$ = 7.29 kN/m

	13.38	78.54	7.29
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Ground floor

dead weight same as 5th
60% of 7 floors imposed load, 7×2.025
 $\times 0.6$ = 8.51 kN/m

	13.38	91.90	8.51
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^a Factor 0.45 from table 3.6, BS 8110: Part 1:1985.

^b Imposed load reduction from table 2, BS 6399: Part 1.

walls will provide the resistance to wind loading. In an actual design, the designer must of course check that the structure is safe for wind blowing east-west and vice versa.

In the calculation below it has further been assumed that the walls act as independent cantilevers; and hence moments or forces are apportioned according to their stiffness.

12.5.2 Wind loads

These are calculated according to CP 3, Chapter V: Part 2. We have

$$V_s = VS_1S_2S_3$$

$$S_1 = S_3 = 1.0$$

Using ground roughness category 3, Class B, with height of the building=21.0m, from Table 3, CP3, Chapter V: Part 2

$$S_2 = 0.91$$

Therefore design wind speed is

$$V_s = 50 \times 1 \times 1 \times 0.91 = 45.5 \text{ m/s}$$

and dynamic wind pressure is

$$q = 0.613 \times (45.5)^2 = 1269.0 \text{ N/m}^2$$

From Clause 7.3, CP3, Chapter V: Part 2, total wind force

$$F = C_f q A_e \quad (C_f = 1.1, \text{ Table 10})$$

$$A_e = \text{effective surface area}$$

The total maximum bending moment is

$$\text{total max. BM} = F \times h / 2$$

where h is the height under consideration. Total BM just above floor level is given for each floor by:

- 6th floor
 $C_f q A_e \times h / 2 = 1.1 \times (1269 / 10^3) \times 21 \times 3 \times 3 / 2 = 131.9 \text{ kNm}$
- 5th floor
 $1.1 \times (1269 / 10^3) \times 21 \times 6 \times 3 = 527.6 \text{ kNm}$
- 4th floor
 $(1.1 \times 1269 \times 21 / 10^3) \times 9 \times 9 / 2 = 1187.20 \text{ kNm}$
- 3rd floor
 $29.313 \times (12 \times 12 / 2) = 2110.54 \text{ kNm}$
- 2nd floor
 $29.313 \times (15 \times 15 / 2) = 3297.70 \text{ kNm}$