



National Transportation Safety Board Aviation Accident Final Report

Location:	NEWTON, WV	Accident Number:	IAD98FA027
Date & Time:	02/16/1998, 0936 EST	Registration:	N5WU
Aircraft:	Beech C-90	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal

Flight Conducted Under: Part 91: General Aviation - Positioning

Analysis

The airplane was flown from Morgantown to Charleston to drop off passengers. Once there, the pilot called the mechanic who was scheduled to replace the right transfer pump, and told him the right boost pump was also inoperative. The mechanic told the pilot, he would replace both pumps the next morning in Charleston. Adding that de-fueling the airplane would take longer than changing the pumps. The mechanic recalled that the pilot was concerned about the amount of time necessary for the repair. The airplane was then repositioned back to Morgantown for another flight the next day to Charleston. The morning of the accident, the airplane departed Morgantown, and was being vectored for the ILS approach to Charleston when the copilot declared an emergency. He then announced that they had 'a dual engine failure, two souls onboard and zero fuel.' Examination of the wreckage and both engines revealed no pre-impact failures or malfunctions. With the right transfer pump inoperative, 28 gallons of fuel in the right wing would be unusable. In addition, the flight manual states that 'both boost pumps must be operable prior to take-off.'

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot inadequate management of the fuel system which resulted in fuel starvation to both engines. Factors in the accident were the pilot's concern about maintenance being completed prior to executing a scheduled flight later in the day, and operating the airplane with known deficiencies.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL

Phase of Operation: DESCENT

Findings

1. (C) FLUID,FUEL - STARVATION
 2. (C) FUEL MANAGEMENT - INADEQUATE - PILOT IN COMMAND
 3. (F) PRESSURE INDUCED BY CONDITIONS/EVENTS - PILOT IN COMMAND
 4. (F) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - INTENTIONAL - PILOT IN COMMAND
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Occurrence #2: FORCED LANDING

Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - EMERGENCY

Findings

5. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On February 16, 1998, at 0936 eastern standard time, a Beech C-90, N5WU, was destroyed when it collided with terrain 22 miles from the Yeager Airport, Charleston, West Virginia, while attempting an off airport land. The certificated commercial pilot, and the certificated commercial copilot were fatally injured. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the positioning flight conducted under 14 CFR Part 91. The airplane was owned and operated by the University of West Virginia Foundation, and departed the Morgantown Municipal Airport, Morgantown, West Virginia, approximately 0905.

On February 15, 1998, the airplane was flown from Morgantown to Charleston to drop off passengers for an upcoming sports event. Once there, the pilot called the mechanic who was scheduled to replace the right transfer pump. According to the mechanic, the pilot stated, "You are not going to believe this, but my right boost pump has gone out, too." The pilot inquired if a new boost pump could be obtained along with the transfer pump. The mechanic told the pilot that he could obtain a new boost pump, and would replace both pumps the next morning in Charleston. The mechanic then told the pilot that de-fueling the airplane would take longer than changing the pumps. The pilot responded by saying he would run the fuel tank down so the mechanic could complete the repairs. The mechanic recalled that the pilot was concerned about the amount of time necessary for the repair, since they were scheduled to fly the passengers back to Morgantown the next day. That night, the pilot and copilot returned to Morgantown because they were scheduled to fly another passenger to Charleston the next day.

After arriving in Morgantown, the pilot decided to change the departure time, in order to arrive at Charleston the next morning instead of afternoon. Because of the change in time, the passenger scheduled to fly from Morgantown to Charleston decided not to go, leaving just the pilot and copilot.

The morning of the accident, the airplane departed Morgantown, and was being vectored for the ILS approach to Charleston when the copilot declared an emergency. When asked by the controller the nature of the emergency, the number of souls and amount of fuel onboard, the copilot cited "a dual engine failure, two souls onboard and zero fuel."

A witness near the accident site reported hearing the airplane approach and watching it "descended through the fog and drizzle, banked steeply to the right and dropped suddenly to the ground."

The accident happened during the hours of daylight. The wreckage was located 38 degrees, 36.2 minutes north latitude, 81 degrees, 12.2 minutes west longitude, and 830 feet elevation.

