

The Failure of the Cold Roof Concept

Snow melting off the roof causes glaciers of ice cascading down forming massive icicles commonly referred to as ice dams. Ice dams create a hazard from falling ice and refreezing ice melt on walkways. The roof and other structures of the home are damaged by water getting in cracks and openings and then refreezing.

Early attempts to hold the snow on the roof was done with snow guards. Snow guards are hooks mounted all over the roof to hold the snow in place. Many of them are decorative. The pitfalls of snow guards were that the large accumulation of snow provided an insulating area on the roof to which the bottom portion was melted by heat rising from the home and warming the roof.

Have you ever wondered why you have vents in your soffit (eaves) and roof? It seems like it would make the home less efficient and drafty. But if you have ever been up in your attic, you will see that there is a very thick layer of insulation between the rafters. Back in the 1970S, an R value of R-19 to R -30 would have been the norm, but newer homes today typically have R-49 to R-70. While the insulation does keep the heat in the home, its most important job is to create a cold barrier between the roof and the ceiling. This is called the “Cold Roof Design”. The benefits from a cold roof design are extended life of the shingles (prevents overheating) and the prevention of ice dams on the bottom edge of the roof and gutters. The purpose of a cold roof is to prevent snow melting off the roof until the spring thaw when ice damming is less likely to occur.

No system is goof proof. Despite all precautions, homes in the northern climate get ice dams. There is no way to get around icicle formation with an ice storm. Freezing rain is going to cause problems. Snow melting occurs even with the best designed cold roof systems. Shed style roofs (dormers are absent and eaves are on both sides of home) have the least problems. Complicated roofs with multiple dormers have the worst problems because warm air becomes trapped in the back of the dormer. There are a variety of other issues that can contribute to ice damming. The orientation of roof, color, and slope are all a factor in the degree of icicle formation. Dark colored roofs absorb the heat and melt the snow, while light colored roofs reflect the heat away.

Roof vents breathe out warm air and cause snow melting on the roof. There are a variety of reasons as to why warm air is coming out from the supposedly cold barrier between the ceiling and roof. Warm air leaches from the home below from many exit points in the ceiling. Exit points in the ceiling include plumbing vents, bathroom fan vents, attic hatches, recessed lights, and other electrical fixtures. The wooden rafters which compose 10% of the ceiling are not insulated and transfer heat into the attic. Some of the air will heat the roof, while a great deal will spew out the roof vents and melt the snow. Occasionally, the roof vents will become covered with an insulating layer of snow. The trapped air will then melt the roof at a faster pace.

A fire in the fire place lends a comfy feeling to the home. A heated chimney will also melt the snow around it.

A thaw in the middle of the winter can cause problems by warm air being drawn into the soffit vents where it heats up the roof or melts the areas around the roof vents.

The degree of ice damming on the roof will be determined by the style of roof, color, orientation, and other variables warming the roof. Shed roofs will possess the most efficient cold roof system, but most roofs will need some sort of deicing to prevent excessive ice damming issues.