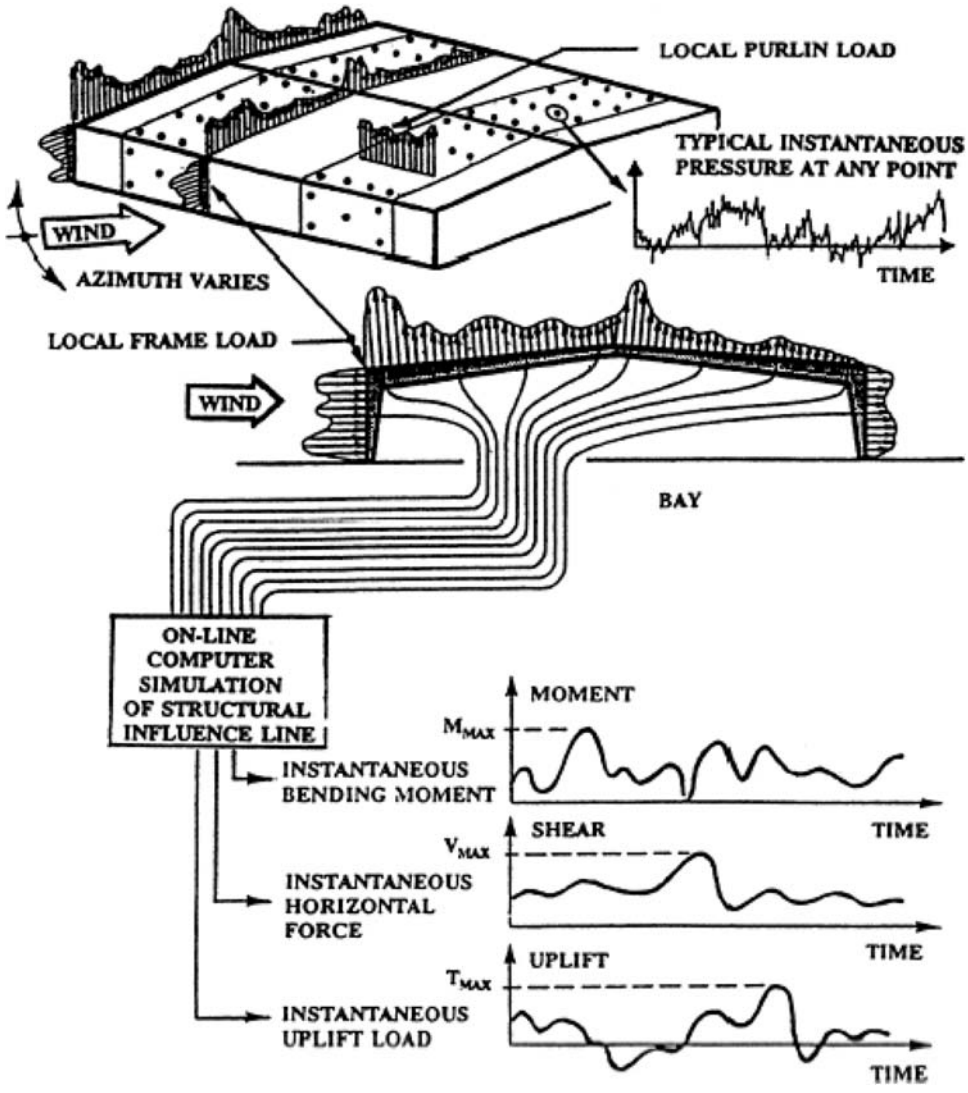

FIGURE C28.4-1 Unsteady Wind Loads on Low Buildings for Given Wind Direction (After Ellingwood 1982).

conservatively envelop the maximum induced force components (bending moment, shear, and thrust) to be resisted, independent of wind direction.

The original set of coefficients was generated for the framing of conventional pre-engineered buildings, that is, single-story moment-resisting frames in one of the principal directions and bracing in the other principal direction. The approach was later extended to single-story moment-resisting frames with interior columns (Kavanagh et al. 1983).

Subsequent wind tunnel studies (Isyumov and Case 1995) have shown that the (GC_{pf}) values of Fig. 28.4-1 are also applicable to low-rise buildings with structural systems other than moment-resisting frames. That work examined the instantaneous wind pressures on a low-rise building with a 4:12 pitched gable roof and the resulting wind-induced forces on its MWFRS. Two different MWFRS were evaluated. One consisted of shear walls and roof trusses at different spacings. The other had moment-resisting frames in one direction, positioned at the same spacings as the roof trusses, and diagonal wind bracing in the other direction. Wind tunnel tests were conducted for both Exposures B and C. The findings of this study showed that the (GC_{pf}) values of Fig. 28.4-1 provided satisfactory estimates of the wind forces for both types of structural systems. This work confirms the validity of Fig. 28.4-1, which reflects the combined action of wind pressures on different external surfaces of a building and thus takes advantage of spatial averaging.