



Aviation Investigation Final Report

Location:	Lowndesville, South Carolina	Accident Number:	ERA09LA527
Date & Time:	September 19, 2009, 11:06 Local	Registration:	N5845A
Aircraft:	Cessna 172	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The non-instrument rated pilot was conducting a personal cross-country visual flight rules flight and had not obtained a weather briefing. Two witnesses heard the airplane make several passes over their location. One of the witnesses reported that the engine was "making a pop pop sound intermittently," then it sounded like a lot of engine power was applied. They both reported that they had observed the airplane descending out of the "very low" overcast cloud layer between 70 and 90 degrees nose down attitude, with the wings level on a path directly toward them. The airplane veered away from their location, and then impacted into a lake approximately 75 feet from their location. Prior to impacting the water, one of the witnesses reported that several control surfaces appeared to be moving in the correct direction. These witnesses also reported that there had been rain just prior to the accident, and the overcast cloud layer was approximately 100 to 200 feet above tree top level, or about 300 feet above ground level. Neither the aircraft maintenance logbooks nor the pilot's flight logbooks were located. Given the lack of an instrument rating and the transition from visual meteorological conditions to instrument meteorological conditions, the pilot most likely misinterpreted the acceleration of the airplane as the nose of the airplane pitching up, and applied forward elevator control to counter. Examination of the wreckage revealed no preimpact mechanical malfunctions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate preflight planning and improper decision to continue flight into deteriorating weather conditions, which resulted in spatial disorientation after entering instrument flight conditions.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Weather planning - Pilot
Personnel issues	Visual illusion/disorientation - Pilot

Factual Information

History of Flight

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

HISTORY OF FLIGHT

On September 19, 2009, about 1106 eastern daylight time, a Cessna 172, N5845A, was substantially damaged after impacting the water on Lake Russell, near Lowndesville, South Carolina. The certificated private pilot and passenger were killed. Instrument meteorological conditions prevailed, and no flight plan was filed for the personal flight, which departed from a private airstrip located near Maryville, Tennessee, destined for Athens/Ben Epps Airport (AHN), Athens, Georgia. The flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to hand written documentation, located with the wreckage, the flight departed at approximately 0926 and an entry was made that reported at 1056, the fuel tanks had been switched; however, no entry was given stating which tank the fuel selector was selected towards.

Two witnesses, on a boat near the edge of the lake, were interviewed over the phone by an NTSB investigator. According to both witnesses, the airplane was heard flying overhead of their location several times. One of the witnesses reported that the engine was "making a pop pop sound intermittently," then it sounded like a lot of engine power was applied. They both reported that they had observed the airplane descending out of the "very low" overcast cloud layer, between 70 and 90 degrees nose down attitude, with the wings level on a path directly toward them. It veered away from their location, and then impacted the water approximately 75 feet from their boat. Prior to impacting the water, one of the witnesses reported from their vantage point, seeing the right wing aileron moving in the up position, the left wing aileron moving in the down position, the rudder surface moving to the right, and the elevator moving so the trailing edge was up. These witnesses also reported that there had been rain just prior to the accident and the overcast cloud layer was approximately 100 to 200 feet above tree top level or about 300 feet above ground level (agl).

A search of nearby Federal Aviation Administration (FAA) radar control facilities did not reveal any radar data for the accident flight. There had also been no recorded transmissions with any FAA air traffic control facilities and the accident flight. Further, there was no record of the pilot obtaining a weather briefing from a flight service station.

PERSONNEL INFORMATION

The pilot held a FAA private pilot certificate with a rating for airplane single-engine land. The pilot did not hold an instrument rating. His most recent third-class medical certificate was issued on January 10, 1992; at that time, the pilot reported 600 total hours of flight experience. The pilot's logbook was unable to be located at the time of this writing.

AIRCRAFT INFORMATION

According to FAA records, the accident airplane was manufactured in 1956 and was equipped with a Continental O-300-B engine. The airplane was owned by someone other than the accident pilot. In an interview with a representative of the previous owner, the accident pilot purchased a share of the airplane a few years prior to the accident. In the beginning of 2009, the accident pilot purchased the remaining shares of the airplane and became the sole owner. However, no documentation showing the transaction was able to be located. Additionally, the airplane logbooks were not recovered.

