



VOLCANIC ASHFALL

ADVICE FOR: AIRPORT OPERATORS

ASH IMPACTS ON AIRPORTS

Volcanic ash accumulations of less than 1mm (0.04 in) may be sufficient to temporarily affect airport operations.

Impacts include:

- Structural loading on hangers is considerably worsened if ash becomes wet, increasing the likelihood of damage and collapse.
- Covering of airfields and grounded aircraft, which can lead to various impacts including loss of marking visibility, abrasion and impaired landing conditions.
- Contamination of electrical systems, including ground-support equipment and machinery.
- Loss of local visibility and complications to the reporting of meteorological conditions.
- Difficult landing conditions due to reduced runway friction, whether ash is wet or dry.
- Damage to aircraft and grounded flights from ingestion of ash into jet engines during taxiing, takeoff and landing.
- An ashfall may affect road transport, which may in turn affect staff access to airports.

Cleaning up airports after an ashfall is time-consuming, repetitive, costly and resource intensive. The complexity and immensity of this task should not be underestimated.

ASH IMPACTS ON AIRCRAFT IN FLIGHT

Volcanic ash in airspace in the vicinity of airports may also cause disruptions to airports even if it does not accumulate on the ground.

Volcanic ash is hazardous to aircraft in flight and can cause:

- Accumulation of melted ash in the engines, potentially leading to engine failure..
- Abrasion and corrosion to engine components, windows and exterior surfaces.
- Clogging of inlets and pitot-static systems.



It took 500 people at least 7 days to clear ash from the airfield using brooms when 4 mm (0.2 in) ash accumulated following the 2002 eruption of Reventador volcano. Photo by Mariscal Sucre Airport, Ecuador.

RECOMMENDED ACTIONS

WHERE TO FIND HAZARD & WARNING INFORMATION

ASH CLOUD FORECAST (airborne ash):

- Volcanic Ash Advisory Centers (VAAC) will issue Volcanic Ash Advisories (VAA) and Volcanic Ash Graphics (VAG) on airborne ash affecting aviation. See: <https://gis.icao.int/icaovaac/>

AVIATION COLOR CODES (airborne ash):

- International aviation color codes are recommended by the International Civil Aviation Organisation. See: <https://wovo.bo.ingv.it/aviation-colour-codes.html>

ASHFALL FORECAST (ash falling to ground):

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

WHERE TO FIND HAZARD & WARNING INFORMATION

- 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.
- For advice on protecting building facilities from ashfall. **See companion Buildings poster.** These plans should, where possible, be integrated with aviation and airline plans. <https://www.icao.int/Pages/default.aspx>

The ICAO resource provides guidance on:

- » Standing arrangements prior to volcanic eruptions.
- » Responses during an eruption.
- » Post-eruption cleanup and re-opening of the airport.

HOW TO RESPOND

If physical damage to aircraft occurs, the airline, local civil aviation authority or aircraft manufacturer should be contacted for advice.

Clean-up must be planned carefully. Property owners and contractors may have legal duties under local health and safety regulations. These may include:

- Ensuring a safe working environment.
- Ensuring that workers have adequate personal protective equipment (long-sleeved clothing, heavy footwear, fitted goggles and a properly-fitted P2, N95 or FFP2 dust mask). Masks should be changed when clogged.

If industry-certified masks are not available, other masks may provide partial protection. For more information: www.ivhnh.org/index.php/ash-protection

Bagged ash at Mariscal Sucre Airport, Quito, Ecuador.



Ash was bagged in place then removed by truck when 4 mm (0.2 in) ash accumulated following the 2002 eruption of Reventador volcano. Photo by Mariscal Sucre Airport, Ecuador.

Ash covering San Carlos de Bariloche International Airport, Argentina.



The airport was closed for 1 month when 25 mm (1 in) of ash accumulated on the airfield following the 2011 eruption of Cordón Caulle volcano in Chile. Extra volumes of antifreeze were required to remove ice contaminated with ash. 1000 tons of ash were removed and distributed in the immediate area. The ash was stabilized using irrigation systems to encourage grass growth. Photo by Bariloche International Airport, Argentina.

• FURTHER RESOURCES •

- https://volcanoes.usgs.gov/volcanic_ash/aviation.html
- www.ivhnh.org (volcanic health hazards information)

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