

# Winter hazard control program:

What you need to do to prepare  
in cold weather conditions





According to the National Weather Service, the impact of winter weather in the United States ranges from \$3 billion

during a normal winter season to \$6 billion during an active winter, more than any other time of the year.

Statistics indicate that more people are injured or killed during the winter months. According to the National Weather Service, 70% of those injured during winter storms are in automobiles. Other causes of deaths and injuries include heart attacks from shoveling snow, hypothermia from prolonged exposure to the cold and frostbite. Many people forget that slipping and falling in the winter is an exposure that, according to the National Safety Council, causes over 1,500 deaths and about 300,000 injuries per year.

Winter weather also challenges buildings and other property with exposures to freezing temperatures, accumulations of snow, and high winds associated with winter storms.

## Winter Hazard Control Program

One way to help reduce the chance of accidents and property damage is to have a winter hazard control program in place. All facilities should have a written program that includes buildings, walking surfaces, people, vehicles and contractors. The program should address actions to be taken before the onset of cold weather as well as various periodic evaluations that should be conducted during cold weather. The program should use checklists or similar documents to capture periodic evaluations, identify needed improvements, and verify the actions taken.

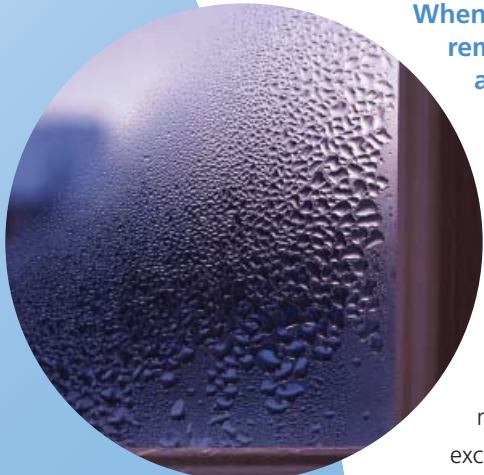
## Buildings

Buildings provide a controlled environment intended to eliminate the adverse affects of winter weather. Buildings and their various systems maintain warmth, exclude cold air, manage accumulations of snow and ice, and avoid freeze damage. Failures of roofs, windows, doors, heating, electrical, and fire protection systems can expose buildings to both freeze damage due to cold intrusion and liquid damage during the ensuing thaw. Each of these areas will be discussed further below.

### Roofs

The roof cover, flashing, drains, deck and rooftop equipment form a system that provides a barrier to cold air, a seal against water intrusion, and strength to support accumulations of snow and ice. Any weak link in this system of features can expose the interior of the building to serious damage. Areas to review include:

- Pre-winter preparation
  - Repair or replace deteriorated roof coverings
  - Verify roof drains are clear and strainer covers are in place
  - Secure any loose rooftop equipment or flashing
  - Verify or determine design snow loads for all roofs
  - Establish roof snow removal contracts
- During cold weather, periodically verify:
  - Roof coverings remain in serviceable condition
  - Roof drains are clear. This includes both drain inlets and outlets.
  - Roof perimeter flashing is intact
  - Rooftop equipment is secure
- During winter storms:
  - Monitor accumulations of snow and ice



### When needed, initiate removal of roof snow accumulations

Roof collapse is always a potential concern during winter storms. Building codes require buildings be designed to accommodate minimum snow loads. Based upon local experience, these minimum designs can be exceeded or compromised.

The designed snow load can be exceeded if there is an unusually heavy snow event, repeated snow events, or if a snow event is followed by rain. Rain falling onto a snow covered roof will not drain readily, and can quickly add to the overall roof load.

The designed snow load may also be compromised by change. The change may involve an addition to the building or new rooftop equipment. Where an addition is added to a building, there is concern when the roof of the addition is a different level than the existing roof. This change in elevation may introduce a potential for drifting snow accumulations on the lower roof that were not considered during the original design. Multi-level roofs can become an issue with snow accumulations and can be a cause of roof failure. When building additions or new rooftop equipment is installed, a structural engineer should re-evaluate the existing building to determine if reinforcement is needed to accommodate the new snow load exposure.

As the design snow load of a roof may be exceeded during the life of a building, it is important to monitor each significant snow event and be prepared to have snow removed should it threaten to exceed the snow load

design. Monitoring snow accumulations can be handled either manually or automatically. Manual monitoring involves periodic measurement of the accumulated snow on the roof. One approach is to weigh a one square foot sample of snow from each roof area. Automatic snow load monitoring is also possible using a roof deflection monitoring system listed by a nationally recognized testing laboratory.

