Baffling Water Stains

by Henri de Marne

This month's column could aptly be called "The Continuing Saga of Unbaffled Ridge and Hip Vents," for it demonstrates, once again, the problems caused by improperly installed ventilation systems.

At the time of this writing, I am involved in the repair of roof leaks in a high-priced, architect-designed house—leaks that are directly attributable to the ventilation system. When I first went to examine the ceiling problem reported by the owners—peeling paint and bad stains on a 25-foot cathedral ceiling, along with peeling drywall seams—I suspected that condensation might be the cause.

(This was a logical conclusion, because last year, when the same house underwent repairs to correct frozen heat pipes in two eave crawl spaces, the rafters were discovered to be blocked solid, effectively stopping the air flow between the soffit and ridge vents.)

The house is covered with a handsome, steep, standing-seam roof that terminates at the ridge with a flat-cap ridge vent. The roof hip at the point where this L-shaped house makes a 90-degree turn also is covered with a flat metal cap discreetly concealing ventilation. There are running soffit vents throughout.

The ventilation system adheres to the highly effective and recommended design of continuous soffit-to-ridge venting, but it lacks one major feature: a wind baffle on the ridge and hip vents.

One of my main gripes about custom-made ridge vents (often a necessity on steep roofs) developed by resourceful builders is that they often don't integrate a wind baffle—a feature most people seem to think unnecessary. (The same is true of some commercially available models, too.)

Attic-Ventilation Essentials

One of the principal functions of a balanced, constantly working, effective attic-ventilation system in cold regions is to "wash" the underside of the sheathing with constantly moving air. This keeps the sheathing as close as possible to the exterior ambient temperature in winter in order to prevent melting snow and concurrent ice-dam and water-backup problems.

Adequate levels of attic insulation also are essential to reduce heat loss into the attic. Without equally adequate *ventilation*, however, the attic temperature encourages snow on the roof to melt from beneath, resulting in the too frequent problems caused by water ponding behind increasingly thicker ice dams at the eaves.

Another function of attic ventilation—the main one for most areas of the country—is to remove diffused or convected interior moisture to the outdoors before it has a chance to condense in the attic, the walls and the living spaces.

The Only Answer

Only one venting system meets these criteria at all times: a combination of continuous soffit vents at the same level on all sides of the house, and a continuous ridge vent. (Of course, the air passages must be kept clear from bottom to top.)

A combination soffit/ridge venting system works on the principle that warm air rises and that the ensuing vacuum is filled with colder air introduced from below. Thus, the ridge vent is the outlet, and the soffit vents are the inlets. The soffit vents are always under positive pressure, while the ridge vent is under negative pressure when viewed from outside.

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However, if the ridge vent is not protected by a wind baffle—or deflector, if you will—the wind, following the roof plane, can enter the ridge vent, thus turning it into a positive vent and stopping the air flow. It also can drive rain and snow into the attic or rafter spaces of a cathedral ceiling.

When protected by a wind baffle, however, the ridge vent becomes an air pump. The wind is deflected above the ridge vent, increasing the negative pressure already built into the system and accelerating ventilation.

The Cause Revealed

This brings us back to our case-in-point house. The discreet ridge vents formed by the space between the flat sheets of the standing-seam roof and the flat cap, both at the ridge and along the hip, were not protected by a wind baffle. But the ridge and hip vents initially were not considered the cause of the problems evident on the ceilings for several reasons: the steepness of the roof, the apparently ample overlap of the roof covering and the ridge/hip cap, the amount and distribution of water damage on the ceilings below, and the apparent seclusion of the site in a wooded area on the affected side.

The assumption was that the builder also had installed solid blocking the full depth of the rafters and that the insulation probably also interfered because of poor installation practices—a situation similar to that witnessed a year earlier when dealing with the frozen-pipe syndrome. We suspected that interior moisture had found its way into the rafter spaces, condensed, and run back through the insulation, coming through at the joints in the kraft-paper vapor retarder, then through the lateral drywall joints from top to bottom, with the worst stains occurring where ceilings and walls meet.

But when the contractor began removing the ceiling drywall to correct these assumed ventilation deficiencies, it became instantly clear that the earlier assumptions were wrong. The plywood sheathing and rafters were as good as new, there were no signs of accumulated moisture over the 15-plus years the house had stood, and there was a clear ventilation space from bottom to top. In other words, the anomalies found in the opened eave spaces a year earlier simply were flukes.

