Preventing ice damming

by **Mark S. Graham**

During this time of year, particularly in cold, northern climates, it is not unlikely for some homeowners and building owners to experience isolated leaks caused by ice damming on their steep-slope roof systems.

Ice damming sometimes occurs when temperatures permit accumulated snow and ice on a roof system to melt and refreeze. This can cause water to back up under steep-slope roof coverings and water intrusion.

What can be done?

When ice damming occurs and leakage results, building owners frequently look for effective repair solutions. Unfortunately, once a roof system has been installed, little can be done to carry out an effective solution.

Temporary repairs, such as shoveling snow from a roof system and removing accumulated ice, generally are not recommended by NRCA—damage to roof covering materials can result. If shoveling snow and removing ice are considered, NRCA recommends that the work be done only by an experienced roofing professional who is knowledgeable about the particular roof covering and proper safety practices.

NRCA also advises against installing electric heat cables in gutters or on a roof surface. Installing such cables can damage roof covering materials. Also, cables typically deteriorate over time and often are not permitted by many building, fire or electrical codes.

The best solution to ice damming and resulting water intrusion is to include appropriate design considerations when installing new steep-slope roof systems.

Ice-dam membranes

One design feature that can be included in a steep-slope roof system is an ice-dam protection membrane—a waterproof membrane that is applied along a roof's eaves, in valleys and behind roof penetrations before new roof system installation. Such a membrane is intended to prevent any water that backs up under a roof covering from leaking into a building's interior.

An ice-dam protection membrane typically consists of a self-adhering polymer-modified bitumen sheet product applied to a roof deck. As an alternative, two plies of roofing felt can be used with the first ply nailed to a deck and the second set in asphalt lap cement or hot asphalt.

NRCA recommends using ice-dam protection membranes as components of steep-slope roof systems for buildings located in climatic areas where the mean temperature during the coldest month is 30 F (-1 C) or colder. Specific locations where the mean temperature during the coldest month is 30 F (-1 C) can be determined from climatic data.

When used, an ice-dam protection membrane should start from a roof's downslope perimeter (e.g., eave edges) and extend a minimum of 24 inches (610 mm) from inside a building's exterior wall line. Then, a roof covering should be installed over the ice-dam protection membrane and remainder of the roof system.

Attics

Research conducted by the Cold Regions Research and Engineering Laboratory shows that to prevent ice dams on steep-slope roof systems when outside temperatures are 22 F (-6 C) or colder, it is necessary to keep the temperature at the bottom side of a roof deck (i.e., attic side) below 32 F (0 C). When outside temperatures are 22 F (-6 C) or higher, water seldom refreezes at eaves.

To provide for temperature differentials of less than 10 degrees Fahrenheit (6 degrees Celsius) between the outside air and bottom sides of roof decks, optimum attic ventilation performance far in excess of industry-recognized, code-prescribed minimums likely will be necessary.

Gutters

Although properly designed gutters may perform adequately during freezing conditions, many gutter designs promote ice damming. During freezing conditions, gutters typically are one of the first areas where water freezes and begins to back up under steep-slope roof coverings. Eliminating gutters at roof edges is a practical design consideration to minimize ice damming on steep-slope roof systems.

Closing thoughts

The most effective solution to ice damming is to include appropriate design considerations when installing new steep-slope roof systems. Although these considerations may add slightly to the cost of new steep-slope roof systems, the costs typically are offset when ice damming is avoided.

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