Aviation Investigation Final Report

Location:	Commerce, Georgia	**Accident Number:**	ERA18FA149
Date & Time:	May 21, 2018, 19:10 Local	**Registration:**	N94909
Aircraft:	Taylorcraft BC12	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot departed on a visual flight rules local flight. A witness saw the pilot conduct a preflight inspection of the accident airplane and depart on a 10-minute flight. When the airplane returned to the airstrip to land, the witness heard the engine rpm "going up and down." After the airplane landed, the pilot began taxiing toward the hangar but then taxied back to the runway for another takeoff. The witness stated that the airplane reached an altitude between about 50 and 75 ft above the runway with the engine sputtering. At that time, the airplane seemed to slow and was just above the trees when the right wing and then the nose dropped, which was followed by an impact with trees.

Postaccident examination of the engine revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation. The weather conditions near the accident site at the time of the accident were conducive to the formation of serious carburetor icing at descent engine power settings. Given that these conditions existed, and that the witness reported the engine rpm may have been fluctuating during the airplane's previous landing approach, it is likely that carburetor ice accumulated during the prior descent and possibly the taxi period that followed prior to the accident takeoff. The undetected partial loss of power during the accident takeoff ultimately led to an aerodynamic stall from which the pilot was unable to recover.

Probable Cause and Findings

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

The pilot's failure to effectively mitigate an accumulation of carburetor ice, which resulted in an undetected partial loss of engine power and an aerodynamic stall during takeoff.

Findings

Personnel issues	Use of equip/system - Pilot
Aircraft	Angle of attack - Capability exceeded
Personnel issues	Aircraft control - Pilot
Environmental issues	Conducive to carburetor icing - Effect on equipment
Environmental issues	Conducive to carburetor icing - Response/compensation

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)
Initial climb	Loss of control in flight
Initial climb	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On May 21, 2018, about 1910 eastern daylight time, a Taylorcraft BC12-D airplane, N94909, was substantially damaged when it collided with trees and terrain during the initial climb after takeoff from a private airstrip in Commerce, Georgia. The commercial pilot was fatally injured. The airplane was registered to and operated by the pilot as a Title 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed for the local flight.

A witness saw the pilot conduct a preflight inspection of the accident airplane and depart from the airstrip. When the airplane returned to the airstrip about 10 minutes later, the witness heard the engine rpm "going up and down." After the airplane landed, the pilot began taxiing the airplane toward the hangar but then turned around and taxied the airplane back to the runway for another takeoff. The witness stated that the airplane reached an altitude between about 50 and 75 ft above the runway. At that time, the airplane seemed to slow and was just above the trees when the right wing and then the nose dropped, which was followed by an impact with trees. The witness reported hearing the engine sputter before the airplane impacted the trees. When the witness arrived at the accident site to assist the pilot, he noticed that fuel was leaking and that the starter motor was running. He thought that the pilot had been attempting to restart the engine. The witness also stated the pilot typically wore hearing aids but was not wearing them during the accident flight and that the pilot might not have heard the engine rpm fluctuating during the landing that occurred before the accident takeoff.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	80,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 28, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 28, 2017
Flight Time:	10366 hours (Total, all aircraft)		

The pilot held a commercial pilot certificate with ratings for airplane single-engine land, airplane multi-engine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single-engine, airplane multi-engine, and instrument airplane. According to the Federal Aviation Administration (FAA), he received an FAA second-class medical certificate on June 28, 2007. A review of the pilot's logbook revealed that he had about 10,266 hours of total flight experience as of March 1, 2017. The number of flight hours between that date and the date of the accident could not be determined. The pilot's logbook also showed that he completed his last flight review on March 28, 2017.

Aircraft and Owner/Operator Information

Aircraft Make:	Taylorcraft	**Registration:**	N94909
Model/Series:	BC12 D	**Aircraft Category:**	Airplane
Year of Manufacture:	1946	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	9309
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	November 17, 2017 Annual	**Certified Max Gross Wt.:**	1200 lbs
Time Since Last Inspection:	2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:	Not installed	**Engine Model/Series:**	A65
Registered Owner:	On file	**Rated Power:**	65 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The Taylorcraft BC12-D was a high-wing, single-engine, two-seat airplane that incorporated a

tailwheel landing gear. The airplane was equipped with a 65-horsepower Continental A65 reciprocating engine and a fixed-pitch Sensenich propeller. The airplane was built in 1946 and was purchased by the pilot on April 29, 2011. According to the most current aircraft logbook, an annual inspection of the airplane was completed on November 17, 2017; the airplane accrued about 1.6 hours of flight time after the inspection.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KAHN,785 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	18:51 Local	**Direction from Accident Site:**	171°
Lowest Cloud Condition:	Scattered / 12000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	25°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Commerce, GA (N/A)	**Type of Flight Plan Filed:**	None
Destination:	Commerce, GA (N/A)	**Type of Clearance:**	None
Departure Time:	18:50 Local	**Type of Airspace:**	Class G

At 1851, the weather conditions reported at Athens/Ben Epps Airport, Athens, Georgia, which was about 12 nautical miles south of the accident site, included calm wind, 10 statute miles visibility, scattered clouds at 12,000 ft, temperature 25°C, dew point 23°C, and an altimeter setting of 30.09 inches of mercury.

