



National Transportation Safety Board Aviation Accident Final Report

Location:	McClellanville, SC	Accident Number:	ERA13FA295
Date & Time:	06/20/2013, 1648 EDT	Registration:	N727JA
Aircraft:	ROCKWELL INTERNATIONAL 690B	Aircraft Damage:	Destroyed
Defining Event:	Aerodynamic stall/spin	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

The purpose of the flight was for the pilot to accomplish a flight review with a flight instructor. According to air traffic control records, after takeoff, the pilot handling radio communications requested maneuvering airspace for airwork in an altitude block of 13,000 to 15,000 feet mean sea level (msl). About 8 minutes later, the air traffic controller asked the pilot to state his heading, but he did not respond.

A review of recorded radar data revealed that, about 14,000 msl and 3 miles southeast of the accident site, the airplane made two constant-altitude 360-degree turns and then proceeded on a north-northeasterly heading for about 2.5 miles. The airplane then abruptly turned right and lost altitude, which is consistent with a loss of airplane control. The airplane continued to rapidly descend until it impacted trees and terrain on a southerly heading. No discernible distress calls were noted. The wreckage was found generally fragmented, and all of the airplane's structural components and flight control surfaces were accounted for within the wreckage debris path. Subsequent examination of the engines revealed evidence of rotation and operation at impact and no mechanical malfunctions or failures that would have precluded normal operation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's loss of airplane control during high-altitude maneuvering and his subsequent failure to recover airplane control. Contributing to the accident was the flight instructor's inadequate supervision of the pilot and his failure to perform remedial action.

Findings

Aircraft	Performance/control parameters - Not attained/maintained (Cause)
Personnel issues	Aircraft control - Pilot (Cause) Lack of action - Instructor/check pilot (Factor)

Factual Information

HISTORY OF FLIGHT

On June 20, 2013, about 1648 eastern daylight time, a Rockwell International 690B, N727JA, was destroyed following a collision with terrain after an in-flight loss of control near McClellanville, South Carolina. The private pilot and the flight instructor were fatally injured. The airplane was registered to a corporation and was operated by the pilot under the provisions of 14 Code of Federal Regulations (CFR) Part 91, as an instructional flight. Visual meteorological conditions prevailed and an instrument flight rules (IFR) flight plan was filed. The local flight originated at Charleston Executive Airport (JZI), Charleston, South Carolina about 1633.

The purpose of the flight was for the pilot to accomplish a CFR Part 61.56 flight review. After takeoff from JZI, the pilots requested maneuvering airspace for airwork over the McClellanville area, at an altitude block of 13,000 to 15,000 feet above mean sea level (msl). About 1646, the air traffic controller asked the pilot to say his heading, and there was no response. Radar contact was lost and search and rescue operations were initiated. Based on a witness report, local responders found the wreckage within the boundary of the Francis Marion National Forest in Charleston County.

A review of recorded radar data revealed that, about 14,000 feet msl and about 3 miles southeast of the accident site, the airplane was observed in two constant-altitude 360-degree turns; the first to the right and the second to the left. The airplane then was observed on a north-northeasterly heading for about 2.5 miles, when an abrupt right turn, accompanied by a loss of altitude, occurred. At 1646:51, the radar track showed the airplane crossing U.S. Highway 17 at 12,100 feet. Concurrently, a keyed microphone could be heard on the recorded voice communications, with loud background noise that lasted for about seven seconds, and a single voice making an unintelligible sound similar to "ahhh..." The airplane was then observed entering a steep, descending left turn, losing about 7,500 feet in 28 seconds. The last radar return was at 1647:19, when the airplane was at 4,600 feet msl.

A witness, who was traveling southbound on Highway 17 at the time, observed the airplane in flight for "a couple of seconds." He observed the airplane in the left upper corner of his windshield. His car windows were up and he could not hear anything. When he saw the airplane, the belly was facing him and the nose was "completely vertical down" prior to it entering the trees. He observed both wings and the tail and he did not see anything missing from the airplane. No smoke was observed.

Another witness was working outside, at his residence, at the time of the accident. The airplane was "...either circling or looping and it did this for several minutes." The engine sounded "strained" and the "...engine speed was being changed." He then heard a "thud" and the engine noise stopped.

PERSONNEL INFORMATION

The private pilot, seated in the left cockpit seat, held airplane single engine land, airplane single engine sea, airplane multiengine land, and instrument airplane ratings. His personal pilot logbook(s) was not located after the accident. On his most recent FAA Class 1 medical certificate application, dated May 20, 2013, he reported 1,540 hours total time, including 106 hours in the previous six months. His total flight time in the accident airplane was not

determined.

The flight instructor and airline transport pilot, seated in the right cockpit seat, held airplane single engine land, airplane single engine sea, airplane multiengine land, airplane multiengine sea, and instrument airplane ratings. He also held a flight instructor certificate for airplane single engine land, airplane multiengine land, and instrument airplane. On his most recent FAA Class 1 medical certificate application, dated May 8, 2013, he reported 22,300 hours total time, including 75 hours in the previous six months.

