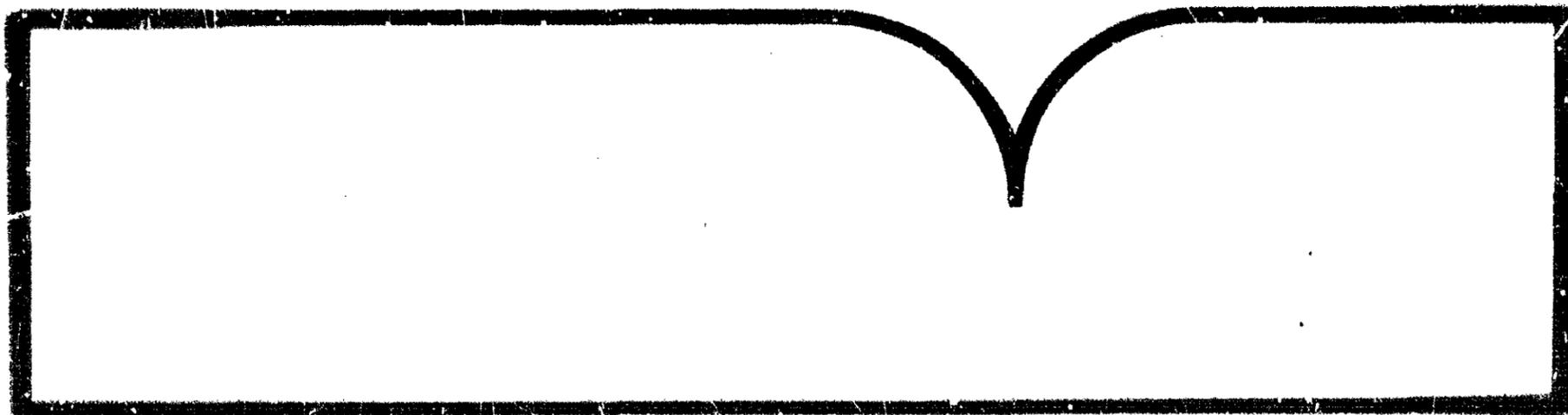


PB86-910404

Aircraft Accident/Incident Summary Reports  
Soldotna, Alaska - February 4, 1985;  
San Juan, Puerto Rico - June 27, 1985

(U.S.) National Transportation Safety Board  
Washington, DC

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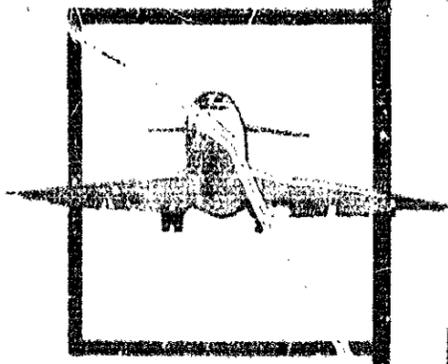


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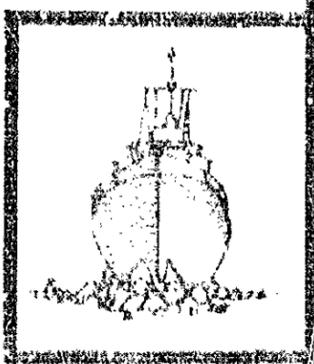
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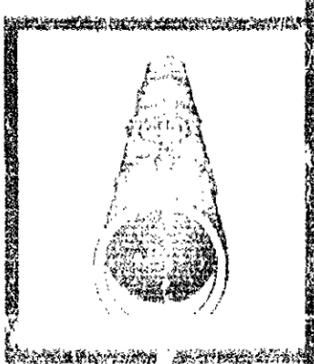
# NATIONAL TRANSPORTATION SAFETY BOARD



WASHINGTON, D.C. 20594



## AIRCRAFT ACCIDENT/INCIDENT SUMMARY REPORTS



SOLDOTNA, ALASKA -- FEBRUARY 4, 1985

SAN JUAN, PUERTO RICO -- JUNE 27, 1985



NTSB/AAR-86/01/SUM

UNITED STATES GOVERNMENT

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**National  
Transportation  
Safety Board**

Washington, D.C. 20594

## **AIRCRAFT ACCIDENT/INCIDENT SUMMARY**

File No.:	387
Aircraft Operator:	North Pacific Airlines Flight 1802
Aircraft Type and Registration:	Beechcraft BE65-A-80, "Queen Air" N50NP
Location:	Soldotna, Alaska
Date and Time:	February 4, 1985, 1951 Alaska standard time
Persons on Board:	2 flight crewmembers 7 passengers
Injuries:	9 fatal
Aircraft Damage:	Destroyed
Other Damage or Injury:	None
Type of Occurrence:	Collision with ground
Phase of Operation:	VOR approach

On February 4, 1985, at 1951, 1/ North Pacific Airlines Flight 1802, operating under 14 CFR Part 135 as a commuter airline, crashed about 1.5 miles southeast of the airport, while making the VOR 2/ Alpha approach to the Soldotna Airport, Soldotna, Alaska. The seven passengers and two flightcrew members aboard were fatally injured. The airplane was destroyed by impact and postcrash fire. The scheduled flight from Anchorage, Alaska, to Soldotna was operating on an instrument flight rules (IFR) flight plan at the time of the accident.

About 1740, an individual identifying himself as "I am on NPA 1802" contacted the preflight weather briefing controller at the Anchorage Flight Service Station (FSS) of the Federal Aviation Administration (FAA) via telephone and stated that he was departing Anchorage for Soldotna at 1800 and requested the following: an Anchorage forecast, the current Kenai, Alaska, weather, and "anything" the Anchorage FSS had for Soldotna and Homer, Alaska. The preflight weather briefing included the existing weather conditions at Kenai and Homer, a terminal forecast for Kenai, and a portion of in-flight weather advisory AIRMET Sierra 1. 3/ The AIRMET which was in effect at the time called for light to occasional moderate rime icing in clouds, precipitation below 9,000 feet, and patches of moderate clear icing in light freezing rain. There were several pilot reports (PIREPs) reporting light to moderate icing in the Anchorage area. The weather briefing was concluded at 1746.