Remember that all drifted snow should be removed first; this snow will generally be on lower roofs, around rooftop mechanical vents, skylights, parapet walls and penthouse walls. Care must be taken with the removal of snow to prevent damage to the roof membrane. Avoid removal within two inches of the surface of the roof membrane. The use of plastic snow shovels is recommended. Remember the use of salt on most roofs will likely void the manufacturer's warranty.

### Windows and doors

Windows and doors also can be a source of cold air entry to your building. Here are a few areas to review:

- Pre-winter preparation
  - Replace cracked or missing glass
  - Repair or replace exterior doors, door closers, door frames, door gaskets, and truck dock door seals
- During cold weather, periodically verify:
  - Window glass is intact
  - Doors and windows are normally closed
  - Doors and windows have a good weather seal
- During winter storms:
  - Verify doors and windows are closed

Windows are subject to breakage due to thermal stress, accidental abuse, or intentional vandalism. To allow prompt detection of broken glass, windows should be inspected during cold weather so that prompt repairs can be made. Damaged glass can quickly lead to a localized loss of building heat that can in turn lead to freeze damage to sprinklers, domestic water, and process water systems.

Doors are another source of localized building heat loss that can quickly lead to freeze damage. Personnel doors should normally be kept closed, and periodically inspected to verify door seals remain in good condition. Overhead loading dock doors should be kept closed whenever trucks are not actively loading. Dock door seals, which close the space between trailers and the overhead doorframe, should be maintained in good condition.

### Heating systems

Heat is essential to protect water-based systems such as fire protection, domestic water and process water from freezing during cold weather. Appropriate measures should be implemented to maintain and monitor building heat systems before and during the cold weather season.

- Pre-winter preparation
  - Service all heating systems
- During cold weather, periodically verify:
  - Adequate heat is maintained in all areas at all times
  - Monitor all areas electronically or with periodic human presence
  - Maintain adequate supply of fuel
- During winter storms:
  - Do not turn off or reduce heat from normal levels

All heating systems should be checked annually before the start of winter. A qualified professional should conduct these inspections. During cold weather, prioritize steam usage for critical equipment.

Unoccupied buildings should have temperature monitoring systems to promptly detect and report temperature loss. As an option, personnel should periodically visit unoccupied buildings especially during extreme cold weather occurring over weekends or holidays.

During periods of extreme cold weather, heat should not be turned off or reduced excessively during unoccupied hours.

Maintain an adequate supply of heating fuel on site just prior to and during the cold weather season. Keep in mind that demand for fuel may limit available supplies and snow and ice may delay scheduled fuel deliveries. Do not forget that back-up fuel systems also need to be maintained. Make sure that you store fuel in designated areas away from sources of ignition.

In addition to maintaining the sources of building heat, also maintain the distribution of adequate heat to all building areas housing systems subject to freezing. These systems may include fire sprinklers, domestic hot and cold water, steam condensate return lines, process water lines, and other similar systems.

### Electrical systems

Electric power is essential to maintaining heat and other services needed to protect the building and operations from the adverse affects of cold weather. Appropriate measures should be implemented to maintain normal and emergency sources of electric power.

- Pre-winter preparation
  - Review lockout/tagout procedures should service or repair become necessary
  - Service emergency generators
  - Service emergency lighting
  - Clear branches that could break, fall and damage overhead power lines under the weight of snow or ice
- During cold weather, periodically verify:
  - Back up of computer data
  - Maintain adequate supply of fuel at all times

If you have an emergency generator, verify that it is operating properly and that there is adequate fuel available in case of a power outage. All emergency lighting should be checked to make sure it is in operating



condition. Inspect electrical supply lines to make sure that they are free from obstacles such as tree limbs that could cause an outage in a storm. Review emergency equipment shut down and lock out / tag out procedures in case repair becomes necessary. All of your computer data should be backed up and stored off site in case you cannot access your facility for several days.

### Fire protection systems

Many fire protection systems are water-based and subject to freeze damage. Maintaining adequate heat where needed is the simplest way to prevent cold weather damage. In addition, where fire protection systems will be exposed to freezing temperatures,

verify system drains and non-freeze configurations are appropriately maintained to avoid freeze damage.

