



National Transportation Safety Board Aviation Accident Final Report

| | | | |
|--------------------------------|--------------------------------------|-------------------------|------------|
| Location: | Jamestown, NY | Accident Number: | NYC07FA055 |
| Date & Time: | 01/08/2007, 0950 EST | Registration: | N720Z |
| Aircraft: | Piper PA-60-601P | Aircraft Damage: | Destroyed |
| Defining Event: | | Injuries: | 1 Fatal |
| Flight Conducted Under: | Part 91: General Aviation - Personal | | |

Analysis

During the initial climb, a "throbbing or surging" sound was heard as the airplane departed in gusting wind conditions with a 600-foot ceiling and 1/2 mile visibility in snow. Moments later the airplane came "straight down" and impacted the ground. During examination of the wreckage, it was discovered that the fuel selector switch for the right engine had been in the "X-FEED" position during the accident. Examination of documents discovered in the wreckage revealed, three documents pertaining to operation of an Aerostar. These documents consisted of two airplane flight manuals (AFMs) from two different manufacturers, and a checklist. Examination of the first of the AFMs revealed, that it had the name of both the pilot and the operator on the cover of the document. Further examination revealed that it had been published 4 years prior to the manufacture of the accident airplane, and contained information for a Ted Smith Aerostar Model 601P, which the operator had previously owned. This document contained no warnings regarding the use of the crossfeed system during takeoff. Examination of the second of the two AFMs found in the wreckage revealed that it was the Federal Aviation Administration (FAA) approved AFM for the accident airplane. Unlike the first AFM, the second AFM advised that the fuel selector "X-FEED" position should be used in "level coordinated flight only." It also advised that each engine fuel selector "must be in the ON position for takeoff, climb, descent, approach, and landing." It also warned that, if the airplane was not in a level coordinated flight attitude, "engine power interruptions may occur on one or both engines" when "X-FEED" is selected "due to unporting of the respective engine's fuel supply intake port." Review of the checklist contained in the FAA approved AFM for the Piper Aircraft Model 601P under "STARTING ENGINES," required a check of the crossfeed system prior to engine start by selecting each fuel selector to "ON," then selecting "X-FEED," and after verifying valve actuation and annunciator light illumination, returning the fuel selector to "ON." Additionally, under "BEFORE TAKEOFF" It also required that the fuel selectors be checked in the "ON" position, and that the "X-FEED" annunciator light was out, prior to takeoff. Examination of the pilot's checklist revealed that, it consisted of multiple pages inserted into plastic protective sleeves and included both typed, and hand written information. A review of the section titled "BEFORE TAKEOFF" revealed that the checklist item "Fuel Selectors - ON Position," which was listed in the AFM, had been omitted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's incorrect selection of the right engine fuel selector position, which resulted in fuel starvation of the right engine, a loss of the right engine's power, and a loss of control during initial climb. Contributing to the accident were the pilot's inadequate preflight planning and preparation, and his improper use of the manufacturer's published normal operating procedures.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. 1 ENGINE
2. (C) FUEL TANK SELECTOR POSITION - INCORRECT - PILOT IN COMMAND
3. (F) IMPROPER USE OF PROCEDURE - PILOT IN COMMAND
4. FLUID,FUEL - STARVATION
5. (F) PREFLIGHT PLANNING/PREPARATION - INADEQUATE - PILOT IN COMMAND

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

6. AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings

7. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On January 8, 2007, at 0950 eastern standard time, a Piper PA-60-601P, N720Z, was destroyed when it impacted terrain shortly after takeoff from Chautauqua County Airport (JHW), Jamestown, New York. The certificated private pilot was fatally injured. Instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed for the personal flight destined for Buffalo Niagara International Airport (BUF), Buffalo, New York. The flight was conducted under 14 Code of Federal Regulations Part 91.

According to witness statements, the pilot "picked up" his IFR clearance to Buffalo, New York, and announced over the radio his intention to taxi to runway 25 for departure. A "throbbing or surging" sound was then heard as the airplane departed. Moments later the airplane came "straight down" and impacted the ground.

The accident occurred during the hours of daylight. The wreckage was located at 42 degrees, 08.959 minutes north latitude, 79 degrees, 16.258 minutes west longitude, at an elevation of 1,701 feet mean sea level (msl).

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with ratings for airplane single-engine-land, airplane-multiengine-land, and instrument airplane. He reported a total flight time of 5,489.4 flight hours, with 2,926 hours in single-engine airplanes, and 2,377.7 hours in multiengine airplanes. His most recent FAA third-class medical certificate was issued on December 6, 2006.

