



# SLIDING SNOW

## ARE YOUR CUSTOMERS' BUILDINGS PREPARED?

BY DAN FLORCZYKOWSKI

**DESTROYED PARAPETS AND GUTTERS**, damaged walls and windows, bent vent pipes and electrical lines torn from the side of a building. These problems were not caused by tornados or hurricanes. They were caused by sliding snow and ice.

At some point between the months of October and March, snow will accumulate on rooftops throughout different parts of the country. Michigan, New York, Ohio and Pennsylvania likely will experience tremendous snowfall and "lake-effect" snow caused primarily by their proximity to the Great Lakes. Other regions of the country, such as Arkansas, the Carolinas and Oklahoma, may not see as much snowfall throughout these winter months, but it can and will happen when least expected.

With this in mind, examining the relationship between snow and metal roof systems is critical to the safety of people and protection of property. Unless snow guards or other obstructions, like roof curbs, stacks, vents and fans, are present, metal roofs are considered slippery surfaces.

### DANGER: FALLING SNOW

Snow can form a temperature-sensitive bond to a metal roof, which eventually will be broken by one or two separate phenomena.

1. Snow is translucent and radiation from the sun passes through it, warming the panel beneath.

2. Heat loss from a building passes to the roof surface, warming it.

Snow loads on roof systems can be greatly reduced when snow slides off but can pose serious threats to anything or anyone in its path. Factors that determine the threat of sliding snow include the following:

→ Roof slope



- Distance from eave to ridge
- Roof panel width
- Length of run
- Local snow load (pounds per square foot)
- Drift loads

Each of the above factors should be considered when calculating the snow load on a rooftop. To ensure an intended snow-retention system will function as expected, it is important to know the types of loads created by a blanket of

## TO KEEP SNOW FROM SLIDING OFF A METAL ROOF AND DAMAGING PROPERTY OR INJURING PEOPLE, YOU SHOULD CONSIDER INSTALLING A SNOW-RETENTION SYSTEM.

snow. Fortunately, there is a calculation for such a force. The diagonal, or vector, load, which results from a blanket of snow on a roof, can be calculated from the snow load, the roof slope, the distance from eave to ridge and the roof panel width. The steeper

the roof slope, the more exaggerated the vector load. Similarly, the longer the eave-to-ridge dimension, the more area for snow to accumulate and, therefore, the greater the load. The exact load per square foot can be computed by utilizing the following

## [ FIELD TECHNIQUES ]

equation: Vector Force = Vertical Load x Sine Roof Slope.

### WHY SNOW RETENTION

To keep snow from sliding off a metal roof and damaging property or injuring people, you should consider installing a snow-retention system. It is important to note there is not a snow-retention system on the market that is designed for any type of impact effect, such as falling snow or ice pack that gains momentum as it slides from high up on the roof's ridge.

Instead, snow-retention systems are designed to hold and retain snow. Without such a system vehicles and ground air-conditioning units easily can be damaged by snow or ice falling from rooftops. Furthermore, plumbing stacks, vent pipes and antennae can be torn by moving snow, leaving a building interior exposed to the elements. Most important of all, human lives are at risk if ice and snow unexpectedly plummet to the ground from rooftops above sidewalks or entryways.

Even lower roofs, such as canopies, can



experience larger than normal snow loads caused by falling snow or drift loads from rooftops above. Large deposits of snow also can form at a structure's eaves and poten-

tially damage windows and walls.

In addition, when snow and ice fall from a roof, melt water can seep under the base of a wall. With a snow-retention

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## ARCHITECTS, CONTRACTORS AND BUILDING OWNERS HAVE A TREMENDOUS ECONOMIC AND PERSONAL RESPONSIBILITY TO INSTALL CONTINUOUS MECHANICALLY FASTENED SNOW-RETENTION SYSTEMS ON ROOFTOPS.

system, snow gradually melts on the roof and into the gutters in a more controlled manner, greatly reducing the likelihood of melting problems.

### A RESPONSIBLE CHOICE

Architects, contractors and building owners have a tremendous economic and personal responsibility to install snow-retention systems on rooftops. Unfortunately, these systems often are left out of projects because of cost and lack of awareness of the dangers associated with not installing a system.

Today, more options with improved designs and simpler installation techniques are available. For example, mechanically fastened continuous snow guards can be installed at any time of year and do not rely on adhesive cure times or temperatures. Also, mechanically fastened systems do not void the roof panel warranty by penetrating the roof and are designed to last the life of the roof. Single- or double-rod systems utilize aluminum or stainless-steel rods to create a continuous snow-retention system along the eave of a building. All components should be mill-finished aluminum or stainless steel; brass also is an option for a copper roof.

Rather than utilizing rods, some systems use a bar with space to insert color strips, allowing roofing professionals and building owners to color match a roof. The color strip actually is flat-stock or roofing material sheared to size—2 by 96 inches (51 by 2438

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mm)—that slides into the front of the bar. Snow-retention systems that color match to the roof provide architects, contractors and building owners new design options.

When choosing the proper snow guard for your building, you should consider the following:

→ The attachment method should be mechanical, utilizing round-nose set screws that will not penetrate a roof system.

→ Independent lab tests should be performed qualifying the holding strength of the system.

→ The attachment method must not violate the thermal movement of the roof panels or affect any paint or roof warranties.

→ The design of the system, meaning one or more rows, should be engineered to consider the distance from eave to ridge, length of each run, roof slope, snow and drift loads, and panel spacing.

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## SNOW-RETENTION SYSTEMS THAT COLOR MATCH TO THE ROOF PROVIDE ARCHITECTS, CONTRACTORS AND BUILDING OWNERS NEW DESIGN OPTIONS.

→ If the snow guard is to match the roof panels, only use a paint finish with a 20-year warranty to help eliminate possible paint differences.


→ All components should be fabricated from aluminum and stainless steel.

A continuous mechanically attached snow-retention system is to be installed 8 to 12 inches (203 to 305 mm) up from the eave over the load-bearing wall, unless the overhang is designed to hold the retained snow, and/or as close to the hold-down clip as possible without interfering with the roof's ability to float. Round-nose set screws should be torqued to a minimum of 115 inch pounds and a maximum of 150 inch pounds with a screw gun. The screws must be checked periodically during installation. Generally, snow-retention systems can be installed at a rate of 18 to 24 feet (5.5 to 7 m) per man hour.

Architects and contractors greatly can reduce liability and the possibility of damaged property by installing a snow-retention system on buildings in snow-prone areas. Snow-retention systems not only help eliminate the damage to gutters and the roof itself, they prevent catastrophic injuries to persons and objects below. ☺




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