PILOT INFORMATION

The pilot held a commercial pilot certificate with ratings for airplane single engine land, single engine sea, multi engine land, and instrument. His last first class medical certificate was dated April 22, 1997. According to the NTSB Pilot/Operator Report of Aircraft Accident form, the pilot had logged a total of 12,542 hours of flight experience in the accident airplane's make

and model as of July 8, 1997. His last biennial flight review was January 27, 1997, in the accident airplane's make and model.

The copilot held a commercial pilot certificate with ratings for airplane single engine land, multi engine land, and instrument. His last first class medical certificate was dated February 11, 1998. According to the NTSB Pilot/Operator Report of Aircraft Accident Form, the copilot had logged a total of 5,914 hours of flight experience as of July 10, 1997. His last biennial flight review was April 21, 1997, in the accident airplane's make and model.

METEOROLOGICAL CONDITIONS

At 0935, Charleston reported wind 080 at 7 knots, 5 miles visibility in mist, few clouds at 1,800 feet, ceiling 2,800 feet broken, 4,500 feet overcast, temperature 4 degrees Fahrenheit, dewpoint 3 degree Fahrenheit, and altimeter 30.12 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The wreckage was examined the day of the accident at the accident site. The airplane came to rest on a magnetic bearing of 020 degrees partially in a creek surrounded by woods. Approximately 40 feet above the site were broken power lines.

The wreckage was divided into five main areas: cockpit, cabin, empennage, right wing, and left wing. The cockpit area was destroyed. The cabin section of the fuselage was intact and recognizable. The empennage had separated aft of the pressure bulkhead. It was identifiable, and the right horizontal stabilizer, the left horizontal stabilizer, and the vertical stabilizer were attached. The right wing was partially separated from the fuselage, and the right engine was partially separated from its mounts. The right propeller hub, with blades, had separated from the engine, and was buried. Damage to the left wing was similar to the right. The left wing was also partially separated from the fuselage. The left engine had separated from its mounts, and the left propeller hub, with blades, had separated from the engine. All control surfaces were accounted for, and no flight control pre-impact failures or malfunctions were identified.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was preformed on the pilot and copilot on February 17, 1998, at the Medical Examiners Office in South Charleston, West Virginia.

A toxicological test was performed on the pilot and copilot by the Federal Aviation Administrations Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma.

TEST AND RESEARCH

On March 9, 1998, the Safety Board's Materials Laboratory examined light bulbs from the right hand ignition annunciator, right hand fuel pressure annunciator, and the crossfeed valve annunciator. The right fuel pressure annunciator, and the right hand ignition annunciator, contained a total of four lamps. Three of the lamps contained broken filaments, and one lamp contained an intact filament. "The fracture features of the broken filaments were indicative of a cold break." One of the lamps from the crossfeed annunciator exhibited "severe elongation." A second lamp from the crossfeed annunciator "was also elongated, but to a lesser degree." In addition, both filaments were intact and attached to their support post.

On February 27, 1998, under the supervision of a FAA Inspector, at South Bend Controls Inc. in South Bend Indiana, the crossfeed valve was examined. During the examination no pre-impact failures or malfunctions were identified.

On March 11, 1998, under the supervision of a FAA Inspector, at the Airborne Division of Parker Hannifin Corporation in Elyria, Ohio, the fuel transfer pumps were tested. Both pumps produced pressure when power was applied. No internal examination was preformed.

On March 11, 1998, under the supervision of a FAA Inspector at the Airborne Division of Parker Hannifin Corporation in Elyria, Ohio, the fuel boost pumps were examined. Impact damage prevented the pumps from being tested, and an internal examination was inconclusive.

On August 14, 1998, under the supervision of a FAA Inspector at Hartzell in Piqua, Ohio, both propellers were examined. During the examination no pre-impact failures or malfunctions were identified.

On April 12, 1999, under the supervision of a representative of the Transportation Safety Board Canada, both engines were examined at Pratt & Whitney in Longueuil, Quebec, Canada. During the examination, no pre-impact failures or malfunctions were identified.

