Aviation Investigation Final Report

Location:	Climax, Georgia	**Accident Number:**	ERA17FA107
Date & Time:	February 16, 2017, 18:52 Local	**Registration:**	N3434G
Aircraft:	Beech A45	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was flying a local, personal flight from his personal airstrip after sundown. A witness who heard the airplane before the crash reported that the engine made a "sputtering" sound. The airplane collided with two tall trees and came to rest inverted on the approach end of the runway. The propeller did not exhibit indications of rotational damage. Although the right fuel tank was breached from impact and no fuel was found inside, the left tank contained 11 gallons of fuel.

An annual inspection was completed on the airframe and engine about 2.2 hours before the accident. An examination of the engine fuel lines found the throttle and metering unit outlet AN "B" nut was less than finger-tight. When the fuel manifold valve cap was opened, fuel leaked from the loose throttle and metering unit outlet AN "B" nut. Compressed air was passed through the throttle and metering unit inlet fuel line; bubbles and fuel could be seen coming out of the fuel outlet AN fitting. The condition of the fuel lines was an inspection item specifically noted as completed during the annual inspection. The throttle and metering unit outlet "B" nut most likely was not adequately secured during the inspection and backed off during the 2.2-hour previous flight and the 12-minute accident flight, which subsequently resulted in a total loss of engine power. The pilot was likely attempting to return to the runway, as the landing gear were extended and the flaps were up at the time of the accident. However, since the accident occurred concurrently with the end of civil twilight, it is possible that he did not see the trees on final approach due to the darkening conditions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of maintenance personnel to ensure that the throttle and fuel metering unit AN "B" nut was secured, which resulted in a total loss of engine power in flight and a subsequent collision with trees while attempting to land after sunset.

Findings

Aircraft	Fuel distribution - Inadequate inspection
Personnel issues	Scheduled/routine inspection - Maintenance personnel
Personnel issues	Lack of action - Maintenance personnel
Environmental issues	Dark - Effect on operation

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)
Approach-VFR pattern final	Collision with terr/obj (non-CFIT)

On February 16, 2017, about 1852 eastern standard time, a Beech A45, N3434G, collided with trees and terrain while on final approach for landing at Anderson Airport (GE21), Climax, Georgia. The private pilot was fatally injured, and the airplane was substantially damaged. The airplane was privately owned and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91. Night visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight, which originated about 1840.

According to a friend of the pilot, the accident flight was the pilot's first flight in the airplane since the completion of an annual inspection on February 9, 2017. The friend flew the airplane from Florida to Georgia immediately after the annual inspection and reported that there were no mechanical anomalies during the flight. The friend reported that 2.2 hours of flight time accrued from the completion of the inspection to the beginning of the accident flight. According to the airplane's Hobbs meter, the duration of the accident flight was about 12 minutes.

A neighbor reported that the heard the airplane before the crash. He stated that the engine made a "sputtering" sound before impact, but that the engine did not "backfire."

Pilot Information

Certificate:	Private	**Age:**	50,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 17, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1200 hours (Total, all aircraft)		

The pilot, who was the owner of the airplane, held a private pilot certificate with an airplane single-engine land rating. He reported 1,200 total hours of flight experience on his most recent Federal Aviation Administration (FAA) second-class medical certificate, dated June 17, 2015. His personal pilot logbooks were not located.

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N3434G
Model/Series:	A45 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1957	**Amateur Built:**	
Airworthiness Certificate:	Aerobatic	**Serial Number:**	53-4106
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	February 9, 2017 Annual	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:	2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4609 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-470-KCN
Registered Owner:		**Rated Power:**	260
Operator:	On file	**Operating Certificate(s) Held:**	None

The single-engine, low-wing, tandem-cockpit airplane incorporated retractable, tricycle landing gear. It was equipped with a Continental IO-470-KCN reciprocating engine rated at 260 horsepower. An examination of the maintenance logbooks revealed that the engine accumulated about 1,021 hours since its last major overhaul, which was accomplished in 1983. The airplane, which was stored outside on the pilot's property, had been operated a total of 40 hours during the 11 years before the accident.

According to the maintenance records for the most recent annual inspection, the following items were marked as completed for the engine and engine bay inspection: "Check condition of fuel lines, injection unit, or carburetor," and "Check condition and age of all engine hoses."

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	BGE,141 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	23:55 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.04 inches Hg	**Temperature/Dew Point:**	12°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Climax, GA (GE21)	**Type of Flight Plan Filed:**	None
Destination:	Climax, GA (GE21)	**Type of Clearance:**	None
Departure Time:	18:40 Local	**Type of Airspace:**	Class G

Decatur County Industrial Airpark (BGE), Bainbridge, Georgia, was located about 13 miles west of the accident site. The 1855 weather at BGE included calm wind, 10 statute miles visibility, sky clear, temperature 12°C, dew point 3°C, and altimeter setting 30.04 inches of mercury.

According to sun and moon data for Climax, Georgia, sunset occurred at 1827 and the end of civil twilight occurred at 1851.

Airport Information

Airport:	Anderson Airport GE21	**Runway Surface Type:**	Grass/turf
Airport Elevation:	138 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	18	**IFR Approach:**	None
Runway Length/Width:	3350 ft / 75 ft	**VFR Approach/Landing:**	Traffic pattern

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:**	31.023611,-84.393058(est)

The airplane came to rest inverted on the approach end of runway 18. The unlit, grass runway was part of the pilot's personal property. Oak and pine trees were located at the northern boundary of the runway. Examination of the accident site revealed that the airplane was traveling on a southerly heading and collided with two oak trees before contacting the ground. The airplane's tail cone remained lodged in one of the trees, and numerous broken tree limbs were found adjacent to the wreckage. The distance from the initial impact with the tree to the main wreckage was 109 ft.