1/ All times are in Alaska standard time and are shown using the 24-hour clock.

2/ VHF omnidirectional radio range: a very high frequency radio navigational aid.

3/ AIRMET (Airman's Meteorological Information): An in-flight weather advisory that includes weather phenomena (of less severity than that covered by Significant Meteorological Information (SIGMET)) which are potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. They are at least of operational interest to all aircraft. Specifically, they include warnings of (1) moderate icing, (2) moderate turbulence, (3) ceilings less than 1,000 feet and/or visibility less than 3 miles, (4) winds of 30 knots or more at the surface, and (5) mountains extensively obscured.

At 1839:21, flight 1802 contacted the Anchorage International Airport Air Traffic Control Tower controller advising that the current Automatic Terminal Information Service (ATIS) had been received and an IFR clearance to Soldotna was requested.

At 1839:30, the clearance delivery controller issued an IFR clearance to the flight as, "North Pacific eighteen oh two Anchorage clearance delivery cleared to the Soldotna Airport via the Anchorage Eight Departure except maintain three thousand then as filed departure frequency will be one two three point eight squawk two seven zero five. . . ." Flight 1802 acknowledged the clearance and departed Anchorage at 1849:45.

Flight 1802 flew southbound on Victor Airway 438 and had been cleared to climb to 4,000 feet. A change of flight plan was requested and approved for flight 1802 to proceed to the Skila Intersection for the NDB 4/ approach to the Soldotna Airport.

Radar service from Anchorage Center was terminated, and at 1920:27, flight 1802 reported to the Kenai FSS that it was over Skila Intersection 5/ and was starting the NDB approach to runway 25 at Soldotna Airport. Kenai FSS acknowledged the position and issued the latest weather for the airport at Kenai. At 1925:17, flight 1802 reported to Kenai FSS that it was at the NDB and inbound to Soldotna Airport.

At 1927:19, flight 1802 reported a missed approach to Kenai FSS and requested permission to make another approach. The flightcrew was instructed to contact Anchorage Center for another approach clearance. Flight 1802 contacted Anchorage Center, established radar contact, and was instructed to turn to a heading of 360° and to climb to 5,000 feet. At 1928:16, flight 1802 replied, "Anchorage Center eighteen oh two unable five thousand carrying ah heavy load of ice." The controller acknowledged the information and cleared flight 1802, "Roger, climb and maintain two thousand." Flight 1802 acknowledged the clearance and continued to accept further heading instructions from Anchorage Center.

At 1949, flight 1802 was vectored to an inbound course to the Kenai VOR from which to start the second approach to Soldotna, this time using a VOR Alpha approach. At 1949:41, flight 1802 reported a position to Kenai FSS as, "Roger, we are seven point five DME." 6/ This was the last recorded transmission between flight 1802 and any FAA air traffic facility.

Prior to the first approach, flight 1802 was required to contact the company weather observer at Soldotna in order to have current weather information, including the local altimeter setting, before making an instrument approach. About 1900, a member of the crew of flight 1802 called Soldotna on the company radio and requested winds and weather. The call was answered by an employee of North Pacific Airlines who was certified to make weather observations. According to the employee, the following Soldotna weather information was provided to flight 1802: "Winds calm, ceiling 600 to 800 feet, visibility approximately 8 to 10 miles, no precipitation." On completing the transmission, a member of the crew stated that they were 10 to 15 minutes out. At this time (about 1900), flight 1802 was about to level off at 4,000 feet after departing Anchorage.

4/ Nondirectional beacon: a navigational aid used to serve as an approach fix to the Soldotna Airport.

5/ Skila Intersection is a point located about 6 miles east of the Soldotna NDB.

6/ Distance measuring equipment.

About 1920, flight 1802 called again on the company radio and requested the Soldotna winds and altimeter setting. The call was answered by the same employee who answered the first call. Again she provided the flight with the winds and altimeter setting for Soldotna. She said there was light ground fog with 2 to 3 miles visibility and that there was no definite ceiling. According to the employee, flight 1802 was heard to make a low sweep over the airport, east to west. Shortly thereafter, a crewmember called on the company radio to say that the ceiling was approximately 600 feet.

About 1950, while on the second approach, which was the VOR Alpha approach, a crewmember called and again asked for weather.

A different employee of North Pacific Airlines, who was also certified to take weather observations, answered the call. He said he told the crew of flight 1802 that the weather was below minimums, that there was fog all the way to the ground, and to "get the hell out of there." The crew did not acknowledge the transmission.

At 1951, flight 1802 struck the ground about 1.5 miles southeast of the airport. All occupants were fatally injured.

The navigational aids used for the approach were flight-checked after the accident and were found to be operating satisfactorily.

Examination of the ground path revealed that flight 1802 struck the tops of trees about 60 feet above the ground with the left wing down. The airplane continued for 234 feet on a path oriented to 073° and in a descending path of about 15°. Parts of the airplane were torn from the airframe and were distributed along and to each side of the ground path.

The examination of both engines revealed no evidence of preimpact malfunction. The examination of both propellers showed evidence that they were at a high power condition at initial impact with the large trees. This evaluation was supported by evidence of the decreasing damage from one blade to the next in the direction of rotation, and the tip-to-hub blade twisting. The propeller blade damage shows that at the time of initial impact, the propellers were producing thrust and the initial impact was rapid and severe enough to stop both propellers almost instantly. The statement from one witness, who heard the sound of the engines and the sounds of impact, further confirms the Safety Board's conclusion that a loss of engine power did not cause or contribute to this accident.

Examination of the aircraft records disclosed no corrective action for the following maintenance discrepancies: the deice boots on two of the blades on the left propeller were missing; the "single" or manual operational mode of the anti-ice system was inoperative, although the "automatic" mode was operational; the autopilot was inoperative; the transponder altitude encoder was inoperative; and the vacuum fail light did not work. Records showed that the airplane had a recurring problem with its deice system and may have only provided for partial operation of the deicer boots because of leaks in the pneumatic system.

