

Roof Collapse

Some Causes and Prevention

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Common conditions that cause roof deficiencies

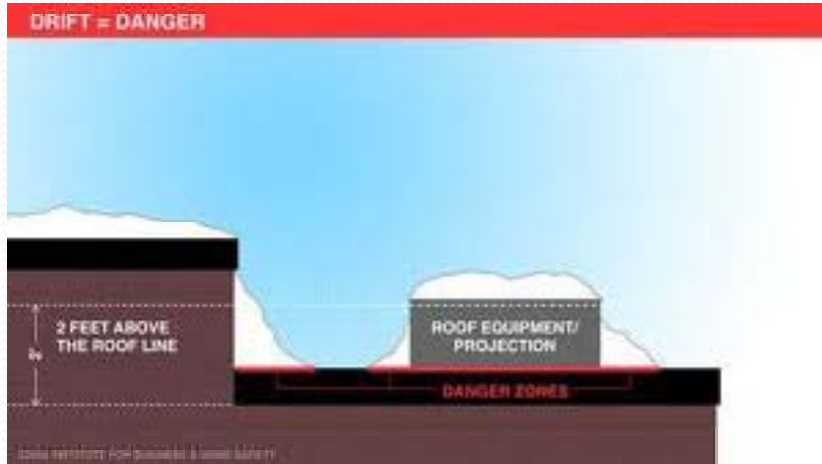
- Roof leaks and moisture
- Blow-offs, tenting, reduced wind uplift resistance, and billowing
- Design, installation, and workmanship errors
- Lack of maintenance
- Ponding water and drifting snow
- Fire damage
- Punctures and the addition of penetrations post-installation
- Improper repairs
- Shrinkage and Blistering
- Overloading



Signs of Potential Roof Problems

- Sagging roofs
- Severe and/or recurrent roof leaks
- Cracked or split framing members
- Cracks, deformations, tears, ripples, and/or bulges in walls or supports
- Sheared anchors , cracks, and separations at connection points
- Sprinkler heads that have dropped well below ceiling tiles
- Racked doors and windows
- Bowed utility pipes or conduit attached at ceiling
- Creaking, cracking or popping sounds

Common Roof Failure Mechanisms



Snow drift



Clogged drains and ponding



Combined Effects including ponding, snow drift, and overburden



Fire damage

Common Roof Failure Mechanisms Cont'd



Impact damage to structural supports and roof framing members

Common Roof Failure Mechanisms Cont'd



Design and installation errors



Common Roof Failure Mechanisms Cont'd



Long term leak has compromised structural steel connections beneath garage roof



Long term leak onto reinforced concrete roof with cast-in-chlorides (Pre or circa 1975) caused significant concrete deterioration.

Deferred and/or lack of maintenance

Simple steps Owners and Boards can take to avoid such crises

- Monitor the condition and likely remaining life of the building's roof systems. Begin monitoring about halfway through the initial predicted life of a system because substantial failure can occur considerably earlier than predicted. Have roof systems inspected by a qualified consultant twice per year (once in the spring and once in the fall).
- Keep records of leaks and maintenance and repairs performed.
- Keep gutters, drains, and drainage systems clear and free of debris and correct standing water (ponding) conditions before they become an issue.
- Prune or remove trees that overhang roof systems.
- Consult a structural engineer whenever the use of the roof, roof framing, or an existing roof component or system is modified or loading patterns are altered in any way. Have your structural drawings accessible and in digital format.
- Make tenants and residents aware of warning signs.
- Keep a list of consultant and contractor resources handy so you know who to call when problems arise.
- Safely remove extra overburden such as ponding water and accumulated snow and ice.
- Install shoring and strengthen roof systems if they are determined deficient.