



Figure 8.7 Conical vortices for oblique wind directions.

Similar flow separation and re-attachment, as described for roofs, occur on the side walls of low-rise buildings, although the magnitude of the mean pressure coefficients is generally lower. The mean pressures on windward walls are positive with respect to the free-stream static pressure. Leeward walls are influenced by the recirculating wake and generally experience negative pressures of lower magnitude; however, the values depend on the building dimensions, including the roof pitch angle.

When the wind blows obliquely on to the corner of a roof, a more complex flow pattern emerges as shown in Figure 8.7. *Conical* vortices similar to those found on delta-wings of aircraft occur. Figure 8.8 shows these vortices visualized by smoke—their axes are inclined slightly to the adjacent walls forming the corner. The pressures underneath these are the largest to occur on the low-pitched roofs, square or rectangular in planform, although the areas over which they act are usually quite small, and are more significant for pressures on small areas of cladding than for the loads in major structural members.

In the following sections, the effects of building geometries on design loads will be discussed in more detail.

8.3.4 Fluctuating pressures

The root-mean-squared fluctuating, or standard deviation, pressure coefficient, defined in Sections 4.6.4 and 8.3.1, is a measure of the general level of pressure fluctuations at a point on a building. As discussed in Section 8.3.2, the values obtained on a particular building are generally dependent on the turbulence intensities in the approaching flow, which in turn are dependent on the Jensen number. In boundary-layer winds over open country terrain, for which longitudinal turbulence intensities are typically around 20%, at heights typical of eaves heights on low-rise buildings, the values of rms pressure coefficients (based on a dynamic pressure calculated from the mean wind speed at eaves height) on windward walls are typically in the range of 0.3–0.4. In separated-reattaching