



Risk Control

Hailstorms: Protecting People and Property

Hail is a naturally occurring weather phenomenon formed when precipitation within thunderstorms freezes in the cold regions of the atmosphere. When the weight of the hail exceeds the ability of the updrafts to keep it aloft, hail falls to the ground. Depending on meteorological conditions, the size of hailstones can vary widely, from pea size (.25") to grapefruit size (4.5") and even larger. The National Weather Service considers any hail 1" or larger to be "severe," though smaller hail may cause property damage as well, particularly to soft or aging building materials.

Where are hailstorms most likely to occur?

While severe hail can occur anywhere in the United States, the frequency is higher in certain areas of the country (see map). The frequency of convective storm activity (i.e., thunderstorms) is a major driver of hail frequency, as well as certain seasonal atmospheric conditions that are conducive to hail formation at lower altitudes, which increases the likelihood of hail striking the ground.

When do hailstorms occur?

Damaging hailstorms can occur during any month but are historically most frequent between March and August, particularly in spring. Multiple hailstorms can occur during one severe weather event, and the total duration can be anywhere from a few seconds to 20 minutes or more. In long-duration hailstorms, hail can accumulate to depths of several inches, similar to snowfall.

What are the risks associated with hailstorms?

Property Damage. Hailstorms result in billions of dollars of property damage in North America each year. In the United States, the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service estimated over 4,600 severe hail events in 2020 alone.¹ Hail strikes can damage buildings, equipment, outdoor storage and vehicles. Beyond the physical impact damage, an often-unanticipated consequence of hail strikes is subsequent water damage. Since hail occurs during thunderstorms when heavy

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Source: Preliminary Severe Weather Report Database (Rough Log), NOAA/Storm Prediction Center, Updated 1/7/21

rain is likely, roofs or skylights damaged by hail impacts will often allow water infiltration into the roof assembly or the building itself, damaging interior contents. Water damage can also occur when hail obstructs drains, scuppers or gutters, particularly during long-duration hail events.

Employee and Visitor Injury. While often overlooked, hailstorms can pose potential health and safety hazards, including serious injuries. The May Fest Storm near Dallas, Texas produced softball-sized (4") hailstones that struck an outdoor festival in 1995. There was little to no shelter to protect attendees from hail impacts, and as a result, there were 400 injuries, including 60 injuries serious enough to require hospitalization.²

¹ NOAA Preliminary Severe Weather Report Database, 2020, https://www.spc.noaa.gov/climo/online/monthly/2020_annual_summary.html#

² National Weather Service, <https://www.weather.gov/fwd/mayfest15>

Protecting Property

There are several steps you can take to reduce the risk to your building(s) and other property at your facility:

Inspect and maintain roofing systems and proactively replace older roofs with hail-resistant roof assemblies. When it comes to buildings, roofs typically absorb the most damage in hailstorms. As a roof ages, normal weathering of the materials reduces the ability of the roofing assembly to resist impact damage like hail strikes. Roofs with existing visible damage such as alligating, blisters and other signs of deterioration are even more vulnerable to damage from hail. While there is significant variation in roof lifespan due to UV exposure and other factors, a 15-year lifespan is a good rule of thumb for single- and multi-ply roofs when considering capital planning for replacements. Roof warranties typically do not cover hail damage.

Normal preventative maintenance should include semi-annual roof inspections by a qualified party. If problems are found during inspections, a Registered Roof Consultant (RRC) can provide an independent assessment of the roof's condition and oversight during any major roofing project to ensure the roofing assembly is installed as specified. If planning to replace a roof at your facility, consult a CNA Risk Control professional for further guidance on how to improve roof hail resiliency.

Inspect and protect key equipment. Heating and cooling (HVAC) systems, refrigeration equipment, dust collectors and photovoltaic (PV) panels are examples of outdoor equipment vulnerable to hail damage.

When inspecting and servicing HVAC equipment in accordance with manufacturer's guidance, check for any hail damage or deformation on condenser coils, which can reduce the efficiency of the unit. These surfaces can be protected by manufacturer-provided guards (preferred) or site-fabricated guards utilizing at least No. 11 gauge steel wire mesh with openings small enough (<1 inch) to keep hail out. When adding hail guards, always ensure airflow is sufficient for proper operation after the guards are installed. If your building is within a hail-prone area, PV panels should also have hail-impact resistance suitable for the geography. A CNA Risk Control professional can provide a personalized risk assessment of your exterior equipment and further guidance on how best to protect it from hail damage.

Inspect and protect skylights. When it comes to compromising roof assemblies in a hailstorm, skylights are the "weakest link" because damage will allow an immediate path for water to enter the structure. When inspecting the roof, check for skylights that show

signs of cracks (embrittlement) or discoloration due to weathering; these skylights are particularly vulnerable to hail damage. In hail-prone areas, install listed or approved skylights that are resistant to hail impacts and guards to reduce the risk of failure during a hail event. A CNA Risk Control professional can provide further guidance on how best to protect these rooftop openings.

Don't forget outside storage and vehicles. If company vehicles are stored outside in parking areas, can they quickly be moved to shelter in the event of severe weather? Unprotected outside storage of raw materials or finished goods in high-hazard hail areas should be avoided, unless materials are unlikely to be damaged by hail.

Protecting People

Here are some tips for keeping employees and visitors safe during hail season:

Review incident response plans. Ensure that your Incident Response plan (sometimes referred to as Emergency Response) contemplates hail and other severe weather events applicable to your location(s). If employees are working outdoors or visitors are congregating in exposed areas, make sure to include procedures for prompt notification and evacuation to designated shelters or protected areas.

Install NOAA Weather Radios. An NOAA Weather Radio is a reliable means of ensuring you'll receive prompt notification of weather emergencies that can threaten your facility, including hail events. Newer NOAA radios incorporate Specific Area Message Encoding (SAME), which allows for the selection of the specific counties or territories in which your facility is located and even the specific hazards you'd want to be alerted to. This feature dramatically reduces the number of weather alerts that are not applicable to your specific location(s). More information on SAME coding and NOAA Radios can be found at the [National Weather Service](#).

Take post-storm safety precautions. Roofs, building exteriors and outside equipment should be inspected following hail events to check for damage. If a hailstorm impacts your facility, do not allow employees to go outside until all storms have passed. It is not unusual for hail events to "stop and restart" when a series of storms is moving through an area.

Use caution when inspecting exterior surfaces, especially roofs. Significant water accumulations or melting hail may create slip-and-fall hazards on walking surfaces and ladders. At minimum, remember to adhere to the fall protection and elevated walk-working surface requirements of OSHA 1910.28.

To learn more about how to help your clients manage risks and increase efficiencies, please visit cna.com/riskcontrol.