



**Aeronautical Services
Advisory Memorandum
(ASAM)
Focal Point: Gen**

**ASAM
No: 25
Issue 4.0
Date 05.11.24**

Title

Guidance on the Impact of Volcanic Ash on Aeronautical Facilities

1. Introduction

- 1.1 The objective of this document is to highlight to air traffic management/air navigation services (ATM/ANS) service providers and aerodrome operators available guidance material and information on the subject of volcanic ash and its potential impact on aviation ground facilities.
- 1.2 ASAM 026 addresses ATM/ANS Provision in the vicinity of volcanic ash

2. Background Information

2.1 ICAO Doc 9691

- 2.1.1 ICAO Doc 9691 "Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds" includes guidance on the potential impact of volcanic ash on aerodromes and communications, navigation and surveillance (CNS) facilities.
- 2.1.2 Chapter 2 identifies that the movement of ash has "important consequences for aerodromes within less than one hundred kilometres downwind of a volcano".
- 2.1.3 Chapter 5 notes that relatively small amounts ("as little as 1mm") of ash deposited on an aerodrome can have a significant impact in terms of visibility and the friction coefficient for landing. Also noted is the potential risk of contamination (including to aircraft and to electrical and electronic equipment used to support air navigation services).
- 2.1.4 Appendix A of Doc 9691 also includes recommendations to mitigate the effects of volcanic ash on aerodromes. This includes recommended procedures in relation to aircraft systems, runways, landing aids, ATC systems, computer systems and radar systems.

2.2 ICAO Eur Doc 019

- 2.2.1 ICAO Eur Doc 019 "Volcanic Ash Contingency Plan – EUR and NAT Regions" sets out standardised guidelines for the alerting of aircraft when eruptions occur, and procedures to be followed by the area control centres (ACCs) when planning routings around the ash cloud.



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2.3 Flight Safety Foundation

- 2.3.1 An article published by the Flight Safety Foundation in May 1993 entitled "Volcanic Hazards and Aviation Safety: Lessons of the Past Decade" contains useful background information on the hazards of ash-laden clouds from a volcano.
- 2.3.2 In particular, the chapter entitled "Aircraft Also Face On-ground Ash Hazards" starting on page 5 gives information on the hazards that occur when ash falls to the ground (as a result of various weather conditions) and covers runways and taxiways.
- 2.3.3 This article is available from <http://www.skybrary.aero/bookshelf/books/358.pdf>

2.4 Eurocontrol Skybrary

- 2.4.1 Additional background information is available from the Eurocontrol Skybrary website:
<http://www.skybrary.aero>

2.5 Selected Extracts

- 2.5.1 Selected extracts from ICAO Doc 9691 and Eur Doc 019 of particular relevance in the context of this ASAM are included in Annex A.

3. Recommendations

- 3.1 ATM/ANS service providers and aerodrome operators should monitor meteorological forecasts in relation to potential deposits of volcanic ash on the ground.
- 3.2 Appropriate mitigation measures should be established in accordance with the guidance material referenced in this ASAM including advance options for clearing aerodrome surfaces of volcanic ash and the protection of critical ATM, Communication, Navigation and Surveillance equipment should this become necessary.



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4. References

- 4.1 ICAO Doc 9691, "Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds"
- 4.2 ICAO Eur Doc 019, "Volcanic Ash Contingency Plan – EUR and NAT Regions"
- 4.3 Flight Safety Digest, May 1993, "Volcanic Hazards and Aviation Safety: Lessons of the Past Decade"

5. Further Information

- 5.1 Requests for further information on the contents of this ASAM should be addressed to ansdinfo@iaa.ie.

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Annex A: Selected extracts from Doc 9691 and Eur Doc 019

Doc 9691 - 5.1.1.1

Volcanic ash can also have a serious effect on aerodromes located downwind of a volcanic ash plume. The ash is deposited on and around the aerodrome, contaminating electronic, electrical and mechanical ground equipment and, if due care is not taken, aircraft parked or taxiing around the aerodrome.

Problems caused by volcanic ash on the runways include a **reduced runway friction coefficient** for landing aircraft, especially when ash is wet, and severe deterioration in local visibility as the ash on the ground is disturbed by engine exhausts from aircraft taxiing, landing and taking off. In fact, **it does not take that much ash to be deposited on an aerodrome** (in fact as little as 1 mm) **before the aerodrome may have to be closed** completely to aircraft operations.

Doc 9691 - 5.1.1.2

The effect of volcanic ash on electronic, electrical and mechanical equipment is very similar to the effects already described on aircraft equipment. Volcanic ash easily penetrates all but the most tightly sealed areas and this applies as much to small electronic components as to hangars and maintenance areas. Cooling, lubrication and filter systems are contaminated, often to the extent that the equipment is impossible to clean completely and has to be replaced. Moving parts in mechanical equipment, especially bearings, brakes and transmissions, are abraded rather quickly because the equipment filters and lubrication systems themselves become clogged and/or contaminated. Special problems can affect high voltage circuits and components, especially if the ash has been dampened by rain which renders it highly conductive electrically. This causes short circuits, arcing and flash-overs which can result in fires on electrical distribution system components.

Doc 9691 - 5.1.3.1

On notification of an eruption which could cause volcanic ash to fall on the airport, protective measures should be initiated immediately, such as the storage of non-essential equipment, sealing/covering openings on aircraft and aircraft engines, ground equipment, strategic buildings and electronic/computer equipment, etc.

Eur Doc 019 Appendix 1 (4c)

If an aerodrome is contaminated with ash, the deceleration will be less than usual despite the use of maximum braking, resulting in a longer ground run. This may be aggravated by limited use of reverse thrust to avoid blowing up ash from the runway surface. If reverse thrust is necessary to bring the aircraft to a stop, a dust cloud may be raised.