

Topics:

- What is a volcanic ash cloud?
- Increased wear and tear, premature failure
- Engine defects resulting from volcanic activity

Volcanic Activity - The Engineers Perspective

The recent volcanic eruptions in Iceland have caused much widespread publicity and media coverage and we all now understand how dangerous volcanic ash can be, or do we? What actually is the effect of an aircraft flying through a cloud of volcanic ash?

What is a volcanic ash cloud?

Ash is created when solid rock shatters and magma separates into minute particles during explosive volcanic activity. The usually violent nature of an eruption involving steam results in the magma and solid rock surrounding the vent being torn into particles of (sand size) clay. Most of the



particles are between 10 and 200 microns across. (The particles in talcum powder, for example are about 10 microns across, and the sand on fine sandpaper is about 200 microns across.)

Volcanic ash particles have a maximum residence time in the troposphere (the normal cruise height for airliners) of a few weeks. The finest particles remain in the stratosphere for only a few months, they have only minor climatic effects, and they can be spread around

the world by high-altitude winds. Wind direction and speed above and downwind from an erupting volcano affects the dispersal pattern of volcanic ash in the atmosphere.

Increased wear and tear, premature failure

After a major volcanic event, experience has shown that increased levels of deterioration and erosion can occur to aircraft surfaces, windshields, paint finishes, leading edges and power plants.

Increased levels of inspection are required both in terms of the depth of inspection and the frequency. Typical systems affected would be air conditioning systems, windshields and cabin windows, navigation and landing lights covers and antennas, all leading edge surfaces. All pitot and static ports/probes may require more frequent cleaning and testing. Component abrasion may cause premature failure of certain components, all contributing to a decrease in aircraft reliability. The most significant and most costly problems to rectify are, of course, increased engine wear.

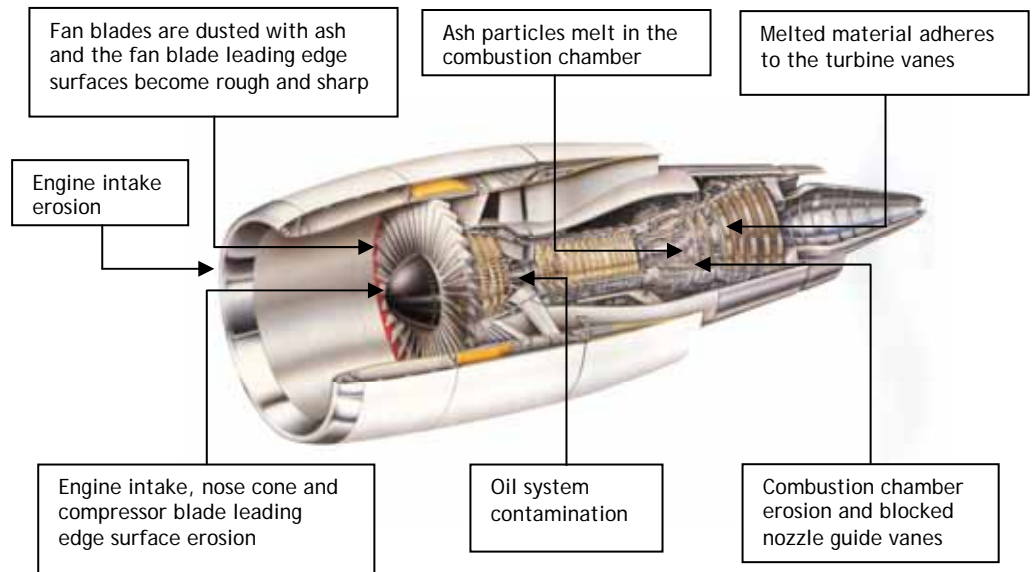
Engine defects resulting from volcanic activity

Ash contains particles whose melting point are below the engine internal temperature and, as such, they re-melt. In flight melted materials are rapidly cooled down and can stick on turbine blades and nozzle guide vanes (Photograph right).



Did You Know...

...that Charles Taylor aviation (asset management) has surveyors travelling to South Africa, Europe and the Far East in the coming weeks



Ash particles can also erode moving parts and/or partially/ completely block off fuel nozzles. Ash deposits can clog bleed systems, which could lead to total bleed loss with associated loss of cabin pressurisation. We also see an increase in the engine oil degradation rate, which if not found early, will result in greater wear to the engine bearings and other moving parts. Increased engine maintenance activity may include more internal engine borescope inspections, engine oil and filter replacements. Recent inspections made by CTa(AM) indicate the recent volcanic activity is already causing increased erosion to engine fan blade leading edge surfaces.

Written by Jeff Solomon - Managing Director

Company Overview

Address:

Second Floor Office Suite
New House
Market Place
Ringwood
Hampshire
BH24 1EN

Phone:

+44 (0) 1425 480 333

E-Mail:

ctaam@ctcplc.com

Website:

www.ctaam.com

Charles Taylor aviation (asset management) is an aviation consulting company specialising in the management of commercial aircraft operating leases. Charles Taylor aviation (asset management) is a Charles Taylor adjusting company. We offer technical support and management that is specifically geared to aircraft operators, owners and financiers. Our commitment is to provide a highly flexible service that can be individually tailored to suit your requirements. We have designed our services to ensure your financial risk is minimised, your assets are secure and values are maintained. Charles Taylor aviation (asset management) is able to assess all risk factors and draw the right conclusions for your investments. Whether we are appointed to make a comprehensive inspection of an aircraft for lease termination, prospective purchase, investment or sale, or whether we manage the aircraft you have leased, we will adapt our approach entirely to meet your needs.

Charles Taylor aviation (asset management) Limited services comprise of the following disciplines:

- *Aircraft Build and Pre-Purchase Inspections*
- *Technical Records Audits*
- *Aircraft Operating Lease Technical Management Services*
- *Airline Technical Audits and Risk Surveys*
- *Maintenance Check Technical Representation*
- *Repossessions, Extractions and Lease Termination Inspections*
- *Airline Quality and Safety Audits*