The Supplementary Aviation Weather Reporting Station (SAWRS) at Soldotna Airport had been certified by the National Weather Service (NWS) in March 1983. Weather observations for the Part 135 operations at Soldotna were made by employees of North Pacific Airlines, who had received NWS certification. Oversight of the SAWRS was the responsibility of the NWS and the FAA. During its investigation of the operation of the Soldotna Airport SAWRS, the Safety Board found the following:

- 1) Ceilometer light inoperative 7/;
- 2) Altimeters not calibrated since February 2, 1982;
- 3) Surface weather observations not recorded on surface weather observations form;
- 4) Last NWS inspection in March 1983;
- 5) No FAA inspection during the last 2 years;
- 6) Only one lighted marker on the visibility reference chart. (It was located less than 1/4 mile from the point of observation. Minimum visibility for landing is 1 mile.);
- 7) No NWS review of surface weather observation forms for Soldotna since March 1983;
- 8) Surface weather observations not transmitted over the normal communications system; and
- 9) Altimeter comparisons not logged on surface weather observations form.

Because of these discrepancies, on February 28, 1985, the Safety Board issued the following safety recommendations to the NWS:

Require an immediate inspection of Supplementary Aviation Weather Reporting Stations in the Alaska Region, which have not been inspected and monitored in accordance with National Weather Service Operations Manual Chapter 14, Part B, and require corrective action as necessary to bring the stations to an acceptable level of performance. (Class I, Urgent Action) (A-85-18)

Determine whether Supplementary Aviation Weather Reporting Stations outside the Alaska Region have been inspected and monitored in accordance with National Weather Service Manual, Chapter 14, Part B, and require an immediate inspection where one is overdue and corrective action as indicated. (Class II, Priority Action) (A-85-19)

As of April 4, 1985, all 19 SAWRS in Alaska had been inspected and were found to be in compliance with NWS standards. Based upon this action, Safety Recommendation A-85-18 has been classified as "Closed--Acceptable Action."

The NWS has surveyed the SAWRS outside the Alaska Region in accordance with the NWS Operations Manual. Since August 13, 1985, all of the affected SAWRS have been inspected except one, which has been closed. Based upon this action, Safety Recommendation A-85-19 has been classified as "Closed--Acceptable Action."

7/ Ceilometer is a device or apparatus for measuring the height of a cloud ceiling or determining the vertical visibility to an obstruction.

The FAA Air Carrier Operations Inspectors Handbook 8430.1D provides specific guidance for inspectors of Part 135 airlines to review the adequacy of the SAWRS facilities at airports served by the carriers. The handbook also contains a checklist to guide the inspector in his duties during base, ramp, and en route inspections. The FAA inspector is directed to bring all discrepancies noted to the attention of the NWS.

Several pilots operating in the Anchorage/Kenai area during the evening of February 4, 1985, reported moderate icing. At least two pilots, who had landed at Kenai (ENA) <sup>8/</sup> between about 1845 and 2000, reported a rate of ice accumulation of 3/4 inch per 5 minutes. None of the pilots reported any wind shear or turbulence greater than light turbulence. Between 1455 and 2049, a trace of precipitation was reported at Kenai.

AIRMET Sierra 1, issued by the NWS at 1515, was valid until 2100. The AIRMET called for light to occasional moderate rime icing in clouds and in precipitation below 9,000 feet and patches of moderate clear ice in light freezing rain. The area covered by this AIRMET included the location of the accident.

The Kenai FSS, which is located about 9 miles northwest of Soldotna, issued the following surface observations at the times shown:

1705 - Special - Measured ceiling 200 feet overcast, visibility 3/4 mile, fog, wind 030° at 05 knots, altimeter setting 30.20 inches of Hg.

1750 - Record Special - Measured ceiling 300 feet overcast, visibility 3/4 mile, light freezing drizzle, fog, temperature 26°F, dew point 24°F, wind 010° at 06 knots, altimeter setting 30.20 inches of Hg., freezing drizzle began 1747.

1855 - Record - Measured ceiling 300 feet overcast, visibility 3/4 mile, light freezing drizzle, fog, temperature 26°F, dew point 23°F, wind 020° at 05 knots, altimeter setting 30.18 inches of Hg.

1955 - Record - Measured ceiling 300 feet overcast, visibility 3/4 mile, light freezing drizzle, fog, temperature 26°F, dew point 24°F, wind 030° at 05 knots, altimeter setting 30.17 inches of Hg.

2050 - Record - Measured ceiling 300 feet overcast, visibility 3/4 mile, light freezing drizzle, fog, temperature 26°F, dew point 23°F, wind 040° at 05 knots, altimeter setting 30.17 inches of Hg.

The Safety Board believes that the airplane did accumulate airframe ice because of the weather conditions in the Anchorage/Soldotna area. The following findings were made based on the meteorological conditions that existed in the Anchorage/Soldotna area:

- 1) Based on the current definition of icing intensities, flight 1802 most likely encountered moderate mixed icing at altitudes below 3,000 feet in the area of Soldotna.
- 2) The content of in-flight weather advisory AIRMET Sierra 1 is considered substantially correct.

<sup>8/</sup> VOR call letter designation for Kenai.

- 3) Flight 1802 most likely encountered freezing precipitation in and below clouds in the area of Soldotna.
- 4) The diameter of liquid water drops probably exceeded 500 microns <sup>9/</sup> while the airplane flew through areas of precipitation in the Anchorage/Soldotna area.
- 5) The rate of ice accretions on the unheated impact areas of the airplane while in and below the clouds would have been about .15 inch per minute.
- 6) Ice probably formed aft of those surfaces not protected by the airplane's deicing equipment.
- 7) Based on previous standard icing intensities established by the National Coordinating Committee for aviation meteorology on February 25, 1964 (but no longer applicable), and on meteorological conditions that existed on the night of the accident, the airplane would have encountered heavy icing while flying in and below the clouds in the area at and near Soldotna.

