



National Transportation Safety Board Aviation Accident Final Report

Location:	Orange, TX	Accident Number:	CEN15FA214
Date & Time:	05/02/2015, 1015 CDT	Registration:	N5176C
Aircraft:	BEECH B35	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	2 Serious
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

Shortly after the private pilot and flight instructor took off on a local training flight several witnesses reported seeing the airplane's wings rocking back and forth just before the airplane struck power lines and then terrain. None of these witnesses reported hearing a loss of engine power. Neither of the pilots recalled the events leading up to the accident or the accident itself.

Witness marks on the airplane and propeller were consistent with an impact with power lines. Signatures on the propeller were consistent with little to no engine power at the time of the impact with the power lines; however, investigators were unable to determine if the pilot reduced engine power, or if the engine lost power, before impact. An examination of the airframe and engine revealed no preimpact anomalies that would have precluded normal operation.

The airplane was determined to be 100 lbs over gross weight (about 2,751 lbs) at the time of takeoff. Calculations using the airplane's performance charts and the weather conditions that existed at the time of the accident indicated that the airplane had sufficient runway available to clear a 50-ft obstacle at a gross weight of 2,600 pounds. It is unknown how significantly the airplane's overweight condition would have impacted the airplane's climb performance.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The impact with power lines for reasons that could not be determined based on the available information.

Findings

Environmental issues	Wire - Not specified (Cause)
Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

HISTORY OF FLIGHT

On May 2, 2015, about 1015 central daylight time, a Beech B35 airplane, N5176C, was substantially damaged when it collided with a powerline and then the ground shortly after takeoff from Orange County Airport (KORG), Orange, Texas. The private pilot and flight instructor were seriously injured. The airplane was registered to Webb Real Estate Investments Inc. and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan. The local flight was originating at the time of the accident.

According to one witness at the airport, the airplane taxied out and conducted an engine run-up. The witness estimated that the airplane was on the ground for 30 to 45 minutes. He did not hear anything abnormal during the run-up – the witness did not see the takeoff.

Several witnesses, located to the east of the airport, observed the airplane wings "rocking" back and forth just prior to the impact with the power lines and terrain. None of these witnesses reported hearing anything unusual.

The airplane impacted terrain ½ mile from the departure end of runway 4.

In a telephone conversation with the pilot immediately following the accident, he stated he did not recall anything about the accident flight. Despite several attempts by the Investigator in Charge, the pilot did not return the National Transportation Safety Board (NTSB) Pilot/Operator Aircraft Accident Report, NTSB 6120.1/2 form. The flight instructor did not recall anything from the accident flight. His NTSB Pilot/Operator Aircraft Accident Report, NTSB 6120.1/2 form was received on July 27, 2015.

PERSONNEL INFORMATION

Private Pilot

The pilot, age 64, held a private pilot certificate with an airplane single engine land rating. His most recent third class airman medical certificate was issued on December 2, 2014. The certificate contained the limitation "Must wear corrective lenses."

The private pilot's flight logbook was located in the airplane. The logbook contained flight entries from March 26, 2011, through April 19, 2015. The last page with logged flight time had a carryover total time of 885.3 hours. Four flights were logged with a total of 6.3 hours; three flights (5.8 hours) were logged in the accident airplane under dual instruction. He had logged 0.7 hours of ground instruction in "propeller systems, gear systems, and emergency procedures" on April 17, 2015. The pilot had successfully completed the requirements of a flight review on August 23, 2013, and had logged 5 landings within the previous 90 days.

Flight Instructor

The flight instructor, age 66, held an airline transport pilot certificate with an airplane multiengine land rating, and commercial pilot certificate with airplane single engine land, and rotorcraft helicopter ratings, a flight instructor certificate with airplane single, multiengine, and instrument ratings, advanced and instrument ground instructor certificate, and an airframe and power plant mechanic certificate. His most recent second class airman medical

certificate was issued on January 20, 2015. The certificate contained the limitation "Must wear corrective lenses."

