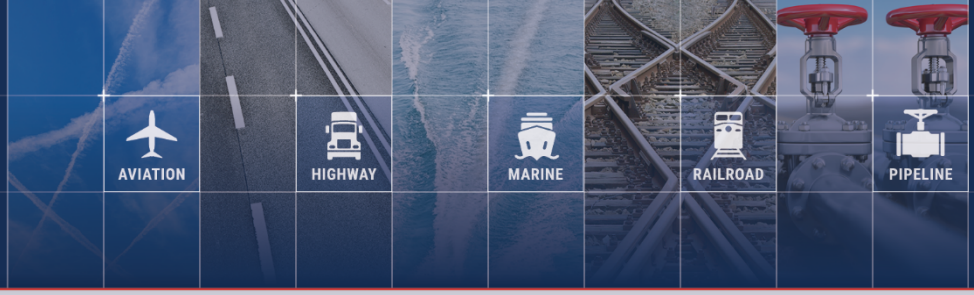


# Aviation Investigation Final Report

| | | | |
|---|---|---|---|
| **Location:** | Dover, Tennessee | **Accident Number:** | ATL03FA125 |
| **Date & Time:** | June 14, 2003, 12:05 Local | **Registration:** | N68551 |
| **Aircraft:** | Bellanca 7KCAB | **Aircraft Damage:** | Substantial |
| **Defining Event:** | | **Injuries:** | 2 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

The airplane departed a private airstrip shortly before the arrival of a thunderstorm, and one witness stated it used an abnormal amount of runway. A second witness stated the engine sounded like it was laboring, and another witness stated it sounded normal. One witness described the storm as a "virtual wall of water." The airplane was not equipped with an artificial horizon instrument. When the airplane failed to arrive at its destination, a search was initiated. On June 22, 2003, a portion of the left main landing gear strut and tire was located in the river a few hundred yards from the departure airport. On August 8, 2003, the airplane was located in the water a few miles from the departure airport. Examination revealed no evidence of airframe, engine, or component malfunction. A review of radar and satellite data revealed a large area of thunderstorms along the intended route of flight, with cumulus clouds embedded in an overcast layer, a band of towering cumulus to developing cumulonimbus clouds, and an area of radar echoes across the intended route of flight with reflectivities at video integrator and processor (VIP) Level 4 to 5,  "very strong" to "intense" intensity.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot continued VFR flight into adverse weather conditions including instrument meteorological conditions and turbulence in thunderstorms, which resulted in a loss of control in flight and subsequent collision with terrain.

## Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CRUISE

Findings
1. WEATHER CONDITION - TURBULENCE(THUNDERSTORMS)
2. (C) FLIGHT INTO ADVERSE WEATHER - CONTINUED - PILOT IN COMMAND
3. (C) VFR FLIGHT INTO IMC - CONTINUED - PILOT IN COMMAND
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - UNCONTROLLED
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. TERRAIN CONDITION - WATER

## Factual Information

HISTORY OF FLIGHT

On June 14, 2003, about 1205 central daylight time, a Bellanca 7KCAB, N68551, registered to and operated by the private pilot, collided with water in Kentucky Lake shortly after departing Short Creek private airstrip in Dover, Tennessee. The personal flight was operated under the provisions of Title 14 CFR Part 91 with no flight plan filed. Visual meteorological conditions with localized instrument meteorological conditions prevailed. The private pilot and the recreational pilot-rated passenger received fatal injuries, and the airplane sustained substantial damage. The flight was originating from Dover, Tennessee, at 1202 on June 14, 2003.

The pilot and passenger attended a cookout and fly-in at the airpark. The host of the cookout stated the pilot and passenger departed using runway 25 about two minutes behind a Piper J3, and they were en route to West Kentucky Airpark, Paducah, Kentucky. A witness on the ground photographed both airplanes departing, and he reported the accident airplane taxied onto an extension to use the full length of runway 25. Published information for the airport stated the runway length was 2,650. The witness observed the takeoff roll and stated the airplane lifted off approximately two-thirds of the way down the runway and did not appear to climb above the tree line before he lost sight of it turning over the lake.