The captain of N50NP had been employed by North Pacific Airlines as a captain and chief pilot since October 1981. He held an air transport pilot certificate dated June 29, 1980, for airplane, multiengine, and commercial privileges for airplane, single-engine, land and sea. He had a total of 7,288 hours flight time, of which 2,500 hours had been flown in the Beech 65 type airplane. His last proficiency check in the Beech 65 was satisfactorily completed on October 26, 1984. He held a first-class medical certificate dated September 27, 1984, with no limitations.

The first officer, who was also qualified as captain, had been employed by North Pacific Airlines since January 1985. He held an airline transport pilot certificate for airplane, multiengine and commercial privileges for airplane, single-engine, land and sea. Company records showed that he had completed a proficiency check as captain on February 2, 1985. His resume (not dated) indicated that his total pilot-in-command time was 5,801.5 hours, of which 243 hours were in multiengine airplanes. Of the 243 hours' multiengine time, 32 hours had been flown in the Beech 65 type airplane. Since he did not have 100 hours of pilot-in-command time in the Beech 65, his flights as captain were restricted to visual flight rules (VFR), single-pilot operation. The first officer held a first-class medical certificate issued February 4, 1985, with no limitations.

Autopsies performed on both pilots revealed nothing medically that could have contributed to the accident. Toxicological tests for drugs and alcohol were negative.

The Safety Board notes that after flight 1802 acknowledged its problem with ice, it continued to fly for 23 minutes without reporting any further ice problems. The Board also notes that the radar vectors given to flight 1802 placed the airplane over the Kenai VOR, from which point a precision instrument landing system (ILS) approach could have been made into Kenai. However, the flightcrew chose instead to continue with the nonprecision VOR Alpha approach to Soldotna.

<sup>9/</sup> One micron equals about .00004 inch.

The radar ground track obtained from Anchorage Center shows that the airplane's inbound course on the second approach went directly to the Soldotna Airport. Since there is no runway aligned with the inbound course, flight 1802 had to circle to land on either runway 25 or 7.

The path of the airplane after it passed over the airport from the VOR Alpha approach <sup>10/</sup> shows the flightcrew was not intending to comply with the published missed approach procedure. This procedure calls for a "climbing right turn to 3000 via heading 180° and then to intercept the 132° radial from the Kenai VOR and hold at Cabug, a point 12 DME miles from the Kenai VOR. There is an additional warning on the Soldotna VOR Alpha approach stating that "circling not authorized south of Rwy 7-25," because of a "300' hill 0.3 NM south of airport." Both crewmembers should have known these instructions and the hazard warning. Had the flightcrew intended to make a second missed approach, they would have contacted Kenai Radio for additional IFR clearance instructions as they did on the first NDB missed approach. The position of the accident site, 1.5 miles southeast of the airport, and the direction of the impact flight/ground path of 073° leads the Safety Board to believe that the flightcrew was circling left, probably while trying to maintain visual reference to the airport to land on runway 25. During this maneuver, the airplane contacted the higher terrain southeast of the airport.

The Safety Board concludes that the accident occurred when the flightcrew allowed the airplane to descend below the published minimum altitude into the higher terrain located south of the airport, while possibly trying to maintain visual contact with the airport. The weather at the airport at the time of the accident was below published minimums for the approach.

The Safety Board believes that the circumstances of this accident exemplify a lack of FAA oversight of the airline operation. The numerous maintenance problems with the airplane would have been easily detected by a ramp inspection and a review of the maintenance records. Similarly, the inadequacy of the Soldotna SAWRS, in spite of the NWS responsibilities, indicates inadequate routine FAA surveillance. The FAA should have detected and corrected these deficiencies before the accident. Several Safety Board investigations in recent years have revealed similar inadequate FAA surveillance of a commuter airline.

The attached brief of aviation accident contains the Safety Board's findings of probable cause relating to this accident.

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

/s/ JIM BURNETT  
Chairman

/s/ PATRICIA A. GOLDMAN  
Vice Chairman

/s/ JOHN K. LAUBER  
Member

April 7, 1986

<sup>10/</sup> The minimum for the circling approach from the Kenai VOR is 680 feet and 1 mile visibility.

National Transportation Safety Board  
Washington, D.C. 20594

Brief of Accident

File No. - 387      2/04/85      SOLDOTNA, AK      A/C Res. No. N50NP      Time (Lcl) - 1951 AST

-----Basic Information-----

Type Operating Certificate - COMMUTER	Aircraft Damage	Fatal	Injuries		None
Name of Carrier - NORTH PACIFIC AIRLINES	DESTROYED		Serious	Minor	
Type of Operation - SCHEDULED, DOMESTIC, PAX/CARGO	Fire	Crew	0	0	0
Flight Conducted Under - 14 CFR 135	ON GROUND	Pass	0	0	0
Accident Occurred During - APPROACH					

-----Aircraft Information-----

Make/Model - BEECH 65-AB0	Eng Make/Model - LYCOMING IO-720-A1B	ELT Installed/Activated - YES/YES
Landing Gear - TRICYCLE-RETRACTABLE	Number Engines - 2	Stall Warning System - YES
Max Gross Wt - 8800	Engine Type - RECIP-FUEL INJECTED	
No. of Seats - 10	Rated Power - 400 HP	

-----Environment/Operations Information-----

Weather Data	Itinerary	Airport Proximity
Wx Briefing - NWS	Last Departure Point	OFF AIRPORT/STRIP
Method - TELEPHONE	ANCHORAGE, AK	
Completeness - FULL	Destination	Airport Data
Basic Weather - IHC	SAME AS ACC/INC	SOLDOTNA
Wind Dir/Speed - 030/005 KTS	ATC/Airspace	Runway Ident - 25
Visibility - .750 SM	Type of Flight Plan - IFR	Runway Lth/Wid - 4973/ 130
Lowest Sky/Clouds - 300 FT	Type of Clearance - IFR	Runway Surface - MACADAM
Lowest Ceiling - 300 FT OVERCAST	Type Appch/Lnds - VOR/DME	Runway Status - SNOW - COMPACTED
Obstructions to Vision - FOG		
Precipitation - FREEZING DRIZZLE		
Condition of Light - NIGHT (DARK)		