On April 13, 1999, under the supervision of a representative of the Transportation Safety Board Canada, the fuel control, engine drive fuel pump, and propeller governor for both engines were examined at Pratt & Whitney in Longueuil, Quebec, Canada. During the examination, no pre-impact failures or malfunctions were identified.

ADDITIONAL INFORMATION

Company flight logs that were signed by both the Captain and First Officer were reviewed. Log number 3431 dated February 10, 1997, showed the day ending with 1,750 pound of fuel onboard the airplane. Log number 3432 dated February 12, 1998, showed 1,750 pounds at the end of the day. Log number 3433 dated February 13, 1998, showed 1,150 pounds at the completion of the day. Log number 3434 dated February 15, 1998, showed 1,000 pounds at the conclusion of the day. Log number 3435 showed 1,000 pounds onboard at the start of the day.

From February 12 to 16, 1998, fuel was obtained on three different occasions, twice from the same vendor in Morgantown, and once from a vendor in Charleston. In Morgantown, invoice number 25670, date February 12, 1998, reflects that the airplane was topped-off with 296 gallons of Jet-A, about 1200. Also in Morgantown, invoice number 25671, dated February 13, 1998, reflected that the right engine nacelle fuel tank was topped-off with 42 gallons of Jet-A sometime during the evening. In Charleston, invoice number 009752, dated February 15, 1998, shows that the airplane's left wing fuel tank was serviced with 75 gallons of Jet-A.

Fuel receipts corresponded with company flight logs except for the receipt from Morgantown dated February 13, 1998. The receipt stated that the airplane's right engine nacelle fuel tank was serviced with 42 gallons of fuel, but no entry was found on the flight log to reflect the addition in fuel.

According to supplemental operational data in the airplane flight manual, "If the transfer pump fails to operate during flight, gravity feed will take over its work. When the main tank level drops to approximately 3/8 full, the gravity feed port in the main tank opens and gravity flow from the wing tank starts. All wing fuel except 28 gallons from each wing will transfer during gravity feed." In addition, the flight manual states that both boost pumps must be operable prior to take-off.

A note for a boost pump failure in the emergency procedure section of the flight manual states, "With crossfeed in AUTO, a boost pump failure will be denoted only by the illumination of the FUEL CROSSFEED light."

On February 19, 1998 a portion of the wreckage was released to the owners representative. On May 28, 1998, the remainder of the wreckage was released minus the engines, propellers, three light bulbs, and a Hobbs Meter. On September 15, 1999, those items were released for the owners representative to claim.

Pilot Information

Certificate:	Commercial	Age:	60, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	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:	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	04/23/1997
Occupational Pilot:	Last Flight Review or Equivalent:		
Flight Time:	12700 hours (Total, all aircraft), 6155 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N5WU
Model/Series:	C-90 C-90	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	LJ-635
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	12/12/1997, Continuous Airworthiness	Certified Max Gross Wt.:	9650 lbs
Time Since Last Inspection:	48 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	7523 Hours	Engine Manufacturer:	P&W
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	PT6A-20A
Registered Owner:	WV UNIVERSITY FOUNDATION	Rated Power:	550 lbs
Operator:	WV UNIVERSITY FOUNDATION	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	CRW, 982 ft msl	Distance from Accident Site:	22 Nautical Miles
Observation Time:	0935 EST	Direction from Accident Site:	230°
Lowest Cloud Condition:	Scattered / 1800 ft agl	Visibility	5 Miles
Lowest Ceiling:	Broken / 2800 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	90°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	4° C / 3° C
Precipitation and Obscuration:			
Departure Point:	MORGANTOWN, WV (MGW)	Type of Flight Plan Filed:	IFR
Destination:	CHARLESTON, WV (CRW)	Type of Clearance:	IFR
Departure Time:	0905 EST	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	JIM CAIN	Report Date:	09/07/2000
Additional Participating Persons:	THOMAS FYE; CHARLESTON, WV PAUL E YOOS; WICHITA, KS THOMAS A BERTHE; BURLINGTON, VT		
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](#).