What *was* apparent was the crinkling of the insulation's kraft paper everywhere the drywall was removed. The insulation was completely dry, but daylight could be seen along the hip and ridge vents when it was removed, and close inspection revealed water stains on adjacent wood.

The owners also mentioned that despite the heavily wooded site, ferocious winds blowing down the mountainside hit this side of the house and came through the hip vent at record speeds. We needed no rain to be convinced that the culprit had been unmasked.

The Cure

What to do about it? Obviously, baffles needed to be provided in every bay between standing seams, and they might as well be installed even where no water stains were visible.

We contacted the original roofer and asked him to make and install L-shaped pieces of metal slightly shorter than the distance between the standing seams. The pieces would be used to provide drainage. But the contractor expressed concern that soldering the pieces to a roof as old as this one—and with paint on it, to boot—might not work.

What next? I asked the contractor (who is a pleasure to work with because he's always willing to experiment) what he thought of this idea: We could adapt our custom-made, L-shaped pieces so that each leg is just shy of the depth of the standing seams. Corresponding with each seam, we could make a vertical cut in one leg to the bend, then cut along the bend for an inch or so to form a tab. The tab could be bent and used to pop-rivet the metal pieces to the standing seams, with the other leg of the metal pieces resting on top of the seams.

He liked the idea immediately, and we both agreed that it would be a lot faster and cheaper than the original plan. The bent tab would provide the needed drainage slots, and additional inverted "V"s could be cut on the lateral pieces installed below the ridge vent if he felt the need for more. (But the fact that there would be a slight space between the retrofitted baffle and the original metal, coupled with a one-inch slot in each bay, should be sufficient, we agreed.)

Of course, the baffle sections protecting the hip vent need no more drainage holes if you ensure that the slots are on the lower sides by fastening the tabs to the

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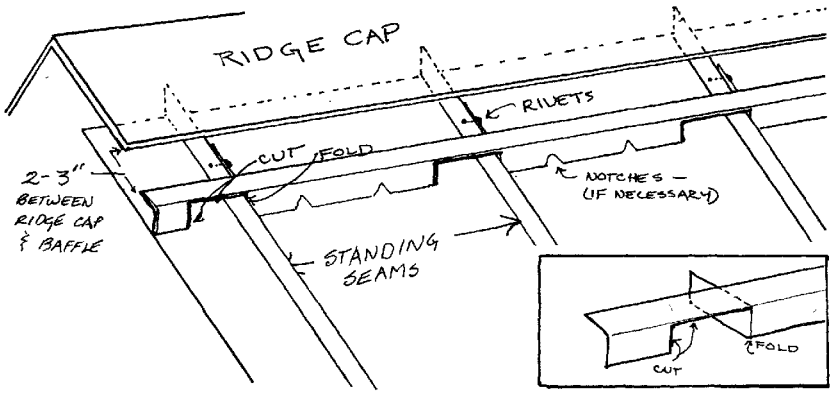

high side of each bay seam.

I cannot testify to the success of the method at this point, as it has yet to be carried out, but there seems to be no reason it should not work.

Other Applications

This method appears to provide a relatively simple solution for anyone tackling a similar ridge- or hip-venting system, whether as part of a new house covered with a standing-seam tin roof or as a later correction. It also should work with a V-crimp metal roof, except that if would require two vertical cuts, with the tab bent along the bend in the L-shaped baffle pieces and fastened to the top of the inverted "V"s of the roof panels.

Accessories generally are available for corrugated roof panels to seal the corrugations. For example, ridge caps could be cut in half and adapted with a metal brake to act as wind deflectors just below a job-built ridge vent. *NEB* readers may have an even better idea to share, but in the meantime, I hope this experience convinces everyone that a ridge vent (or hip vent) not protected by a wind baffle is an invitation to puzzling water stains.

Finally, here is another tidbit gleaned from past experience that may prompt stalwart innovators to revise their ridge-vent designs, particularly as they relate to procedures designed to screen out insects.

Some wasps—especially the dark brown, thin, slow-flying, and even slower-to-anger kind—love to build their paper-thin, honeycombed, umbrella-type nests in ridge vents. Over a few years, the entire space can be filled with their nests, cutting off all air circulation through the vents.

To avoid the problem, screening should be done on the *underside* of the outer edges by using half-inch ridge-vent sections, such as Air Vent Inc.'s Uni-Utility vent. ■