Spot The Safety Violation: Bearing the Weight of Heavy Snow

What do you think caused the roof of this store to collapse and the walls to bulge’

The direct hazards to workers posed by snow and ice are obvious. Workers can slip and fall on these substances. And working in snowy conditions can expose workers to cold stress. But even in the confines of a warm, dry building, snow can endanger them if it builds up on the roof and causes a collapse.

A lot of snow, particularly if it's heavy and wet, can compromise the roof's structural integrity. And ice dams can keep melting snow from draining off the roof, causing leaks inside.

These pictures show a Trader Joe's store in New Jersey whose roof collapsed from the weight of snow that fell during a recent blizzard. In addition, three of the store's walls buckled. Fortunately, the store was closed and no one was hurt. But imagine what could've happened if there had been workers and customers inside the store at the time.

For example, Qu□bec's health and safety commission released a 100-page report on the collapse of a snow-covered roof on a food distribution warehouse. Three workers were killed. The report concluded that a decorative awning acted as a wall and allowed snow to build up on the roof. The snow and ice accumulations exceeded the roof's capacities, causing its

failure [*Gourmet du village Morin Heights*, The Canadian Press, Nov. 20, 2008].

9 Tips for Removing Snow from Roofs

To reduce the chance of a roof collapse, it's important to know your roof's load limit. If you don't know the load limit, have a civil or structural engineer inspect it. If the snow and ice has exceeded the roof's load limit, allowing workers and equipment onto the roof to remove the snow may cause a collapse.

Here are nine tips workers should follow when they clear snow and ice from roofs:

1. Clear as much of the snow as possible from the ground.
2. Never spray water on the roof to try to clear the snow'it'll just freeze and create additional problems. Instead, use a de-icing chemical.
3. Never work on a roof in the winter'even a flat roof'unless fall prevention (such as covers, screens, railings or guardrails) is in place or you're using adequate fall protection equipment (such as a full-body harness, lanyard, connectors and appropriate anchorage points) and slip-resistant footwear.
4. Be wary of any skylights or other openings in the roof that may be hidden by the snow. And never sit on, lean against or step on a skylight lens or any covering placed over such a hole.
5. Clear snow in a cross direction to the roof trusses to reduce the stress on all the trusses at the same time, rather than reducing stress from only one truss.
6. Remove drifted snow first. On multi-level roofs, this snow will likely be on the lower roofs.
7. Remove snow evenly from both sides of the roof to avoid concentrating a load in one area, which could stress the roof and cause that area to collapse.
8. Completely remove the snow from the roof as you clear

it.

9. Use caution when removing snow from one section to avoid travelling over and compacting snow on adjacent sections.

In addition, a hazard alert from OSHA recommends that you plan ahead for safe snow removal from building roofs by answering these questions:

- Can snow be removed without workers going onto the roof'
- Are there any hazards on the roof that might be hidden by the snow and need to be marked so that workers can see them (such as 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'