According to Federal Aviation Administration (FAA) records he had logged no less than 15,620 hours. The flight instructor did not provide his total time, time in the make and model of the accident airplane, or the date of his last flight review. The entries in the private pilot's logbook indicated that the flight instructor had provided the previous instruction in the accident airplane to the private pilot.

AIRCRAFT INFORMATION

The accident airplane, a Beechcraft B35 (serial number D-2375), was manufactured in 1950. It was registered with the FAA on a standard airworthiness certificate for normal operations. A Continental E-225-8 engine rated at 225 horsepower at 2,650 rpm powered the airplane. The engine was equipped with a 2-blade Beechcraft 215-107 propeller.

The airplane was maintained under an annual inspection program. A review of the maintenance records indicated that an annual inspection had been completed on November 12, 2014, at an airframe total time of 6,099.17 hours.

This airplane was equipped with a pressure-type carburetor. In this design the fuel did not flow across the throttle plate, therefore the system was not susceptible to carburetor icing. The airplane was not equipped with carburetor heat – only alternate air in the event that the filter iced over.

METEOROLOGICAL INFORMATION

The closest official weather observation station was Orange County Airport, Orange, Texas (KORG). The elevation of the weather observation station was 13 feet mean sea level (msl). The routine aviation weather report (METAR) for KORG, issued at 1015, reported, wind 340 degrees at 3 knots, visibility 10 miles, sky condition clear, temperature 25 degrees Celsius (C), dew point temperature 12 degrees C, altimeter 30.11 inches.

Calculations of relevant meteorological data revealed the density altitude was 1,143 feet.

A review of the carburetor icing probability chart, located in the FAA's Special Airworthiness Information Bulletin CE-09-35, dated 6/30/2009, revealed that the airplane was operating in an area favorable for the formation of serious carburetor icing at glide power. The plotted point was not near the threat area for icing in pressure-type carburetors.

AIRPORT INFORMATION

KORG is a public uncontrolled airport located 3 miles southwest of Orange, Texas, at a surveyed elevation of 13.2 feet. The airport had 2 open runways, runway 4/22 (5,500 feet by 75 feet, asphalt), and runway 13/31 (3,000 feet by 50 feet, turf).

FLIGHT RECORDERS

The accident airplane was equipped with an Electronics International MUX-8A (serial number 079179). The unit was not damaged and the non-volatile flash memory was extracted normally, at the National Transportation Safety Board Vehicle Recorders Laboratory, following the manufacturer's procedures. The data extracted spanned from November 23, 2005, through May 2, 2015. Data consistent with the accident flight were sampled once every six minutes and included two sets of data.

The first set of data was recorded at 0957 and provided the following readings:

EGT1 - 950 EGT2 - 977 EGT3 - 927 EGT4 - 1015 EGT5 - 1000 EGT6 - 967
CHT1 - 236 CHT2 - 237 CHT3 - 246 CHT4 - 242 CHT5 - 234 CHT6 - 219

The second set of data was recorded at 1003 and provided the following readings:

EGT1 - 1073 EGT2 - 1152 EGT3 - 1032 EGT4 - 1130 EGT5 - 1112 EGT6 - 1065
CHT1 - 333 CHT2 - 335 CHT3 - 347 CHT4 - 332 CHT5 - 307 CHT6 - 323

According to Continental Motors, the exhaust gas temperature (EGT) numbers did not approach typical full power temperatures.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in level terrain vegetated with grass. The accident site was at an elevation of 16 feet msl and the airplane impacted on a magnetic heading of 040 degrees.

The main wreckage included the right wing, the left-wing, the fuselage, and the engine and propeller assembly. Both wings remained attached to the fuselage. The engine partially separated at both upper engine mounts.

