



National Transportation Safety Board Aviation Accident Final Report

Location:	ANCHORAGE, AK	Accident Number:	ANC90FA020
Date & Time:	12/15/1989, 1148 AST	Registration:	PHBFC
Aircraft:	BOEING 747-400	Aircraft Damage:	Substantial
Defining Event:		Injuries:	245 None
Flight Conducted Under:	Part 129: Foreign		

Analysis

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 ENCTRD, 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.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: 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.

Findings

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

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

Factual Information

Pilot Information

Certificate:	Airline Transport; Foreign	Age:	51, Male
Airplane Rating(s):	Multi-engine Land	Seat Occupied:	Rear
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	11/13/1989
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	13000 hours (Total, all aircraft), 100 hours (Total, this make and model), 100 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft), 9 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BOEING	Registration:	PHBFC
Model/Series:	747-400 747-400	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	23982
Landing Gear Type:	Retractable - Tricycle	Seats:	293
Date/Type of Last Inspection:	11/24/1989, Continuous Airworthiness	Certified Max Gross Wt.:	792000 lbs
Time Since Last Inspection:	227 Hours	Engines:	4 Turbo Fan
Airframe Total Time:	7050 Hours	Engine Manufacturer:	GE
ELT:	Not installed	Engine Model/Series:	CF6-80C2
Registered Owner:	KLM ROYAL DUTCH AIRLINES	Rated Power:	57180 lbs
Operator:	KLM ROYAL DUTCH AIRLINES	Operating Certificate(s) Held:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	KRDF

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	TKA, 358 ft msl	Distance from Accident Site:	25 Nautical Miles
Observation Time:	1150 AST	Direction from Accident Site:	225°
Lowest Cloud Condition:	Scattered / 6000 ft agl	Visibility	0 Miles
Lowest Ceiling:	Overcast / 8000 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	50°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	0° C / -4° C
Precipitation and Obscuration:			
Departure Point:	AMSTERDAM, OF (EHAM)	Type of Flight Plan Filed:	IFR
Destination:	ANCHORAGE, AK (ANC)	Type of Clearance:	IFR
Departure Time:	0337 AST	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	14 None	Aircraft Damage:	Substantial
Passenger Injuries:	231 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	245 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	ROY C DAW	Adopted Date:	06/30/1992
Additional Participating Persons:	WENDELL WILLIAMS; ANCHORAGE, AK ZYGMUNT PRZEDPELSKI; CINCINNATI, OH JAMES ROBERTS; SEATTLE, WA FRANZ DRESSING; THE NETHERLANDS, OF		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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