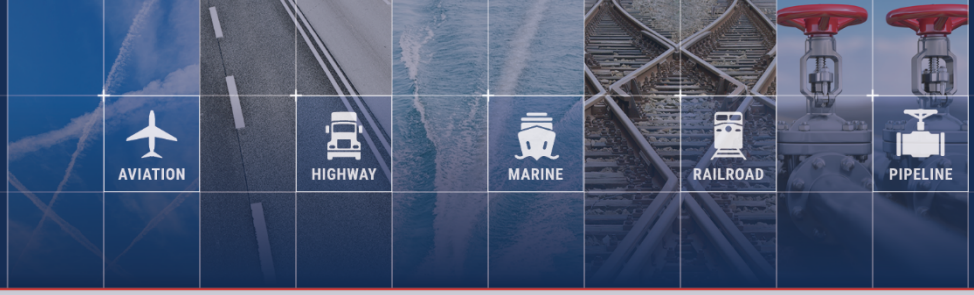

Aviation Investigation Final Report

Location:	Lakeland, Florida	**Accident Number:**	ERA21LA201
Date & Time:	May 1, 2021, 14:28 Local	**Registration:**	N125WC
Aircraft:	Beech A36	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot under instruction, who owned the airplane, and the flight instructor flew four flight legs on the day of the accident, totaling about 1 hour 17 minutes. The pilot under instruction stated that the airplane departed on the first flight leg with full fuel tanks and the fuel selector positioned to the left tank. Although he recalled moving the fuel selector to the right tank about 30 minutes into the flight, the actual flight duration based on ADS-B data was less than 30 minutes. The pilot under instruction reported that the fuel selector was positioned to the right tank during the second leg, then moved to the left tank position where it remained for the remainder of that flight and the accident flight.

During the accident flight when the airplane was close to the destination airport, the engine suddenly quit. Airplane control was transferred to the flight instructor while the pilot under instruction attempted to restore power. Among the actions that the pilot under instruction took was to move the fuel selector from the left to right tank position (in accordance with emergency checklist procedures) and then back to the left tank position, but the engine did not start.

While the flight instructor was maneuvering the airplane for an off-airport forced landing, the left wing struck a palm tree separating the outboard 5 ft of wing, which was followed by contact with the ground, contact with another tree, and a trailer before the airplane came to rest. A postcrash fire ensued.

Postaccident examination of the powertrain, air induction, ignition, and exhaust systems of the engine revealed no evidence of preimpact failure or malfunction. No discrepancies were found with the airframe fuel supply, vent systems, or flight controls.

Although no fuel was found in the left fuel tank; the engine fuel supply and fuel return lines from and to the fuel selector valve were fractured in multiple areas consistent with impact. Therefore, it is likely that any remaining fuel in the left fuel tank leaked from the open fuel lines. Additionally, based on the airplane departing on the first leg with full fuel tanks, adequate fuel should have been available in either the left or right fuel tank to complete the accident flight.

The tested fuel metering components showed no evidence of preimpact failure or malfunction. The inability to rotate the throttle lever was likely the result of impact damage to the throttle lever and throttle shaft of the metering valve and was likely not a factor in the loss of engine power. Therefore, the reason for the reported sudden and total loss of engine power could not be determined based on the available evidence for this investigation.

Probable Cause and Findings

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

The total loss of engine power for reasons that could not be determined based on the available evidence.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Approach-VFR pattern downwind	Loss of engine power (total) (Defining event)
Landing	Collision during takeoff/land
Post-impact	Fire/smoke (post-impact)

On May 1, 2021, about 1428 eastern daylight time, a Beech A36, N125WC, was destroyed when it was involved in an accident near Lakeland Linder International Airport (LAL), Lakeland, Florida. The flight instructor was fatally injured, and the pilot under instruction was seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot under instruction, who was the owner of the airplane, stated that, after arriving at the airport, he checked the engine oil, walked around the airplane, and performed a preflight inspection. After the airplane was fueled, the pilot under instruction waited for the flight instructor to arrive, and he checked the fuel drains, the tip tank fuel drains, and the lower part of the fuel strainer (near the engine compartment) for water; no water was detected.

According to Federal Aviation Administration (FAA) automatic dependent surveillance-broadcast (ADS-B) data, the airplane flew four legs on the day of the accident, including the accident leg. The pilot under instruction stated that the first flight departed with full fuel tanks and the fuel selector positioned to the left tank. About 30 minutes into the flight, he moved the fuel selector to the right tank. The flight continued to Sebring Regional Airport (SEF), Sebring, Florida, where the pilot under instruction performed a full-stop landing and secured the airplane.