-----Personnel Information-----

Pilot-In-Command	Age - 37	Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT
Certificate(s)/Rating(s)	Biennial Flight Review	Flight Time (Hours)
ATP	Current - YES	Total - 7288
SE LAND, ME LAND, SE SEA	Months Since - 3	Last 24 Hrs - 7
	Aircraft Type - BE-80	Last 30 Days - 96
		Last 90 Days - 255

Instrument Rating(s) - AIRPLANE

-----Narrative-----

DURING ARRIVAL, THE CREW OF NPA FLT 1802 CONTACTED THE COMPANY WX OBSERVER AT SOLDOTNA WHO ADVISED THE WX WAS: WND CALM, CEILING 600 TO 800 FT, VIS 8 TO 10 MI, NO PRECIP. THEY MADE AN NDB APCH, BUT MISSED THE APCH & REQUESTED ANOTHER APCH. APRX 1 MIN LATER, THE CREW REPORTED THE ACFT HAD ACCUMULATED A HVY LOAD OF ICE. THEY COULD HAVE DIVERTED NEARBY TO KENAI FOR AN ILS APCH, BUT ELECTED TO MAKE A VOR APCH BACK TO SOLDOTNA. WHILE BEING VECTORED, THEY MADE 2 MORE CHECKS WITH THE WX OBSERVER WHO ADVISED THE WX HAD DETERIORATED TO BELOW MINS & RECOMMENDED DIVERTING, BUT THE CREW DID NOT ACKNOWLEDGE. SUBSEQUENTLY, THE ACFT COLLIDED WITH TREES ON HI TERRAIN APRX 1.5 MI SE OF THE ARPT. THERE WAS EVIDENCE THE ACFT WAS CIRCLING WHEN IT CRASHED. CIRCLING WAS NOT AUTHORIZED SOUTH OF RWY 7/25. INV REVEALED RECURRING PRBLMS WITH THE ANTI-ICE SYS, ITS "SINGLE" MODE WAS INOP, 2 DE-ICE BOOTS WERE MISSING FM PROP BLADES. WX STATION LISTED ONLY 1 LGTD MARKER (1/4 MI AWAY) FOR VIS REF; MIN LNDRG VIS WAS 1 MI; CEILOMETER WAS INOP. NO FAA INSPN OF WX STATION IN 2 YRS. ICG FORCASTED.

Brief of Accident (Continued)

File No. - 387

2/04/85

SOLDOTNA, AK

A/C Reg. No. N50NP

Time (Lcl) - 195: AST

Occurrence #1 IN FLIGHT ENCOUNTER WITH WEATHER  
Phase of Operation APPROACH

Findings(s)

1. ANTI-ICE/DE-ICE SYSTEM - INADEQUATE
2. MAINTENANCE - INADEQUATE - COMPANY MAINTENANCE PSNL
3. INADEQUATE SURVEILLANCE OF OPERATION - FAA(ORGANIZATION)
4. OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - PERFORMED - PILOT IN COMMAND
5. OTHER AIRPORT/RUNWAY MAINTENANCE - NOT MAINTAINED - COMPANY/OPERATOR MGMT
6. INADEQUATE SURVEILLANCE OF OPERATION - FAA(ORGANIZATION)
7. METEOROLOGICAL SERVICE - INADEQUATE - COMPANY/OPERATOR MGMT
8. INADEQUATE SURVEILLANCE OF OPERATION - FAA(ORGANIZATION)
9. WEATHER CONDITION - LOW CEILING
10. WEATHER CONDITION - FOG
11. WEATHER CONDITION - RAIN
12. WEATHER CONDITION - ICING CONDITIONS
13. FLIGHT INTO KNOWN ADVERSE WEATHER - PERFORMED - PILOT IN COMMAND
14. WING - ICE
15. WEATHER CONDITION - BELOW APPROACH MINIMUMS
16. MISSED APPROACH - INITIATED - PILOT IN COMMAND
17. FLIGHT TO ALTERNATE DESTINATION - NOT PERFORMED - PILOT IN COMMAND

Occurrence #2 IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation APPROACH - CIRCLING(IFR)

Findings(s)

18. IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
19. MISSED APPROACH - IMPROPER - PILOT IN COMMAND
20. TERRAIN CONDITION - HIGH TERRAIN
21. MINIMUM DESCENT ALTITUDE - NOT MAINTAINED - PILOT IN COMMAND
22. OBJECT - TREE(S)

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are finding(s) 18;19;21

Factor(s) relating to this accident is/are finding(s) 1;2;3;4;5;6;7;8;9;10;11;12;13;14;15;17;20;22



**National  
Transportation  
Safety Board**

Washington, D.C. 20594

## AIRCRAFT ACCIDENT/INCIDENT SUMMARY

File No.:	DCA 85-AA-027
Aircraft Operator:	American Airlines, Inc.
Aircraft Type:	McDonnell Douglas DC-10-10
Aircraft Registration:	N129AA
Location:	Luis Munoz Marin International Airport
Date:	June 27, 1985
Time:	1136 Atlantic standard time
Occupants on Board:	270
Injuries:	32
Aircraft Damage:	Substantial
Other Damage or Injury:	Runway Lighting
First Occurrence:	Tire Failure
Phase of Operation:	Takeoff
Second Occurrence:	Overrun
Phase of Operation:	Takeoff (Abort)

On June 27, 1985, an American Airlines, Inc., DC-10-10, N129AA, operating as Flight 633, was a regularly scheduled passenger flight from St. Maarten, Netherland Antilles, to the Dallas-Ft. Worth International Airport, Dallas, Texas, with an intermediate stop at the Luis Munoz Marin International Airport, San Juan, Puerto Rico. The flight departed St. Maarten at 0913 hours for the 33-minute flight to San Juan. The aircraft landed at 0949 hours and arrived at gate 20 at the International Building at 0953 hours to clear immigration procedures. Later, the aircraft was towed to gate 15 to board passengers for the final portion of the flight.

