



National Transportation Safety Board Aviation Accident Final Report

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| Location: | Sherwood, OR | Accident Number: | WPR09FA175 |
| Date & Time: | 04/01/2009, 0735 PDT | Registration: | N9996D |
| Aircraft: | PIPER PA-22-150 | Aircraft Damage: | Substantial |
| Defining Event: | Loss of control in flight | Injuries: | 2 Fatal |
| Flight Conducted Under: | Part 91: General Aviation - Personal | | |

Analysis

A witness reported that he was standing in his driveway when he heard an airplane circling overhead, but that he could not see it due to the fog. He estimated that the airplane was about 100 feet above him and that the lateral visibility was about 30 feet. The witness stated that he was looking into the fog when the airplane suddenly appeared, and recalled seeing the wing and a light. The witness estimated that the airplane was in a 90-degree bank angle and struck the ground less than 50 feet from his position. A review of recorded radar data indicated that the airplane maintained a straight track at a level altitude toward the accident area. Its altitude varied slightly over the next few minutes, and then the target began to climb. It reached its peak altitude of 2,400 feet mean sea level (msl), and began a turn to the left as it approached the area of the accident site. The target made turns in a figure-8 pattern, with the altitude varying a few hundred feet, before continuing in a turn to the right and descending, consistent with the pilot being spatially disoriented. The accident site elevation was about 900 feet msl. The closest official weather observation station was 8 nautical miles east of the accident site and its elevation is 200 feet msl. The reported conditions 42 minutes prior to the accident were light rain and mist with broken clouds at 2,100 feet above ground level (agl) and overcast at 2,800 feet agl. The report 18 minutes after the accident reported light rain showers and mist with scattered clouds at 2,600 feet agl and overcast skies at 3,400 feet agl. The temperature/dewpoint for all three reports was 4/3 degrees Celsius. Postaccident investigation identified no mechanical anomalies with the airframe or engine that would have precluded normal operation. The pilot did not have an instrument rating.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's continued visual flight into instrument meteorological conditions, resulting in spatial disorientation and a loss of control.

Findings

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| Personnel issues | Aircraft control - Pilot (Cause) Spatial disorientation - Pilot (Cause) Incorrect action selection - Pilot (Cause) |
| Environmental issues | Clouds - Contributed to outcome |

Factual Information

This report was modified on 5/2/2011

HISTORY OF FLIGHT

On April 1, 2009, about 0735 Pacific daylight time, a Piper PA-22-150, N9996D, collided with terrain near Sherwood, Oregon. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The private pilot and one pilot-rated passenger were killed; the airplane sustained substantial damage. The cross-country personal flight departed Lusardi Field, Salem, Oregon, at 0711, with a planned destination of Hillsboro, Oregon. Visual meteorological conditions prevailed at the Aurora State Airport, Aurora, Oregon (KUAO), which was 106 degrees at 8 nautical miles from the accident site. The closest official weather reporting site reported visual meteorological conditions; however, instrument meteorological conditions prevailed within the vicinity of the accident site. No flight plan had been filed.

Family members reported that the pilot and passenger routinely commuted to work along the accident route.

A witness reported that he was standing in his driveway when he heard an airplane circling overhead, but could not see it due to the foggy conditions. He estimated that the airplane was about 100 feet above him, and the lateral visibility was about 30 feet. The engine was sputtering and backfiring, but then went quiet. He was looking into the fog when the airplane suddenly appeared. He only recalled seeing the wing and a light, and estimated that the airplane was in a 90-degree bank angle. He ducked and estimated that the airplane flew less than 10 feet over his head, and then struck the ground less than 50 feet away. One other family member of the witness was in the garage, and also heard the engine sputter. Another family member of the witness was in the basement, and did not hear the engine sputter.

Another witness was in his garage about 1/4 mile away. He did not recall hearing the airplane while it was flying around. However, he thought that he heard the engine race up just prior to the sound of impact.

A review of recorded radar data revealed a target on a secondary beacon code of 1200 that was on a northerly course at 0721 that maintained a straight track toward the accident area. At 0725:53, the target had a mode C recorded altitude of 1,600 feet mean sea level (msl), and all following altitudes in this report are msl unless noted. It maintained this altitude plus and minus 100 feet for the next several minutes, and then went to a mode C altitude of 1,400 feet for about 1 minute. The target then began to climb. It reached its peak altitude of 2,400 feet, and began a turn to the left as it approached the area of the accident site. After completion of the left turn, the target started a right turn, and made a figure-8 pattern. The altitude varied between 2,100 and 2,300 feet during the figure-8 turn. As the target completed the figure-8 at 2,300 feet, it continued the turn to the right, and began descending during the last 30 seconds of data. The last target with a reported altitude was at 1,800 feet. The final two targets were in the radar coast mode with no altitude recorded; the last target was at 0734:52.

PERSONNEL INFORMATION

Pilot

A review of Federal Aviation Administration (FAA) airman records revealed that the 49-year-

old pilot held a private pilot certificate with ratings for airplane single-engine land. The pilot had a third-class medical certificate issued on June 11, 2008. It had the limitations that the pilot must wear corrective lenses.

