larger drift was caused when snow on a somewhat lower roof, upwind of the upper roof, formed a drift between those two roofs allowing snow from the upwind lower roof to be carried up onto the upper roof then into the drift on its downwind side. It was suggested that the sum of the lengths of both roofs could be used to calculate the size of the leeward drift. The issue of potential reduction in leeward drift size at a roof step due to a parapet wall is discussed in O'Rourke (2007).

In another situation (Kennedy et al. 1992) a long "spike" drift was created at the end of a long skylight with the wind about 30° off the long axis of the skylight. The skylight acted as a guide or deflector that concentrated drifting snow. This caused a large drift to accumulate in the lee of the skylight. This drift was replicated in a wind tunnel.

As shown in Fig. 7-8, the clear height, h_c, is determined based on the assumption that the upper roof is blown clear of snow in the vicinity of the drift. This assumption is reasonable for windward drifting but does not necessarily hold for leeward drifting. For leeward drifting, the last portion of the upper level roof that would become blown clear of snow is the portion adjacent to the roof step. That is, there may still be snow on the upper level roof when the roof step drift has stopped growing. Nevertheless, for simplicity, the same assumption regarding clear height is used for both leeward and windward drifts.

Tests in wind tunnels (Irwin et al. 1992 and Isyumou and Mikitiuk 1992) and flumes (O'Rourke and Weitman 1992) have proven quite valuable in determining patterns of snow drifting and drift loads. For roofs of unusual shape or configuration, wind tunnel or water-flume tests may be needed to help define drift loads. An ASCE standard for wind tunnel testing including procedures to assist in the determination of snow loads on roofs is currently under development.

C7.7.2 Adjacent Structures

One expects a leeward drift to form on an adjacent lower roof only if the lower roof is low enough and close enough to be in the wind shadow (aerodynamic shade) region of the upper roof as sketched in Fig. C7-2. The provisions in Section 7.7.2 are based upon a wind shadow region that trails from the upper roof at a 1 downward to 6 horizontal slope.

For windward drifts, the requirements of Section 7.7.1 are to be used. However the resulting drift may be truncated by eliminating the drift in the horizontal separation region as sketched in Fig. C7-3.

C7.8 ROOF PROJECTIONS AND PARAPETS

Drifts around penthouses, roof obstructions, and parapet walls are also of the "windward step" type because the length of the upper roof is small or no upper roof exists. Solar panels, mechanical equipment, parapet walls, and penthouses are examples of roof projections that may cause "windward" drifts on the roof around them. The drift-load provisions in Sections 7.7 and 7.8 cover most of these situations adequately, but flat-plate solar collectors may warrant some additional attention. Roofs equipped with several rows of them are subjected to additional snow loads. Before the collectors were installed, these roofs may have sustained minimal snow loads, especially if they were windswept. First, because a roof with collectors is apt to be somewhat "sheltered" by the collectors, it seems appropriate to assume the roof is partially exposed and calculate a uniform snow load for the entire area as though the collectors did not exist. Second, the extra snow that might fall on the collectors and then slide onto the roof should be computed using the "cold roofs-all other surfaces" curve in Fig. 7-2b. This value should be applied as a uniform load on the roof at the base of each collector over an area about 2 ft (0.6 m) wide along the length of the collector. The uniform load combined with the load at the base of each collector probably represents a reasonable design load for such situations, except in very windy areas where extensive snow drifting is to be expected among the collectors. By elevating collectors several feet (a meter or more) above the roof on an open system of structural supports, the potential for drifting will be diminished significantly. Finally, the collectors should be designed to sustain a load calculated by using the "unobstructed slippery surfaces" curve in Fig. 7-2a. This last load should not be used in the design of the roof because the heavier load of sliding snow from the collectors has already been considered. The influence of solar collectors on snow accumulation is discussed in Corotis et al. (1979) and O'Rourke (1979).

C7.9 SLIDING SNOW

Situations that permit snow to slide onto lower roofs should be avoided (Paine 1988). Where this is not possible, the extra load of the sliding snow should be considered. Roofs with little slope have been observed to shed snow loads by sliding. Consequently, it is prudent to assume that any upper roof sloped to an