A witness at his residence near the airpark reported hearing two airplanes depart around noon, and he stated the second airplane was flying lower than the first, and its engine "did not sound right" to him. He stated it sounded like it was "laboring," like a "truck trying to pull a large load up a hill." He stated that, shortly after he saw the airplanes, a storm came in with high, strong winds. The host of the cookout described the storm's arrival as a "virtual wall of water." The pilot of the Piper J3 had a similar intended route of flight of the accident airplane, and he reported encountering moderate rain shortly after takeoff. He stated the moderate rain seemed to be intensifying, and he diverted around it to the west.

When the accident airplane failed to arrive at its destination, a search was initiated. On June 22, 2003, search and rescue personnel located a portion of the left main landing gear strut and tire on the east bank of the Tennessee River, approximately six miles south of the Paris Landing Bridge, Paris Landing State Park, Tennessee. The location of the gear component was about 400 yards from the departure airfield. Search and recovery operations reconvened and located the airplane in the Tennessee side of Kentucky Lake on August 8, 2003, and the Stewart County Sheriff's Department recovered the airplane on August 9, 2003. The widths of the river and lake search areas were two to four miles wide, and the water depth was 40 to 60 feet.

PERSONNEL INFORMATION

The pilot held a private pilot certificate for airplane single-engine land issued December 30, 1987, and a third class medical certificate with no restrictions issued May 6, 2003. The pilot reported a total of 970 total civilian flight hours on his application for the medical certificate. His logbook was not recovered for examination. He also held airframe and powerplant mechanic ratings issued January 31, 1993, with inspection authorization, as well as a repairman certificate for an experimental aircraft issued June 11, 1985.

The passenger held a recreational pilot certificate for rotorcraft/gyroplane issued May 4, 1992, and a third class medical certificate issued March 4, 1999.

AIRCRAFT INFORMATION

The Bellanca 7KCAB was a tandem-seat, tail wheel airplane equipped with a Lycoming IO-320-E2A, 150-horsepower engine. Examination revealed the airplane was equipped with instrumentation for visual flight rules per Title 14 CFR Part 91.205(b). It was not equipped with a gyroscopic pitch and bank indicator (artificial horizon). A review of maintenance logbooks recovered from the airplane revealed an annual inspection was completed on May 26, 2003, at a tachometer time of 2149.76. The mechanic-rated pilot performed the maintenance and inspections himself. The tachometer reading on the instrument at the time of the accident was 2158.28.

An acquaintance of the pilot stated the airplane was kept in a hangar, and he described the pilot's maintenance practices as "meticulous." The spouse of the pilot reported the pilot had no complaints or problems with the airplane, and that she had heard him speak of how "strong" the engine performed.

METEOROLOGICAL INFORMATION

Meteorological research was conducted by the National Transportation Safety Board, Office of Aviation Safety, Operational Factors Division, Washington, D. C.

The National Weather Service Radar Summary chart for 1215 depicted a large area of echoes identified as thunderstorms and rain showers over Kentucky and Tennessee along the intended route of flight. The GOES-12 satellite imagery surrounding the period of the accident indicated a northeast to southwest band of cumulus clouds embedded in an overcast layer of clouds moving across the area. At 1202, the band of cumulus clouds immediately west of the departure airport had a radiative cloud top temperature that corresponded with clouds in the range of 20,000 feet. The GOES-12 visible imagery showed a band of towering cumulus to developing cumulonimbus clouds was moving across the area at the time of the accident.

At 1206 the Paducah, Kentucky, WSR-88D radar identified an area of echoes west through northeast of the departure airport with reflectivities at video integrator and processor (VIP) Level 4 to 5, "very strong" to "intense" intensity. These echoes crossed the intended route of

flight.

The Area Forecast issued for the time period including the accident flight expected general visual flight rules conditions to prevail over western Tennessee and Kentucky with scattered thunderstorms and rain showers, with cumulonimbus cloud tops from 35,000 to 43,000 feet. The header of the Area Forecast includes a warning that thunderstorms implied severe or greater turbulence, severe icing, low-level wind shear, and local IFR conditions. There was no record the pilot received a weather briefing from an Automated Flight Service Station or through Direct User Access Terminal System.

