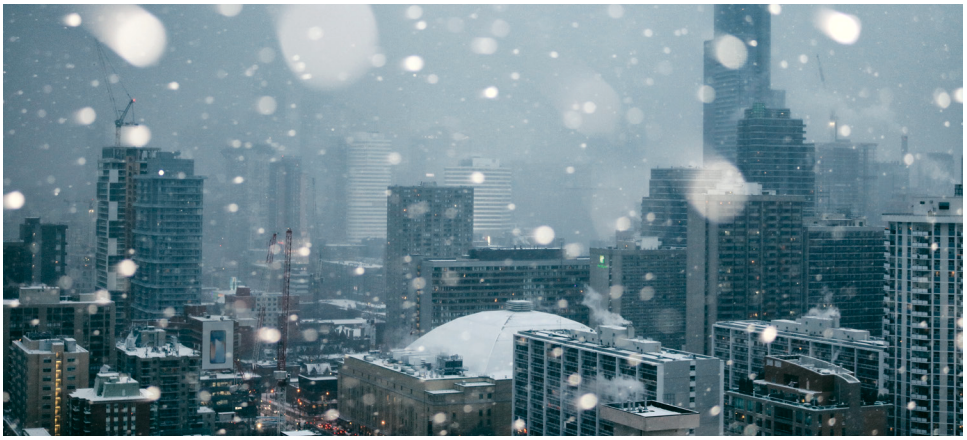
Winter storm action plan

Property risk management guide

from Liberty Mutual Insurance



Survey facilities for damage. If damage has occurred, take photographs of the damage and contact the Liberty Mutual Claims Service Center as soon as possible.

- **Small business customers:** 1-844-325-2467 (1-844-3-CLAIMS)
- **Mid/large business customers:** 1-800-362-0000

Winter storms can be devastating, causing those affected to lose their business, inventory, property, and lives. Winter storms can affect more than those living in Northern climates.

In recent history, freezing pipes and snow collapse losses have occurred in many Southern states. It is wise to be as prepared as possible in the event a winter storm threatens your business and your employees.

The winter weather season extends from November 1 to March 1 for the following geographic locations in the United States: Northeast, Midwest, Mountain West, Northwest, Mid-Atlantic as well as some areas within the Southeast. You can take steps to maintain and protect your facilities by using the information contained in this Action Plan.

Liberty Mutual INSURANCE

Pre-winter storm preparation

Secure supplies and information

- Ensure that supplies and equipment are on hand and ready for the on-site emergency action team.
- Review the plan annually and at least a couple of weeks prior to the winter weather season.
- Obtain cash for post-storm needs, such a buying food and supplies, or paying employees and contractors.
- Keep names and phone numbers of electrician, heating contractor, plumber, fire department, and building owner easily accessible. Identify which outside vendors and repair services you may need to restore your operation after the storm.

Emergency kit

- First aid kit: Include prescription medications, over-the-counter painkillers, rubbing alcohol, eye wash kit, and vomit-inducing medicine in case of accidental poisoning
- Water and non-perishable food (three-day supply)
- Rock salt or ice melt, sand, and snow shovels
- Emergency lighting, flashlights, and extra batteries
- Whistles to signal and direct attention during and after the storm
- Battery- or crank-powered radio
- Walkie-talkies and/or cell phones with spare batteries
- Blankets and extra clothing
- Hand and power tools
- Portable pumps and hose
- Plastic covers and tarpaulins
- Have all employee, vendor, and client contact information collected and backed up at an off-site location
- Maintain copied of vital records off site, including business and customer records, utility plans, etc.

Inspect and fortify your facility

- Update your Emergency Response Program to include appropriate response procedures for winter emergencies.
- Add rock salt or ice melt, sand, and snow shovels to your disaster supply kit.

