Hardfacts

AVIVA

Managing Snow load
Overview

Snow storms are a regular wintertime occurrence across all regions of Canada that can result in serious damage to public, commercial and industrial buildings.

Building collapse, due to excessive snow loads on roofs, is a serious problem both in terms of economic loss and public safety.

Factors affecting snow load
Climatic variables:

The amount and type of snow, wind, air temperature and the amount of sunshine influence the build up of snow.

Canada experiences a wide range of snow types and accumulation patterns. There may be extreme variations in the properties of falling snow, from dry & granular to wet & sticky, intermixed with precipitation such as rain & sleet.

Wind may be the most important influence on snow accumulations. Snow on roofs is notably susceptible to drift action because of the exposed location and because wind speeds are higher there than at ground level.

At wind speeds greater than about 20 km/hr snow particles are picked up from the existing snow cover and carried along the flow. This scouring action leads to removal of snow from some areas and an accumulation in others such as the lower levels of multi-level roofs, valleys, and the downwind side of peaked and arched roofs.

Wind blow-off and snow slide-off can reduce snow load on a section of the roof. However, snow drifting onto leeward or lower roofs and valleys and sliding onto lower roofs can add significant loads from accumulated snow in these other areas. Snow or ice falling from a roof can also present a hazard to people walking near the outside of the building.

Warming trends do not always mean that the collapse potential disappears. Rain absorbed into the snow pack will increase the load produced by a snowdrift.

As well, roof collapse can be caused by the ponding of melted snow. A drop in temperature (particularly at night) causes the water to freeze and ice dams to form on roof edges or drains preventing proper drainage.

Roof variables:

Buildings come in all shapes and sizes, of varying ages, and made using different materials and construction methods. In addition they may already have items such as air conditioning equipment providing extra weight. All of these variables can affect how your roof will respond to the build-up of snow and ice.

Heavy snowfalls and drifting are responsible for the majority of roof collapses. Almost three-quarters of the collapses occur when snow blows from an upper roof to a lower roof.

Adjacent buildings which vary in height from yours can also affect the way snow accumulates. Snow from taller buildings can be blown into your roof.

New and old buildings are subject to collapse. In fact, a large percentage of snow load collapses have involved boards-on-joist or steel deck roofs of modern construction.

Roof snow load risk assessment

Providing a method for identifying buildings that are potentially at risk of developing snow overloading during any one winter must take into account the snow loading potential of the specific location as well as the construction type and condition, age and history of the building.

Determining local climatic factors is the initial step in evaluating the potential risk of developing snow overloading during any one winter. Knowledge of your building through your ownership and assisted by building and maintenance records as well as project / design records will further assist in your risk assessment.

Things to consider:

Has there been any previous uncorrected leakage or water damage?

Was there any previous superstructure damage from foundation movement, impact or partial collapse or any renovations causing structural changes or major repairs resulting from structural damage (e.g. fire)?

Age of building: Older buildings are designed to a different structural standard and deficiencies are more likely to have developed over time during operation of older buildings.

Danger signs include cracks in interior walls or foundations and doors that suddenly stick.

Roof snow load = Trouble

Accumulation of snow on any roof is a hazardous condition and should be inspected. It is necessary to monitor rooftops for snow accumulation and excess water.

A cubic foot of snow can weigh from 7 pounds for snow that is new and dry to 30 pounds for old compacted snow.

Action Steps:

Before winter:

- Examine the building for visible signs of structural distress, such as twisting, bending or cracking. Consult a structural engineer if necessary.
- Make sure that roof drains and downspouts are clear to handle melting snow and runoff.
- On older buildings, a professional Structural Engineering Study should be completed to determine the snow loading abilities of the building.

After the snow fall:

- If snow or ice is hanging off the side of your building, cordon off the deposit area on the ground and have an employee monitor the area to ensure that pedestrians or vehicles do not enter this zone.
- Hire an Expert: To safely remove excess snow or ice from a roof, an expert in roofing is required. If not removed correctly, the roof could be damaged and those attempting to remove the snow injured.