Before the second flight leg, the pilot under instruction performed a walkaround, started the engine, and taxied to the runway. He reported departing with the fuel selector positioned to the right tank. ADS-B data showed that the airplane flew to Arcadia Municipal Airport (X06), Arcadia, Florida. While the pilot under instruction recalled the second flight leg destination was different then the ADS-B data, he stated that he moved the fuel selector to the left tank position while en route to the destination, where it remained for landing.

Although the pilot under instruction had no recollection of a third flight leg, ADS-B data showed that the airplane departed X06 and proceeded to Bartow Executive Airport (BOW). The position of the fuel selector during the third leg could not be determined.

The pilot under instruction recalled departing from BOW on what he thought was the third flight leg but was actually the fourth flight leg based on ADS-B data. The flight departed with the fuel selector positioned to the left tank and climbed to 2,600 ft mean sea level (msl). The pilot under instruction planned to perform an instrument approach to LAL while the flight instructor handled radio communications. The flight instructor called the tower, gave a position report, and advised the controller that the airplane was inbound for a planned full-stop landing. The controller instructed them to call back when the airplane was 2 miles out from LAL.

According to ADS-B data, between 1423:38 and 1425:37, the flight was about 4 nautical miles east-southeast of the approach end of runway 27 at LAL. The airplane flew to the west, consistent with entering the downwind leg of the airport traffic pattern for runway 9. After 1425:37, the airplane turned slightly to the right and then proceeded briefly to the west.

The pilot under instruction reported that, when the airplane was 2 miles away and descending with the fuel selector positioned to the left tank (about 30 minutes after placing the selector in that position), the engine "absolutely quit." He then told the flight instructor, "your aircraft."

While the flight instructor flew the airplane, the pilot under instruction moved the fuel selector to the other position (the right tank position), checked both magnetos, and turned on the auxiliary fuel pump to prime the engine. Those actions were part of the procedures in the airplane manufacturers' Engine Failure emergency checklist (after liftoff and in flight), but the actions did not restore engine power. The pilot under instruction then moved the fuel selector back to the left tank position and tried to start the engine, noting that it "turned over" but did not start.

The pilots notified the controller that the airplane had lost engine power. The controller cleared the airplane to land on runway 5 and then provided a clearance to runway 27. The pilots advised that the airplane could not reach the runway.

ADS-B data showed that, at 1426:25, the airplane turned to the right and flew west-northwest toward the approach end of runway 27. At 1427:53, when the flight was about 0.8 nautical miles and 101° from the approach end of the runway, the airplane turned right and flew north-northwest toward a forced landing area. The airplane's last ADS-B target, at 1427:59, was located about 0.7 nautical miles east of the approach end of runway 27.

While the airplane was descending, the left wing impacted a palm tree and the ground, and a postimpact fire ensued. The flight instructor initially survived his injuries but succumbed to them 11 days later.

A 13-second video taken by a pilot-rated witness, who was located about 540 ft north-northeast of the airplane's position, depicted the airplane descending with minimal engine sound and the landing gear retracted. The video did not capture the accident. This witness noted that he heard the pilot trying to restart the engine two or three times.

Pilot Information

Certificate:	Private	**Age:**	58,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:**	
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	June 18, 2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 18, 2020
Flight Time:	217 hours (Total, all aircraft), 75 hours (Total, this make and model), 31 hours (Last 90 days, all aircraft)		

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	77,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	February 2, 2021
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 28230 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N125WC
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:	1976	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	E781
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:	C91 installed	**Engine Model/Series:**	IO-550-B
Registered Owner:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

The flight time for the four legs that the accident airplane flew totaled about 1 hour 17 minutes. The estimated maximum total fuel consumption for all four legs including fuel for engine start, run-up, taxi, and takeoff was about 28 gallons.

The left and right main wing fuel tanks each had a total capacity of 74 gallons.

The airplane was equipped with dual control yokes. The engine was modified in 2001 with the addition of a “turbonormalizing system” in accordance with FAA supplemental type certificates.

The airplane manufacturer’s Engine Failure emergency checklist states the following for an engine failure after liftoff and in flight:

> *Landing straight ahead is usually advisable. If sufficient altitude is available for maneuvering, accomplish the following:*

1. *Fuel Selector Valve – SELECT OTHER TANK (Check to feel detent)*
2. *Auxiliary Fuel Pump – ON*
3. *Mixture – FUEL RICH, then LEAN as required*
4. *Magnetos – CHECK LEFT and RIGHT, then BOTH*
5. *Alternate Air T-handle – PULL AND RELEASE*

Note

The most probable cause of engine failure would be loss of fuel flow, improper functioning of the ignition system or blockage of the induction system.

