Aviation Investigation Final Report

Location:	El Dorado, Arkansas	**Accident Number:**	CEN15FA374
Date & Time:	August 23, 2015, 11:51 Local	**Registration:**	N9704Y
Aircraft:	Beech 35 B33	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was conducting a cross-country flight and had departed about 5.5 hours before the accident. The pilot originally filed a flight plan that covered 689 nautical miles (nm); however, he had to divert because of weather, so he changed his destination airport. When he neared the destination, he was cleared for the RNAV/GPS runway 4 approach and reported that he had the airport in sight. The total distance traveled was 722 nm. A witness stated that the pilot reported that he intended to circle for an approach to runway 31 and that he saw the airplane circling south of the airport. Shortly thereafter, the airplane impacted trees and terrain in an inverted, nose-down attitude, and the airplane's cabin was almost completely consumed by a postimpact fire.

A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. Additionally, the propeller and propeller spinner damage was consistent with no engine rotation during the impact.

The airplane was equipped with two fuel tanks, one in each wing, and a fuel selector with positions for selecting the left or right fuel tank with an additional position for turning off the fuel flow. There was no position available for drawing fuel from both tanks simultaneously. The fuel selector valve was not observed, and the determination of which tank was selected could not be determined. Although the departure fuel quantity could not be determined, calculations indicated that, if the airplane had full fuel tanks at the time of departure, it would have had an endurance of about 6.5 hours with an additional 45 minutes reserve fuel capacity at a reduced power setting. It could not be determined how much fuel was onboard the airplane at the time of the impact.

A weather system was approaching the airport at the time of the accident, and lightning was recorded in the distance. It is possible that the pilot became distracted during the instrument approach by the approaching weather system and may not have selected the fullest fuel tank for the approach. This could have led to fuel starvation and a loss of engine power while he was maneuvering to land. Because the quantity of fuel before takeoff or the quantity remaining in each fuel tank at the accident site could not

be determined, a loss of power due to fuel exhaustion could not be ruled out. Based on the available evidence, the engine lost power for a reason that could not be determined. Subsequently, the pilot likely attempted to extend the airplane's glide to reach the runway and exceeded its critical angle-of-attack, which resulted in an aerodynamic stall and loss of control.

Probable Cause and Findings

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

The loss of engine power for reasons that could not be determined during postaccident examination of the accident site or based on the available information and the pilot's failure to maintain adequate airspeed and his exceedance of the airplane's critical angle-of-attack after the engine power loss, which led to an aerodynamic stall and loss of control.

Findings

Not determined	(general) - Unknown/Not determined
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Capability exceeded

Factual Information

History of Flight

Approach-VFR pattern final	Loss of engine power (total) (Defining event)
Approach-VFR pattern final	Loss of control in flight

HISTORY OF FLIGHT
On August 23, 2015, about 1151 central daylight time, a Beech model 35-B33 airplane, N9704Y, was destroyed when it impacted trees and terrain while approaching to land on runway 31 at the South Arkansas Regional Airport (ELD), near El Dorado, Arkansas. The private pilot was fatally injured. The aircraft was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed during the landing approach and the flight was operated on an instrument flight rules (IFR) flight plan. The flight originated from the Florence Regional Airport (FLO), near Florence, South Carolina about 0609. The intended destination was the Memorial Field Airport (HOT), Hot Springs, Arkansas.

The route of flight that the pilot had filed with his IFR flight plan was from FLO to the Colliers VORTAC (IRQ), Colliers, South Carolina, to the Atlanta VORTAC (ATL), Atlanta, Georgia, to the Talladega VOR/DME (TDG), Talladega, Alabama, to the Vulcan VORTAC (VUZ), Birmingham, Alabama, to the Bigbee VORTAC (IGB), Columbus, Mississippi, to the Sidon VORTAC (SQS), Sidon, Mississippi, to the Greenville VOR/DME (GLH), Greenville, Mississippi, to the Bunns intersection (BUNNS), near Carthage, Arkansas, to HOT. The calculated distance from FLO to HOT using the intended route of flight was 689 nautical miles (nm).