WRECKAGE AND IMPACT INFORMATION

The wreckage was examined at a recovery facility on August 12, 2003. The recovery operator reported the wings were removed for transport, and prior to removal, both wings were attached to the airframe at the front attach points. The recovery operator stated the aileron cables were cut during recovery.

The nose of the airplane was crushed, the firewall and engine were separated, and the fuselage was buckled aft of the rear cabin. The horizontal stabilizer and vertical stabilizer were attached to the fuselage, and the elevator, elevator trim tab, and rudder were attached to the airframe. Control cable continuity for the rudder, elevator, and elevator trim was established from the surfaces to the cockpit controls.

The left wing and strut displayed crush damage, and the fuel cap was found in place. The left aileron was damaged and was partially separated from the wing. The forward and aft cables for the left aileron were attached to the bell crank and cable continuity was established from the bell crank to the inboard portion of the wing, where both cables displayed straight-edged, cut-type separation. Cable continuity was established from the horn in the cabin floor to the carry-through near the doorpost, where the cables displayed straight-edged, cut-type separation.

The right wing and strut displayed crush damage, and the fuel cap was found in place. The right aileron was damaged and remained attached to the wing. The forward and aft cables for the right aileron were attached to the bell crank and cable continuity for the aft cable was established from the bell crank to the inboard portion of the wing, where the cable displayed straight-edged, cut-type separation. The forward cable for the right aileron displayed a splayed-type separation near the inboard portion of the wing. Cable continuity was established from the horn in the cabin floor to the carry-through near the doorpost, where one cable displayed a straight-edged, cut-type separation, and the other displayed a splayed separation. Examination revealed no evidence of airframe or flight control malfunction.

Examination of the engine revealed crush damage that was most pronounced on the front, bottom, and left side of the engine. The propeller spinner displayed crush damage on the left side. The propeller blade protruding from the crushed side of the spinner displayed an

approximate 45-degree aft bend mid-span. The other propeller blade displayed a slight aft bend mid-span.

The crankshaft was rotated at the propeller and compression developed on all four cylinders, movement of all valves was observed, and rotation of the accessory gears and oil pump drive were observed. The magnetos were removed and water poured out of each when handled. The right magneto produced ignition spark from all four towers when rotated. The left magneto produced ignition spark from three towers when rotated. The magneto case was opened, and water damage was observed inside. The points were cleaned, and the magneto was reassembled and rotated. The left magneto then produced ignition spark from all four towers.

The throttle body was found separated with the cable attached. A few ounces of clean, blue fuel was recovered from the fuel servo outlet line to the fuel flow manifold. Examination of the fuel nozzles revealed no evidence of obstruction. The engine driven fuel pump was turned by hand and clean, blue fuel was observed spurting from the pump. The electric boost pump was removed and functioned when connected to a battery. Examination revealed no evidence of engine or component malfunction.

## MEDICAL AND PATHOLOGICAL INFORMATION

Autopsy examinations of the pilot and passenger were performed August 9 and 10, 2003, by the Office of the Medical Examiner, Tennessee Department of Health and Environment, Nashville, Tennessee. The cause of death of the pilot was reported as "multiple blunt force injuries ...," and the cause of death of the passenger was reported as "multiple blunt force injuries ...."

Forensic toxicology was performed on specimens from the pilot and passenger on September 26, 2003, by Aegis Sciences Corporation, Nashville, Tennessee. Both reports were negative for drugs except salicylate (aspirin).

## TESTS AND RESEARCH

Metallurgical examination of the splayed ends of the separated right aileron cable were examined by the National Transportation Safety Board, Office of Research and Engineering, Materials Laboratory Division, Washington, D. C. Examination revealed characteristics consistent with a severe overload event.

## ADDITIONAL INFORMATION

The Federal Aviation Administration (FAA) Advisory Circular (AC) 00-24B titled "Thunderstorms" dated January 2, 1983, defined the echo intensity levels and potential weather phenomena associated with those levels. The AC defined the levels as follows: VIP Level 1 is "weak," Level 2 is "moderate," and light to moderate turbulence is possible with lightning. Level 3 is "strong," and severe turbulence is possible with lightning. Level 4 is "very

heavy," and severe turbulence is likely with lightning. Level 5 is "intense" with severe turbulence, lightning, hail likely, and organized surface wind gusts. Level 6 is "extreme" with severe turbulence, lightning, large hail, extensive surface wind gusts and turbulence.