- Identify who is responsible for snow/ice removal from driveways, doorways, and roofs.
- Identify who is responsible for monitoring news and weather updates.
- Inspect and conduct repairs of grounds to ensure proper drainage, including downspouts and gutters.
- Inspect, test, and maintain backup power supply equipment, including solar panels, generators, etc.
- Maintain sufficient fuel for diesel generators at least a three-day supply.
- Maintain fire protection equipment, DO NOT impair.
- Consider a replacement contingency plan for critical equipment or additional production lines.
- Identify a backup system for communication with employees, business partners, customers, etc.
- Determine if there are alternate ways to enter the premises if snow and/or ice prohibit access.
- Mark hydrants near your business to make them easy to locate in accumulating snow.
- Remove loose yard debris.
- Relocate nonessential yard equipment to a safe indoor location (furniture, trash receptacles, portable planters, portable signs, dumpsters, etc.).
- Relocate yard storage of raw and finished goods indoors or secure.
- Secure yard storage of flammable liquids drums or move them to a safe location away from important buildings.
- Anchor all portable buildings and trailers to the ground.
- Secure scaffolds and cranes. Secure scaffolds to the building. Fasten rail crane chassis to track with bolts and clamps.
- Brace outdoor signs.

During the storm

- Consider redirecting phone lines to cell phones or answering service.
- Shut down all non-critical and non-essential electrical equipment, DO NOT impair fire protection equipment.
- Keep driveways, walkways, doorways, and roof access points clear of snow and ice.

- Patrol the property when safe to do so and watch for roof leaks, pipe breakage, fire, or structural damage.
- If there is a power failure, turn off electrical switches to prevent equipment from reenergizing until necessary checks are completed.
- Stay informed. Listen to local news and weather channels for situation developments and road closures.
- Ensure employee and customer safety.
- Be mindful of indoor safety. If backup power supplies are needed, do not use an electric generator indoors, inside a garage, or near building air intakes because of the risk of carbon monoxide poisoning.
- Do not store gasoline indoors where the fumes could ignite.
- Use individual heavy-duty, outdoor-rated cords to plug in other appliances.

Post-storm procedures

Immediate actions

Assess damage and notify all critical people (management, contractors, etc.) of next steps.

When deemed safe to do so, authorize employees to return to facility for clean-up activities.

Ensure fire protection equipment is active.

Inspect the property and take an overall inventory of any damage.

If safe to do so, protect building and equipment from further damage.

Recovery actions

- Look for safety hazards, such as live electrical wires, leaking gas, flammable liquids, corrosive/toxic materials, and damage to foundations or underground piping.
- Repair automatic sprinkler protection and/or water supplies to get protection back in service as soon as possible. Use Liberty Mutual Fire Protection Impairment Procedures whenever sprinkler protection and/or water supplies are impaired. Contact Liberty Mutual at 800-541-5224 to report impairments to fire protection systems or for assistance in restoring systems.
- Restore fire protection systems if necessary.
- Conduct two-inch main drain and alarm tests on automatic fire protection sprinkler systems to verify public water supply availability.
- Cover broken windows and damaged roof coverings immediately.

- Contact key personnel and notify contractors to start repairs.
- Clear away the snow and ice from driveways, walkways, doorways, and roof access points.
- Make sure heating systems and water pipes are working.
- Close water faucets if previously opened to prevent pipes from bursting.
- Clean roof drains and remove, snow, ice, and debris from roofs.
- Make regular temperature and wind chill checks to prevent workers from overexposure to the cold.
- Rotate workers to reduce their individual exposures to cold and to prevent back injuries from shoveling snow.
- Visually check for open bus bars, conductors, and exposed insulators before reenergizing electrical systems.
- If there has been a p freezers ower failure, check refrigerated items for spoilage. Limit access to and refrigerated areas during periods of interrupted electrical service to maintain the temperatures as long as possible.

Winter weather information

Freeze-ups

During severe cold spells, water in sprinkler system piping, domestic water systems, HVAC, or process equipment can freeze and expand causing pipes or fittings to burst. Water damage from this type of incident can be extensive, especially if the water continues to flow for an extended period. Total costs of the damage and business interruption can be substantial.

In deep freeze conditions, a broken window or open door can let in enough cold air to freeze nearby water pipes and start a catastrophic chain of events. In addition, any equipment that contains or uses water, produces condensation, or depends on pneumatic controls is vulnerable to freezing. Other conditions that make your business susceptible to freeze-ups are heating systems that lack reserve capacity beyond their normal heating load, inadequate building insulation, and piping that runs through unheated areas or concealed spaces.

Many businesses find themselves unprepared when normal winter weather suddenly turns extreme. The following guidelines will help you implement preventive measures to better protect your business from the threat of freeze-ups.

