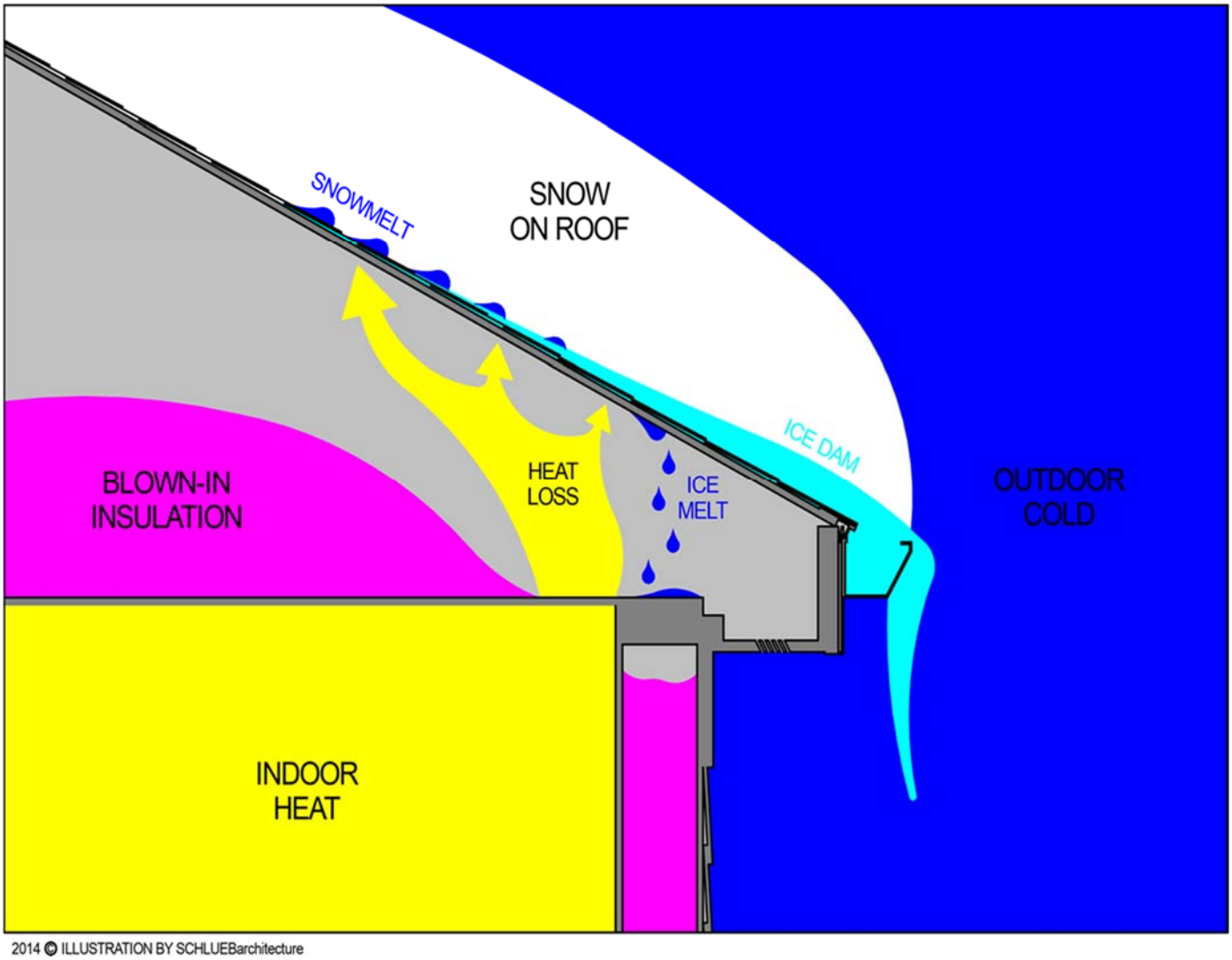
Icicle Lightsabers

"Oskar, why are there snowballs stuck on the side of the house?"
"I'm trying to knock off the icicles."

When my son was a few years younger, he liked to see how long icicles would grow each winter. One year, we had one that reached the ground. Now that he is twelve years old, he is more interested in breaking them loose from the edge of the roof, landing softly intact in the snow below, so he can wield them around in lightsaber duels with his younger brother, Olin.

Living in Pittsburgh, where big temperature swings in a single day is not uncommon, we are blessed with an icicle breeding ground, at least in the eyes of children. But, from the perspective of a homeowner, where icicles can cause structural damage to a house or worse a hazard of bodily injury, they are far less admired for their beauty or fun.

How do icicles form on roof edges and more importantly, how can they be prevented? The answer to these questions are frequently misunderstood. To get at the heart of it, we must take a look under the hood (or in this case, under the roof).



In older houses and most new ones, attics are insulated with blown-in insulation, settling between ceiling joists, leaving the attic as cold as outdoors. This can be a good strategy, as long as there is a sufficient amount of insulation and it is placed correctly. However quite often, the insulation around the perimeter of the attic, in the hard to reach places, is cut short by insulation installers. Even when it is properly insulated, the blown-in insulation frequently becomes dislodged during storms, when strong winds blow through vents in the eaves.

These gaps in the insulation allow heat to leak from inside the house. Aside from wasting energy and raising winter utility bills, the heat loss warms the roof above covered in snow. The snow melts on the underside, insulated from the winter cold on the topside and snowmelt then runs down the surface of the roof shingles. As this water reaches the end of the roof, the cold metal gutters re-freeze it, forming ice. Over time, as snowmelt water continues to run down the roof, the ice grows into a dam along the gutter.

This ice dam, hidden from sight under the snow on the roof, causes the most damage to the house. As the ice grows up the roof, it works under the shingles, finding its way onto the roof sheathing, where it melts for a second time by the heat loss in the attic. At this point, water soaks, drips, runs down onto ceiling joists and wall studs, damaging interior finishes and eventually rotting away structural integrity of the framing.

None of this sounds good, but what does this have to do with icicles? Well, to answer this, we need to return to the temperature swings we get here in the 'burgh. As the thermometer flirts around the freezing point, below it in the early morning, above it in the late afternoon, ice dams melt off on the top side that is exposed to warming outdoor air. This time however, melting on top, the water runs down over the ice dam re-freezing in the gutter, over the gutter as it fills up, eventual as icicles hanging down from the gutter.

So, these icicles are indicators, of the bigger problem - ice dams, growing out of sight up on the roof, under the snow. Use these icicles, not just for lightsabers, but to point out what parts of the roof need a closer investigation for insulation deficiencies. Ice dams and icicles can form by other factors (snow drifts in roof valleys as an example), but with the right amount of insulation in the proper placement, the vast majority of ice related problems on the roof can be avoided.

Here are a few additional measures that can be taken to improve the quality of roof construction and performance against ice damage, for not much more additional money spent. Add insulation baffles at the eaves along the bottom of the roof rafters. Switch to fiberglass batt insulation at the perimeter of the attic. And, use a rubberized asphalt adhesive backed ice and water shield underlayment on the first 36 to 72 inches of roof sheathing along the gutter line. In the end, money spent will be recouped in heating utility savings and your roof will last much longer. Although, your kids will need to go to your neighbor's house for lightsabers.

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Dec 30, 2014 12:11PM, Published by North Hills Monthly magazine, Categories: Health+Wellness, Today
http://www.northhillsmonthly.com/2014/12/30/56589/icicle-light-sabers-signal-a-bigger-problem