

SNOW GUARDS

ARE THEY REALLY OPTIONAL?

The Increased Use of Metal Roofing Spurs a New Look

Snow retention devices can be invaluable in preventing snow from sliding on roofs of many types, but their use is all too often omitted on new construction to save money, and dismissed on existing structures on the grounds that the event which prompted their consideration in the first place "might not happen again". On textured roofs or structures with limited liability exposure these justifications may be reasonable, but on metal roofs this kind of thinking can be dangerous as well as costly. While snow will initially accumulate on the steepest of metal roofs, it is not going to remain there, and unless it is restrained and allowed to dissipate as meltwater or it is restricted to limit the amount of snow which may slide free at any one time, it can cause considerable injury or damage. Even low slope metal roofs experience snow movement, for although research indicates that "sliding is generally unlikely until the roof slope is 14 degrees or more", snow massed on shallow pitched roofs can behave like a glacier and 'may creep slowly downslope even at a slope of 1/4" per foot.' Good planning during the design of a structure can reduce the potential for harm to persons, property and even the building itself where snow or icing can be anticipated, and should in fact be the first line of defense. But there are few metal roofs in snow retention devices that would not be beneficial.

Placement

There are a host of criteria which determine the placement of snow guards on a metal roof. Climate obviously is the first of these, as it affects the amount, frequency and physical charac-

teristics of the snowfall (wet, dry, mixed with sleet or ice), but roof height, shape, type, pitch, lengths of runs, and pan widths, as well as locations of other physical features such as gables and changes in roof elevation and pitch, vents, stacks, chimneys and other penetrations, the direction of prevailing winds and even the presence of snow making machinery at ski resorts all have an impact on snow retention measures. The purpose for which snow or ice is to be retained must also be determined; is it's building occupants, patrons or passerby that are to be protected, what about foundation plantings, vehicles or adjacent structures or equipment, is there a need to control snow build-up on roofs below or to protect gutters or stacks from being deformed? Of equal importance to many owners and every architect is the visual impact that the devices will have on their structure. Given all of these variables, one can see that their placement is certainly not a matter of wote, but there are a number of rules or guidelines which should be observed.

1

The structural capacity of the roof must be reviewed to assure that it is adequate to support the loads which may develop.

2

Snow guards should be placed at or within the interior face of insulated exterior walls to reduce the potential for ice dams to form at the eaves.

3

Spacing of snow guards should be accomplished with the goal of holding snow in place, rather than trying to catch it at the eaves. On long runs or steep pitches this means spacing the devices at suitable intervals up the slope, as study by Tobiasson and Buska of the Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire attests to the fact that it is easier to retain snow or ice on a roof than it is to resist the dynamic loads generated once it breaks free.*

It is recommended that the architect and/or engineer in cooperation with the owner and contractor, ascertain the project's needs and arrive jointly at a placement design. To help guide the parties in this activity, we maintain historical data on snowfall throughout the United States, a constantly growing library of professional and technical papers on metal roofing and snow retention, complete product files on

the available metal roofing and metal building systems, and even early publications and detail books which document the history of snow retention solutions back into the last century. While current industry standards provide the foundation for our suggestions in this area, our extensive background in metal roofing has taught us that local custom also plays an important part in determining placement.



Types of Snow Retention Devices

There are several kinds of snow retention devices available for use on metal roofs. These include fences, surface mounted devices and seam mounted snow guards.

1 Fences are field assembled systems consisting of rods and various other components which are generally designed to hold snow at the eaves. The height of the bottom rod above the roof surface is such that these systems are not particularly effective in retaining ice or light accumulations of snow, and care must be exercised during design, for unless sufficient rows are employed, they tend to concentrate snow loads rather than distribute them over the roof. Being field assembled, the cost of installation is usually higher than that of one-piece snow guards.

2 Surface mounted devices are secured to the pan of metal roofing systems with solder, through fasteners and/or adhesive sealants. While being effective in retaining both ice and snow, many of the devices are not well engineered and lack material strength. Those of quality are particularly useful where there are no suitable seams to which a seam mounted device can be fastened. Unfortunately, the use of adhesives is limited by weather conditions. In hot weather temporary supports or tape may need to be employed until the sealant sets up; in cold weather the adhesive may not properly cure as generally a minimum temperature of 50 degrees F or a period of 30 days is required. In any case the surfaces must be clean and dry. Needless to say, all of these conditions have an impact on the cost of installation, and when the cost of the devices

and the adhesive are added together, their installed cost can be as expensive as that of the solder-on varieties.

3 Seam mounted, one piece snow guards are devices which are secured to the standing seams, which is recommended wherever possible in the recent CRREL/NRCA study "Standing Seam Metal Roofing Systems in Cold Regions".*

The traditional fastening method which has been in use for nearly a hundred years, required that a pair of prongs be driven through the seam and often result in deterioration of the metal, the sheathing and the framing below.

A recent innovation in seam mounted snow guards is the patented non-penetrating device produced by Real-Tool Inc. These one-piece devices employ stainless steel set screws to clamp them to the seam, and install virtually in seconds using a ratchet and hex socket making them economical to install, and are easily retrofit on existing roofs. They are competitively priced, and are available in bronze and aluminum (certified Almag 35, in mill finish, standard electrostatically applied baked finish for field finishing, and custom colors to match prefinished metals. They are manufactured in a number of sizes and configurations to suit different seam profiles.

With the continued growth in the use of metal roofing

throughout the country, problems associated with snow and ice will become more prevalent. To assume that snow retention devices will prevent all claims or damages is certainly not realistic, but recognizing that melting snow and ice will self-lubricate as the metal roof below warms from solar insulation or heat escaping from the building, not to address the problem is certainly an oversight. RM

* U. S. Army Cold Regions Research and Engineering Laboratory & National Roofing Contractors Association paper entitled "Standing Seam Metal Roofing Systems in Cold Regions".

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