The flight instructor's personal pilot logbook(s) was not located after the accident; however, an undated resume of his flight experience was provided to investigators. The resume listed a variety of type ratings and formal training courses completed, including FlightSafety International training in the Turbo Commander. The resume listed more than 5,800 hours in turboprop airplanes and more than 4,100 hours as a flight instructor.

Reportedly, the flight instructor had not flown with the pilot previous to the accident flight.

AIRCRAFT INFORMATION

The airplane was a twin engine, high-wing, retractable landing gear, turboprop airplane, serial number 11399. It was powered by two Allied Signal TPE331-10T-516K engines rated at 776 shaft horsepower each. The engines were fitted with Hartzell three-bladed adjustable pitch propellers.

A review of the aircraft maintenance records indicated that an annual inspection of the airframe and engines was performed on March 4, 2013. The aircraft total time at the time of the annual inspection was 12,192.6 hours. The annual inspection was the most recent maintenance logbook entry in the aircraft and engine records.

METEOROLOGICAL INFORMATION

The 1655 surface weather observation for Mount Pleasant, South Carolina (LRO) included few clouds at 3,400 feet, scattered clouds at 4,700 feet, broken clouds at 6,000 feet, wind calm, 7 miles visibility, temperature 24 degrees C, dew point 23 degrees C, and altimeter 30.14 inches of mercury.

The review of local weather data revealed no convective activity or thunderstorms in the immediate in the area at the time of the accident.

WRECKAGE AND IMPACT INFORMATION

The accident site was situated on level ground on the grounds of the Francis Marion National Forest. The first point of impact was trees, then the ground. The accident site consisted of a swamp. The coordinates of the first observed impact with trees were 33.06239N, 079.52365W. The coordinates of the main wreckage (cockpit area) were 33.06193N, 079.52374W. The total length of the wreckage path was about 290 feet in length and 40 feet in width. The magnetic heading from initial tree impact to the cockpit was about 190 degrees.

Measurements of the path through the trees was consistent with the airplane in a right bank of about 42 degrees and a descent angle of about 21 degrees. The wreckage was generally fragmented. There was no fire.

All aircraft fuel tanks were breached during the impact sequence. There was a strong odor of jet fuel prevalent throughout the wreckage path.

The left engine was separated from the airframe during the impact sequence and was found adjacent to the cockpit area. The right engine was located attached to the right, inboard wing section that was separated from the main wreckage and crushed against trees during the initial impact sequence.

Several smoothly-cut tree branches were found at the area of initial tree impact. The disbursement of the branches was consistent with contact by both engine propellers.

The wreckage was recovered to a storage facility at Griffin, Georgia, where a detailed examination of the wreckage was performed. All major structural components of the airframe, including all flight control surfaces, were accounted for.

Flight control cable continuity could not be completely established due to the general fragmentation of the wreckage. Cable ends that were identified exhibited overstress indications or were torn from their attachment points.

The landing gear selector handle was found in the up, or retracted, position. The physical position of the landing gear could not be determined due to impact damage. The position of the flaps at the time of the accident could not be determined due to impact damage.

An external examination of the engines was performed during the wreckage review. No evidence of uncontained failure or in-flight fire was observed. The engines were shipped to the manufacturer's facility in Phoenix, Arizona, for a teardown examination under the direction of the NTSB Investigator-in-Charge (IIC).

The propeller assemblies were examined during the wreckage review. Both propellers had similar damage. Each one had the cylinder/piston fractured off. Both propellers were missing their spinners.

The left propeller was still attached to the gearbox; however, the gearbox was separated from the engine due to a fractured engine shaft. The propeller experienced damage due to impact and a power setting or blade angle could not be established; however, slight curved tips and some rotational scoring was noted on the blades.

The right propeller was still attached to the gearbox; however, the gearbox had separated from the engine due to a fractured engine shaft. The "R3" blade was fractured off the clamp assembly. All three blades had slight twisting signatures.

No anomalies were noted with either propeller assembly that would have precluded normal operation. For additional information regarding the examination of the propellers, refer to the Hartzell Propeller Examination Reports, located in the public docket for this accident.

MEDICAL AND PATHOLOGICAL INFORMATION

Pilot

A postmortem examination of the pilot was performed at the Medical University of South Carolina, Charleston, South Carolina on June 21, 2013. The autopsy report noted the cause of death as "Full body blunt trauma due to General aviation collision with ejection" and the manner of death was "Accident."

Forensic toxicology testing was performed on specimens of the pilot by the Federal Aviation Administration (FAA) Bioaeronautical Sciences Research Laboratory (CAMI), Oklahoma City, Oklahoma. The CAMI toxicology report indicated negative for carbon monoxide, ethanol, and

drugs. Testing for cyanide was not performed.

Flight Instructor

A postmortem examination of the flight instructor was performed at the Medical University of South Carolina, Charleston, South Carolina on June 22, 2013. The autopsy report noted the cause of death as "Full body blunt force trauma" and the manner of death was "Accident."

