

BIE SAFETY ADVISOR

Avoiding the Hazards of Snow Removal from Elevated Surfaces

Every year, workers are killed or seriously injured while performing snow or ice removal from rooftops and other building structures, such as decks.

Snow removal is performed for a number of reasons, such as to prevent overloading and collapse, or for construction or repair of decking or roofs. Often workers climb directly onto the roofs or structures and use equipment such as shovels, snow rakes, snow blowers, ladders, etc. Other times these operations may be performed from the ground level using snow rakes. Aerial lifts are sometimes used to access roofs and apply de-icing materials. Snow removal operations are often performed under extreme weather conditions (e.g., cold, high winds, icy surfaces). Workers who perform these activities (for example, building maintenance workers) may have little experience or training on the hazards of such operations or work.

Workers performing snow removal operations are exposed to many serious hazards. Based on the findings of OSHA investigations, falls cause the most worker fatalities and injuries during rooftop snow removal. Workers may fall off roof edges, through skylights, and from ladders and aerial lifts. Workers may also be injured or killed by a roof collapse.

Workers removing snow face other significant hazards in addition to falls from roofs, including:

- Amputations, eye injuries, and other injuries associated with the use of snow blowers and other mechanized equipment.
- Collapses or tip-overs when using aerial lifts.
- Entrapment and suffocation under falling snow drifts or snow piles.
- Shock/electrocution hazards from contacting power lines or damaged extension cords.
- Frostbite or hypothermia from cold and windy conditions.
- Musculoskeletal injuries from overexertion.

Under the OSH Act's general duty clause, employers have a duty to protect workers from recognized serious hazards in the workplace, including hazards associated with snow removal from roofs.

Plan Ahead for Safe Snow Removal from Roofs

Before snow starts to accumulate, think about what will be needed to safely remove snow from roofs or other elevated surfaces:

- Can snow be removed without workers going onto the roof?
- Are there any hazards on the roof that might become hidden by the snow and need to be marked so that workers can see them (skylights, roof drains, vents, etc.)?
- How should the snow be removed, based on the building's layout, to prevent unbalanced loading?
- What are the maximum load limits of the roof and how do they compare with the estimated total weight of snow, snow-removal equipment, and workers on the roof?
- What tools, equipment, protective devices, clothing and footwear will workers need?
- What type of fall protection will be used to protect workers on roofs and other elevated surfaces?
- What training will workers need to work safely?
- How will mechanized snow removal equipment be safely elevated to the roof?
- How will you protect people on the ground from snow and ice falling off the roof during removal operations?

Additional Resources:

- National Snow Load Information with state specific links:
http://www.fs.fed.us/td/snow_load/links.htm
- National Weather Service, snow analysis data (searchable by region, state, city, and zip code)
<http://www.noahsc.noaa.gov/nsa/>
- For more in-depth information on *roof* snow load calculations and requirements, see American Society of Engineers (ASCE) 7, Minimum Design Loads for Buildings and Other Structures.

Information courtesy of OSHA Hazard Alert, HAZARD ALERT - Falls and Other Hazards to Workers Removing Snow from Rooftops and Other Elevated Surfaces



PREVENTING FALLS DURING SNOW REMOVAL

Working on a roof with snow, ice, or wind carries a risk of a fall onto the roof, or a fall off the roof to the ground below or through a snow-covered skylight, all of which are often fatal. Therefore, employers should protect their workers from these hazardous work conditions by:

- Using snow removal methods that do not involve workers going on roofs, when and where possible.
- Evaluating loads exerted on roof or structure (e.g., total weight of snow, workers and equipment used), compared to the load limit of the roofs.
- Requiring that workers use fall protection equipment.
- Ensuring that workers use ladders and aerial lifts safely.

Employees Should Stay Off Roof - Whenever possible, use methods to clear ice and snow without workers going on the roof. For example:

- Use ladders to apply de-icing materials.
- Use snow rakes or draglines from the ground. Note: Workers may use ladders to access rooftops for snow removal. **Workers should not use a snow rake or shovel while on a ladder because this greatly increases the risk of losing one's balance and falling.**

Evaluate Load Bearing on the Roof or Structure - Before workers access a roof or other elevated structure, the employer should confirm that the workers' weight and any equipment used can be supported by the roof or structure without causing a collapse. Workers should always use caution by remaining alert to unexpected sounds or movement around surfaces that have been weighed down by snow (or water from melted snow), because these surfaces could collapse. Shoveling or raking a roof without using the proper procedures can also increase the risk of roof collapse by creating an unbalanced load on the roof. To prevent unbalanced loading during snow removal, workers should:

- Remove snow uniformly across the roof.
- Avoid making snow piles on the roof.

Preventing Injuries When Using Mechanized Equipment on Roofs - The unsafe use of mechanized equipment, such as snow blowers, while removing snow from roofs may cause injuries such as amputations and eye injuries. Accidents can also happen when workers are moving equipment used for snow removal to the rooftop.

Avoid Electrical Hazards- Workers may face electrical hazards such as electrocution and electric shock from power lines or snow removal equipment.

- Use extreme caution when working near power lines. Always treat power lines, wires and other conductors as energized, even if they are down or appear to be insulated.

Protect People on the Ground During Snow Removal- Workers standing on the ground removing snow from the roof and bystanders can become trapped under snow falling from roofs and could suffocate.

- Mark a safe work zone in the area where snow is to be removed (e.g., keep people back 10 feet from the point where snow is expected to be blown or fall).
- Wear eye and head protection, especially when removing ice.
- When using snow rakes, remove small amounts of snow at a time.

