

National Transportation Safety Board
Washington, DC 20594

Brief of Accident

Adopted 06/30/1992

ANC90FA020 File No. 6012	12/15/1989	ANCHORAGE, AK	Aircraft Reg No. PHBFC	Time (Local): 11:48 AST	
Make/Model: BOEING / 747-400			Fatal	Serious	Minor/None
Engine Make/Model: GE / CF6-80C2			Crew 0	0	14
Aircraft Damage: Substantial			Pass 0	0	231
Number of Engines: 4					
Operating Certificate(s): Flag Carrier/Domestic					
Name of Carrier: KLM ROYAL DUTCH AIRLINES					
Type of Flight Operation: Scheduled; International; Passenger/Cargo					
Reg. Flight Conducted Under: Part 129: Foreign					

Last Depart. Point: AMSTERDAM , OF	Condition of Light: Day
Destination: Same as Accident/Incident Location	Weather Info Src: Weather Observation Facility
Airport Proximity: Off Airport/Airstrip	Basic Weather: Instrument Conditions
	Lowest Ceiling: 8000 Ft. AGL, Overcast
	Visibility: .00 SM
	Wind Dir/Speed: 050 / 007 Kts
	Temperature (°C): 0
	Precip/Obscuration: None / Dust; Smoke

Pilot-in-Command Age: 51

Certificate(s)/Rating(s)
Airline Transport; Foreign; Multi-engine Land

Instrument Ratings
Airplane

Flight Time (Hours)

Total All Aircraft: 13000
Last 90 Days: 100
Total Make/Model: 100
Total Instrument Time: UnK/Nr

BFR TKOF, CREW OF KLM FLT 867 ADZD OF VOLCANIC ERUPTION ABT 100 MI SW OF DESTN. EN ROUTE, FLT ADZD OF ANOTHER ERUPTION. FOR ARR, FLT CLRD TO DSCND FM FL390 AT PLT'S DISCRETION; VCTR GIVEN TO AVOID LAST KNOWN AREA OF ASH CLD. DRG DSCNT THRU FL260, FLT ENCTRD ASH CLD; ASH/SMOKE ENTERED COCKPIT/CABIN. CREW DONNED O2 MASKS; USED MAX PWR TO CLB. 1 MIN LTR, ALL ENGS LOST PWR (TO 28%-30% RPM); THERE WAS ELEC PWR INTRPN, LOSS OF AIRSPD INDCN, FIRE WARNING ALARM FOR FWD CARGO AREA. AFTER 8-9 ATMTS & DSCNT TO 13,300', ALL ENGS RESTARTED & FLT CONTD TO SAFE LDNG. DMG FND ON EXTERNAL SFCS OF ACFT & IN HI PRES TURBINES OF ALL ENGS. BOEING OMB #747-B2-4, ADZD TO AVOID VOLCANIC ACTIVITY; BUT IF ENCTR, RETARDING THRUST TO IDLE WLD RDC BLDUP IN ENG & IMPROVE STALL MARGIN. ATC RADAR COULD ONLY DETECT VOLCANIC ASH FOR 5-10 MIN AFTER ERUPTION; ACFT RADAR NOT DESIGNED TO DETECT ASH. ASH CLD FCST TO MOV NNE AT 60 KTS; REVIEW OF SATELLITE DATA SHOWED IT ACTUALLY MOVED AT ABT 120 KTS. KLM HAD NO PROC FOR 747 ENCTR WITH ASH CLD & NO ADNL INSTRNS WERE GIVEN TO KLM CREWS.

Brief of Accident (Continued)

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Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: DESCENT - NORMAL

Findings

1. WEATHER CONDITION - CLOUDS
 2. (C) WEATHER CONDITION - SAND/DUST STORM
 3. IN FLIGHT WEATHER AVOIDANCE ASSISTANCE - ATTEMPTED - ATC PERSONNEL(ARTCC)
 4. (F) INFORMATION INSUFFICIENT
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Occurrence #2: LOSS OF ENGINE POWER
Phase of Operation: OTHER

Findings

5. ALL ENGINES
 6. (C) COMPRESSOR ASSEMBLY - FOREIGN OBJECT
 7. (C) COMPRESSOR ASSEMBLY - STALL
-

Occurrence #3: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: DESCENT

Findings

8. FUSELAGE - ERODED
9. WING - ERODED
10. WINDOW,CABIN - ERODED
11. NACELLE/PYLON - ERODED

Findings Legend: (C) = Cause, (F) = Factor

The National Transportation Safety Board determines the probable cause(s) of this accident as follows.
INADVERTENT ENCOUNTER WITH VOLCANIC ASH CLOUD, WHICH RESULTED IN DAMAGE FROM FOREIGN MATERIAL (FOREIGN OBJECT) AND SUBSEQUENT COMPRESSOR STALLING OF ALL ENGINES. A FACTOR RELATED TO THE ACCIDENT WAS: THE LACK OF AVAILABLE INFORMATION ABOUT THE ASH CLOUD TO ALL PERSONNEL INVOLVED.