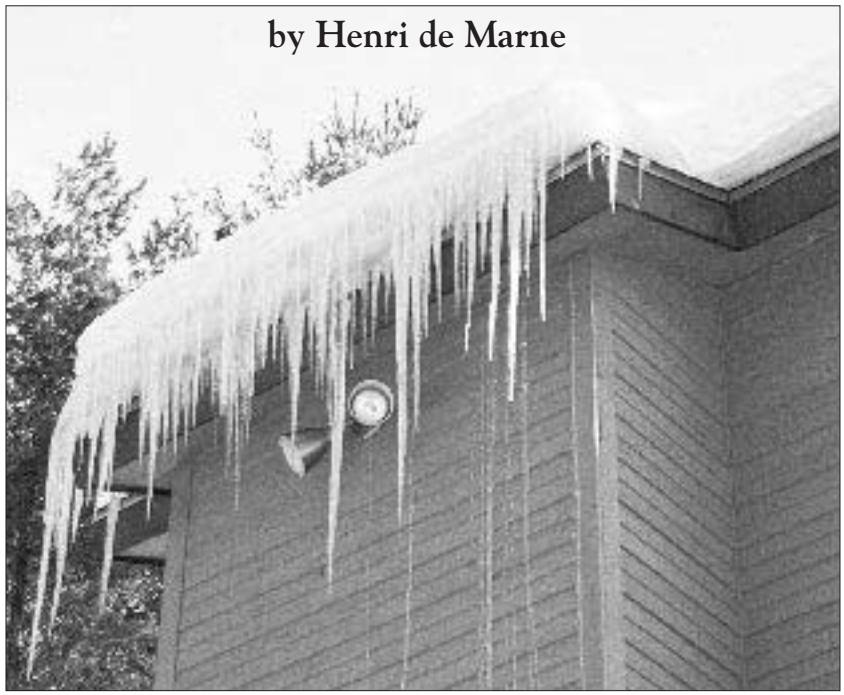
PREVENTING ICE DAM LEAKS

by Henri de Marne



Ice dams form when heat loss melts snow on the roof, sending water to the eaves where it freezes. Pooling water behind the ridge of ice eventually backs up under the roof shingles.

I've seen a lot of ice dams in my 24 years in Vermont, both as a builder and as a home inspector. But in the winter of '94, there were far more problems with leaks from ice dams than ever before. According to several builders I've talked to, the same was true in other parts of the country. Many of the leaks were caused by severe ice dams on roofs that had never leaked before.

What Causes Ice Dams?

Ice dams form when heat loss causes the snow pack on the roof to melt. The water runs down the roof under the insulating layer of snow until it reaches the cold eaves, where it freezes. A ridge of ice grows steadily at the eaves, creating a dam that prevents the water from dripping off the end of the roof. Eventually, the blocked water begins to pool and backs up under the roof shingles.

If the roof overhangs are wide enough, the leaking water freezes in the soffits. Since the outside temperature warms up gradually, the melting ice may never enter the living space. With shallow overhangs, however, and on buildings with no soffits at all, water can build up quickly and cause leaks even during the coldest part of the winter.

Cold roofs are designed to prevent ice dams. Cold air enters through continuous soffit vents, travels between the rafter insulation and the roof sheathing, and exits through a ridge vent. Any heat escaping from the insulation is carried away, so ice dams are prevented because the snow pack never melts.

Skylights are vulnerable to ice dams — even in a well-ventilated roof. A self-sticking membrane will prevent leaks.

The trouble with skylights. Heat loss around a skylight, however, is usually greater than on other parts of a roof. The skylight over my living room is no exception, and last March my roof leaked for the first time in 14 years, despite a cold roof designed to prevent ice dams. In previous years, melting snow from above and around the skylight ran down to the eaves and formed an "ice lens" — a roughly circular plate of ice, thick in the middle and feathered at the edges. There were never any leaks because the water always had room to move downward.

