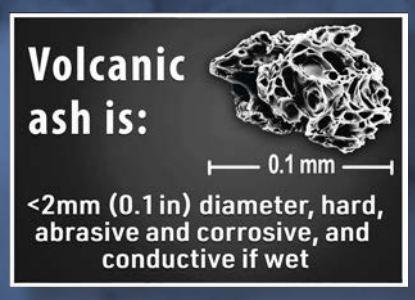


VOLCANIC ASHFALL

ADVICE FOR: **ROAD NETWORK OPERATORS**

ASH IMPACTS ON ROAD NETWORKS

GENERAL IMPACTS

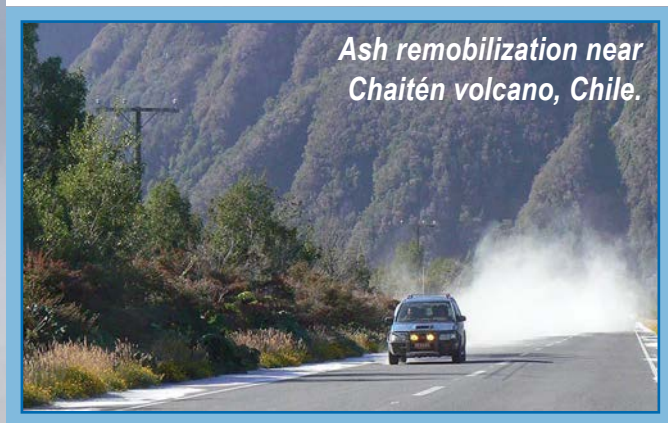
- Accident rates will likely increase due to:
  - » Visibility reduction during and after an eruption from ash suspended in the air.
  - » Skid resistance (traction) reduction on ash-covered roads in both dry and wet conditions, particularly on steep gradients.
  - » Obscured road markings, which can occur from very light ashfalls (<1 mm/<0.04 in thick).
- Vehicle damage may include clogged intakes and filters, corrosion of surfaces and moving engine parts, and windscreen abrasion.
- Roads may become impassable (to 2WD vehicles) when ash on the ground is very thick (>100 mm/>4 in).
- Ash-induced power outages may cause electronic traffic lights, signals and signs to fail.

REMOBILIZATION

- Impacts can continue after eruptive activity has ended due to the remobilization of ash by wind, water, traffic and/or other human activity such as sweeping.
- Ash and fallen vegetation in waterways can lead to floods and lahars (volcanic mudflows) causing damage to bridges and other infrastructure.

ROAD CLOSURES

- Closures are not always necessary during and after volcanic ashfall.
- The decision to close roads or implement traffic management strategies such as lower speed limits, convoys and one-way systems depends on many factors.
- These include:
  - » Visibility.
  - » Ash thickness.
  - » Particle size and color.
  - » Road type and gradient.
  - » Types of vehicles using road.
  - » Weather conditions.
  - » Local policies and regulations.



Volcanic ash from the 2008 Chaitén eruption is remobilized by the vehicle months after the eruption. Photo by Graham Leonard.

RECOMMENDED ACTIONS

WHERE TO FIND HAZARD & WARNING INFORMATION

Refer to the website of your local volcano observatory, national weather service and/or disaster management agency for warnings of ashfall.

HOW TO PREPARE

Operational plans should be developed well in advance for infrastructure at risk from volcanic ashfall.

- Coordinate plans with emergency management groups, scientists and infrastructure providers.
- Develop road closure and detour protocols.
- Identify a hierarchy of roads for clean-up prioritization.
- Plan for clearing of critical evacuation routes.
- Ensure that sufficient equipment and labor resources are available to clear roads of ash (and ash-contaminated snow where applicable) in a timely manner.
- Identify potential disposal sites. ℹ ***See companion Urban Clean-up poster.***

HOW TO RESPOND

If possible, delay clean-up until ash has stopped falling. Repeated cleaning or multiple clean-ups may be necessary.

Vehicle & Machinery Operation:

- Avoid using wipers to clear ash from windscreens as this can cause abrasion damage. Rinse ash from windscreens and vehicle paintwork with water.
- Clean or replace air and oil filters regularly. Also consider installing pre-filters at air intakes.
- Apply lubricant/grease more frequently and check for wear.
- Advise people travelling in open vehicles (e.g. scooters and motorbikes) to wear protective equipment including masks and goggles.

This accident occurred following the 2015 eruption of Calbuco volcano in Chile, which deposited around 20 mm (0.8 in) of ash on the roads. Photo by Junín de los Andes Fire Department, Argentina.

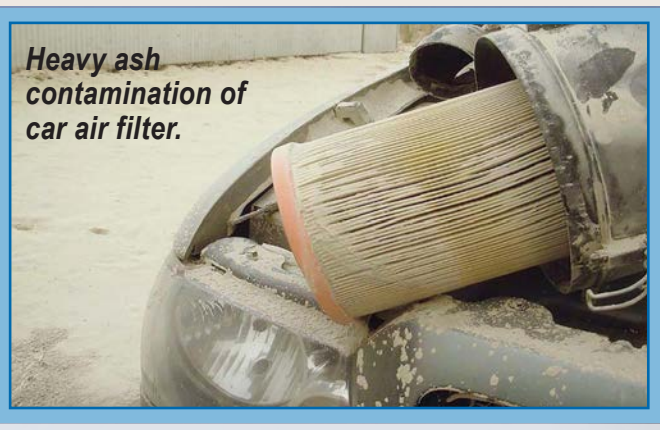
Frequent eruptions from Sakurajima volcano cause reduced visibility and cover road markings in the city. Photo by Minami Nippon Shimbun, Kagoshima, Japan.

Road Network Management:

- Advise the general public to avoid all non-essential travel.
- Implement safety measures, such as:
  - » Headlight use.
  - » Warning information and reduced speed limits (e.g. through variable message signs).
  - » Temporary one-way systems.
  - » Sufficient vehicle spacing and stopping distances.
  - » Dampening road surfaces to reduce remobilization and improve visibility.

Road Clean-up:

- A combination of methods such as sweeping, air blasting, suction and/or spraying may be necessary to remove all ash from roads. Adding damp sawdust as a binder (using a road spreader) may be effective when clearing fine ash (<0.5 mm/0.02 in diameter particle size) from roads.
- Clean high priority routes before markings are covered to maintain safety.
- Avoid sweeping and dumping ash into roadside drain inlets. Roadside drains and ditches may need to be cleared of ash.
- Ensure that field crews are supplied with adequate personal protective equipment (long-sleeved clothing, heavy footwear, fitted goggles and properly-fitted P2, N95 or FFP2 dust masks). Masks should be changed when clogged.
- If industry-certified masks are not available, other masks may provide partial protection. For more information: https://www.ivhhn.org/index.php/ash-protection
- Coordinate clean-up schedule with other stakeholders and the public.



This occurred following 50 mm (2 in) of ashfall from the 2011 eruption of Cordón Caulle volcano, Chile. Photo by Ailen Rodriguez, Jacobacci, Argentina.

• FURTHER RESOURCES •

https://volcanoes.usgs.gov/volcanic_ash/roads_highways.html

www.ivhhn.org (volcanic health hazards information)

Content by Daniel Blake, Tom Wilson, Josh Hayes, Carol Stewart, and Grant Wilson. Layout by Lisa M. Faust. Version 1 of International Volcanic Ash Impacts Posters, November 2020.

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