

How to Prevent Roof Damage from Winter Ice Buildup

By Chris Dorsi

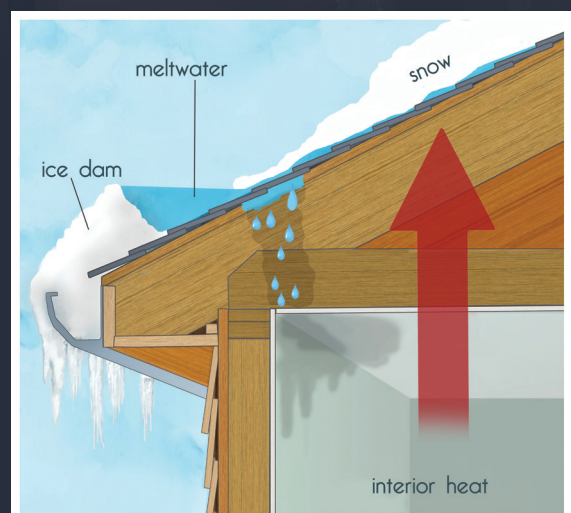
Ice dams are peculiar. In mid-winter, when most water in Montana is bound in snow and ice, water comes running into the house. This is counterintuitive because a roof would normally leak during rainy weather, not snowy winter. Ice dams are annoying because sometimes the battle to remove them can last for years. And they're destructive, potentially causing thousands of dollars in home damage. However, once understood, ice dams can be prevented in most homes.

How do ice dams form?

Ice dams form when a winter roof is warm enough in some areas to melt snow and create liquid water, but cold enough near the edges to re-freeze that water and form a dam. Then more water backs up behind the dam and runs under the shingles into the home, where it can saturate attic insulation, stain drywall or plaster, and encourage mold and mildew growth. It's wise to find the cause of ice dams and take action to solve them before significant damage occurs.

Proper insulation

Homeowners who battle ice dams often discover that not everyone agrees on the cause or solution. Calls to contractors or appeals to friends can yield conflicting advice. "Shovel your roof." "Install heat-tape." "Remove the gutters." "Insulate the attic." "Replace the shingles." Who IS correct?



Interior heat melts snow on the roof. Ice along roof edges blocks meltwater from draining off the roof. Meltwater then pools and leaks through the roof.

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Since the root cause of most ice dams is heat leaving the home and melting snow on the roof, the basic fix is to keep heat away from the roof. Ideally a home has a thick blanket of insulation above the ceiling that slows heat transfer. It'll also have a continuous air barrier that keeps warm house air from entering the attic. But many homes don't have sufficient insulation or an effective air barrier—and some of the biggest gaps in this thermal boundary can be in the attic where they feed the cycle of ice dam formation.

Trouble Spot #1: Insulation at the Edges

In houses with slanted roofs, the thinnest attic insulation is at the home's edges where the roof meets the walls. It's a hard place to insulate properly, and not all builders pay attention to this problem area during initial construction.

What's the Fix?

If a home has minimal attic insulation, adding more insulation can solve the problem. A home should have 16–20 inches of loose-fill or batt insulation, and as much as the structure will allow at the edges. Better than loose-fill or batts, it is sometimes possible to install foam insulation at the edges to get a boost in insulating value. Foam insulation has about twice the R-value (insulating power or capacity to resist heat) per inch of loose-fill or batt insulation, making it a go-to material to upgrade attic insulation edges.

Trouble Spot #2: Air Leakage

A home's ceiling should prevent heated air from leaving the living space. Though a ceiling assembly is ideally airtight, the reality of construction methods and subsequent maintenance activities leaves many ceilings full of visible and hidden holes. These passageways carry air and heat into the attic, where they contribute to the formation of ice dams.

What's the Fix?

The easiest way to spot this construction defect is to tour the attic. Look for openings in framing that lead down into the home. These could be at the tops of walls, above cabinets, around stairways, or where pipes and wires pass through the ceiling.

An even better way to find hidden air pathways for heat and air is to use a blower door and/or

infrared camera. These specialized tools, used by energy auditors, give a simple version of “x-ray vision.”

When you find air pathways from the house to the attic, seal them to slow the flow of air.

- *Don't worry about little stuff: cracks of ¼-inch or less don't tend to be consequential in formation of ice dams.*
- *For cracks of ¼-inch to 2-inches, use cans of spray foam from the hardware store.*
- *For larger openings, cut pieces of drywall or rigid foamboard to fit the holes, then seal the edges with canned foam or caulking.*
- *Do not seal around chimneys since these sometimes have intentional air spaces that keep them cool.*

Who you should call

The first step in solving ice dam problems is to take a close look at the attic to identify where the insulation or air barrier are ineffective. If you're comfortable doing so, get a ladder and bright light and take a look. If you don't feel safe doing this inspection, get professional help. Energy auditors or insulation specialists are often the best people to call. If calling for professional help, ask a few questions:

- *Will they go into the attic to assess the problem?*
- *Do they use a blower-door and infrared camera to detect air leakage?*
- *Will they address the usual suspects of thin insulation and excess air movement?*

Ice dams are solvable

Don't suffer through ice dams. A few small icicles are okay: in fact they're a normal sign of winter. But if there is water leaking into a home and staining walls and ceilings, it's a problem worth fixing. The solution is almost always a combination of improved insulation and air-sealing in the attic. ■

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