

ROOF COLLAPSE: HOW TO REDUCE THE RISK DUE TO SNOW AND ICE

Adverse weather conditions can affect the structural integrity of homes and buildings and can lead to partial or complete roof collapse.

Several factors influence snow-load intensity and distribution on roofs:

Roof slope

As slopes increase, snow loads decrease. The wind is partially responsible, as is the tendency for a sloped roof to shed snow by sliding. Sliding snow, however, can also increase snow loads if snow accumulates onto a lower roof or canopy.

Drifting

Snow drifts accumulate on roofs in what is known as the “wind shadow” of chimneys, adjacent walls, or roof projections.

Rain-on-snow loads

Additional loads produced by rain on snow can be significant, due to ice accumulation.

Susceptibility

Buildings may be more susceptible to damage due to the following reasons:

- Poor drainage allows water to accumulate near the foundation. Foundations are affected by freeze/thaw cycles.
- Large icicles at the roof’s edge and ice dams in roof valleys can cause additional load and water damage when the melting runoff is backed up.
- Location of windbreaks can put the building within the “snow catch zone” and cause snow to accumulate on the roof.

- Overhanging tree branches.
- Additional equipment installed from rafters adds “dead load” to the roof.
- Insulation added to roofs prevents heat transfer that normally melts snow and reduces the snow load. Additional insulation allows snow to accumulate.
- Uneven drifting of snow.

Warning signs

Determining the structural integrity of a building is beyond the scope of this bulletin. However, a professional engineer should be consulted if one or more of the following warning signs appear:

- Broken or cracked rafters, trusses, studs, or columns.
- Twisted or deformed rafters or trusses.
- Building leaning or out of plumb.
- Loose fasteners.
- Cracked drywall or plaster on ceilings.
- Leaks from melting snow.

Removing snow

Removing snow from roofs is preventive maintenance and is a common-sense measure to reduce the risk of building failure. However, extreme caution is urged. Work from ground level and use a snow rake if at all possible. Many building contractors are also willing to remove snow from buildings they have constructed.

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