METEOROLOGICAL INFORMATION

The 0953 recorded weather observation at McGhee Tyson Airport (TYS), Knoxville, Tennessee, located about 8 miles to the northwest of the private airstrip in which the accident flight departed, reported winds from 060 degrees at 4 knots, 3 statute miles visibility due to mist, overcast at 300 feet, temperature 21 degrees C, dew point 19 degrees C, and an altimeter setting of 30.14 inches of mercury.

The recorded weather in the two preceding hours and the subsequent hour revealed that the ceiling varied between 200 and 600 feet agl and the visibility varied between 1/4 and 3 statute miles.

The 1056 recorded weather observation at Anderson Regional Airport (AND), Anderson, South Carolina 20 miles to the north of the accident site, reported winds from 120 degrees at 3 knots, overcast cloud layer at 700 feet agl. However the remarks section revealed a variable ceiling between 300 and 1,000 feet agl, temperature 23 degrees C, dew point 21 degrees C, and an altimeter setting of 30.16 inches of mercury.

The recorded weather in the two preceding hours revealed that the ceiling varied between 200 and 1,200 feet agl. The recorded weather approximately 45 minutes following the accident revealed that there were a few clouds at 900 feet agl, a broken cloud layer at 1,700 feet agl, and an overcast layer at 2,400 feet agl.

WRECKAGE AND IMPACT INFORMATION

The airplane was in water of about 4 feet in depth and close to the lake shore. A photo provided to the NTSB by one of the eyewitnesses revealed that the airplane came to rest in a

nose down attitude. The airplane forward of the main landing gear was submerged in the water and the tail of the airplane was bent forward. The Sheriff's deputies and personnel from the Department of Natural Resources that responded to the accident site reported a sheen similar to fuel on top of the water. Estimates ranged from a few gallons to 30 gallons. The FAA inspector that responded to the accident scene reported that the airspeed indicator was located and indicated an airspeed of 150 mph.

The wreckage was subsequently transported to a secure salvage yard for further examination, where it was examined on November 12, 2009. The cockpit, cabin area, and empennage were crushed in compression. The cockpit, engine control quadrant, and instrument panel were destroyed by impact. The pilot's side rudder control tube was fractured by impact.

Control cable continuity was established from the ailerons to the root of each wing, and also from the rudder and elevators to the aft bulkhead in the cargo compartment. Several of the control cables were cut during the recovery process and a few control cables exhibited tensile overload separation. Examination of the flap actuator revealed a position consistent with retracted flaps.

The nose gear was fracture separated at the attach point. Both main landing gears remained attached to the carry through support structure.

The attitude indicator and turn and slip indicator instruments were disassembled. The rotors were removed from their housing and scoring marks were observed on the inside of the housings.

The engine had marks consistent with impact damage. The propeller, magnetos, starter, and the alternator remained attached to the engine. The two-blade propeller was attached to the crankshaft and in place. One blade was bent approximately 30 degrees toward the non-cambered side. The other blade was bent approximately 80 degrees toward the non-cambered side. Both blades had scarring on the cambered side and S-bending at the tips. Several cracks were observed in the crankcase halves and the largest crack was observed in the right crankcase half, forward of the No. 5 cylinder attach point. The top spark plugs were removed and appeared normal. The crankshaft was rotated and continuity was confirmed to the rear of the engine. The cylinders were examined using a lighted borescope. The cylinder barrels contained mud and corrosion was noted. The valves were in place and undamaged. The oil screen was removed and carbon type deposits and a few metal flakes were noted. Both screens were coated with oil.

The magnetos exhibited impact damage, however both drive shafts rotated freely and no spark was observed on any of the towers. The magnetos were disassembled and no internal damage was noted but the inside of the case contained moisture. The carburetor was separated from the engine had exhibited impact damage. The fuel screen was clean and clear, however no fuel was found on the screen. The carburetor was disassembled and contained mud and water. The metal floats and needle valve were in place and connected and moved freely and no

damage was noted to the needle valve or the needle valve seat. One of the floats exhibited crush damage similar to hydraulic crushing.

