



Advisory Bulletin

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Roof Loading

Roof collapses are catastrophic in nature when they occur. Structural roof collapse can also lead to serious injuries for both workers on the roof and occupants of the building. Of course, the financial implications can be crippling for all involved; building owner, contractor and building occupants.

Excessive roof top loading can be overlooked on construction sites and can lead to damage to roof decks and walls, and in rare instances, the complete collapse of roof structures.

Significant factors which can lead to roof collapse as a result of overloading include:

- Excessive snow, ice or rain from extreme weather events and/or poor or blocked roof drainage,
- Excessive or improper loading during roofing or re-roofing activities (materials and/or equipment),
- Additional loading by building owner/occupants (equipment, storage, etc.),
- Seismic loading and,
- Deteriorated structural members.

Buildings are typically designed for uniform loads across roof tops, including both live (variable loads due to intended use and occupancy, snow, ice or rain) and dead loads (permanent loads due to weight of building components that are relatively constant over time). A load or force can be either concentrated or distributed. A distributed load is spread out over a large area. It can be uniformly distributed, wherein the amount of force is approximately the same throughout the area to which it is applied; or non-uniform, meaning it is not evenly distributed. A point load is a load which is localized to a specific location on a structure.

Large point loads combined, or not, with excessive uniform and/or non-uniform loads on a roofing surface can and have led to structural failure. Excessive non-uniform or point loads can include heavy or large volumes of construction materials or equipment. Large volumes of snow, ice or rain, can be characterized as large uniform loads. Improper stockpiling of heavy roofing materials, for example, has resulted in structural damage and even complete structural failure.

Many building codes provide guidance on the structural requirements of roof loading. The National Building Code of Canada states that *"precautions must be taken during all phases of construction to ensure that the building is not damaged or distorted due to loads applied during construction"* (Section 4.1.1.3.5 NBCC 2010).

A qualified structural engineer can provide guidelines on allowable temporary roof top loading and precautions that would be required for a particular roof and building structure.

CRCA advises that building owners and those involved in roof top work of any kind, should be aware of the vulnerability of the roofing structure to excessive loads, even if for short periods of time. Temporary construction loads applied to structural assemblies during construction may exceed the original design loads for the building.

A qualified structural engineer should be consulted prior to commencement of any construction work if there are any concerns regarding the building structure and loading.

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