At 1119, American 633 was pushed back onto the north-south taxiway facing south. Takeoff gross weight was 396,000 pounds, including 95,700 pounds of jet A fuel. There were 257 passengers and 13 crewmembers aboard. Because of the direction the aircraft was pushed back, the captain had to taxi the aircraft to the south into the general aviation parking area, make a right 180° turn, and proceed northerly on the north-south taxiway. Flight 633 then turned left onto taxiway Sierra and taxied approximately 4,000 feet to the assigned departure runway (runway 08).

Before reaching the runway, the first officer radioed the tower that American 633 was ready for takeoff. The tower controller cleared American 633 for takeoff at 1133 hours. The wind was reported as 160° at 11 knots, with gusts to 22 knots. The first officer made a "rolling" takeoff, with the captain adjusting the throttles for a maximum power takeoff. The takeoff data card listed V1, VR, and V2 as 141, 147, and 158 knots, respectively.

The flightcrew stated that the takeoff roll appeared normal until about 120 KIAS, <sup>1/</sup>at which time, there was a loud "rumbling" sound, which increased rapidly and a vibration which began shaking the airplane in a manner that neither pilot could read the instruments. The captain stated that he rejected the takeoff by closing the throttles and firmly pushing the column forward, that he used full braking and full reverse thrust,

<sup>1/</sup> Knots Indicated Airspeed (KIAS).

and that the spoilers automatically deployed. The captain also stated that the antiskid was armed and appeared to have functioned properly. The first officer stated that, except for calling the tower to report the aborted takeoff, his hands and feet were off the controls and that he "monitored" the aircraft's deceleration.

The flight crew stated that they initially felt that sufficient runway remained to bring the aircraft to a stop. However, as the aircraft proceeded down the runway, the flight crew stated that deceleration began "flattening out" and that it became increasingly apparent that the aircraft would not be able to stop on the runway. Specifically, the captain stated that it appeared that the brakes were "fading," particularly on the right side.

The tower controller, who was working as the cab coordinator, stated that he saw smoke coming from the right main landing gear and that the aircraft appeared to be aborting the takeoff. He said he called out "633's aborting" to the ground and local controllers and that he called the airport and crash/fire/rescue (CFR) unit and the Puerto Rico Air National Guard (PRANG) before the aircraft departed the runway. All three controllers stated that the amount of smoke coming from the main landing gear area increased as the aircraft proceeded down the runway. They said they realized that American 633 would not be able to stop on the remaining runway. Additionally, the three controllers stated that they saw a momentary flash of fire in the left main landing gear area immediately before the airplane turned left and off the runway.

The captain stated that, when he realized that he would not be able to stop the aircraft on the runway, his thoughts centered on the safety of his passengers and crew. Because the area to the left of the runway appeared to offer the safest area to stop, the captain directed the aircraft into that area. Just before stopping, the nose of the aircraft dropped into a tidal lagoon. The airplane came to rest on a magnetic heading of 040°, about 62 feet past the departure end of runway 08 and about 160 feet to the left of the extended runway centerline. The forward fuselage, nose landing gear, both main landing gears, No. 3 engine, and part of the right wing were partially submerged in the La Torrecialla Lagoon. At the time, the weather was: 3,000 feet scattered, visibility--10 miles; temperature--92° F; dew point--66° F; wind--160° at 8 knots; altimeter--30.05 inches Hg.

Runway 08 is grooved and was dry at the time of the accident. Additionally, the runway did not appear to have any rubber deposit buildup in the grooves.

The only serious impact-induced injury was sustained by the flight engineer, who was leaning forward from his seat and was grasping the spoiler handle when the airplane's nose gear struck the REIL 2/ support system. This resulted in a fracture of his thoracic spine.

No passenger, flight attendant, or cockpit crewseats were damaged, nor was there any sign of disruption to the cockpit or cabin floors. The galleys remained intact.

A Puerto Rico Air National Guard (PRANG) security officer was on patrol and saw smoke coming from the airplane's landing gear. He immediately notified his base station. Eight persons from the PRANG CFR units were on scene about 1 minute after the airplane stopped. Four of the eight PRANG responders were firefighters, and they applied aqueous film forming foam (AFFF) to the left main landing gear and to the left engine. A small grass fire developed at the edge of the runway but did not progress toward the aircraft. The fire also was extinguished with AFFF. The four remaining PRANG personnel assisted with the evacuation of passengers and crewmembers.

2/ REIL--Runway End Identifier Light.

The airport emergency plan was implemented by the airport operations center immediately upon notification of the accident from the control tower.

The airport CFE units reported that they were on scene about 93 seconds after notification; however, a postaccident trial response by the same CFR trucks took 135 seconds. PRANG and airport CFR personnel stated that, although the response to the scene was without incident, their firefighting and rescue vehicles had to approach the scene cautiously because of the large number of people around the aircraft.

One deficiency noted with the CFR response was the breakdown in the timely notification of the area hospitals. Civil Defense was notified by the airport operations staff approximately 11 minutes after the accident. This shortcoming also was identified in a December 1980 airport emergency exercise. Apparently, no provisions had been made by airport personnel to correct this problem in the subsequent 4 years. In 1985, following its annual certification inspection of the airport, the Federal Aviation Administration (FAA) gave written notification to the airport manager that an exercise of the emergency plan was overdue. Although 14 CFR 139 does not require a test of an airport's emergency plan, the FAA recommends that the plan be tested periodically. In the case of the Luis Munoz Marin International Airport, the FAA airport inspector stated that 4 plus years was too long since the last exercise.

Passengers and flight attendants agreed that the final "stop" was not severe and that it caused no discomfort or serious injuries. However, oxygen compartment doors opened and dislodged a ceiling panel in the forward cabin service center.