No personal flight records were located for the pilot. The investigator-in-charge (IIC) obtained the aeronautical experience listed in this report from a review of the FAA airmen medical records on file in the Airman and Medical Records Center located in Oklahoma City, Oklahoma. The pilot reported that he had a total flight time of 490 hours, with 90 hours logged in the previous 6 months.

Pilot-Rated Passenger

A review of FAA airman records revealed that the 53-year-old pilot-rated passenger held a private pilot certificate with ratings for airplane single-engine land. The pilot-rated passenger had a third-class medical certificate issued on August 30, 2007. The certified medical records indicated a total time of 249 hours, with 30 hours in the previous 6 months.

AIRCRAFT INFORMATION

The airplane was a Piper PA-22-150, serial number 226789.

The airplane's logbooks were not located during the course of the investigation. A mechanic with inspector authorization (IA) stated that he had completed the previous two annual inspections, and he provided copies of his records. The airplane had a total airframe time of 3,349 hours at the last annual inspection dated June 7, 2008, and a tachometer time of 713 hours. The tachometer read 893 at the accident site.

The engine was a Textron Lycoming O-320-A1B, serial number L-9618-27. Total time recorded on the engine at the last annual inspection was 3,349 hours, and time since major overhaul was 1,518 hours.

METEOROLOGICAL CONDITIONS

The airplane impacted in the front yard of a residence, and the owner was standing in his driveway area at the time of the accident. He stated that there was light rain and drizzle; it was quite foggy with low clouds. He heard the airplane, and estimated that it was about 100 feet above him, but he could not see it. He estimated that the lateral visibility was about 30 feet. Estimated elevation at the accident site was 940 feet.

The closest official weather observation station was Aurora State Airport (KUAO), which was 8 nautical miles (nm) at 106 degrees from the accident site. The elevation of the weather observation station was 200 feet msl.

An aviation routine weather report (METAR) for KUAO was issued at 0653 PDT. It stated: wind from 180 degrees at 6 knots; visibility 7 statute miles, light rain showers; sky conditions 2,100 feet broken, 2,800 feet overcast; temperature 4/39 degrees Celsius/Fahrenheit; dew point 3/37 degrees Celsius/Fahrenheit; altimeter 30.16 inches of mercury.

A METAR for KUAO was issued at 0753 PDT. It stated: winds from 170 degrees at 8 knots; visibility 6 statute miles, light rain showers and mist; sky conditions 2,600 feet scattered, 3,400 overcast; temperature 4/39 degrees Celsius/Fahrenheit; dew point 3/37 degrees Celsius/Fahrenheit; altimeter 30.15 inches of mercury.

A special METAR for KUAO was issued at 0802 PDT. It stated: winds from 180 degrees at 9

knots; visibility 7 statute miles, light rain showers; sky conditions 2,600 feet broken, 3,400 overcast; temperature 4/39 degrees Celsius/Fahrenheit; dew point 3/37 degrees Celsius/Fahrenheit; altimeter 30.15 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

FAA inspectors examined the wreckage at the accident scene, and they made the following observations.

The debris field extended approximately 150 feet beyond the initial impact site. The majority of the airplane was within approximately 20 feet of the initial impact site. By the time the inspectors arrived on site, the fire department had cut through portions of the airplane's structure to aid in the victims' extraction, so flight control continuity could not be verified.

Visibility was varying between 500 feet to 50 feet, while the inspectors were on site with a steady drizzle to light rain.

The propeller was intact and still attached to the engine. All four cylinders were intact, and the engine case appeared to be intact. The starter ring gear sustained crush damage, and was displaced out of position. The baffling was smashed flat against the engine top, and components were broken loose from the aft end of the engine. They noted no oil striping on the airplane, and no puddling around the engine area. There was a strong odor of fuel at the accident site; but all fuel tanks were ruptured, and contained no visible amounts of fuel. The fuel selector was in the left position. The throttle control was at the full throttle position.

MEDICAL AND PATHOLOGICAL INFORMATION

The Oregon State Police Medical Examiner's Division completed an autopsy of both occupants. Both deaths were the result of massive blunt force injuries.

The FAA Forensic Toxicology Research Team, Oklahoma City, performed toxicological testing of specimens of the pilot and pilot rated passenger.

Analysis of the specimens for the pilot contained no findings for tested drugs. They did not perform tests for carbon monoxide or cyanide.

The report contained the following findings for volatiles: 10 (mg/dL, mg/hg) ethanol detected in muscle; no ethanol detected in the brain. The report stated that the ethanol found in this case may potentially be from postmortem ethanol formation, and not from the ingestion of ethanol.

Analysis of the specimens for the pilot-rated passenger contained no findings for tested drugs or ethanol. They did not perform tests for carbon monoxide or cyanide.

TESTS AND RESEARCH

Investigators from the Safety Board, Piper, and Lycoming examined the wreckage at Vancouver, Washington. Examination notes are part of the public docket.

Airframe Exam

The fuselage sustained severe crush damage. Most of the flight and engine instruments separated from the instrument panel.

