

# ASH IMPACTS ON BUILDINGS AND STRUCTURES

## ADVICE FOR FACILITIES MANAGERS: BUILDINGS

VOLCANIC ASH IS: HARD, HIGHLY ABRASIVE, MILDLY CORROSIVE AND CONDUCTIVE WHEN WET.

- **Disruption of HVAC units** due to obstructed filters, condensers & air intakes
- **Contamination of building interiors**, leading to:
  - » Risk of adverse health impacts for building occupants (see [www.ivhnh.org](http://www.ivhnh.org))
  - » Damage to sensitive equipment
  - » Abrasion damage to flooring
- **Ash may block gutters and downpipes**, leading to localised flooding and damage, especially on roofs, drainage networks, and in ceiling spaces. Internal gutters are particularly at risk and are not easily accessible for cleaning
- **Abrasive damage to roofing materials during ash removal.**
- **Loss of essential services**, due to disruption by ashfall
  - » For more information please see companion posters ([www.aelg.org.nz](http://www.aelg.org.nz))
- **Structural damage** due to excessive ash loading. Very thick ash deposits (>100 mm) may cause roof collapse, although this ash thickness is rare.
  - » Long span, low pitched roofs are typically the most vulnerable
  - » When ash is wet, static loads may increase by up to 100%
  - » Non-structural elements, such as gutters, are more vulnerable to failure. Gutters will accumulate ash from the roof, reducing the drainage capacity and further increasing loading

See companion poster for advice on operating Generator Sets and Heating, Ventilation and Air-Conditioning (HVAC) systems.



## RECOMMENDED ACTIONS

### WHERE TO FIND WARNING INFORMATION

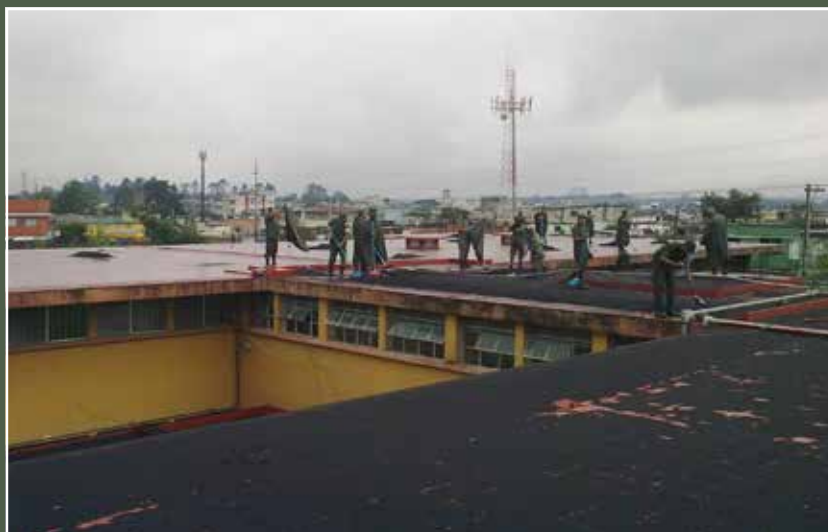
See [www.geonet.org.nz](http://www.geonet.org.nz) for ashfall forecasts in the event of an explosive eruption.

### HOW TO PREPARE

At-risk facilities should develop operational plans for managing ash fall events, including:

- Identify entry/exit points required for building operation, areas which need sealing and restricted access to limit spreading ash
- Ensuring adequate supplies of necessary equipment
- Ensure that roofs and similar elevated areas where ash accumulation will need to be removed, have pre-installed fall arrest anchor points and that a safe means of access is identified
- Cover outlets / downpipes to reduce ash ingress into drainage networks, and if possible disconnect down pipes and/or gutters
- Shutdown and cover exposed non-essential equipment, where possible
- Consider dependency on critical services and take steps to increase resilience:
  - » Ensure backup power generation
  - » Cover water tanks

Ash cleanup operations create significant additional labour and resource demands.



An eruption of Pacaya volcano in 2010 deposited ~20 mm of coarse basaltic ash on Guatemala City. This photo shows cleanup of ash from the roof of a major public hospital. Ash entered gutters and drains, causing flooding. Some abrasion damage to the paint coating on the roof occurred.

### HOW TO RESPOND

Avoid cleanup until ash has stopped falling. However, in some situations, immediate action may be required to prevent damage or loss of function to the building

**Use extreme caution as falls from roofs/structures are a major cause of casualties during ashfalls**

- **During ashfall:**
  - » Seal building to limit ash ingress:
    - Select an entry point which can be used as an 'ash lock'. Two sets of doors separated by a few meters are ideal
    - Ash-covered clothing and footwear should be left in this area
    - Use ash foot baths
    - Place damp towels at the bottom of external doors
    - Close and seal (e.g. with duct tape) non-essential doors, windows, vents and other gaps
- Monitor HVAC systems (see companion poster). Minimise use if operation is necessary;
- Limit movement of staff and contractors to reduce their exposure
- **After ashfall**
  - » **Exterior Clean up**
    - Prioritize areas to be cleaned. Use a 'top down' and 'up-wind' method to prevent recontamination of cleaned areas
    - Use dry methods where possible. Use shovels to remove bulk of ash, then brooms. Ash may be dampened slightly to reduce dust
    - Start with a small test area, as sweeping some ash types may cause damage to roof surfaces. Innovation may be required
    - Clean gutters after adjoining roof surfaces have been cleaned, with a gutter scoop or small trowel
    - Store removed ash in bags to reduce remobilisation
  - » **Interior Clean up**
    - Use a vacuum to clean ash where possible
    - Difficult surfaces can be cleaned with a damp cloth
    - Avoid excessive rubbing as this can scratch delicate surfaces
  - » **Computers and Electronics**
    - Cover sensitive equipment with plastic sheeting
    - Equipment can be cleaned carefully using low pressure compressed air and a damp cloth
    - See companion poster: "Advice for Facility Managers: Computers and Electronics"

### MORE INFORMATION

**THE FOLLOWING RESOURCES PROVIDE FURTHER INFORMATION ON VOLCANIC HAZARDS:**

<http://www.geonet.org.nz>  
<http://www.gns.cri.nz>  
<http://volcanoes.usgs.gov/ash/index.html>  
<http://www.ivhnh.org>

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20 September 2013