AIRCRAFT INFORMATION

The accident airplane was manufactured in 1979 By Piper Aircraft. The most recent annual inspection was completed on October 9, 2006. At the time of the inspection, the airplane had accrued 2,783.3 total hours of operation.

METEOROLOGICAL INFORMATION

A weather observation taken about 1 minute after the accident, recorded the wind as 260 degrees at 16 knots, gusting to 26 knots, visibility 1/2 mile in snow, ceiling overcast at 600 feet, temperature 0 degrees Celsius, dew point -2 degrees Celsius, and an altimeter setting of 29.60 inches of mercury.

AIRPORT INFORMATION

JHW had two runways, oriented in a 13/31 and 07/25 configuration. Runway 25 was asphalt, grooved, and in good condition. It was equipped with high intensity runway lights and precision markings. The total length of the runway was 5,299 feet, and its width was 100 feet.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest in marshy terrain on a magnetic heading of 114 degrees, 945.8 feet northwest of the departure end of runway 25, and 17 feet in elevation below it.

Fuel sheen on areas of standing water, along with the smell of fuel was evident at the scene. The debris path was 96 feet long and 40 feet wide, and all the major components of the airplane were accounted for at the scene.

A ground scar approximately 25 feet in length, oriented on a 345-degree magnetic heading, led up to the main wreckage. Further examination revealed that the left wingtip fairing was on the end closest to the runway, and that the ground scar matched the shape of the left wing.

Examination of the main wreckage revealed no evidence of any preimpact malfunctions, preimpact airframe icing, or fire.

Airframe and Flight Controls

The main wreckage displayed heavy crush and compression damage, and both engines separated from their mounts. The left wing and right wing, along with all of the associated flight control surfaces displayed differing degrees of damage. The forward cabin was upright, and the left wing leading edge cap had separated from the wing and was found lying in front of the wing. The right wing was bent aft at the wing root, and was pinned beneath the main wreckage. The wing flaps and wing flap actuating cylinders were in the flaps up (0-degree) position.

The tail section of the airplane, along with portions of the aft fuselage, had separated from the airframe and was lying inverted next to the right side of the forward portion of the fuselage. The vertical stabilizer was separated from its attach fittings, and was located on the ground beneath the tail section. The left and right horizontal stabilizers remained attached to their fittings and displayed varying degrees of impact damage.

Examination of the flight control system revealed impact damage and multiple fractures of the push-pull tubes that made up the system. The breaks in the flight control system were consistent with overload, and control continuity was confirmed from the ailerons, elevators, and rudder to the cockpit area. Continuity could not be established to the control yokes or rudder pedals due to crush damage. Elevator and rudder trim tab positions correlated to approximately neutral, and no preimpact failures or malfunctions with the primary flight controls or trim system were identified.

Engine Controls

Examination of the cockpit revealed that the forward portion of the airframe had been displaced into the area of the pilot's instrument panel and throttle quadrant. The throttles were at their aft stops, with portions of the crushed fuselage structure encroaching on their normal area of forward travel. The mixture controls were approximately full rich, and the propeller controls were set to high RPM.

Propellers and Engines

The airplane was equipped with two 3-bladed propellers. Examination of both propellers revealed areas of light to moderate scratching on an approximate 45-degree angle to the chordline of the blades, and some leading edge gouging. All of the propeller blades had remained attached to their hubs. The left propeller exhibited blade bending on all three blades in the rearward direction. One of the blades was twisted out of the low pitch position and exhibited S-bending. The right propeller had one blade that displayed no evidence of bending, while the remaining two blades, were bent aft.

Examination of both engines revealed that the vacuum pumps and magnetos had separated from their respective mounts and exhibited impact damage. Both vacuum pumps could be rotated by hand and the rotors and blades were intact. Damage to the magnetos precluded any functional checks, but examination of both units did not reveal any preimpact malfunctions.

The intake systems were compromised and exhibited breaks in the tubing. All four turbocharger waste gates were closed and continuity of the exhaust systems was confirmed. The crankshafts were rotated by hand, and no binding was noted. Thumb compression was obtained on all cylinders, with the exception of the No. 5 cylinder, on the right engine, which exhibited impact damage. All sparkplugs were removed for examination. The electrodes were light gray in color, with the exception of the bottom spark plugs of the No. 2 cylinders on both engines, which exhibited impact damage.

Fuel System

Examination of the fuel system revealed that all fuel filler caps were closed and latched and all of the fuel injectors were clear. Fuel samples obtained from each engine's fuel injection system appeared to be bright, clear, and exhibited no visible contamination. When the fuel samples were applied to a coupon containing water-finding paste, the paste did not change color, indicating that water was not present.

