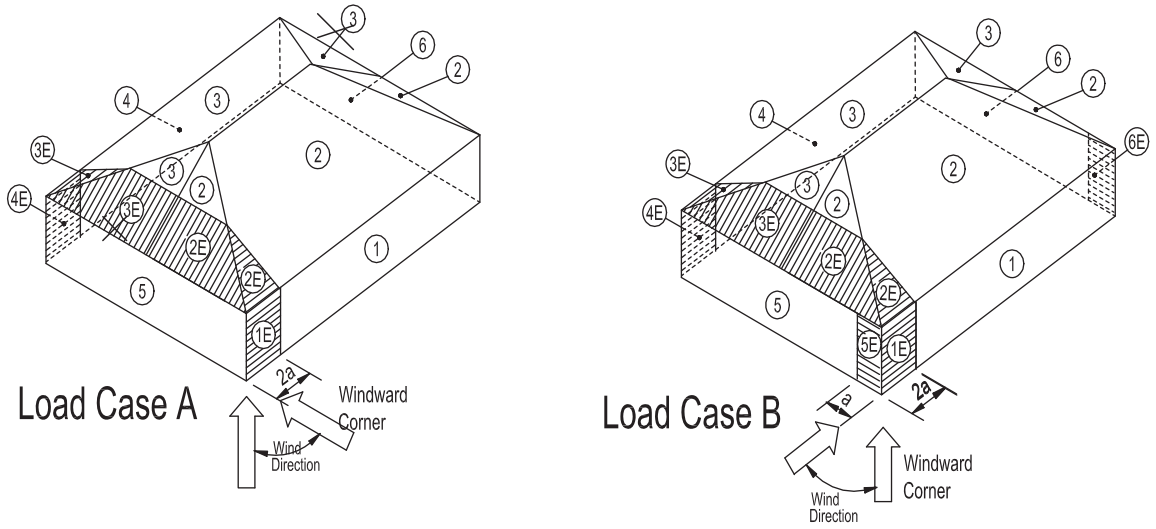
In the original wind tunnel experiments, both B and C exposure terrains were checked. In these early experiments, Exposure B did not include nearby buildings. In general, the force components, bending moments, and so forth were found comparable in both exposures, although (GC_{pf}) values associated with Exposure B terrain would be higher than that for Exposure C terrain because of reduced velocity pressure in Exposure B terrain. The (GC_{pf}) values given in Figs. 28.4-1, 30.4-1, 30.4-2A, 30.4-2B, 30.4-2C, 30.4-3, 30.4-4, 30.4-5A, 30.4-5B, and 30.4-6 are derived from wind tunnel studies modeled with Exposure C terrain. However, they may also be used in other exposures when the velocity pressure representing the appropriate exposure is used.

In comprehensive wind tunnel studies conducted by Ho at the University of Western Ontario (1992), it was determined that when low buildings (h < 60 ft) are embedded in suburban terrain (Exposure B, which included nearby buildings), the pressures in most cases are lower than those currently used in existing standards and codes, although the values show a very large scatter because of high turbulence and many variables. The results seem to indicate that some reduction in pressures for buildings located in Exposure B is justified. The Task Committee on Wind Loads believes it is desirable to design buildings for the exposure conditions consistent with the exposure designations defined in the standard. In the case of low buildings, the effect of the increased intensity of turbulence in rougher terrain (i.e., Exposure A or B vs. C) increases the local pressure coefficients. Beginning in ASCE 7-98 the effect of the increased turbulence intensity on the loads is treated with the truncated profile. Using this approach, the actual building exposure is used and the profile truncation corrects for the underestimate in the loads that would be obtained otherwise.

Figure 28.4-1 is most appropriate for low buildings with width greater than twice their height and a mean roof height that does not exceed 33 ft (10 m). The original database included low buildings with width no greater than five times their eave height, and eave height did not exceed 33 ft (10 m). In the absence of more appropriate data, Fig. 28.4-1 may also be used for buildings with mean roof height that does not exceed the least horizontal dimension and is less than or equal to 60 ft (18 m). Beyond these extended limits, Fig. 27.4-1 should be used.

All the research used to develop and refine the low-rise building method for MWFRS loads was done on gable-roofed buildings. In the absence of research on hip-roofed buildings, the committee has developed a rational method of applying Fig. 28.4-1 to hip roofs based on its collective experience, intuition, and judgment. This suggested method is presented in Fig. C28.4-2.



Notes:
1. Adapt the loadings shown in Figure 28.4-1 for hip roofed buildings as shown above. For a given hip roof pitch use the roof œefficients from the Case A table for both Load Case A and Load Case B.

2. The total horizontal shear shall not be less than that determined by neglecting the wind forces on roof surfaces.

FIGURE C28.4-2 Hip Roofed Low-Rise Buildings.