All structure and components of the airplane were accounted for at the accident site. The landing gear were found in the extended position and the wing flaps were retracted. Flight control continuity was confirmed from the ailerons, elevator, and rudder to the cockpit controls. The cockpit fuel selector handle was found in the right tank position.

The right wing was crushed and buckled; its 25-gallon-capacity bladder fuel tank was ruptured from impact forces and contained no quantifiable fuel or fuel residue. The fuel filler cap was installed and secure. All fuel lines and vents were unobstructed. The inboard section of the wing remained attached to the fuselage. The outboard section was severed near wing station 113 and was found adjacent to the inboard wing section.

The left wing exhibited impact damage at the leading edge of the wingtip. The fuel filler cap was installed and secure. All fuel lines and vents were unobstructed. The left wing fuel tank was intact, and fuel was observed dripping from the fuel cap while the airplane was inverted at the accident site. The amount of fuel that leaked from the left wing tank before recovery was not determined. After recovery, about 11 gallons of blue-colored fuel were recovered from the left wing tank. No water or other contaminants were found in the recovered fuel.

The left horizontal stabilizer and elevator exhibited impact damage from stabilizer station 15 outboard to the tip. The right horizontal stabilizer and elevator were undamaged. The vertical stabilizer and rudder exhibited ground impact damage at the upper tips of their surfaces.

The wreckage was moved to a storage facility, where the engine was removed from the airframe and examined.

The engine remained partially attached to the airframe through cables, wires, and hoses; all four engine mounts were broken and the engine displayed impact damage. The crankcase remained intact and displayed minor impact damage. The crankshaft remained intact and was undamaged. All six cylinders remained attached to their cylinder bays and displayed varying amounts of impact damage. The engine's two-blade propeller was undamaged and attached to the crankshaft; there was no discernible bending or twisting of the blades. The propeller spinner showed no rotational damage signatures.

Internal continuity of the engine was confirmed through manual rotation of the propeller. Compression and suction were confirmed on all cylinders. Valve action was correct. The accessory drive gears rotated normally when the propeller was manually rotated.

The left and right magnetos remained attached to their installation points and were undamaged. During crankshaft rotation, the impulse couplings were heard operating; the magnetos produced spark at all posts in the correct order during impulse coupling operation.

All spark plugs remained installed in their cylinders and were undamaged. The spark plugs were removed and all of the electrodes were medium gray in color and showed minimal wear when compared to a Champion inspection chart. The Nos. 2 and 4 bottom plugs were oil-soaked. All 12 spark plugs produced spark from the ground electrode to the center electrode during impulse coupling operation.

The fuel pump remained attached to its installation point and displayed impact damage signatures; the fuel inlet AN fitting was broken free from the fuel pump. The fuel pump was removed, and the fuel pump drive was intact; it was noted during removal that the fuel pump outlet AN "B" nut was not tight. The fuel return line from the throttle and metering unit was placed into a bucket of fuel and the drive shaft was rotated using a drill; the fuel pump was capable of pumping fuel.

The throttle and metering unit remained attached to the engine and was undamaged. The rubber coupling attaching the throttle body to the induction Y-tube exhibited dry rot signatures. The mixture and throttle control arms remained secured to their shafts and the control cable rod ends remained secured to the control arms. An examination of the fuel lines found the throttle and metering unit outlet AN "B" nut was less than finger tight. When the manifold valve cap was opened, fuel leaked from the loose throttle and metering unit outlet AN "B" nut. Compressed air was passed through the throttle and metering unit inlet fuel line; bubbles and fuel could be seen coming out of the fuel outlet AN fitting. While applying compressed air, the mixture control and throttle control were actuated and it was noted that both controls were capable of modulating the air coming out of the outlet line. The fuel outlet B-nut was removed by hand; there was no damage noted to the outlet elbow threads and the fuel line did not exhibit any impact damage. The fuel inlet screen was removed and there were no contaminants noted within the screen.

The fuel manifold valve remained attached to the engine and was undamaged. The manifold cap screws were not safety wired and the data plate was missing. When the manifold valve was disassembled, fuel drained out of the manifold valve and the fuel line going from the metering unit to the manifold valve. The rubber diaphragm was undamaged. The internal components of the manifold valve were visually inspected; there were no anomalies noted and the screen was clear of contaminants.

All 6 fuel nozzles remained installed in their cylinders and were undamaged. The nozzles were removed and were clear of obstructions.

The oil screen remained secured and was properly safety wired. The screen was removed and was visually inspected; no metallic particles were noted on the screen surfaces.

Medical and Pathological Information

The Georgia Bureau of Investigation Division of Forensic Sciences performed an autopsy on the pilot. The cause of death was multiple blunt force trauma, and the manner of death was accident.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma performed toxicology testing on specimens from the pilot. The specimens tested negative for carbon monoxide, ethanol, and a wide range of drugs, including major drugs of abuse.

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Steve Davidson; FAA FSDO; Atlanta, GA Andrew Hall; Textron Aviation; Wichita, KS Kurt Gibson; Continental Motors Inc.; Mobile, AL
Original Publish Date:	April 23, 2018
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94722