WIND LOADS CALCULATION PER BS 6399-2

FOR A BASIC WIND SPEED OF 25 m/s

$V_b := 25\ \frac{m}{s}$ basic wind speed

$K_b := 1$ building type factor in accordance with BS 6399-2 Table 1.
for ramed building with structural walls arround lifts and stairs only (e.g. office buildings of open plan or without partitions)

$H_r := 30\ m$ Reference height

$H_e := H_r$ Effective height to be considered in the calculations

Basic wind speed calculation in accordance with BS 6399-2 Section 2.2.1

$\Delta_S := 100$ site altitude above sea level in meters - Section 2.2.2.2

$S_a := 1 + 0.001 \cdot \Delta_S$ altitude factor

$S_a = 1.1$

$S_d := 1$ direction factor - Section 2.2.2.3 for unknown wind direction

$S_s := 1$ seasonal factor - Section 2.2.2.4

$S_p := 1$ probability factor - Section 2.2.2.5

$V_s := V_b \cdot S_a \cdot S_d \cdot S_s \cdot S_p$ $V_s = 27.5\ \frac{m}{s}$

Effective wind speed calculation in accordance with BS 6399-2 Section 2.2.3

$S_b := 1.96$ terrain and building factor - Section 2.2.3.3 - Table 4

$V_e := V_s \cdot S_b$ $V_e = 53.9\ \frac{m}{s}$ effective wind speed

for building heights larger that the width some reduction in wind loads may be obtained by dividing the building into a number of parts - in our case the reduction is neglijable.

$L := 51\ m$ building length

$W := 25$ building width

$\frac{L}{H_e} = 1.7$ external pressure coeff. - longitudinal per BS 6399-2 - Table 5

Longitudinal coefficients

$C_{pe.winward.L} := 0.749$ interpolation - values in Table 5

$C_{pe.leeward.L} := -0.249$

$\frac{W}{H_e} = 0.833 \ \frac{1}{m}$ external pressure coeff. - transversal per BS 6399-2 - Table 5

Transversal coefficients

$C_{pe.winward.T} := 0.800$ values in Table 5

$C_{pe.leeward.T} := -0.300$

$C_{a.L} := 0.848$ in accordance with BS 6399-2 Figure 4

$C_{a.T} := 0.816$

Dynamic pressure per BS 6399-2 Section 2.1.2

$q_s := 0.613 \cdot \left| \frac{V_e}{\frac{m}{s}} \right|^2 \cdot Pa$ in accordance with BS 6399-2 Formula 1

$q_s = (1.781 \cdot 10^3) \ Pa$

$p_{e.winward.L} := q_s \cdot C_{pe.winward.L} \cdot C_{a.L}$ in accordance with BS 6399-2 Formula 2

$p_{e.winward.L} = 1.131 \ kPa$

$p_{e.leeward.L} := q_s \cdot C_{pe.leeward.L} \cdot C_{a.L}$ in accordance with BS 6399-2 Formula 2

$p_{e.leeward.L} = -0.376 \ kPa$

$p_{e.winward.T} := q_s \cdot C_{pe.winward.T} \cdot C_{a.T}$ in accordance with BS 6399-2 Formula 2

$p_{e.winward.T} = 1.163$ ***kPa***

$p_{e.leeward.T} := q_s \cdot C_{pe.leeward.T} \cdot C_{a.T}$ in accordance with BS 6399-2 Formula 2

$p_{e.leeward.T} = -0.436$ ***kPa***