FM's guide to winter roofing care

By John A. D'Annunzio

Take action before, during, and after storms.

Combat temperature swings, high winter winds.

Ice dams: The silent killer.

Winter weather is upon us, and it can have a negative impact on the roof system. If the roof is not properly cared for, roof problems caused by winter conditions can lead to everything from interior leaks to roof material damage to structural collapse. Facility managers should develop a winter roof management plan that incorporates inspections, maintenance actions, and repair procedures that take effect before and after winter storm events.

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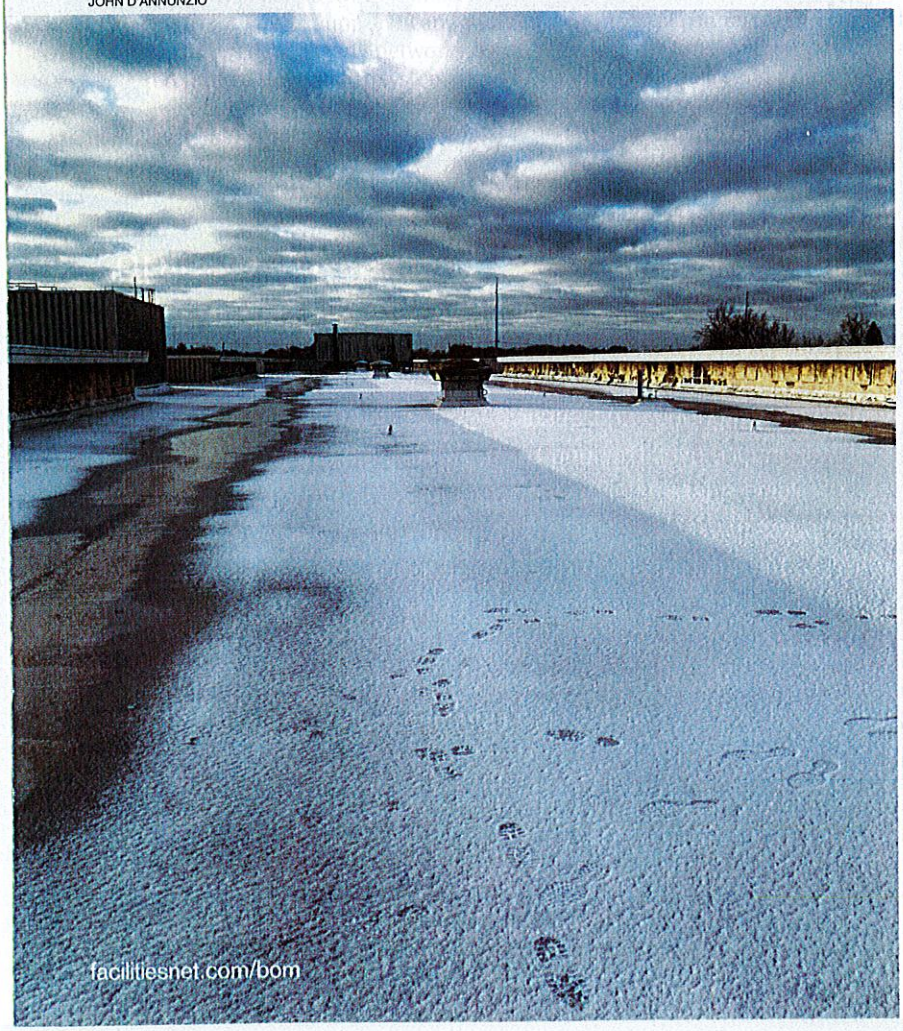

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A range of winter weather conditions could have an impact on the roof system: cold temperatures, high winds, and precipitation. For facility managers, the first step to prevention of problems is identifying the roof problems associated with these events. Also, understanding best practices on how to maintain and repair these conditions during the winter months is crucial. A properly executed winter roof management plan can eliminate costly roof repairs and extend the service life of the existing roof system.

Although roof materials are manufactured to protect the structure from the elements, certain weather conditions can create havoc for both low-slope and steep-slope roof assemblies. Most facility managers are aware that conducting roof maintenance inspections and making repairs in the fall are best practices to prepare the roof prior to the winter months. Preparation is indeed an important step; however, there are also steps to take during harsh winter weather that will be more beneficial in the long run. Colder weather and excessive precipitation are the primary problems that affect most of the country (to some extent) in winter months.

Temperature swings

A decrease in temperature can have a negative impact on roof materials if temperature fluctuations are extreme. The most extreme temperature fluctuations are typically in northern climates,

Doing regular inspections after snow or ice storms can help prevent costly repairs during the winter months.

Detached and damaged counterflashing (left) can be caused by temperature fluctuations and can lead to moisture infiltration into the building. A ridge in the membrane (right), likely caused by expansion and contraction due to freeze/thaw cycles, can split and cause roof leaks.

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although this is a relative concern in all regions. For instance, a daytime temperature of 70 F and a nighttime temperature of 40 F is common in the southeast and southwest and equates to a temperature drop of 30 degrees within hours.