The flight attendants initiated an emergency evacuation, and four of the eight cabin exits were used during the evacuation. Complete evacuation took about 120 seconds; there was some confusion because four exits were not usable. Also, because only two flight attendants spoke Spanish, the Spanish-speaking passengers became somewhat confused when they had to be directed away from the unusable exits.

Flight attendants repeatedly told passengers to leave their personal belongings behind. Despite these warnings, several passengers insisted on carrying purses, duty-free liquor bottles, garment bags, and small packages.

The four exits that were not used were:

L-1-- The slide pack had to be kicked out the exit, and as it inflated, it became stuck in trees and turned on its side.

R-1-- Submerged by water.

L-3-- The slide pack did not slide onto the wing due to the up angle of the left wing. The flight attendant did not manually inflate the slide because of the closeness of trees.

R-4-- The flight attendant probably disarmed the door from habit and opened it in the electrical mode. Shut down of electrical power rendered the door unusable.

The nose down-right wing down attitude of the airplane caused the L-1 and L-3 slides not to deploy. The at rest attitude of the airplane exceeded the "crash landing" attitude to which the DC-10's emergency evacuation slides had been certified, i.e., one main gear retracted and the other main gear and nose gear extended.

Company records indicated that the flightcrew members were properly certificated and qualified and had received the required training and off-duty time prescribed by Federal regulations. There was no evidence of preexisting psychological or physiological problems that might have adversely affected their performance.

Examination of the aircraft's records revealed that the aircraft was certificated, equipped, and maintained in accordance with approved procedures and Federal regulations. No discrepancies were noted in the aircraft's flight logs. A review of the dispatch documentation indicated that the aircraft was loaded within its prescribed weight and balance limits.

A postaccident examination of the airplane revealed that the No. 7 tire had failed and that due to the increased load on its companion tire, the No. 8 tire also failed about 800 feet from the runway's end. All of the left and right main landing gear tires and brakes, antiskid wheel speed transducers, tire pieces, and the right main landing gear truck were retained for examination. With the exception of the failure of the Nos. 7 and 8 tires, all systems and components were functioning normally throughout the abort procedure.

An inspection of the engines and confirmation by digital flight data recorder (DFDR) data indicated that all three engines operated normally throughout the abort. All three thrust reversers were deployed, and DFDR data indicated that maximum reverse thrust was achieved during the abort. The No. 1 engine showed evidence of water ingestion at high power.

A focal point of the investigation centered on the sequence of events that led to the failure of the No. 7 tire, which then caused the No. 8 tire to fail from overload. American's preflight procedures require tire inspection at the gate by the flight engineer. All tires on the DC-10 are equipped with pressure gauges which permit a visual check for proper inflation. According to the flight engineer, he accomplished the tire inflation check before the airplane was pushed back onto the north-south taxiway, and all tires indicated normal pressure.

Because the aircraft was pushed back in the wrong direction, and subsequently had to make a tight 180° turn to taxi to the departure runway, a ramp inspection was made to determine if this action was causal. Tire marks could not be found in the ramp area that could be related to the No. 7 tire. In addition, the failure mode of the tire was not indicative of a failure from a tight turn, i.e., broken tire beads. A later examination of the tire at the B.F. Goodrich and the Transportation Systems Center facilities indicated that the probable cause of failure of the No. 7 tire was low inflation pressure. Measurements of the No. 7 tire track, first visible at the intersection of taxiway Sierra and the north-south taxiway, about 1,500 feet from the gate, indicated an increasing tire track width as the aircraft progressed. This finding suggests decreasing inflation pressure during taxi and takeoff.

A hole, 0.2 inch in diameter, was found in a piece of tire carcass from the No. 7 tire. Sectioning of the hole produced information that rubber was vulcanized into the hole. The presence of cured rubber in the hole suggests that it had been in the tire since

its last retreading in January 1985. Based on discussions with Goodrich, Safety Board investigators determined that the plug used to repair the hole was consistent with the practice of the repair station which last retreaded the tire. The repair procedure represents accepted practices within the industry, and the repair station was FAA-certificated. The repair was thus an authorized repair, and no evidence exists that the repair contributed to the failure of the No. 7 tire. FAA Advisory Circular AC 145-4 permits repairs to the cord structure, provided not more than 40 percent of the plies are affected. Only 6 of the 24 actual plies of this tire were observed to have this hole.

The Safety Board believes that the aircraft's No. 7 tire picked up a foreign object that penetrated the carcass. The penetration could have occurred very early in the pushback/taxi-out sequence, or quite possibly before the airplane arrived at the gate. After the airplane was pushed back from gate 15, the object either dislodged from the tire, or shifted its position, causing a rapid air loss. Data from B.F. Goodrich indicates that an unloaded, pressurized 50x20-20 tire at ambient temperature will lose gauge pressure from 205 to 72 psi in about 6 minutes when allowing air to escape through a .09-inch-diameter hole.

Another focal point of the investigation centered on the flightcrew's response to the catastrophic tire failure 4,900 feet down the runway. A correlation between the cockpit voice recorder (CVR) and the DFDR indicated that the flightcrew aborted the takeoff almost concurrent with the "V1" callout. The Safety Board believes that, given the severity of the vibration, as heard on the CVR, and its unknown source, the flightcrew responded properly by aborting the takeoff.

Theoretically, the aircraft should have been able to stop on the remaining runway. DFDR data indicates that the captain's application of full reverse thrust and full wheel braking was accomplished within 2 to 3 seconds. However, the failure of the Nos. 7 and 8 tires decreased the available braking capability and hindered the flightcrew's effort to stop the aircraft on the remaining runway.

See attached brief for findings, probable cause, and factors.