Before the cold weather season

- Update your Emergency Response Program to include appropriate response procedures for below normal temperatures or extreme cold.
- Appoint one or more members of the Emergency Response Team to monitor weather forecasts and initiate winter emergency procedures when appropriate.
- Develop procedures to be followed if you lose heat or electricity (including procedures for restoring electrical services on an item-by-item basis).
- Determine which processes depend on continued building heat for safety (i.e., processes that are subject to solidification or runaway reactions) and need prompt attention.
- Identify equipment, processes, and piping that contain or use water or other liquids that could freeze, and take appropriate measures to prevent potential damage during cold spells.
- Drain idle equipment.
- Frequently drain condensation from equipment and pneumatic lines.
- Provide adequate heat and relocate equipment to a heated enclosure, protect it with suitable antifreeze, or install electrical heat tracing and insulation.
- Identify building areas that are unusually difficult to heat or that lose heat rapidly. Install an ordinary thermometer and develop procedures to monitor temperatures during cold spells. If these areas are unattended, provide low temperature detectors that can be monitored from a central location.
- Verify that water-filled sprinkler pipes that pass through open areas, cold rooms, passageways, or other areas exposed to temperatures below 40°F are protected against freezing by insulating coverings, frost-proof casings, or listed heat tracing systems.
- Verify that windows, skylights, doors, ventilators, other openings and closures, concealed spaces, unused attics, stair towers, roof houses, and low spaces under buildings do not expose water-filled piping to freezing.
- Service heating systems.
- Make sure adequate supplies of alternate fuels are on hand if the heating systems are capable of dual fuel firing.

- Inspect and maintain the building exterior to minimize openings. Fix windows and doors so they close tightly. Caulk, insulate, and apply weather stripping as needed. Close and seal unneeded dampers, louvers, vents, and openings. Inspect roof drains for debris.
- Drain condensation from dry pipe sprinkler system piping by opening the priming water level drain valve until the water has been expelled. Also, make sure auxiliary drains installed at the system's low points are regularly inspected and drained.
- If there are any trapped sections of sprinkler branch line piping, it may be necessary to briefly shut down the system to drain the water. Shut off and drain automatic sprinkler systems only as a last resort. Use Liberty Mutual's *Sprinkler Impairment Program* to report impairments.
- Maintain and test standby electric generator(s) for emergency power, if applicable.
- Determine if portable heaters or other emergency equipment are needed.

During cold spells

- Monitor temperatures every few hours in vulnerable areas. This can be done by regular watch tours or by providing low-temperature alarms connected to a constantly monitored location.
- Verify that water-filled sprinkler piping is maintained at a minimum temperature of 40°F.
- Inspect valve enclosures for preaction and deluge valves daily to verify a minimum temperature of 40°F.
- Provide approved portable heaters for vulnerable areas that might fall below 40°F.
- Provide heat or steam tracing for exterior piping that contains liquids subject to freezing.
- Use tarps to erect temporary windbreaks. For a permanent windbreak, consider planting evergreen trees and hedges upwind (prevailing winter wind direction) of vulnerable buildings and equipment.

- For pipes vulnerable to freezing, open water faucets slightly to let them drip to keep water flowing. Ice may still form, but the open faucet helps prevent the pipe from bursting by allowing relief for any built-up pressure.
- If pipes freeze, turn off the water supply and thaw or repair damaged piping. If the frozen piping affects fire protection systems, use the *Sprinkler Impairment Program* to notify Liberty Mutual Insurance.

- Do not use open flame devices to thaw frozen pipes or equipment.
- Verify that all fire protection equipment is in service.
- Constantly monitor any boilers or other heating systems that must remain online.
- Keep names and phone numbers of your heating contractor, plumber, and fire department easily accessible.

Snow loading and roof collapse

Most businesses plan for snow and severe weather by winterizing vehicles, contracting for snowplowing, etc. However, many neglect to adequately plan for excessive snow loading on roofs. The potential for roof collapse or structural damage increases as the weight of accumulated snow and ice exceeds the snow load capacity of the roof.

Rain falling on accumulated snow is especially dangerous because snow-covered roofs do not drain well and accumulating water and ice can quickly exceed the design limits of the roof.

Even if you are in a warm area of the country, you should not ignore this hazard. In fact, your facilities may be more susceptible to an unusually severe winter storm because they are not designed for extreme weather and personnel are less accustomed to, and less prepared for extreme conditions. In addition, building codes in these areas have lower snow load requirements which can make roofs more susceptible to collapse from unusual snow loading. Roofs with multiple elevations are particularly concerning, as snow can easily accumulate at the elevation change, which may lead to collapse.

