Making sense of risk
Disaster preparedness
Asia Pacific

Hail action plan

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Hail action plan

Organisations and individuals are likely to face natural and manmade catastrophe at some stage. It is therefore crucial to have a plan well in advance of emergencies, in order to protect you, your employees and your customers from personal injury and your business from damage and protracted downtime.

Hail damage can affect any exposed property, especially vehicles, aircraft, roofs and roof-mounted equipment, such as air conditioners, vents, cooling towers, skylights and heating units. Crops can also be devastated and, in extreme cases, hail can cause casualties. External insulating and finishing systems (EIFS) may be damaged if the hail has any significant horizontal force. The hail storm that devastated parts of Sydney in 1999 is still regarded as one of Australia's worst natural disasters, and would cost the equivalent of more than $3.3 billion today.

Like other extreme weather phenomena, hail causes significant property damage every year and, since hail can occur with any severe thunderstorm, it is a threat nearly everywhere. Severe thunderstorms can be localised and can develop very quickly, and their location is therefore difficult to accurately predict. As a result, advance warning of a severe hail storm or thunderstorm may have a lead time of no more than an hour.

This action plan is intended as a guide to help business owners and managers prepare in advance their business, premises and employees for a hail storm, in order to minimise the risk of personal injury and damage to property, and to reduce business interruption.

Understand your hail risk

While last-minute preparation of your property is important, it is advisable to consider your hail risk in terms of the likelihood of hail storms in your area. Ask your neighbours about the frequency of hail storms and, in Australia, visit www.bom.gov.au to learn more about your area's hail history.

If your area has experienced serious hail storms in the last decade, consider what you could do to limit the damage from future storms.

Consider your roof type

The roof is the main barrier that stands between your business and the elements and different types of roof covering have different vulnerabilities to the effects of weather, and hail damage in particular.

Although hail damage to a roof varies according to the properties of the hailstones (their size, density, free-fall

Hail storm emergency kit

A well-stocked emergency kit forms part of the essential advance planning for any emergency weather event, such as a hail storm or severe thunderstorm. Management should take responsibility for maintaining the kit, which should contain the following:

- Contact details for police, fire and emergency services; plumber; electrician; HVAC contractor; building owner; senior management; suppliers; and your insurance broker
- Instructions for the safe shut down of vulnerable and/or critical processes
- Emergency supplies, as follows:
  - First aid kit
  - Torch with spare batteries
  - Emergency radio (battery, solar or crank powered)
  - Food and drinking water supplies
  - Blankets and extra clothing
  - Tools for emergency repairs.

velocity and angle of impact), it is also affected by the age of the roof, type of construction, support condition, impact location and the ambient temperature.

In order to reduce the potential for roof damage at your place of business, it is wise to inspect it regularly, and to do that, it is important to understand the most common types of roof and roofing materials. (Refer to the Liberty document Roof systems for more information on terminology and roof types.)

Since roofs may be designed for function and aesthetics rather than hail resistance, durability and strength, it is important to consider the following when assessing an existing roof, planning a new roof, or replacing an old one:

Construction

Material selection and roof slope both play a major role in a roof's hail resistance. Several hail-resistant roofing and skylight materials are available on the market. Roof coverings are tested for impact resistance using Underwriters Laboratory (UL) standards (specifically, UL 2218) and are categorised from Class 1 to 4, Class 4 being the most impact resistant. The material chosen for roofing may influence your insurance costs, which will be a function of the hail resistance and replacement cost of the roof. Class 3 or 4 materials are recommended for hail-prone areas.

Smooth roof coverings

Smooth roof coverings, including single-ply and built-up roofs, are more susceptible to hail damage than those with gravel, stone or paving block ballast.

Metal roofs

Metal roofs – especially those with a low-pitch - can be dented or even penetrated by large hailstones, and clearly the lighter the gauge of metal used, the greater the susceptibility to damage. Superficial hail damage is usually indicated by paint damage or small dents.

Blistered roof coverings

Blistered coverings are more susceptible to damage. Blisters are more likely to form during warm weather when the sun warms and expands the trapped air that forms the blister. As the blister grows, it lifts the membrane covering from the roof, and with subsequent hail damage, water can penetrate and cause leaks. Severe, undetected or neglected water leaks can cause electrical damage, delaminate the roof membrane layers, promote fungal and mould growth, or even lead to roof collapse.

Ballasted roofs

Uneven distribution of ballast, and especially thin or bare patches, can make the underlying roof membrane vulnerable to tears and perforation by hail.

Tiled roofs

Although large hail stones can break or even penetrate terracotta or cement roof tiles, hail damage to tiled roofs can be relatively subtle. The only evidence of damage may be chipped or cracked tiles and often, small fragments may be missing from the corners of tiles. Undetected hail damage to a tiled roof can announce itself in the form of leaks or loosened tiles months or years later.

Inspect and maintain your roof and gutters

Weather has an ongoing wear-and-tear impact on roofs of any type, and regular and thorough roof inspections (ideally by a professional roofing contractor) are important in maintaining a safe and secure building.

Scheduled inspections and follow-up maintenance may be the difference between a roof that lasts its expected lifespan and one that fails prematurely. Regular inspections reduce the need for expensive emergency repairs and reduce the likelihood of structural damage.