Last winter, however, very cold temperatures reduced the insulating value of the unusually heavy snow pack on the roof. Water from melting snow around the skylight was trapped between a very cold layer of snow and a very cold vented roof, so it froze more quickly than usual. The resulting ice dam formed rapidly at the eaves and worked its way up the roof, with new snow melt freezing closer and closer to the skylight. Instead of the usual ice lens below my skylight, there was a continuous sheet of ice 3 or 4 inches thick running the width of the skylight and extending all the way down to the eaves

(Figure 1). The top and bottom edges of the ice sheet were much thicker than the rest of the sheet — almost 8 inches thick. Water had pooled behind the ice immediately below the skylight, and was backing up under the skylight flashing and entering the house.

I spent the better part of an afternoon creating a channel to allow the water to escape to the ground. Using a masonry hammer, I completely removed the wall of ice at the top and carved out a V-shaped channel all the way down to the eaves. Once the water was able to run off the roof through this channel, the leak stopped. Rain and warmer temperatures over the next few days melted the rest of the ice sheet.

Preventing Ice Dam Leaks

Even though I stopped the leak before it did any real damage, it was hard work, and I don't want to repeat it every year. When I replace my aging roofing in the next few years, I will shield the entire area around the skylight before the new roofing is applied. I recommend the following procedure, even on cold roofs.

After the skylight is installed, but before the counterflashing is in place, cover the area around and below the skylight with a self-adhering bituminous membrane, such as Ice and Water Shield (W.R. Grace Construction Products, 62 Whittemore Ave., Cambridge, MA 02140; 617/876-1400). Begin at the eaves, and lay the membrane so that it extends 3 feet to each side of the skylight, with a 6-inch overlap at the seams (Figure 2). Extend the membrane 3 feet above the skylight as well. To prevent water from leaking into the skylight, roll strips of membrane up the sides of the curb, lapping the main membrane by 6 inches. Finally, apply the skylight counterflashing and roofing in the normal manner.

While you may not need this kind of protection every year, the extra cost of the protective membrane layer is a small price to pay for peace of mind. And it's a lot easier than standing at the top of a ladder, chipping away at an ice dam. ■

A remodeling contractor for 30 years, Henri de Marne works as a home inspector, consults on energy issues, and writes a nationally syndicated home repair column.

