



# Aviation Investigation Final Report

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<b>Location:</b>	McAlester, Oklahoma	<b>Accident Number:</b>	CEN17LA357
<b>Date &amp; Time:</b>	September 15, 2017, 16:20 Local	<b>Registration:</b>	N18403
<b>Aircraft:</b>	Beech A36	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

The private pilot stated that the flight originated with full fuel tanks. About 8 minutes after takeoff, he noticed fuel leaking from the left fuel tank cap for a short period. The pilot continued the flight, switching fuel tanks every 25 minutes. The flight continued uneventfully until the engine lost total power while the airplane was entering the downwind leg to land. The pilot switched fuel tanks and attempted to restart the engine to no avail. The pilot performed a forced landing in a field; the airplane touched down hard and contacted a hay bale, which resulted in substantial damage to the wings and compromised the fuel system. Postaccident examination of the main fuel tank caps revealed the O-rings were cracked. Maintenance records showed that the O-rings were replaced about 17 months before the accident. Although it is unknown how much fuel leaked from the fuel cap during the flight, the pilot reported that, about 50 minutes before the accident, both fuel tanks were indicating about 3/4 full; thus, it is doubtful that enough fuel would have leaked to result in fuel exhaustion. A postaccident engine test run was conducted with the fuselage strapped down on a trailer; an alternate fuel system was rigged to both the left and right fuel inlet lines at the fuselage. The engine started without hesitation and ran smoothly up to 1,500 rpm using the left fuel tank inlet. The test was repeated using the right fuel tank inlet, and the engine performed in the same manner. The rpm was not increased any higher due to the security of the fuselage during the test. Postaccident examination of the engine did not reveal evidence of preimpact malfunctions or failures that would have precluded normal operation; thus, the reason for the loss of engine power could not be determined.

## Probable Cause and Findings

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

A total loss of engine power for reasons that could not be determined because postaccident examination of the engine did not reveal any evidence of mechanical malfunctions or failures that would have precluded normal operation.

## Findings

<b>Not determined</b>	(general) - Unknown/Not determined
<b>Environmental issues</b>	(general) - Contributed to outcome

## Factual Information

### History of Flight

<b>Approach</b>	Loss of engine power (total) (Defining event)
<b>Landing-flare/touchdown</b>	Hard landing
<b>Landing-landing roll</b>	Collision with terr/obj (non-CFIT)

On September 15, 2017, at 1615 central daylight time, a Beech A36 airplane, N18403, collided with a hay bale during a forced landing following a loss of engine power while on approach to the McAlester Regional Airport (MLC), McAlester, Oklahoma. The private pilot received minor injuries. The airplane was substantially damaged. The airplane was registered to Travel Air LLC and was being operated by the pilot as a 14 *Code of Federal Regulations* Part 91 personal flight. Visual flight rules conditions existed near the accident site at the time of the accident. The pilot had canceled his instrument flight rules flight plan when he had MLC in sight. The flight departed from the Garner file Airport (UVA), Uvalde, Texas, at 1357.

The pilot reported he purchased fuel prior to takeoff and that both main fuel tanks and both tip tanks were full. The pilot stated he selected the right fuel tank for takeoff and used a stop watch to switch the fuel tanks every 25 minutes during the flight. About 8 minutes after takeoff, while climbing through 5,000 ft, the pilot noticed fuel leaking from the left fuel tank filler cap for a short period. He continued the flight which was uneventful until he prepared to enter a downwind leg at MLC which was when the engine lost power. The pilot switched fuel tanks and attempted to restart the engine to no avail.

The pilot stated he touched down hard during the off airport forced landing. Both main landing gear were pushed up through the wings and the right wing contacted a hay bale. The left wing remained attached to the fuselage. The right tip tank was separated from the right wing which remained connected to the fuselage by the control cables and wiring. The fuel system was compromised due to impact damage.