The cabin of the airplane was impact damaged and the occupiable space of the cabin was not compromised or reduced except for at the floorboard rudder pedals. The forward wind screen was broken on the left side and was impact damaged. The throw over single control yoke was impact damage and separated. The damage was consistent with the yoke being on the pilot's side at the time of impact and separation. The instrument panel was impact damaged. The turn coordinator glass was impact damaged. The magneto key was found in the "both" position. The throttle control was about 1 inch out. The propeller control was impact damaged and the mixture control was full rich.

The leading edge of the right wing was crushed, torn, and wrinkled. A 4-foot section of the leading edge of the wing about mid span was torn and separated. The right aileron separated at the outboard hinge and was bent and wrinkled. The inboard trailing edge of the right flap was bent up. The right main landing gear was retracted and secured within the wheel well. Control continuity for the aileron was confirmed from the flight control inboard to the control yoke. The outboard bottom portion of the right wing contained witness marks consistent with a wire strike.

The left-wing was bent up and diagonally wrinkled about mid span. The skin along the leading edge was crushed and wrinkled. The inboard trailing edge of the flap was torn. The left aileron remained attached and was wrinkled. Control continuity for the aileron was confirmed from the flight control inboard to the control yoke. Discoloration on the leading edge of the left wing was consistent with arcing.

The empennage was partially separated from the airframe. A small section was cut for recovery purposes. The emergency locator transmitter was in the "On" position and was shut off by the airport manager following the accident. The elevator/rudder control continuity was confirmed from the separation point aft to the control surfaces. The separation points on all but one of the control cables were consistent with overload and impact damage. One cable was cut during the recovery process.

The upper and lower skin on the left elevator/rudder was wrinkled. The flight control was

unremarkable. The right elevator/rudder was unremarkable. The skin on the fuselage from the separation point to the empennage was wrinkled on both sides.

The propeller assembly remained attached to the engine at the propeller flange. The upper and lower cowling and firewall were wrinkled and torn. One lead on the right magneto harness was impact damaged. Fuel was observed in the lines up to the fuel pump. The upper bank of spark plugs were removed and appeared new. No external catastrophic damage was observed on the engine.

The propeller blades were arbitrarily labeled "A" and "B" for identification purposes in the report. Blade A was bent aft about 90° about 12 inches outboard from the propeller hub.

The face of the propeller blade at the bend was abraded. The propeller was otherwise unremarkable. The spinner of the propeller was crushed on the bottom. Blade B was bent aft slightly and exhibited witness marks along the face of the blade consistent with a wire strike. There was no rotational scoring evident on the face or edge of either blade.

Two 25-pound gym weights and an air conditioner cooler flow in-line blower were located in the back of the airplane. The cooler was full of 8 one half gallon plastic bottles of water. They were frozen at the time of the accident. The weight of the cooler and water was 49.4 pounds.

No preaccident mechanical malfunctions or failures were found that would have precluded normal operation.

The mechanic who assisted in recovering the airplane following the accident reported that the fuel tanks were full. The left fuel tank contained 15.5 gallons, the right fuel tank contained 16 gallons, and the auxiliary tank contained 8 gallons.

TESTS AND RESEARCH

The engine was relocated to Mobile, Alabama, for further examination.

The accessory case, alternator, engine mount, and carburetor were impact damaged. The mounting point on the accessory case for the starter was repaired and an exemplar carburetor was mounted for engine run purposes only.

The engine was fitted with exhaust tubing, thermo couplings, pressure lines, and test pads for test purposes only, and was relocated to the engine test cell. The engine was mounted to the test cell for operation and a test club propeller for the engine was attached at the propeller flange. A pre-engine run compression test was performed with the following results: Cylinder 1 – 2, cylinder 2 – 7, cylinder 3 – 63, cylinder 4 – 10, cylinder 5 – 22, and cylinder 6 – 7. Master orifice level prior to the test was 39.

The engine started and ran through a series of rpm increases for 20 minutes without any hesitation, stumbling, or interruption in power. Cylinder temperature, manifold pressure, oil temperature, oil pressure, fuel pressure, and fuel temperature were monitored and recorded at varying engine rpms. A post-engine run compression test was performed with the following results: Cylinder 1 – 60, cylinder 2 – 40 (exhaust), cylinder 3 – 75, cylinder 4 – 40 (exhaust), cylinder 5 – 52 (exhaust), and cylinder 6 – 40 (exhaust).