Radar flight track data indicated that the airplane departed FLO about 0609 and proceeded on a heading of about 250 degrees, and climbed to 8,000 feet above mean sea level. At this time, the airplane was following the intended route of flight. When the airplane was about 82 nm from FLO, the pilot requested a change to his originally filed route of flight due to weather. The requested deviation of the flight from the intended route coincided with a weather system that was present west of Columbia, South Carolina, that extended north to south over ATL. The request was approved and when the airplane was about 85 nm from FLO, at 8,000 feet msl, it turned further south to a heading of about 240 degrees, which was away from the originally filed route. The airplane continued on this heading for about 190 miles before turning to a heading of about 270 degrees for about 85 miles. During this time, the pilot requested a change to his intended destination from HOT to ELD. The controller approved the request and cleared the flight direct to the Montgomery VORTAC (MGM), Montgomery, Alabama, and then direct to ELD. The airplane proceeded on a heading of 270 degrees, until reaching MGM, and then to a heading of 280 degrees for about 305 nm. This heading placed the airplane on a direct track toward ELD. About 1131, the flight was cleared for the RNAV/GPS runway 4 instrument approach to ELD. A short time later, the pilot reported that he had the airport in sight and was below the clouds, and he cancelled his IFR clearance. The final portion of the radar data showed the airplane maneuvering on the instrument approach. The final recorded radar position was about 2.5 nm and 210 degrees from ELD. The total duration of the flight based on the radar data obtained was 5:36:41, and the total distance travelled was 722 nm.

PERSONNEL INFORMATION
The pilot, age 51, held a private pilot certificate with airplane single-engine land and instrument airplane ratings. He also held a third class Airman Medical Certificate, issued on November 13, 2014. The medical certificate stated that the pilot must wear corrective lenses. The pilot reported having 1,806 hours total flight experience with 50 hours in the six months preceding his medical examination. The pilot's flight logbook was not recovered during the investigation.

AIRCRAFT INFORMATION
The airplane was a Beech model 35-B33, Debonair, bearing serial number CD-597. The airplane was a six seat low wing monoplane with a retractable tricycle landing gear. It was constructed primarily of aluminum alloy materials and was powered by a six cylinder Continental IO-470-K reciprocating engine rated to produce 225 horsepower.

According to maintenance records, the airplane had undergone an annual inspection on December 5, 2014. At the time of the annual inspection the airplane had accumulated 6,768 hours total time in service, and the engine had accumulated 1,617 hours since its most recent overhaul.

METEOROLOGICAL INFORMATION
At 1153, the recorded weather conditions at ELD were; wind from 10 degrees at 17 knots gusting to 25 knots, visibility 10 statute miles, scattered clouds at 1,900 feet above ground level (agl), overcast clouds at 3,600 feet agl, temperature 27 degrees Celsius, dew point 21 degrees Celsius, altimeter setting 30.13 inches of mercury. The remarks section of the weather report noted lightning in the distance to the north of the airport. A weather radar plot of the area indicated an approaching weather system located northwest of the airport at the time of the accident.

COMMUNICATIONS
An employee at ELD reported that he heard the accident pilot report over the radio that he was on approach to runway 4 and his intention to circle to land on runway 31. The employee stated that he went onto the ramp to direct the airplane to parking when it arrived and he saw it circling south of the airport for a left hand traffic pattern to runway 31. A few minutes later the employee went into a building at the airport and tuned a handheld radio to the approach control frequency to see if the pilot was communicating with ATC. He stated that he could hear the controller issuing weather updates, but did not hear the pilot of the accident airplane.

AIRPORT INFORMATION
ELD was owned by the city of El Dorado, Arkansas. It was open for public use and had two intersecting runways, 13/31 and 4/22. Runway 13/31 was an asphalt paved runway that was 5,100 feet long by 100 feet wide. Runway 4/22 was an asphalt paved runway that was 6,601 feet long by 150 feet wide. There were five instrument approach procedures associated with the airport, which included the RNAV (GPS) RWY 4 approach used by the accident pilot.

WRECKAGE AND IMPACT INFORMATION
The airplane came to rest in a densely wooded area about 2,200 feet from the approach end of runway 31 at ELD. The trees were estimated to be about 100 feet in height. The accident site was on airport property, but outside of the airport boundary fence. The airplane had impacted in a near vertical attitude as evidenced by the lack of damage to the tall trees. The airplane came to rest in an inverted position and the engine was beneath portions of the fuselage. An outboard section of the left wing was separated and

located about 50 feet from the main wreckage. The inboard section of the left wing was located with the main wreckage and still had the flap and aileron attached to it. The right wing was predominately intact and the flap and aileron remained attached. The nose landing gear and the left main landing gear were noted in the extended position. The right main landing gear was in the wheel well. The flaps appeared to be retracted. The tail surfaces were still attached to the aft fuselage and the elevator and rudder remained attached. The fuselage cabin section was almost completely consumed by fire. Both fuel tanks were ruptured and it was not possible to determine how much fuel remained or which tank contained the majority of the remaining fuel. The airplane was removed from the accident scene for further examination. The fuel selector valve and handle was not observed and the strainer bowl was melted.

