



National Transportation Safety Board Aviation Incident Final Report

Location:	Boise, ID	Incident Number:	SEA02IA044
Date & Time:	03/01/2002, 1840 MST	Registration:	N410QX
Aircraft:	Bombardier DHC-8-401	Aircraft Damage:	None
Defining Event:		Injuries:	73 None
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Analysis

During en route cruise, there was a failure of a number two system elevator hydraulic line. This resulted in a loss of hydraulic fluid and loss of pressurization in the number two system. The loss of this system resulted in the rudder being dependent upon the sole remaining activation system (hydraulic system number one) for its operation. After the landing gear was lowered manually, the aircraft landed without further incident, but because the loss of the number two system rendered the nose wheel steering inoperative, the aircraft had to be towed from the runway. The reason for the failure of the hydraulic line could not be positively determined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The partial failure of one of the number two hydraulic system elevator hydraulic lines, leading to the loss of fluid and pressure in that system during cruise flight. This loss resulted in reliance upon the sole remaining activation system (number one hydraulic) to operate the rudder.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE - NORMAL

Findings

1. (C) HYDRAULIC SYSTEM,LINE - FAILURE,PARTIAL
2. (C) FLUID,HYDRAULIC - STARVATION
3. (C) HYDRAULIC SYSTEM - INOPERATIVE

Factual Information

On March 1, 2002, approximately 1840 mountain standard time, a Horizon Airlines Bombardier DHC-8-401, N410QX, experienced a failure of the number two hydraulic system during en route cruise to Boise, Idaho. The airline transport pilot, his first officer, the two flight attendants, and the 69 passengers were not injured, and the aircraft did not sustain any damage. The 14 CFR Part 121 scheduled passenger flight, which departed Seattle-Tacoma International Airport, Seattle, Washington, about two hours earlier, was being operated in visual meteorological conditions. The flight, which was on an IFR flight plan, eventually landed at its destination around 1900. There was no emergency evacuation.

According to the flight crew, during en route cruise, they noticed the number two hydraulic system quantity beginning to decrease. As they began to run the appropriate checklist, they noticed the illumination of several hydraulic system caution lights. Eventually, the number two system lost pressurization, and the rudder became dependent upon the sole remaining system (hydraulic system number one) for its movement. After the landing gear was extended manually, the aircraft landed without further incident, but it had to be towed from the runway, as the failure of the number two system rendered the nose wheel steering inoperable.

It was later discovered that the number two system hydraulic line to the elevator had failed, leading to a loss of pressure in the number two system. The reason for the failure could not be positively determined.

Pilot Information

Certificate:	Airline Transport	Age:	49, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	Glider	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--w/ waivers/lim.	Last FAA Medical Exam:	10/19/2001
Occupational Pilot:		Last Flight Review or Equivalent:	01/17/2002
Flight Time:	16000 hours (Total, all aircraft), 50 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bombardier	Registration:	N410QX
Model/Series:	DHC-8-401	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	4053
Landing Gear Type:	Retractable - Tricycle	Seats:	74
Date/Type of Last Inspection:	01/02/2002, Continuous Airworthiness	Certified Max Gross Wt.:	64500 lbs
Time Since Last Inspection:	349 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	726 Hours at time of accident	Engine Manufacturer:	P&W
ELT:	Not installed	Engine Model/Series:	PW150A
Registered Owner:	Wells Fargo Bank NW, NA	Rated Power:	5071 hp
Operator:	Horizon Airlines	Operating Certificate(s) Held:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	QXEA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:		Distance from Accident Site:	
Observation Time:		Direction from Accident Site:	
Lowest Cloud Condition:	Scattered / 4500 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	Light and Variable /	Turbulence Type Forecast/Actual:	/
Wind Direction:	Variable	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	11 °C
Precipitation and Obscuration:			
Departure Point:	Seattle, WA (SEA)	Type of Flight Plan Filed:	IFR
Destination:	Boise, ID (BOI)	Type of Clearance:	IFR
Departure Time:	1640 PST	Type of Airspace:	Class B

Wreckage and Impact Information

Crew Injuries:	4 None	Aircraft Damage:	None
Passenger Injuries:	69 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	73 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC): Orrin K Anderson **Report Date:** 06/03/2002

Additional Participating Persons: Terry Bateman; Boise FSDO

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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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).