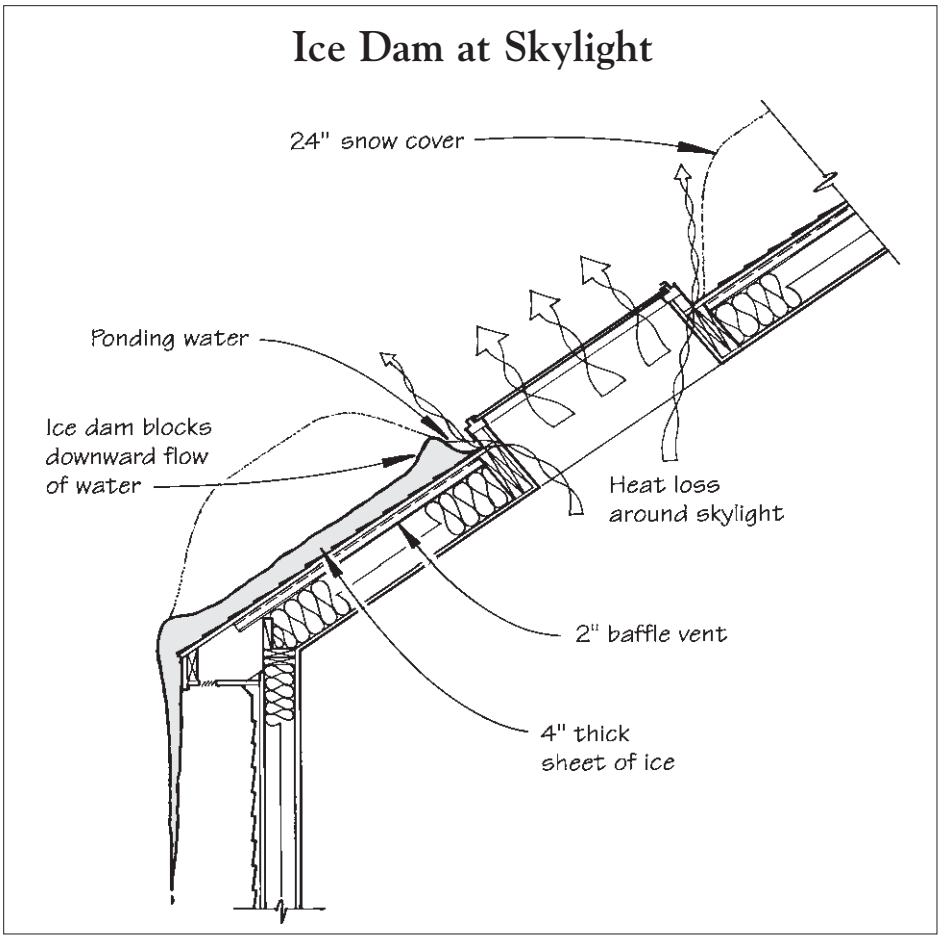


Figure 1. *In extremely cold temperatures, the snow pack on a roof doesn't have much insulating value. Water from melting snow at the skylight is trapped between the cold, vented roof and the snow, freezing almost immediately. A thick sheet of ice can form between the skylight and the eaves, causing water to back up into the building.*

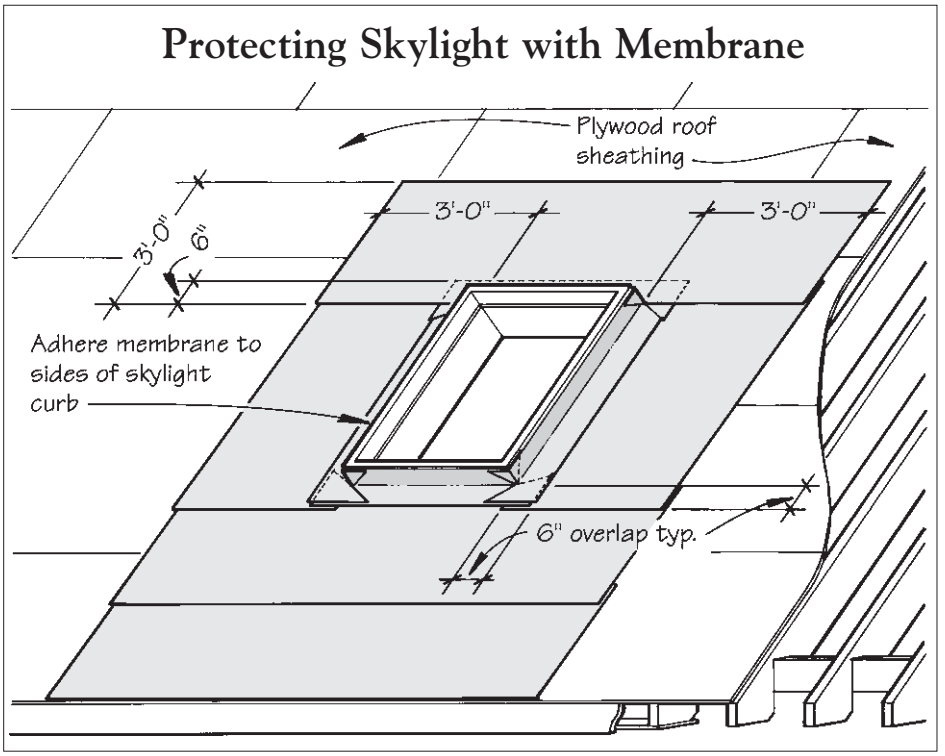


Figure 2. *When ice dams can't be prevented, protect against leaks with a continuous bituminous membrane applied before the skylight counterflashing. Extend the membrane 3 feet on all sides of the skylight, and run it all the way down to the eaves.*