- Inspect fire sprinkler systems prior to winter to verify:
  - All dry sprinkler system pipes are pitched to low point drains
  - Each dry sprinkler system has a reliable source of air
  - Presence of adequate specific gravity for anti-freeze fire sprinkler systems
  - All dry-barrel fire hydrants are drained
  - All fire department connections are equipped with automatic drains
  - All fire pump test headers are drained
- During cold weather, periodically verify:
  - All dry sprinkler system low points are drained weekly
  - Dry sprinkler system piping remains pitched to low points
  - Dry sprinkler system air supplies remain in service and maintain appropriate pressure



### Walking surfaces

The potential for slip and fall accidents increases during winter months. While you cannot completely eliminate snow and ice, there are things that you can do to reduce slip and fall exposures.

- Pre-winter preparation
  - All snow removal equipment should be checked to make sure it is in good operating order. When there are 6 inches of snow is not the time to determine that your snow blower needs repair.
  - Purchase entry walk off mats and extend mats 8-12 feet into the entrance to allow removal of moisture from shoes
  - Verify all outside lighting is in full operating condition
- During cold weather:
  - Exercise additional care to help make sure employees are protected from cold temperatures when using snow removal equipment
  - During extreme conditions, consider the use of a "buddy system"
  - Lighting in parking areas is very important during winter months. All lights should be checked not only at the start of the season but on an on-going basis to help make sure that parking areas are adequately lit.
- During winter storms:
  - Monitor floors at doors to see if dry mopping is needed. Post wet floor signs to alert people of wet floor surfaces.

The risk from slips, trips and falls does not end when the storm is over, but extends to warming conditions. Most people are more cautious walking during storms, but the daily thaw and night freeze cycles bring more slick surfaces. The walking surfaces that you have treated with salt or sand will probably need to be treated again, and you will need monitoring of all entryways for wet floors.



## People

It's important to prepare your employees for the rigors of winter weather. Some things you can do are:

- Pre-winter preparation
  - Review National Weather Service alert terminology with employees
  - Set up an employee notification system so they can be aware of facility closures
  - Train employees who work outside of the signs and symptoms of cold weather exposure
  - Educate employees to stay home when sick during cold weather

Review with employees the various alerts that are issued by the National Weather Service. A watch indicates that conditions are favorable for winter weather. Warnings indicate that the event is happening within an hour of your location.

Establish a telephone tree in the event it becomes necessary to close your facility. Verify with your employees that the information is correct on the tree before the start of the season.

Another option is an 800 number or other phone number for your employees to access in order to obtain information on location closings. Employees should be given cards to carry with this phone number on it. This number could also serve as an excellent notification tool for other emergencies.

If you have employees that must work outside, help make sure they understand the signs of hypothermia and frostbite. Frostbite is a loss of feeling in hands and feet as well as ears and noses and can cause permanent harm to people.

Hypothermia occurs when the body temperature drops below 95 degrees F. Symptoms include shivering, memory lapse, stumbling, slow speech, drowsiness and exhaustion. Prolonged hypothermia can cause permanent damage to the pancreas, liver or kidneys.

With cold winter weather come the flu season. You should educate your employees and

encourage them to stay home when they are sick to prevent spreading illness. Monitor the WHO (World Health Organization), U.S. Center for Disease Control or your local health department to determine alerts that may affect your employees and review your business continuity plans.



## Contractors

Contractors may be used for various activities associated with your preparation for winter weather. Consider the following as you review contractors:

- Pre-winter preparation
  - Carefully review all contracts for snow removal for adequate levels of insurance
  - Verify contracts for snow removal is established when action is to begin

When you select an outside contractor for snow removal on roofs, sidewalks or parking areas it is important to review the contracts to verify that adequate levels of insurance are in place. Certificates of insurance should be obtained from all contractors for both Workers' Compensation and General Liability. Make sure that coverage is provided for any property damage or bodily injuries caused by contractor employees or their operations.

All contracts for snow removal should specify under what condition snow removal begins (for example, 1", 2" or 4" of snow depth). The contract may also require you to call in order to request specific services and a set price per plowing. Make sure you have a backup plan in case your contractor does not show up.

There are a number of contractors who perform snow/ice removal as a secondary business during their off-season or slow periods. An example

would be landscapers who perform snow removal during cold weather. Others are simply owners of 4-wheel drive vehicles who attach a snowplow and offer snow removal services. Be sure to select contractors with the appropriate experience and insurance. Check references provided by the contractor, the Better Business Bureau and other similar organizations.