Examination of the cockpit mounted fuel system controls revealed that, the fuel control panel for each engine had three selectable positions; "OFF," "ON," and "X-FEED" (crossfeed). These modes of operation were controlled through rotating fuel selector switches, which had detents at each of the three positions. Examination of these switches revealed that they had both been broken off of the fuel control panels. Further examination of the fuel control panel for the right engine revealed, however, the presence rotational scoring and deformation in the area of the "X-FEED" detent.

The multiple sump assembly, which was installed below the fuselage tank, and all four of its fuel shutoff valves, was also examined. During the examination, it was discovered that the left fuel shutoff valve was open, however; the right fuel shutoff valve was closed, and both fuel crossfeed shutoff valves were open.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination was performed on the pilot by the Erie County Medical Examiner's Office.

Toxicological testing of the pilot was conducted at the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma.

The pilot's forensic toxicology report revealed:

">> NAPROXEN detected in URINE"

TESTS AND RESEARCH

A review of pilot records revealed that the pilot last refueled the airplane on December 10, 2006, at Du Bois-Jefferson County Airport (DUJ), Du Bois, Pennsylvania. According to a "service request" form, he requested 30 gallons of gasoline be added to the fuselage tank, and to fill both wings tanks. After refueling, he flew the airplane on two more flights prior to the accident flight.

A review of fuel system information provided by the airplane manufacturer revealed that the airplane's fuel was stored in large area, shallow, integral wet wing tanks located outboard of the engine nacelles. A deep rectangular bladder-type fuselage fuel tank also was installed and was

located between the rear cabin bulkhead and the forward bulkhead of the baggage compartment. The total capacity of the system was 173.5 gallons. Each wet wing fuel tank had a capacity of 65 gallons, and the fuselage fuel tank had a capacity of 43.5 gallons.

The multiple sump assembly discovered in the wreckage was installed below the fuselage fuel tank. The center sump was the low point for the fuselage tank and the two wing sumps were the low points for each wet wing tank. The four electrically operated shutoff valves, were controlled by the two cockpit mounted fuel selector switches.

Normal and Crossfeed Modes

According to the manufacturer, fuel was normally fed to the left and right wing sumps through check valve assemblies, which would prevent backflow of fuel. With the fuel selectors in the "ON" mode, the fuselage tank and wing tanks would feed simultaneously through all check valves. Each wing tank would feed its respective engine, and the fuselage tank would feed both engines. With the crossfeed supply system activated, however, by rotating either fuel selector switch to the "X-FEED" position, the system would allow an engine to draw its total fuel from the opposite wing tank, bypassing the sump check valves.

Comparison of the positions of the accident airplane's multiple sump shutoff valves to manufacturer supplied data revealed, that the valve positions correlated to right engine fuel selector switch being in the "X-FEED" position which would allow the right engine to burn fuel only from the left wing tank, bypassing the check valves.

Airplane Operating Information

The airplane type was originally designed and manufactured by the Ted Smith Aircraft Company and certificated in 1968. After certification of the airplane, the company was sold to American Cement Company. In 1970, American Cement sold the firm to Butler Aviation and in 1973; Ted Smith Aerostar Corporation purchased the design rights and resumed production of the airplane in Santa Maria, California. In 1978 Piper Aircraft Corporation purchased the design and moved production to Vero Beach, Florida. Piper Aircraft then sold the design in 1994 to Aerostar Aircraft Corporation. According to the FAA, each of the different entities has produced operating information for various models of the Aerostar.

Examination of documents discovered in the wreckage revealed, three documents pertaining to operation of an Aerostar. These documents consisted of two airplane flight manuals (AFMs) from two different manufacturers, and a checklist.

Examination of the first of the AFMs revealed, that it had the name of both the pilot and the operator on the cover of the document. Further examination revealed that it had been published in January of 1975, and contained information for a Ted Smith Aerostar Model 601P, which the operator had previously owned. Review of this document revealed that it contained no warnings regarding the use of the crossfeed system during takeoff.

Examination of the second of the two AFMs found in the wreckage revealed that it was the FAA approved Airplane Flight Manual (AFM) for the Piper Aircraft produced Model 601P. Unlike the first AFM, this AFM advised that the fuel selector "X-FEED" position should be used in "level coordinated flight only." It also advised that each engine fuel selector "must be in the ON position for takeoff, climb, descent, approach, and landing."

It also warned that, if the airplane was not in a level coordinated flight attitude, "engine power interruptions may occur on one or both engines" when "X-FEED" is selected "due to unporting

of the respective engine's fuel supply intake port."