The engine cowling was removed and an attempt to rotate the engine was unsuccessful due to impact damage to accessories mounted on the rear of the engine. Following removal of the fuel pump, magnetos, vacuum pump and starter drive adapter from the rear accessory case, the engine was able to rotate freely. The upper spark plugs were removed and exhibited a normal but worn appearance. The engine was rotated and valve movement was verified on all cylinders. Suction and compression were verified on all cylinders except for the no. 2 cylinder. The rocker arms for the no. 2 cylinder were removed and the valves "staked". The engine was again rotated and compression was verified on the no. 2 cylinder. The fuel hoses from the airframe to the mechanical fuel pump and to the fuel servo were damaged by the post-impact fire. The fuel manifold valve assembly on top of the engine was intact. The cover was removed and no fuel was observed within the assembly.

The airplane had a two bladed constant speed propeller. The blades were predominately straight with no apparent evidence of rotation at impact. The spinner nose cone was crushed and also had no apparent evidence of twisting.

The airplane's control system was examined. Control continuity was verified from all primary control surfaces (rudder, elevator, right aileron, left aileron) to the cockpit area where cuts in the cables to facilitate wreckage removal had been made. The aileron sprocket from the control yoke was found along with the associated chain/cable assembly. The chain was intact. The cables were intact from the chain to the cuts that had been made for wreckage removal and each cable remained attached to the chain.

The separated portion of the airplane's left wing exhibited a semicircular indentation consistent with a tree strike. The angle represented by the indentation along with the resting attitude of the wreckage was consistent with an inverted left wing low impact angle. No apparent pre-impact structural defects were identified.

The airplane's instrument panel was destroyed by the post-impact fire.

The postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed at the Arkansas State Crime Laboratory on August 25, 2015. The pilot's death was attributed to thermal injuries received in the accident.

Toxicology testing was performed by the FAA Civil Aerospace Medical Institute. Testing results were negative for all substances in the screening profile.

ADDITIONAL INFORMATION

Fueling records from the departure airport indicated that the airplane was fueled with 7.6 gallons of aviation gasoline 4 days prior to the accident flight. It was not known if the airplane fuel tanks were filled at the time of the fueling, or if the airplane had been flown after the fueling and prior to the accident flight.

The airplane was equipped with two fuel tanks, one in each wing, and a fuel selector with positions for selecting the left, or right fuel tank with an additional position for turning off the fuel flow. There was no position available for drawing fuel from both tanks simultaneously. The total useable fuel capacity was 74 gallons. The fuel selector valve was not observed and determination of which tank was selected was not possible.

The radar track data along with winds aloft data were used to determine the average airspeed of the airplane during the cruise portion of the flight. Based on the data obtained, the airplane's average cruise airspeed was about 142 knots. Using performance data for the accident airplane, the calculated average cruise speed correlated to a power setting of about 55 percent of maximum continuous power. Based on this power setting, the airplane, with full fuel tanks at departure, would have had an endurance of about 6.5 hours with an additional 45 minutes reserve fuel capacity at 45 percent of maximum continuous power. The total duration of the accident flight based on radar data obtained was 5:36:41, and the total distance travelled was 722 nm.

Pilot Information

Certificate:	Private	**Age:**	51
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	November 13, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1806 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N9704Y
Model/Series:	35 B33 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1963	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	CD-597
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	December 5, 2014 Annual	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	6768 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	I0-470-K
Registered Owner:	On file	**Rated Power:**	225 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ELD,277 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Scattered / 1900 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 3600 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	17 knots / 25 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	10°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	27°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	FLORENCE, SC (FLO)	**Type of Flight Plan Filed:**	IFR
Destination:	HOT SPRINGS, AR (HOT)	**Type of Clearance:**	IFR
Departure Time:	07:09 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	South Arkansas Regional ELD	**Runway Surface Type:**	Asphalt
Airport Elevation:	277 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	31	**IFR Approach:**	Circling;Global positioning system
Runway Length/Width:	5100 ft / 100 ft	**VFR Approach/Landing:**	Full stop

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	33.220832,-92.813331

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Bill Aldrich; FAA; Little Rock, AR Mike Council; Continental Motors; Mobile, AL Jan Smith; Textron Aviation; Wichita, KS
Original Publish Date:	May 23, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91839