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

/s/ PATRICIA A. GOLDMAN  
Acting Chairman

/s/ JIM BURNETT  
Member

/s/ JOHN K. LAUBER  
Member

/s/ JOSEPH T. NALL  
Member

June 27, 1986

National Transportation Safety Board  
Washington, D.C. 20594

Brief of Accident

File No - 2420      6/27/85      SAN JUAN, PR      A/C Reg. No. N129AA      Time (Lcl) - 1136 AST

-----Basic Information-----

Type Operating Certificate	-AIR CARRIER - FLAG/DOMESTIC	Aircraft Damage	Injuries			
Name of Carrier	-AMERICAN AIRLINES, INC.	Substantial	Fatal	Serious	Minor	None
Type of Operation	-SCHEDULED, INTL, PASSENGER	Fire	Crew	1	1	11
Flight Conducted Under	-14 CFR 121	NONE	Pass	2	28	227
Accident Occurred During	-TAKEOFF					

-----Aircraft Information-----

Make/Model	- MCDONNELL DOUGLAS DC-10-10	Eng Make/Model	- GE CF6	ELT Installed/Activated	- NO -N/A
Landing Gear	- TRICYCLE-RETRACTABLE	Number Engines	- 3	Stall Warning System	- YES
Max Gross Wt	- 430000	Engine Type	- TURBOFAN		
No. of Seats	- 345	Rated Power	- 45000 LBS THRUST		

-----Environment/Operations Information-----

<b>Weather Data</b>	<b>Itinerary</b>	<b>Airport Proximity</b>
Wx Briefing - COMPANY	Last Departure Point - SAME AS ACC/INC	ON AIRPORT
Method - TELETYPE	Destination - DALLAS/FT WORTH, TX	<b>Airport Data</b>
Completeness - FULL	<b>ATC/Airspace</b>	LUIS MUNOZ MARIN INT'L
Basic Weather - VMC	Type of Flight Plan - IFR	Runway Ident - 08
Wind Dir/Speed - 160/008 KTS	Type of Clearance - IFR	Runway Lth/Wid - 10002/ 200
Visibility - 10.0 SK	Type Apch/Lnds - NONE	Runway Surface - ASPHALT
Lowest Sky/Clouds - 3000 FT SCATTERED		Runway Status - DRY
Lowest Ceiling - NONE		
Obstructions to Vision - NONE		
Precipitation - NONE		
Condition of Light - DAYLIGHT		

-----Personnel Information-----

<b>Pilot-In-Command</b>	<b>Age - 55</b>	<b>Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT</b>
<b>Certificate(s)/Rating(s)</b>	<b>Biennial Flight Review</b>	<b>Flight Time (Hours)</b>
ATP, CFI	Current - YES	Total - 19000
ME LAND	Months Since - 6	Make/Model - 215
	Aircraft Type - DC-10	Instrument - UNK/NR
		Multi-Eng - UNK/NR
		Last 24 Hrs - 6
		Last 30 Days - UNK/NR
		Last 90 Days - 180
		Rotorcraft - UNK/NR

Instrument Rating(s) - AIRPLANE

-----Narrative-----

AFTER LANDING AT SAN JUAN, THE ACFT WAS PARKED AT THE CUSTOMS AREA, THEN WAS TOWED TO GATE 15 & LOADED FOR THE NEXT FLT. THE PUSH-BACK WAS SUCH THAT THE CREW HAD TO TAXI TO THE GEN AVN PARKING AREA & TURN AROUND BFR PROCEEDING TO RWY 8 FOR DEPARTURE. WHEN CLEARED FOR TAKEOFF, THE WND WAS FROM 160 DEG AT 11 GUSTING 22 KTS. AT APRX 120 KTS ON THE TAKEOFF ROLL, A LOUD RUMBLING SOUND OCCURRED WHICH INCREASED RAPIDLY, THEN THE ACFT BEGAN TO VIBRATE. AT APRX THE V1 SPD OF 141 KTS, THE CAPT REJECTED THE TAKEOFF USING MAX BRAKING. UNABLE TO STOP ON THE REMAINING RWY, HE ANGLED THE ACFT TO THE SAFEST AREA. THE FLT ENGR'S BACK WAS INJURED AS THE ACFT HIT THE REIL SYS. THE ACFT STOPPED WITH ITS NOSE IN A LAGOON. DUE TO TREES, WTR, ACFT ATTITUDE & ONE ACCIDENTAL DISARMING, ONLY 4 OF 8 EMERG SLIDES WERE USED. A LAB ANALYSIS INDICATED THAT THE #7 TIRE HAD FAILED DUE TO LOW INFLATION, MOST LIKELY FROM FOD. DURING THE ABORT, ITS COMPANION TIRE FAILED FROM OVERLOAD. BLACK MARKS ON THE TAXIWAY REVEALED THE #7 TIRE STARTED LOSING PRESSURE WHILE THE ACFT WAS TAXIING.

Brief of Accident (Continued)

File No. - 2420

6/27/85

SAN JUAN, PR

A/C Reg. No. N129AA

Time (Lcl) - 1136 AST

Occurrence #1 AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION  
Phase of Operation TAKEOFF - GROUND RUN

Findings(s)

1. LANDING GEAR, TIRE - FOREIGN OBJECT
2. LANDING GEAR, TIRE - LEAK
3. LANDING GEAR, TIRE - FAILURE, TOTAL

Occurrence #2 OVERRUN  
Phase of Operation TAKEOFF

Findings(s)

4. ABORTED TAKEOFF - PERFORMED - PILOT IN COMMAND

Occurrence #3 ON GROUND COLLISION WITH OBJECT  
Phase of Operation OTHER

Findings(s)

5. OBJECT - APPROACH LIGHT/NAVAID

Occurrence #4 ON GROUND COLLISION WITH TERRAIN  
Phase of Operation OTHER

6. TERRAIN CONDITION - ROUGH/UNEVEN
7. TERRAIN CONDITION - WATER, ROUGH
8. MISC EQPT/FURNISHINGS, SLIDES - OTHER
9. EMERGENCY EQUIPMENT - INADVERTENT DEACTIVATION - FLIGHT ATTENDANT
10. OBJECT - TREE(S)
11. MISC EQPT/FURNISHINGS, SLIDES - MOVEMENT RESTRICTED

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are findings 1, 2, 3

Factor(s) relating to this accident is/are findings 5, 6, 7