Review of the checklist contained in the FAA approved AFM for the Piper Aircraft Model 601P under "STARTING ENGINES," required a check of the crossfeed system prior to engine start by selecting each fuel selector to "ON," then selecting "X-FEED," and after verifying valve actuation and annunciator light illumination, returning the fuel selector to "ON." Additionally, under "BEFORE TAKEOFF" It also required that the fuel selectors be checked in the "ON" position, and that the "X-FEED" annunciator light was out, prior to takeoff.

Examination of the checklist revealed that, it consisted of multiple pages inserted into plastic protective sleeves and included both typed, and hand written information. A review of the section titled "BEFORE TAKEOFF" revealed that the checklist item "Fuel Selectors - ON Position," which was listed in the AFM, had been omitted.

Pilot Information

| | | | |
|----------------------------------|---|--|----------------------------|
| Certificate: | Private | Age: | 73, Male |
| Airplane Rating(s): | Multi-engine Land; Single-engine Land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | Seatbelt, Shoulder harness |
| Instrument Rating(s): | Airplane | Second Pilot Present: | No |
| Instructor Rating(s): | None | Toxicology Performed: | Yes |
| Medical Certification: | Class 3 With Waivers/Limitations | Last FAA Medical Exam: | 12/01/2006 |
| Occupational Pilot: | | Last Flight Review or Equivalent: | 11/01/2006 |
| Flight Time: | 5531 hours (Total, all aircraft), 753 hours (Total, this make and model), 5489 hours (Pilot In Command, all aircraft), 29 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft) | | |

Aircraft and Owner/Operator Information

| | | | |
|-------------------------------|------------------------------------|--------------------------------|-----------------|
| Aircraft Make: | Piper | Registration: | N720Z |
| Model/Series: | PA-60-601P | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | No |
| Airworthiness Certificate: | Normal | Serial Number: | 61P05927963262 |
| Landing Gear Type: | Retractable - Tricycle | Seats: | 6 |
| Date/Type of Last Inspection: | 10/01/2006, Annual | Certified Max Gross Wt.: | 6000 lbs |
| Time Since Last Inspection: | 29.3 Hours | Engines: | 2 Reciprocating |
| Airframe Total Time: | 2783.3 Hours as of last inspection | Engine Manufacturer: | Lycoming |
| ELT: | Installed, not activated | Engine Model/Series: | IO-540-S1A5 |
| Registered Owner: | FTBA | Rated Power: | 290 hp |
| Operator: | FTBA | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

| | | | |
|----------------------------------|-----------------------|--------------------------------------|------------|
| Conditions at Accident Site: | Instrument Conditions | Condition of Light: | Day |
| Observation Facility, Elevation: | JHW, 1723 ft msl | Distance from Accident Site: | |
| Observation Time: | 0951 EST | Direction from Accident Site: | |
| Lowest Cloud Condition: | | Visibility | 0.5 Miles |
| Lowest Ceiling: | Overcast / 600 ft agl | Visibility (RVR): | |
| Wind Speed/Gusts: | 16 knots / 26 knots | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 260° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 29.6 inches Hg | Temperature/Dew Point: | 0°C / -2°C |
| Precipitation and Obscuration: | Snow | | |
| Departure Point: | Jamestown, NY (JHW) | Type of Flight Plan Filed: | IFR |
| Destination: | Buffalo, NY (BUF) | Type of Clearance: | IFR |
| Departure Time: | 0950 EST | Type of Airspace: | |

Airport Information

| | | | |
|----------------------|-----------------------------------|---------------------------|---------|
| Airport: | Chautauqua County/Jamestown (JHW) | Runway Surface Type: | Asphalt |
| Airport Elevation: | 1723 ft | Runway Surface Condition: | Wet |
| Runway Used: | 25 | IFR Approach: | None |
| Runway Length/Width: | 5299 ft / 100 ft | VFR Approach/Landing: | None |

Wreckage and Impact Information

| | | | |
|----------------------------|---------|-----------------------------|-----------------------|
| Crew Injuries: | 1 Fatal | Aircraft Damage: | Destroyed |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 1 Fatal | Latitude, Longitude: | 42.149444, -79.270833 |

Administrative Information

| | | | |
|--|--|---------------------|------------|
| Investigator In Charge (IIC): | Todd G Gunther | Report Date: | 04/30/2008 |
| Additional Participating Persons: | Randall E Steele; FAA/FSDO; Rochester, NY Michael C McClure; Piper Aircraft Inc.; Vero Beach, FL Aaron L Spotts; Textron Lycoming Inc.; Williamsport, PA | | |
| 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/ . | | |

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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](#).