Roof inspections should be scheduled according to the seasons: after summer, when UV exposure and high temperatures may have caused damage, and after winter in areas that experience very low temperatures, snow or ice. Interim inspections should follow hail storms, severe rain storms or high winds.

Blocked or poorly draining gutters and downpipes may lead to significant damage during or after a hail storm. Regular roof maintenance should include the removal of leaves and other debris from the gutters. Gutters blocked by hailstones should overflow away from the eaves and therefore it is important that gutters are installed correctly.

Protect your heating ventilation air conditioning (HVAC) systems

The hail damage to roof-mounted HCAV systems may cause loss of heating and cooling and may even prohibit the use of the premises.

The impact of hailstones can cause compression of the fins of the condenser coils, reducing their heat transfer capacity. Cumulative hail damage may eventually demand the replacement of the unit, with the associated downtime while work on rooftop ductwork and controls is carried out.

Protecting your HVAC system with a hail guard may be less costly in the long term than replacing a damaged unit. If you are installing a new HVAC unit, choose one

with a factory-fitted hail guard. This will help protect the unit from hail and other flying debris. Most systems are designed to protect against hailstones less than 3.8 centimetres in diameter.

Consider retro-fitting a hail guard on existing HVAC systems. Either the manufacturer will be able to supply and install a hail guard or, failing that, a third party manufacturer could make and install a made-to-measure hail guard. Any design should take into account the potential impact on airflow and on the cleaning and maintenance of the HVAC system. It is advisable to consult the manufacturer to make sure that installation of a customised device will not void the equipment warranty.

Protect your skylights

Skylights are vulnerable to hail damage if the glazing is unable to withstand the impact of the hail. Protective covers made of polycarbonate or acrylic materials have a good impact resistance but are susceptible to scratches and may deteriorate and lose clarity with exposure to ultraviolet light. An alternative is clear or tinted protective film, which will not prevent the glass from breaking on impact, but will hold the glass in place.

General recommendations

It is important to plan ahead for extreme weather emergencies in order to protect your employees, premises and equipment from injury or damage. The safety of your employees and customers is paramount.

Things to consider *before an impending hail storm*:

☐	Locate the Hail storm emergency kit and, using the Liberty kit checklist as a guide, ensure that it is well stocked and available for onsite use.
☐	Identify the best shelter within the premises, preferably a small interior room or stairwell, ideally with walls reinforced with pipes (such as the bathroom) or concrete (such as the basement) on the lowest floor of the building.
☐	Make sure all employees know where to go and what precautions to take during the storm (detailed below).
☐	Encourage employees and customers to remain indoors until the storm has passed.
☐	Choose a meeting place where all employees and customers can gather after the storm, to make sure everyone is accounted for.
☐	Fill the fuel tanks of company vehicles as service stations may be closed for a time after the storm.
☐	Secure or store loose yard equipment.
☐	Park vehicles under cover.
☐	Tune to your local radio/TV station to monitor the weather situation, and watch the skies.

Safety measures to take *during a hail storm* include:

- ☐ When indoors:
  - Make sure the Hail storm emergency kit is close at hand at all times.
  - Stay away from windows and glass doors.
- ☐ When outdoors:
  - Seek cover if possible; otherwise, turn your back to the wind and protect your head.
- ☐ When driving:
  - Stay inside the vehicle.
  - Where safe to do so, pull over in a safe place and stop the vehicle. Driving adds to the impact of the hail on your vehicle. Stop on the road shoulder or under an overpass if possible. Avoid roadside ditches that may become flooded.
  - Angle the vehicle so that the windscreen takes the brunt of the hail. Windscreens are reinforced to withstand impact more than side or rear windows.
  - Lie down, turn your back to the windows and protect your head.
  - If possible, protect yourself from flying debris with a blanket or coat.
- ☐ Be aware that any high winds, lightning and flooding may be a component of any hail storm or severe thunderstorm and take precautions accordingly.

Roof inspections checklist

Conduct regular roof inspections and interim inspections after storms and high winds.

Inspections are often best left to the professionals, since roofs are high up and often sloped. Get onto the roof through a roof hatch or fixed ladder against an outside wall and always manage the risk of falls in accordance with the relevant industry Codes of Practice.

Points to consider:

- Eliminate ponding, plant growth and storage.
- Remove debris from the roof and gutters.
- Ensure even distribution of roof ballast on a ballasted roof.
- Ensure roof-mounted equipment is securely attached to the roof and, if vulnerable to hail damage, has hail guards fitted.
- Remove any foreign material on the roof and investigate the origin and cause.
- Engage a roof contractor to evaluate and repair the roof when you notice:
  - Loose flashing
  - Loose bricks in chimney stacks
  - Deterioration of chimney stacks, antennas, guy wires, cables or anchors
  - Damage to air conditioners, vents or skylights
  - Cracks, blisters or brittle membranes.

Want more information?

http://www.facilitiesnet.com/roofing/article/Comprehensive-Strategies-for-Effective-Roof-Inspections--15979

http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/managing-risk-falls-cop

Australian Standard (AS)/New Zealand Standard (NZS) 3500.3 Plumbing and drainage – Part 3: Stormwater drainage.

Underwriters Laboratory (UL) 2218 Modification Document, Impact Resistance of Prepared Roof Covering Materials.

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