The carburetor was impact damaged and could not be functionally tested. The mixture arm was bent, and the casing for fuel metering valve and case for the throttle valve were impact damaged. The fuel screen was free of visible contamination. The carburetor was disassembled – no anomalies were noted that would have precluded normal operation.

ADDITIONAL INFORMATION

Weight and Balance

According to the most recent weight and balance, dated November 23, 2005, the basic empty weight of the airplane (including engine oil) was 1,835.7 pounds. According to the FAA Type Certificate Data Sheet, the airplane's maximum weight was 2,650 pounds. Fuel receipts and entries in the pilot's logbook indicated the last flight was on April 19, 2015, and the airplane was serviced with 12 gallons of fuel on April 25, 2015. It was reported that the two main fuel tanks and auxiliary fuel tank were full (39.5 gallons of fuel recovered). The useful fuel weight was 252 pounds. The combined weight of the pilot and flight instructor was 564 pounds (based upon their weights reported during medical certificate application). The weight of the gym weights and cooler of ice was 99.4 pounds. The estimated weight of the airplane at takeoff was at least 2,751.1 pounds.

According to a weight and balance calculation document found in the wreckage, the empty weight of the airplane was 1,670 pounds, the weight of the occupants was estimated at 520 pounds, baggage and cargo was estimated at 200 pounds, and 10 pounds of fuel was deducted for engine start, taxi, and takeoff allowances. The total fuel weight was 264 pounds and the sub total takeoff weight was calculated at 2,644 pounds.

Takeoff Performance

According to the takeoff distance chart located in the Beechcraft B-35 pilot operating handbook, performance section, the airplane should have required between 700 (no obstacle) and 1,300 feet (50-foot obstacle). The conditions for this performance include takeoff power, flaps up, landing gear retracted, and mixture leaned to maximum rpm at full throttle. A temperature of 25 degrees C, a weight of 2,600 pounds, and a headwind of 3 knots were also factored.

History of Flight

Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	Age:	64, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	12/02/2014
Occupational Pilot:	No	Last Flight Review or Equivalent:	08/23/2013
Flight Time:	891.6 hours (Total, all aircraft), 5.8 hours (Total, this make and model), 5.8 hours (Last 90 days, all aircraft), 5.8 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Flight Instructor Information

Certificate:	Airline Transport; Flight Instructor; Commercial	Age:	66, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	No
Medical Certification:	Class 2 With Waivers/Limitations	Last Medical Exam:	01/20/2015
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 15620 hours (Total, all aircraft), 5.8 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	BEECH	Registration:	N5176C
Model/Series:	B35 NO SERIES	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	D-2375
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	11/12/2014, Annual	Certified Max Gross Wt.:	2553 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	6099.17 Hours	Engine Manufacturer:	Teledine Continental Motors
ELT:	Not installed	Engine Model/Series:	E-225-8
Registered Owner:	Webb Real Estate Investments, Inc	Rated Power:	225 hp
Operator:	On file	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	KORG, 13 ft msl	Observation Time:	1015 CDT
Distance from Accident Site:	1 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	180°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	25° C / 12° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	3 knots, 340°	Visibility (RVR):	
Altimeter Setting:	30.11 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Orange, TX (KORG)	Type of Flight Plan Filed:	None
Destination:	Orange, TX (KORG)	Type of Clearance:	None
Departure Time:	1015 CDT	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	2 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Serious		

Administrative Information

Investigator In Charge (IIC):	Jennifer Rodi	Adopted Date:	07/12/2016
Additional Participating Persons:	Jefferson A Riff; FAA FSDO; Houston, TX Henry J Soderlund; Textron Aviation; Wichita, KS Mike Council; Continental Motors; Mobile, AL		
Publish Date:	07/12/2016		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91118		

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