A postaccident examination of the wreckage was conducted on October 24, 2017. Both wings were detached from the airframe and were stored outside. Both fuel caps were removed, inspected, and found to have cracks in the main O-ring seal. The left fuel cap was tested in place, by applying air pressure to the fuel outlet line and plugging the vent system and tip tank fuel inlet. A soap and water solution placed around the cap bubbled up indicating an air leak. Air could be felt escaping from around the fuel cap outer seal and the center seal. The right wing was not tested due to impact damage. The aircraft logbook shows that the fuel cap O-rings were replaced with new O-rings during the annual inspection on April 1, 2016.

The engine, which was not damaged, had been converted from an IO-520 per STC SE10746SC. A borescope was used to examine the piston domes, cylinder walls, and valve faces which exhibited normal wear and combustion deposits. The propeller was damaged during the accident. The extent of the damage precluded using the accident propeller during the engine run. The propeller was removed, and

slave propeller was installed on the airplane. The top spark plugs appeared to be normal in wear and color. The plugs were then reinstalled in the engine.

The airframe was secured on a flatbed trailer. An alternate fuel system was rigged to the left fuel wing fuel inlet line at the fuselage. The fuel line going into the JPI fuel flow transducer was disconnected, power was applied to the airplane and the fuel system boost pump was turned on until positive fuel flow at the disconnected line was verified. The line was then reconnected. The engine started on the first attempt and was idled between 600 – 700 rpm to confirm oil pressure and fuel flow. The rpm was increased to 1,000 rpm. The engine power was then increased to 1,500 rpm and a magneto check was performed. The rpm drop for each magneto during the check was 60 to 80 rpm. The engine run was limited to 1,500 rpm due to the security of the fuselage on the trailer. The above process was repeated with an alternate fuel supply rigged to the right-wing fuel inlet line. The engine run results were the same. With the engine running 1,500 rpm, the fuel selector was switched to the off position. The engine ran for about 25 seconds prior to it shutting down. Examination of the engine revealed the engine started and ran smoothly as tested up to 1,500 rpm.

The airplane was equipped with a JPI FS-450 which monitored fuel flow, fuel used, and fuel remaining. The unit was removed from the airplane and shipped to the National Transportation Vehicle Recorder Division for examination. The device stores the last remaining record of fuel used and fuel remaining in gallons. It does not show which fuel tank contains the remaining fuel. A power supply was attached to the unit and the unit display showed 45.4 gallons of fuel used, and 66.6 gallons of fuel remaining. These amounts do not take into consideration the unknown amount of fuel that leaked from the left fuel tank filler cap. The pilot reported that at 1524, both fuel tanks were indicating about ¾ full.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	42, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	October 27, 2014
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	September 7, 2017
<b>Flight Time:</b>	508 hours (Total, all aircraft), 72 hours (Total, this make and model), 326 hours (Pilot In Command, all aircraft), 47 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Beech	<b>Registration:</b>	N18403
<b>Model/Series:</b>	A36	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1977	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	E-1120
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	August 16, 2017 Annual	<b>Certified Max Gross Wt.:</b>	3651 lbs
<b>Time Since Last Inspection:</b>	15 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	2515 Hrs at time of accident	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	IO-520-BB
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	300 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	MLC,771 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	16:53 Local	<b>Direction from Accident Site:</b>	180°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	6 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	160°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.87 inches Hg	<b>Temperature/Dew Point:</b>	32°C / 19°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Uvalde, TX (UVA )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	McAlister, OK (MLC )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	13:57 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	McAlester Regional Airport MLC	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	771 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Minor	<b>Latitude, Longitude:</b>	34.871944,-95.78778

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Sullivan, Pamela
<b>Additional Participating Persons:</b>	Mike Kout; FAA; Oklahoma City, OK Mike Council; Continental Motors; Mobile, AL
<b>Original Publish Date:</b>	April 8, 2019
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=96031">https://data.ntsb.gov/Docket?ProjectID=96031</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).