Planning, preparation, and prompt action to remove accumulated snow can help minimize the potential risk of roof collapse.

Before the cold weather season

- Be sure your Emergency Response Program covers winter emergencies, including appropriate response procedures for excessive snow loads.
- Determine the maximum safe snow depth for the roof based on its load capacity as indicated in the building plans and specifications, or in an engineering analysis of the roof design.

- For new construction or when reinforcing roof load limits, follow the design guidelines in the American Society of Civil Engineers, *Standard for Minimum Design Loads for Buildings and Other Structures,* ASCE 7.
- Inspect the roof structure for damage or deterioration, and repair or reinforce as needed.
- Inspect all roof drains and downspouts, and clean any accumulated debris from the roof to prevent clogging the drainage system.
- Look for evidence of past water ponding and eliminate the causes.
- Identify who is responsible for snow/ice removal from roofs.
- Establish a plan for elevating mechanized snow removal equipment to the roof.
- Determine what special tools, equipment, protective devices, clothing, and footwear will be needed to work on a snow covered roof. Make sure all the necessary gear is on hand and ready for use.
- Identify the types of fall protection needed to work on a snow covered roof. Guardrails, nets, or personal fall-arrest system for each worker may be necessary, depending on roof configuration and existing fall protection already installed.
- Determine if there are special hazards on the roof that may be hidden from view by the snow. Mark skylights, roof drains, vents, and other hazards or obstructions so that workers will see and avoid them.
- Develop a plan for keeping all roof access points clear of snow.
- Teach workers the warning signs of overexposure and hypothermia.
- Read, understand, and follow all manufacturers' instructions for the safe use of snow blowers and similar mechanical equipment.
- Develop a plan to ensure that powered equipment is not used within 10 feet of any roof edge.
- Check with a roofing contractor before using mechanized equipment on the roof to ensure the equipment will not damage the roof membrane.

- Instruct workers on snow covered roofs to operate equipment at reduced speeds due to slippery roof conditions.

When the snow flies

Regularly monitor snow depth on the roof, paying close attention to areas where snow tends to drift and accumulate. Areas such as roof valleys (low sections adjacent to higher sections) and roof-mounted structures, such as tanks and penthouses, are particularly susceptible.

Remove snow accumulations from the roof before the snow reaches 50 percent of the safe maximum depth. Do not send employees on to the roof once the snow load approaches the load capacity. Remove snow during a storm only if the forecast indicates that the total snowfall will result in dangerous accumulations.

Remove snow in layers uniformly across the roof to prevent unbalanced loads that might cause a collapse. Avoid making snow piles on the roof during the removal process.

Clear snow and ice from storm drains and catch basins. Periodically inspect the roof drainage system to make sure that it is not clogged with ice or debris.

Use care with snow removal equipment (shovels, ice spades, snow blowers, etc.) to prevent roof cover damage. It is not necessary to clean completely down to the roof surface if melting snow and water can freely flow to the drains.

Measuring snow load

Most buildings can support 20 pounds per square foot on the roof's surface area, however this varies depending on geography and year built.

The following general guidance can be used to determine approximate weight for just 5 pounds per square foot:

- **Ice:** One inch deep
- **Packed snow:** 3 to 5 inches in depth
- **Fresh snow:** 10 to 12 inches in depth

Based on the above, a storm that creates two-inches of ice (10 pounds per square foot) can potentially stress a roof by 50 percent. At this point, a roof contractor should be hired to safely remove ice and snow from your roof.

Additional resources

American Society of Civil Engineers. *Standard for minimum design loads for buildings and other structures.* ASCE 7.

Ready.gov. www.ready.gov/winter-weather

Sprinkler impairment procedures kit, PE 3001. Liberty Mutual Insurance.

VanDevender, Karl, & Petty, Doug. (March, 2006). *Ice and snow accumulations on roofs*. University of Arkansas, Division of Agriculture, Cooperative Extension Service.

Weather.gov. www.weather.gov/safety/winter

Emergency contacts

Insurance Agent/Broker	*Building Owner*
HVAC Contractor	*Electrician*
Plumber	*Other*

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