## Vehicles

Vehicles undergo a lot of stress during cold, winter weather. Some things to consider are:

- Pre-winter preparation
  - Review winter driving safety with each driver
  - Verify emergency supplies are provided in each vehicle
  - Winterize each vehicle
- During cold weather:
  - Have employees maintain fuel levels above a half tank

All vehicles should be winterized before the season. Keeping vehicles in good condition will reduce the chance of becoming stranded in the snow. Some items to check include:

### Mechanical aspects of the vehicle

You should check windshield wipers, antifreeze levels, oil and if necessary replace oil with winter grade oil. Do not forget to check tires for adequate tread and air pressure.

Employees should be reminded that fuel tanks should be no less than half full to prevent condensation build up in the fuel tank, which can cause gas lines to freeze. Having the extra fuel can also be very important if the driver is stranded in traffic or extreme weather circumstances.

Emergency items should be kept in each vehicle, including rain gear and extra clothing (including mittens, gloves, hats and socks), a fully charged cell phone, flashlights with extra batteries, a small sack of sand (for traction), a snow shovel, a brightly colored cloth to use as a flag (if needed), bottled water, and food such as a box of crackers.

Before the start of the season, you should review winter driving safety with employees and remind them of winter driving techniques. Make sure they plan their routes and let you know the route before departing on company business.

## Additional resources

The following is a list of resources that can keep you updated on the weather in your area:

- The National Weather Service issues weather advisories, either winter weather watches or warnings. A watch means that conditions are favorable for winter weather; a warning normally means that there will be a storm
- The National Oceanic and Atmospheric Administration (NOAA) has local, regional, and nationwide weather forecasts for the United States
- The Weather Channel frequently updates current conditions, in addition to the local forecast
- Local TV and radio will give current updates on conditions in your area
- A weather radio will send out an audible alarm if a watch or warning has been posted for your area
- [www.meteoalarm.com/](http://www.meteoalarm.com/)
- [www.meteoalarm.eu/](http://www.meteoalarm.eu/)

## Conclusion

As winter approaches, reduce the chance of accidents, injuries and property damage by being prepared with a comprehensive winter hazard control plan.

The plan should be written. The plan should address buildings, walking surfaces, people, vehicles and contractors. The plan should address actions to be taken before the onset of cold weather, during cold weather, and during winter storm events.

The plan should include checklists or similar documents to capture periodic evaluations, identify needed improvements, and verify the actions taken.



# Pre-winter checklist

During the pre-winter plan review, also take time to review all business continuity plans to make sure that they are up to date and ready for use in the event of any emergency, including a winter storm.

Task	Assigned to	Date assigned	Date completed
<b>Roofs</b>			
Repair or replace deteriorated roof coverings			
Verify roof drains are clear and strainer covers are in place			
Secure any loose rooftop equipment or flashing			
Verify or determine design snow loads for all roofs			
Establish roof snow removal contracts			
<b>Windows and doors</b>			
Replace cracked or missing glass			
Repair or replace exterior doors, door closers, door frames, door gaskets, and truck dock door seals			
<b>Heating systems</b>			
Service all heating systems			
<b>Electrical systems</b>			
Review lockout/tagout procedures should service or repair become necessary			
Service emergency generators			
Service emergency lighting			
Clear branches that could break, fall and damage overhead power lines under the weight of snow or ice			
<b>Fire protection</b>			
All dry sprinkler system pipes are pitched to low point drains			
Each dry sprinkler system has a reliable source of air			
The presence of adequate specific gravity for anti-freeze fire sprinkler systems.			
All dry-barrel fire hydrants are drained			
All fire department connections are equipped with automatic drains			
All fire pump test headers are drained			

## Pre-winter checklist - *continued*

Task	Assigned to	Date assigned	Date completed
<b>Walking surfaces</b>			
All snow removal equipment should be checked to make sure it is in good operating order			
Purchase entry walk off mats and extend mats 8-12 feet into the entrance to allow removal of moisture from shoes			
Verify all outside lighting is in full operating condition			
Develop snow cleaning log to be used for walkway cleaning season			
<b>People</b>			
Review National Weather Service alert terminology with employees			
Set up an employee notification system so they can be aware of facility closures			
Train employees who work outside of the signs and symptoms of cold weather exposure			
Educate employees to stay home when sick during cold weather			
<b>Contractors</b>			
Carefully review all contracts for snow removal for adequate levels of insurance			
Verify contracts for snow removal is established when action is to begin			
<b>Vehicles</b>			
Review winter driving safety with each driver			
Verify emergency supplies are provided in each vehicle			
Winterize each vehicle			

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