PART 5: OPEN BUILDINGS

30.8 BUILDING TYPES

The provisions of Section 30.8 are applicable to an open building of all heights having a pitched free roof, monosloped free roof, or troughed free roof. The steps required for the determination of wind loads on components and cladding for these building types is shown in Table 30.8-1.

30.8.1 Conditions

For the determination of the design wind pressures on components and claddings using the provisions of Section 30.8.2, the conditions indicated on the selected figure(s) shall be applicable to the building under consideration.

30.8.2 Design Wind Pressures

The net design wind pressure for component and cladding elements of open buildings of all heights with monoslope, pitched, and troughed roofs shall be determined by the following equation:

$$p = q_h G C_N \qquad (30.8\text{-}1)$$

where

q_h = velocity pressure evaluated at mean roof height h using the exposure as defined in Section 26.7.3 that results in the highest wind loads for any wind direction at the site
G = gust-effect factor from Section 26.9
C_N = net pressure coefficient given in:
- – Fig. 30.8-1 for monosloped roof
- – Fig. 30.8-2 for pitched roof
- – Fig. 30.8-3 for troughed roof

Net pressure coefficients C_N include contributions from top and bottom surfaces. All load cases shown for each roof angle shall be investigated. Plus and minus signs signify pressure acting toward and away from the top surface of the roof, respectively.

User Note: Use Part 5 of Chapter 30 for determining wind pressures for C&C of *open buildings* having pitched, monoslope or troughed roofs. These provisions are based on the Directional Procedure with *wind pressures calculated from the specified equation* applicable to each roof surface.

Table 30.8-1 Steps to Determine C&C Wind Loads Open Buildings

Step 1: Determine risk category, see Table 1.5-1

Step 2: Determine the basic wind speed, V, for applicable risk category, see Figure 26.5-1A, B or C

Step 3: Determine wind load parameters:
- ➢ Wind directionality factor, K_d, see Section 26.6 and Table 26.6-1
- ➢ Exposure category B, C or D, see Section 26.7
- ➢ Topographic factor, K_{zt}, see Section 26.8 and Figure 26.8-1
- ➢ Gust effect factor, G, see Section 26.9

Step 4: Determine velocity pressure exposure coefficient, K_z or K_h, see Table 30.3-1

Step 5: Determine velocity pressure, q_h, Eq. 30.3-1

Step 6: Determine net pressure coefficients, C_N
- ➢ Monosloped roof, see Fig. 30.8-1
- ➢ Pitched roof, see Fig. 30.8-2
- ➢ Troughed roof, see Fig. 30.8-3

Step 7: Calculate wind pressure, p, Eq. 30.8-1