Airport Information

Airport:	Private N/A	**Runway Surface Type:**	Grass/turf
Airport Elevation:	869 ft msl	**Runway Surface Condition:**	Rough;Soft;Vegetation
Runway Used:	23	**IFR Approach:**	None
Runway Length/Width:	1900 ft / 40 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.153331,-83.368331(est)

The airplane wreckage was located in a wooded area about 40 ft southeast of the departure end of the runway. The airplane came to rest in a near vertical, nose-down attitude about 97 ft from the point of initial impact with the top of a tree. The wreckage path was orientated on a magnetic heading of 245°. All components of the airplane were accounted for at the accident site. Flight control continuity was confirmed from all flight control surfaces to the cockpit controls. Leading edge damage was present on both wings. Both wings remained attached to the fuselage, but the right wing aft spar was fractured. One propeller blade was undamaged, and the other blade was bent aft with chordwise scratching. The airplane was not equipped with wing flaps or a stall warning system. The main landing gear remained attached to the fuselage.

A fuel smell was noted in the soil under the engine. Residual fuel was present in the fuselage tank; the fuselage tank valve was found in the ON position. One gallon of uncontaminated light blue fuel was present in the left wing tank; no fuel was found in the right wing tank. The left and right wing tank valves were both found in the OFF position. Fuel that was clear and light blue in color, consistent with 100 low-lead fuel, was found in the fuel gascolator. One gallon of fuel was added to the fuselage tank to test for leaks; the fuselage tank fitting leaked fuel.

The engine was examined at Atlanta Air Recovery, Griffin, Georgia. The top spark plugs were removed from the engine for inspection. The electrodes were normal in wear and dark gray/black in color compared with a Champion Check-A-Plug chart. The engine was rotated smoothly by manually turning the propeller hub. Compression and suction were observed on all cylinders, and valve action was correct. The magnetos were removed and spun with a power drill. Spark was observed on all leads on both magnetos. The mixture and throttle control cables remained attached. All cockpit engine controls were in the forward positions. The carburetor heat control knob was in the OFF position. The carburetor was attached to the engine and appeared undamaged. The carburetor was removed and disassembled for examination. The metal float moved freely in the bowl and was intact, and the venturi and butterfly valve were in a serviceable condition. The bowl contained 1 ounce of clear, light blue fuel. The postaccident examination of the engine revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation.

Medical and Pathological Information

An autopsy of the pilot was performed by the Georgia Bureau of Investigation's Division of Forensic Sciences in Decatur, Georgia. The pilot's cause of death was multiple blunt force injuries.

Toxicology testing performed at the FAA Forensic Sciences Laboratory found that fluid and tissue specimens from the pilot tested negative for carbon monoxide and ethanol.

Acetaminophen was present in the pilot's urine specimen, and warfarin and metoprolol were detected in his urine and blood specimens. Acetaminophen is an analgesic commonly known as Tylenol and is not impairing. Warfarin is a blood-thinning medication used to help treat or prevent the clots associated with atrial fibrillation, ischemic stroke, and venous disease. Metoprolol is a blood pressure medication that can also be used to control the rate of fast arrhythmias like atrial fibrillation. Neither drug is considered impairing.

Additional Information

According to the carburetor icing probability chart by the Australian Transport Safety Bureau, the atmospheric conditions about the time of the accident (based on the weather conditions reported near the accident site) were conducive to serious icing at descent power.

FAA Advisory Circular 20-113, "Pilot Precautions and Procedures to be taken in Preventing Aircraft Reciprocating Engine Induction System and Fuel System Icing Problems," states the following: "To prevent accidents due to induction system icing, the pilot should regularly use [carburetor] heat under conditions known to be conducive to atmospheric icing and be alert at all times for indications of icing in the fuel system."

Administrative Information

Investigator In Charge (IIC):	Hill, Millicent
Additional Participating Persons:	Danny Cox; FAA/FSDO; Atlanta, GA
Original Publish Date:	April 20, 2020
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97293