SNOW RETENTION – The Invisible Code

By Terry E. Anderson

Snow retention codes do not seem to be a priority within the United States roofing industry. But it is very common to see snow and ice sliding off of a metal roof's slippery surface; crushing cars; and damaging roofs, gutters, and landscapes. In some cases, snow and ice cascading off roofs have killed people. Codes for snow retention systems are essential in order to protect people and property from sliding ice and snow (*Photo 1*).

There are many reasons snow retention systems fail and why we need codes in place. Some examples follow.

PRODUCT FAILURE

The Snow Guard Was Not Strong Enough to Hold the Load It Was Carrying

Anyone can cast a wax snow guard, spread some adhesive on the bottom, and tell the consumer how to install it without any testing of the product or the system. Codes would provide a standard to ensure adequately designed products are utilized.

SHEATHING/ROOFING MATERIAL FAILURE

Roofing Material Is Inadequately Secured for the Shear Created by Sliding Snow

If the roofing material is not securely fastened to the deck (specifically on standing-seam metal roofs), added weight can cause the standing-seam metal roof to slide right off, along with the rest of the roofing material and snow retention system. There is a code requirement in place for wind uplift on standing-seam metal roofs but not for shear strength of the installed panels.

Screws or Fasteners Pull Out

When installing snow retention on roof sheathing, the thickness and type of the sheathing determine the fastener pull-out strength. If one is installing a snow retention system on 7/16-in. OSB board, the fastener will fail more quickly than when using ¾-in. plywood. When designing a layout for a project, many snow retention manufacturers do not test for these variations. If the snow retention system was designed for ¾-in. plywood and the project is using 7/16-in. OSB board, the entire system needs to be redesigned.

Photo 2 – These plastic snow guards fell to the ground because the adhesive did not bond properly.

Photo 1 – Sliding snow can be incredibly dangerous.

Photo 3 – This snow retention system was not engineered for some variable of the project that caused it to fail.

Photo 4 – A snow retention code needs to be put in place to help prevent injury to people and damage to property.

The Fastener Does Not Penetrate the Sheathing

If the fastener/screw is not penetrating the sheathing, the snow guard will not have the holding strength for which it was designed.

ADHESIVE FAILURE

When using an adhesive, if the surface is not free of dust, dirt, oil, or waterproofing or it is not clean and dry, the adhesive will not bond properly (*Photo 2*).

If the temperature is not above 50°F (10°C), the sealant will not cure. If a load is placed on the snow guard before the 28-day cure time, the snow guard is more likely to fail.[1]

SYSTEM FAILURE

The System Is Not Designed for the Roof Slope and Snow Load

When designing a snow retention system, factors change from project to project: the slope, roof type, sheathing type, and roof snow load. If the snow retention system is not engineered for the variables of the project, it can fail (*Photo 3*).

Most Snow Guards Are Not Tested to the Fail Point of the System

Many snow guard manufacturers claim their products are tested, and many of them are, but they are not tested to the fail point of the entire system. The product may be tested to maintain its shape, but was it tested to stay on the roof? It's great if the product stays in one piece, but not if the fastener fails, the adhesive fails, and the sheathing fails.

INSTALLATION FAILURE

The Product Was Not Installed to Manufacturer's Specifications

The manufacturer's instructions need to be followed meticulously in order to ensure safety and to keep warranties in effect. Many manufacturers have specific torque requirements, as well as placement and maintenance instructions. If these are not followed, the system can fail and the manufacturer is not at fault.

Obviously, there are valid reasons why the United States should establish codes for snow retention on roofs. Why hasn't this happened? A few reasons follow:

1. Snowfall occurs in certain areas of the country but not nationwide; therefore, the demand for codes is sporadic.
2. Not many deaths occur due to sliding ice and snow.
3. Property damage is localized.
4. The insurance industry is not pushing for this type of code.

There are many other codes in place to protect people and property, so why not for snow retention? We have codes for wind uplift and ICC test standards for product failures due to wind and moisture penetrations, to name a few. How many life-threatening events (*Photo 4*) need to occur before we do the right thing when it comes to a code for snow retention on roofs?

It's time to make the invisible snow retention code visible.

REFERENCES

1. Surebond Technical Data Sheet SB-190.

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Terry E. Anderson has been in the roofing industry for over 35 years. He is the owner of Anderson Associates Consulting and president of T.R.A.-MAGE, Inc., a manufacturer of roof snow and sun accessories. Anderson was sought after to solve tile roof problems, eventually researching solutions to the frequent structural damage caused by sliding snow and ice. Traveling to Europe, Terry studied how the roofing industry there successfully dealt with snow and ice issues. Using his years of experience and research, he coauthored *Concrete and Clay Tile Roof Design Criteria for Cold and Snow Regions*. Anderson founded T.R.A. Snow and Sun, now in partnership with MAGE and known as T.R.A.-MAGE, and is recognized as a leader in snow retention systems. He is a member of RCI, WSRCA, and on the technical committee for the Tile Roofing Institute (TRI).