Variance in temperatures contributes to expansion and contraction of materials. Because roof assemblies are a system of materials, all of the materials expand and contract independently (known as differential movement) due to the continual freeze/thaw process. This condition causes roof system deficiencies such as loss of attachment, which creates membrane blisters/ridges and membrane openings/splits at blisters/ridges. Moisture presence in the insulation will also contribute to these defects.

One smart strategy to negate extensive problems from membrane splits and openings is to monitor and repair existing blisters/ridges at formation. In harsh conditions, temporary repairs should be made to eliminate moisture intrusion into the building. Permanent repairs should then be completed once conditions are favorable for proper repairs.

Colder temperatures are often accompanied by gusting winds. Any loose, unsecured, or unattached roof materials are susceptible to displacement during these events. The most common points of roof displacement occur at perimeter edges, with problems occurring at flashings and metal terminations. Another risk is separation of material from the assembly, which can be catastrophic. Damage can also occur from the impact of displaced material on the roof membrane. This can create several membrane splits or openings that will allow moisture into the building at several points.

Best practice is to ensure all roof materials and components are properly secured during the winter months.

Prevent ponding

Another element that can have a negative impact on roof assemblies is precipitation. When precipitation occurs as mercury is falling, the result is ice or snow. Without proper roof maintenance, these can create havoc with the roof assembly. The problems associated with snow and ice on roof assemblies can vary.

The most significant concern is excessive snow load, which can lead to structural damage or full roof collapse. This condition can occur if there is a heavy snowfall coupled with freezing temperatures that lead to a snow/ice mixture that could exceed the snow load of the structural deck. The facility manager should be aware of the snow load rating and, in the case of a heavy downfall, it may be prudent to pay a contractor to remove snow from the roof surface. If snow has to be removed, be certain that roof materials (membrane and flashings) are not damaged during the process.

Best practice is to remove excess snow at the top layer. Any damage to the roof materials that occurs during this process should be repaired immediately.

Another potentially negative impact of the freeze/thaw cycle: When snow and ice melt, they revert back to water. Snow and ice can melt during lower temperature days if the roof is exposed to continual sunlight. The melting process could leave a substantial amount of ponding water on the roof surface. Ponding water adds additional weight to the roof surface, can find its way into the roof system through even minor openings, and can lead to growth of vegetation and fungi on — and into — the roof surface.

Most roof membranes require the removal of ponding water from the roof surface within 48 to 72 hours of a rainfall. Once the snow or ice melts, it is important that the accumulated water is allowed to properly drain from the roof surface. This could be a substantial amount of water for the drains to process at one time. It is imperative that all roof drains are free of debris at the surface and that the drain line is not clogged at any point. It is also important to ensure that all drain connections are sealed and in working condition.

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The roof material around the drain should be thoroughly inspected for openings and splits. There is typically a combination of materials applied in these areas, and openings could be created from differential movement of any membrane, piping, or metal materials. These areas are also points of continual water accumulation, making them highly susceptible to roof leaks.

Best practice is to inspect the roof drains throughout the year to ensure that they are in proper working conditions. If there is an indication of clogging at any of the drains, they should be inspected with a camera to identify the clogged area and then properly cleaned out. It is also recommended to inspect all drain strainers prior to a heavy snowfall to ensure there is no debris present to impede the drainage.

The most vulnerable points on a roof system are at flashings and penetrations. These areas are vulnerable to roof leaks from snow or ice accumulation that settles around the higher surface elevations. Moisture can enter the structure from openings and splits in the materials or from openings at terminations or coverings.

Steep-slope best practices

Winter weather can also have a negative impact on steep-slope roof systems. The most common defect is back-up of accumulated snow or ice (known as ice dams) at perimeter walls and gutters. Once the ice dams start to melt, they can enter the structure from openings at fascias and eaves. The fascia panels should be inspected for openings at joints and for separation from the substrate. The ICC building code requires application of eaves flashing material a minimum of three feet upslope from the perimeter. This material is typically a higher mil thickness than a standard underlayment and it serves as a flashing material to eliminate moisture intrusion from ice dams that find their way under the shingles. The eaves flashing material must be fully adhered to the substrate – primarily at the perimeter edge.

The accumulated weight of ice dams can also damage exterior gutters by deflection and collapse.

Best practice is to ensure fascia and eaves flashing materials are in proper working condition. In extensive snow/ice events that create significant ice dams, it may be advisable to hire a local roofing contractor to properly remove the ice dams.

As we plow through another winter, we should provide as much care to the roof system as we do to other building components. Remember that all of the snow and ice present in the parking lot is also present on the roof. The roof surface experiences greater accumulation, however, because the snow and ice are not removed from the roof as they are in the parking lot. To care for the roof system in the winter months, facility managers should develop a roof maintenance plan that includes the preceding best practices. A prepared winter roof management plan that is properly executed before, during, and after winter storm events will eliminate costly repairs and interior down time associated with roof damage. An ounce of snow and ice prevention can equal a full winter of successful roof service. ■

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