

RISK INSIGHTS

PREVENTING ROOF COLLAPSE

Extreme weather conditions, general wear and poor maintenance can jeopardize the structural integrity of industrial and commercial buildings. The accumulation of snow and ice places stress on all types of roofs. In farm buildings specifically, corrosive materials can build up to weaken the gusset plates that bind the trusses together.

PREVENT PROPERTY DAMAGE, SERIOUS INJURIES AND BUSINESS INTERRUPTION BY CONDUCTING REGULAR INSPECTIONS AND MAINTENANCE OF YOUR ROOFS.

Roofing systems differ in material, shape, size and the amount of weight they can handle. To learn more about the technical provisions for the design and construction of buildings, refer to the [**National Building Code of Canada \(NBC\)**](#).

Weather conditions

Roofs collapse when the weight of snow and ice exceeds the load it can handle. This places people, equipment and goods in harm's way. Canadian winters present a variation of snow types (powder, packed, slushy, icy, etc.). Perform snow removal before the snow hardens and becomes much heavier.

Evaluate your building and roof

Before a storm or blizzard comes your way, reduce your loss exposures. Pay attention to signs of structural distress and make necessary repairs.

- Listen for unusual sounds coming from the ceiling, walls and roof.
- Look for sagging, cracking or movement in the ceiling and walls.
- Observe for water leaks and jamming of doors.
- Identify areas of the roof where snow doesn't easily slide off, such as valleys, dormers and other low-sloped areas.

Remove snow and ice

Clean off snow and ice from your roof before the load intensifies. As temperatures shift, melting snow can freeze into ice.

- Hire a qualified and insured snow removal company if you're untrained in these conditions.
- Acquire training on snow removal, as this is a dangerous maintenance task.
- Wear personal protective equipment (PPE).
- For steep roofs, use a telescoping roof rake (durable and extendable rake designed for roofs).
- Prevent unbalanced roof loads by gradually removing snow from all sides of the roof. Clear snow in a cross direction to the trusses to relieve stress from multiple trusses rather than one at a time.
- Clear gutters, roof drains and downspouts.
- Keep metal tools away from power lines because metal conducts electricity.

Set up snow fences and windbreaks

Consider setting up snow fencing or tree windbreaks to redirect drifting snow and protect your building from accumulating excessive snow.

Gusset plates on wood trusses

Gusset plates are light gauge metal pieces that connect prefabricated wood trusses together. The combination of manure, humidity and moisture produces ammonium hydroxide gas, a chemical that corrodes metal surfaces quickly. Moisture on unprotected steel initiates the rusting process. Corrosion on metal also occurs in cold, ventilated farm buildings, such as dairy barns.

Without regular inspection and maintenance, corrosive materials can build up and weaken the gusset plates, which causes roofs to deteriorate and fail.

Ventilate your building

Insufficient ventilation traps moisture inside buildings.

- Evaluate the building's envelope to ensure the sealing of cracks aren't too tight (as this reduces the ventilation rate) or too wide (as this prevents the building from retaining the intended temperature).
- Keep at least one exhaust fan on at all times to circulate air and filter out moisture (some fans only turn on when a heat sensor hits a certain temperature).
- Increase the strength of a fan or add more fans.
- Install sensors that detect heat and humidity throughout the building and connect them to a central monitoring alarm system that notifies building owners of any notable incidents.
- Perform a colour dye powder test to identify "dead spots", where there's no air movement.

Inspect your roof truss system

Buildings experience severe corrosion within 5-10 years but are often left undetected because inspections and maintenance aren't performed.

- At a minimum, conduct annual visual inspections of your roof truss system.
- Ensure plates are centered and connected properly on both sides of a truss joint.
- Document and file all inspections and repairs.

Protect or reconstruct your gusset plates

For existing roofs, protect your gusset plates with coating or use alternatives to steel plates. For new roofs, determine if using pre-coated or stainless steel plates (delays rusting process) or wooden plates (eliminates rusting) are suitable for your roofing system.

- Use protective coating to galvanize your steel plates. *Epoxy-polyamide primer and topcoat* (CGSB Paint No. 1-GP-146 or SSPC Paint No. 22) is lead-free and chromate-free. A truss manufacturer or industrial paint supplier can help you find this coating material or an equivalent product. For more information, refer to the *Canadian Government Specifications Board or the Steel Structures Painting Council (U.S.)*.
- As an alternative to steel gusset plates, you can secure 1½" plywood plates on a truss joint using 3" galvanized nails. Consult with a roof specialist.

Property loss and business interruption can set you back a significant amount of time and money. Be sure to inspect and maintain your building and roof regularly. Keep records of your maintenance schedule and quality control initiatives. You can protect your assets and worry less once these measures are established. For more information on loss prevention, ask your Northbridge Risk Services Consultant.

For more information on making your business safer, contact our Risk Services team at **1.833.692.4111** or visit us at www.northbridgeinsurance.ca.

