Aviation Investigation Final Report

Location:	ANCHORAGE, Alaska	**Accident Number:**	ANC90FA020
Date & Time:	December 15, 1989, 11:48 Local	**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:**	
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:**	November 13, 1989
Occupational Pilot:	Yes	**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:**	
Airworthiness Certificate:	Transport	**Serial Number:**	23982
Landing Gear Type:	Retractable - Tricycle	**Seats:**	293
Date/Type of Last Inspection:	November 24, 1989 Continuous airworthiness	**Certified Max Gross Wt.:**	792000 lbs
Time Since Last Inspection:	227 Hrs	**Engines:**	4 Turbo fan
Airframe Total Time:	7050 Hrs	**Engine Manufacturer:**	GE
ELT:	Not installed	**Engine Model/Series:**	CF6-80C2
Registered Owner:	KLM ROYAL DUTCH AIRLINES	**Rated Power:**	57180 Lbs thrust
Operator:		**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 (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TKA ,358 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	11:50 Local	**Direction from Accident Site:**	225°
Lowest Cloud Condition:	Scattered / 6000 ft AGL	**Visibility**	
Lowest Ceiling:	Overcast / 8000 ft AGL	**Visibility (RVR):**	
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:	N/A - None - Smoke		
Departure Point:	AMSTERDAM (EHAM)	**Type of Flight Plan Filed:**	IFR
Destination:	ANCHORAGE (ANC)	**Type of Clearance:**	IFR
Departure Time:	03:37 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	NONE	**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	

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:**	61.160522,-149.989074(est)

Administrative Information

Investigator In Charge (IIC):	Daw, Roy
Additional Participating Persons:	WENDELL WILLIAMS; ANCHORAGE , AK ZYGMUNT PRZEDPELSKI; CINCINNATI , OH JAMES ROBERTS; SEATTLE , WA FRANZ DRESSING; THE NETHERLANDS, OF
Original Publish Date:	June 30, 1992
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=5278