



# Aviation Investigation Final Report

<b>Location:</b>	ANCHORAGE, Alaska	<b>Accident Number:</b>	ANC90FA020
<b>Date &amp; Time:</b>	December 15, 1989, 11:48 Local	<b>Registration:</b>	PHBFC
<b>Aircraft:</b>	BOEING 747-400	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	245 None
<b>Flight Conducted Under:</b>	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 ENCTR'D 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'D, 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

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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

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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

<b>Certificate:</b>	Airline transport; Foreign	<b>Age:</b>	51, Male
<b>Airplane Rating(s):</b>	Multi-engine land	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	November 13, 1989
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	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

<b>Aircraft Make:</b>	BOEING	<b>Registration:</b>	PHBFC
<b>Model/Series:</b>	747-400 747-400	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	23982
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	293
<b>Date/Type of Last Inspection:</b>	November 24, 1989 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	792000 lbs
<b>Time Since Last Inspection:</b>	227 Hrs	<b>Engines:</b>	4 Turbo fan
<b>Airframe Total Time:</b>	7050 Hrs	<b>Engine Manufacturer:</b>	GE
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	CF6-80C2
<b>Registered Owner:</b>	KLM ROYAL DUTCH AIRLINES	<b>Rated Power:</b>	57180 Lbs thrust
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	Flag carrier (121)
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	KRDF

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	TKA ,358 ft msl	<b>Distance from Accident Site:</b>	25 Nautical Miles
<b>Observation Time:</b>	11:50 Local	<b>Direction from Accident Site:</b>	225°
<b>Lowest Cloud Condition:</b>	Scattered / 6000 ft AGL	<b>Visibility</b>	
<b>Lowest Ceiling:</b>	Overcast / 8000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	7 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	50°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30 inches Hg	<b>Temperature/Dew Point:</b>	0°C / -4°C
<b>Precipitation and Obscuration:</b>	N/A - None - Smoke		
<b>Departure Point:</b>	AMSTERDAM (EHAM)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	ANCHORAGE (ANC)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	03:37 Local	<b>Type of Airspace:</b>	Class E

## Airport Information

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

## Wreckage and Impact Information

<b>Crew Injuries:</b>	14 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	231 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	245 None	<b>Latitude, Longitude:</b>	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.nts.gov/Docket?ProjectID=5278>

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