Forensic toxicology testing was performed on specimens of the flight instructor by the Federal Aviation Administration (FAA) Bioaeronautical Sciences Research Laboratory (CAMI), Oklahoma City, Oklahoma. The CAMI toxicology report indicated negative for ethanol. Testing for carbon monoxide and cyanide was not performed. The report indicated that there was diphenhydramine in the liver and urine, pioglitazone in the liver and urine, and 47.3 ug/ml salicylate in the urine.

Diphenhydramine (Benadryl® or Sominex®) is an over-the-counter sedating antihistamine used to treat allergies and Sominex® is marketed as a non-prescription sleep aid. A determination of possible impairment was not possible since there was no blood available for testing.

Pioglitazone (Actos®) is a prescription oral antidiabetic agent that acts primarily by increasing uptake of glucose by peripheral organs and decreasing glucose production by the liver. It is used in the management of type 2 diabetes mellitus. According to CAMI, the flight instructor had diabetes that was treated and controlled with oral medications and was issued a Class 1, Restricted Medical Certificate, not valid for any class after May 31, 2014. He had also lost an eye due to an injury years ago; however, he was evaluated at 20/20 visual acuity in his remaining eye during his most recent FAA medical examination.

Salicylate is a metabolite of aspirin, an over-the-counter anti-inflammatory medication to treat aches and pains, as an antipyretic to reduce fever.

The report also noted 127 mg/dl glucose in the urine. Postmortem urine levels above 100 mg/dL are considered abnormal. No blood was available for hemoglobin A1C analysis.

TESTS AND RESEARCH

Enhanced Ground Proximity Warning System

The airplane was equipped with a Honeywell Enhanced Ground Proximity Warning System (EGPWS). The outer case sustained minor damage; however, the internal memory survived the impact. The unit was sent to Honeywell for download of the data under the direction of a NTSB air safety investigator. Although the unit captured the final portion of the accident flight, the data, according to the manufacturer, was not accurate. The position data was observed in the "dead reckoning" mode, indicating that the GPS data was invalid or went out of navigation mode. This resulted in significant inaccuracies in the aircraft position data toward the end of the recording.

Engines

The engines were examined at the Honeywell facilities at Phoenix, Arizona on September 16 through 18, 2013, under the direction of the NTSB IIC.

The teardown and examination of the left engine, S/N P-79794C, revealed that the type and degree of damage was indicative of an engine that was rotating and operating at the time of

impact. Numerous indicators of rotation and operation were noted, including rotational scoring, ingested and burned organic debris, and metal spray adhesion. No pre-existing condition was found that would have prevented normal operation.

The teardown and examination of the right engine, S/N P-79792C, revealed that the type and degree of damage was indicative of an engine that was rotating and operating at the time of impact. Numerous indicators of rotation and operation were noted, including rotational scoring, ingested and burned organic debris, and metal spray adhesion. No pre-existing condition was found that would have prevented normal operation.

For additional information regarding the examination of the engines, refer to the Honeywell Engine Examination Reports, located in the public docket for this accident.

History of Flight

Maneuvering	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	Age:	44
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 1 With Waivers/Limitations	Last FAA Medical Exam:	05/20/2013
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	1540 hours (Total, all aircraft)		

Flight Instructor Information

Certificate:	Airline Transport; Flight Instructor	Age:	69
Airplane Rating(s):	Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 With Waivers/Limitations	Last FAA Medical Exam:	05/08/2013
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	22300 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROCKWELL INTERNATIONAL	Registration:	N727JA
Model/Series:	690B	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	11399
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	03/04/2013, Annual	Certified Max Gross Wt.:	10325 lbs
Time Since Last Inspection:		Engines:	2 Turbo Prop
Airframe Total Time:	12193 Hours as of last inspection	Engine Manufacturer:	Honeywell
ELT:	C126 installed	Engine Model/Series:	TPE331-Series
Registered Owner:	Nighthawk Air LLC	Rated Power:	776
Operator:	Patrick L. Eudy	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	LRO, 12 ft msl	Distance from Accident Site:	16 Nautical Miles
Observation Time:	1655 EDT	Direction from Accident Site:	240°
Lowest Cloud Condition:	Few / 3400 ft agl	Visibility	7 Miles
Lowest Ceiling:	Broken / 6000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	30.14 inches Hg	Temperature/Dew Point:	24° C / 23° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Charleston, SC (JZI)	Type of Flight Plan Filed:	IFR
Destination:	Charleston, SC (JZI)	Type of Clearance:	IFR
Departure Time:	1633 EDT	Type of Airspace:	

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:	33.061944, -79.523611

Administrative Information

Investigator In Charge (IIC):	Ralph E Hicks	Report Date:	04/23/2014
Additional Participating Persons:	Jim Franklin; FAA/FSDO; Columbia, SC Jay Eller; Honeywell; Phoenix, AZ		
Publish Date:	04/23/2014		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=87248		

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](#).