Two aeronautical charts were located within the wreckage. One chart was an FAA Jacksonville Sectional Aeronautical Chart "76th Edition" with a chart date of September 1, 2005 and was scheduled to be replaced February 16, 2006. The other was an FAA Atlanta Sectional Aeronautical Chart "78th Edition" with a chart date of March 15, 2007 and was scheduled to be replaced on August 30, 2007. No other aeronautical charts were located.

MEDICAL AND PATHOLOGICAL INFORMATION

The Abbeville County Coroner's Office, conducted a postmortem examination of the pilot on September 21, 2009. The reported cause of death was "massive blunt force trauma consistent with airplane accident."

Toxicological testing was performed post mortem at the FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The tests were negative for carbon monoxide, cyanide, ethanol, and drugs, legal or illegal.

ADDITIONAL INFORMATION

According to the FAA Airplane Flying Handbook, FAA-H-8083-3A (Chapter 16, Emergency Procedures), "A VFR pilot is in IMC conditions anytime he or she is unable to maintain airplane attitude control by reference to the natural horizon, regardless of the circumstances or the prevailing weather conditions."

The handbook additionally stated, "The pilot must believe what the flight instruments show about the airplane's attitude regardless of what the natural senses tell. The vestibular sense (motion sensing by the inner ear) can and will confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in airplane attitude, nor can they accurately send the attitude changes which occur at a uniform rate over a period of time. On the other hand, false sensations are often generated, leading the pilot to believe the attitude of the airplane has changed when, in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation."

According to the FAA Airplane Instrument Flying Handbook FAA-H-8083-15A, the definition of somatogravic illusion is "The misperception of being in a nose-up or nose-down attitude, caused by a rapid acceleration or deceleration while in flight situations that lack visual reference." It is further stated in Chapter 1 that "... [accelerating] stimulates the otolith organs in the same way as tilting the head backwards. This action creates the somatogravic illusion of being in a nose-up attitude, especially in situations without good visual references. The disoriented pilot may push the aircraft into a nose-low or dive attitude."

FAA Advisory Circular 61-134 stated in part, "According to the National Transportation Safety

Board (NTSB) and FAA data, one of the leading causes of GA accidents is continued VFR flight into IMC... The importance of complete weather information, understanding the significance of the weather information, and being able to correlate the pilot's skills and training, aircraft capabilities, and operating environment with an accurate forecast cannot be emphasized enough... VFR pilots in reduced visual conditions may develop spatial disorientation and lose control, possibly going into a graveyard spiral..."

FAA Advisory Circular 60-4A stated in part, "The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments." It further states, "Tests conducted with qualified instrument pilots indicate that it can take as much as 35 seconds to establish full control by instruments after the loss of visual reference with the surface."

Pilot Information

Certificate:	Private	Age:	66, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Unknown
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	January 10, 1992
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 600 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N5845A
Model/Series:	172	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	28445
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	CONT MOTOR
ELT:	C91A installed	Engine Model/Series:	O-300-B
Registered Owner:	On file	Rated Power:	145 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	AND	Distance from Accident Site:	20 Nautical Miles
Observation Time:	10:56 Local	Direction from Accident Site:	10°
Lowest Cloud Condition:		Visibility	5 miles
Lowest Ceiling:	Overcast / 700 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	3 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	120°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.15 inches Hg	Temperature/Dew Point:	23°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Maryville, TN (NONE)	Type of Flight Plan Filed:	None
Destination:	Athens, GA (AHN)	Type of Clearance:	None
Departure Time:	09:26 Local	Type of Airspace:	

Wreckage and Impact Information

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:	34.159168,-82.694168(est)

Administrative Information

Investigator In Charge (IIC):	Etcher, Shawn
Additional Participating Persons:	Joesph S Camp; FAA/FSDO; Columbia, SC Tom Moody; Cessna Aircraft Company; Wichita, KS John Kent; Teledyne Continental Mortors, Inc.; Mobile, AL
Original Publish Date:	July 22, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74773

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).