A friend of the pilot who assisted with search and recovery efforts reported the Jackson Flight Service Station detected an Emergency Locator Transmitter (ELT) signal on August 8, 2003, and he wondered if it originated from the underwater wreckage when the divers were handling it. Examination revealed the ELT was an AmeriKing AK-450, FAA TSO C91a, with the next battery replacement recorded for June 2004. The ELT was found secure in the empennage, the switch was found in the armed position, and the fuselage antenna was found attached. Internal examination of the ELT revealed water damage and corrosion on the circuit board and on all six alkaline batteries.

The wreckage was released, except for the ELT and a segment of aileron cable, to a representative of International Loss Management, Inc., Norcross, Georgia, on February 27, 2004. The ELT and the segment of aileron cable were released to a representative of Atlanta Air Recovery, Griffin, Georgia, on April 2, 2004.

## Pilot Information

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|---|---|---|---|
| **Certificate:** | Private | **Age:** | 62,Male |
| **Airplane Rating(s):** | Single-engine land | **Seat Occupied:** | Front |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | |
| **Instrument Rating(s):** | None | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 3 Without waivers/limitations | **Last FAA Medical Exam:** | May 6, 2003 |
| **Occupational Pilot:** | UNK | **Last Flight Review or Equivalent:** | |
| **Flight Time:** | 970 hours (Total, all aircraft) | | |

## Aircraft and Owner/Operator Information

| | | | |
|---|---|---|---|
| **Aircraft Make:** | Bellanca | **Registration:** | N68551 |
| **Model/Series:** | 7KCAB | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 324-72 |
| **Landing Gear Type:** | Tailwheel | **Seats:** | 2 |
| **Date/Type of Last Inspection:** | May 26, 2003 Annual | **Certified Max Gross Wt.:** | 1650 lbs |
| **Time Since Last Inspection:** | 8.52 Hrs | **Engines:** | 1 Reciprocating |
| **Airframe Total Time:** | 2158.28 Hrs at time of accident | **Engine Manufacturer:** | Lycoming |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | IO-320-E2A |
| **Registered Owner:** | Earl Louis Witte | **Rated Power:** | 150 Horsepower |
| **Operator:** | | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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|---|---|---|---|
| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | KHOP,573 ft msl | **Distance from Accident Site:** | 29 Nautical Miles |
| **Observation Time:** | 12:58 Local | **Direction from Accident Site:** | 58° |
| **Lowest Cloud Condition:** | | **Visibility** | 7 miles |
| **Lowest Ceiling:** | Broken / 2000 ft AGL | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 7 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 260° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 29.94 inches Hg | **Temperature/Dew Point:** | 26°C / 22°C |
| **Precipitation and Obscuration:** | Moderate - None - Rain | | |
| **Departure Point:** | Dover, TN (8TN7) | **Type of Flight Plan Filed:** | None |
| **Destination:** | Paducah, KY (KFIO) | **Type of Clearance:** | None |
| **Departure Time:** | 13:00 Local | **Type of Airspace:** | Class G |

## Airport Information

| | | | |
|---|---|---|---|
| **Airport:** | Short Creek (private) 8TN7 | **Runway Surface Type:** | Grass/turf |
| **Airport Elevation:** | 290 ft msl | **Runway Surface Condition:** | Dry |
| **Runway Used:** | 25 | **IFR Approach:** | None |
| **Runway Length/Width:** | 2650 ft / 30 ft | **VFR Approach/Landing:** | None |

## 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 | **Latitude, Longitude:** | 36.404167,-88.01583 |

## Administrative Information

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|---|---|
| **Investigator In Charge (IIC):** | Wilson, Ralph |
| **Additional Participating Persons:** | B.J. Haire; Nashville FSDO - 03; Nashville, TN<br>Edward G Rogalski; Textron Lycoming; Bellview, FL |
| **Original Publish Date:** | September 29, 2004 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=57270 |