The left wing separated from the fuselage. The aileron and flap separated from the wing; their control cables remained attached to their respective bellcrank attachment points.

The right wing separated from the fuselage, and the wing tip exhibited upward bending. The aileron and flap separated from the wing; their control cables remained attached to their respective bellcrank attachment points.

All control surfaces on the empennage remained attached. The rudder and elevator control cables remained attached to their respective attachment fittings.

The elevator trim drum exhibited six threads (eight threads are neutral) on the upper side of the jack screw, which indicated a slight nose down trim setting.

Engine Exam

Investigators removed the engine, and elevated it from a hoist. They removed the spark plugs. All spark plugs were clean with no mechanical deformation; the gaps were similar to each other. The spark plug electrodes were oval and gray, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart.

The intake and exhaust tubes exhibited ductile bending.

A borescope inspection revealed no mechanical deformation on the valves, cylinder walls, or internal cylinder head.

The engine crankshaft would not rotate; the crankshaft was displaced about 3/16 inch aft and bound the internal components. Investigators drilled four holes in the crankcase to facilitate internal examination with a lighted borescope. The connecting rods were attached. The camshaft lobes did not appear to be misshaped or discolored.

Both magnetos separated from the engine at their mounting pads along an angular and rough fracture surface. Their mounting pads were secured under the mounting nuts. Investigators manually rotated the magnetos, and both magnetos produced spark at all posts.

The carburetor sustained crush damage and was breached. Its interior was packed with mud. The metal floats were crushed.

The oil sump sustained crush damage and was breached. The oil filter separated; the fracture surfaces were angular and jagged. It sustained crush damage, and was breached in several places; mud was compacted in breached area. The oil pump was removed for examination, and manually rotated.

Propeller

One propeller blade was bent aft along its length. The other blade exhibited leading edge gouges and trailing edge buckling. Its tip was twisted toward the low pitch, high revolutions per minute (rpm) position.

Investigators identified no mechanical anomalies with the airframe or engine that would have precluded normal operation.

History of Flight

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| Enroute-cruise | VFR encounter with IMC |
| Maneuvering | Loss of control in flight (Defining event) Collision with terr/obj (non-CFIT) |

Pilot Information

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| Certificate: | Private | Age: | 49, Male |
| Airplane Rating(s): | Single-engine Land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | Seatbelt |
| Instrument Rating(s): | None | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | Yes |
| Medical Certification: | Class 3 With Waivers/Limitations | Last Medical Exam: | 06/11/2008 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | |
| Flight Time: | 490 hours (Total, all aircraft) | | |

Aircraft and Owner/Operator Information

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|-------------------------------|--------------------------|------------------------------------|-----------------|
| Aircraft Manufacturer: | PIPER | Registration: | N9996D |
| Model/Series: | PA-22-150 | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | No |
| Airworthiness Certificate: | Normal | Serial Number: | 22-6789 |
| Landing Gear Type: | Tailwheel | Seats: | 4 |
| Date/Type of Last Inspection: | Annual | Certified Max Gross Wt.: | 1950 lbs |
| Time Since Last Inspection: | | Engines: | 1 Reciprocating |
| Airframe Total Time: | | Engine Manufacturer: | Lycoming |
| ELT: | Installed, not activated | Engine Model/Series: | O-320 |
| Registered Owner: | Steven R Fordyce | Rated Power: | 150 hp |
| Operator: | Steven R Fordyce | Air Carrier Operating Certificate: | None |

Meteorological Information and Flight Plan

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| Observation Facility, Elevation: | KUAO, 200 ft msl | Observation Time: | 0753 PDT |
| Distance from Accident Site: | 8 Nautical Miles | Condition of Light: | Day |
| Direction from Accident Site: | 106° | Conditions at Accident Site: | Instrument Conditions |
| Lowest Cloud Condition: | Scattered / 2600 ft agl | Temperature/Dew Point: | 4°C / 3°C |
| Lowest Ceiling: | Overcast / 3400 ft agl | Visibility | 0 Miles |
| Wind Speed/Gusts, Direction: | 8 knots, 170° | Visibility (RVR): | |
| Altimeter Setting: | 30 inches Hg | Visibility (RVV): | |
| Precipitation and Obscuration: | Light - Showers - Rain; Mist | | |
| Departure Point: | Salem, OR (4OR7) | Type of Flight Plan Filed: | None |
| Destination: | Hillsboro, OR | Type of Clearance: | None |
| Departure Time: | 0711 PDT | Type of Airspace: | |

Wreckage and Impact Information

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|---------------------|---------|---------------------|-------------|
| Crew Injuries: | 1 Fatal | Aircraft Damage: | Substantial |
| Passenger Injuries: | 1 Fatal | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 2 Fatal | | |

Administrative Information

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| Investigator In Charge (IIC): | Howard D Plagens | Adopted Date: | 05/19/2011 |
| Additional Participating Persons: | Paul Lehman; Federal Aviation Administration FSDO; Hillsboro, OR Charles Little; Piper Aircraft Corporation; Vero Beach, FL Mark Platt; Textron Lycoming; Williamsport, PA | | |
| Publish Date: | 05/19/2011 | | |
| 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.