Recovered records included an airplane flight manual supplement, aircraft registration, Pilot's Operating Handbook and FAA Approved Airplane Flight Manual, a Basic Empty Weight and Balance form, and a transponder installation entry. No other maintenance records were located.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLAL,142 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	13:45 Local	**Direction from Accident Site:**	282°
Lowest Cloud Condition:	Scattered / 4300 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:		**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	28°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Bartow, FL (BOW)	**Type of Flight Plan Filed:**	None
Destination:	Lakeland, FL	**Type of Clearance:**	None
Departure Time:	14:20 Local	**Type of Airspace:**	

Airport Information

Airport:	Lakeland Linder International LAL	**Runway Surface Type:**	
Airport Elevation:	142 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	27.989563,-81.99518(est)

Postaccident examination of the area surrounding the wreckage revealed damage to a palm tree about 12 ft above ground level. The palm tree was located about 4,069 ft east of the approach end of runway 27 and about 141 ft northwest from the last ADS-B target. The airplane made ground contact about 94 ft northwest from the tree contact. The airplane rolled about 45 ft while on an energy path of 348°, the left wing contacted the base of an oak tree, and the right wing impacted a parked trailer. The airplane came to rest upright about 180 ft from the palm tree.

At the accident site, brown grass was noted. About 5 ft of the outer portion of the left wing was impact separated and no fuel could be seen in the left fuel tank which appeared to be intact. An unquantified amount of fuel was observed in the right fuel tank.

Examination of the airplane revealed that the cockpit and cabin were extensively heat damaged. The magneto switch was between the 1 and 2 o'clock positions, which was consistent with the BOTH or RUN position, and the fuel selector was positioned to the left tank.

Examination of the flight controls for roll, pitch, and yaw revealed no evidence of preimpact failure or malfunction. Examination of the control yoke revealed that the outer shaft was intact and that the yoke chains were connected to the inner shaft.

Continuity of each fuel supply was confirmed from each fuel tank to the fuel selector valve. Both fuel vents were unobstructed from the inlet opening to each fuel tank. The auxiliary fuel pump was heat damaged, and the engine fuel supply and return lines from and to the fuel selector valve exhibited multiple breaks, but all lines were free of obstructions. The screen of the airframe fuel strainer was clear, and no fuel was present. The inlet and outlet flexible hoses connected to the engine-driven fuel pump were tightly installed; the hoses were removed and found to have no fuel.

Examination of the engine revealed crankshaft, camshaft, and valve train continuity. During had rotation of the crankshaft, thumb suction and compression were noted to all cylinders except for the right front cylinder, which exhibited impact damage. Borescope inspection of all cylinders revealed no damage to any valves or pistons. The turbocharger rotated freely by hand, and the blades exhibited no damage. Examination of the air induction and exhaust systems revealed no evidence of blockage. The air filter, which was impact damaged, contained organic material. Inspection of the oil filter element revealed no ferrous or nonferrous materials.

Impact damage was noted to the No. 2 top and Nos. 3 and 5 top and bottom ignition leads. The impulse couplings from both magnetos operated, and spark was noted at all ignition leads during hand rotation of the crankshaft. Examination of the left magneto revealed that it was tightly secured to the engine, but the magneto flange (near the upper securing nut) was cracked, and a linear gouge was noted on the cracked flange section, consistent with slippage or rotation. Examination of the bottom spark plugs revealed that all were oil soaked except for

the Nos. 4 and 6 spark plugs. All spark plugs exhibited normal wear and color when compared with the Champion Aviation Check-A-Plug chart.

Examination of the impact-separated throttle body and fuel metering valve revealed that the throttle lever was bent near both ends. When the throttle lever was rotated, the throttle shaft and throttle plate did not rotate. The internally locking hex nut that secured the throttle lever to the throttle shaft was tight and could not be moved by hand. Hand movement of the throttle plate caused movement of the throttle shaft and corresponding movement of the interconnect linkage to the throttle control. The throttle body fuel inlet screen was clean. A slight amount of fuel was drained from the flexible fuel hose between the metering valve and the flow divider. No contaminants were noted, and the smell was consistent with 100 low-lead fuel. Operational testing of the throttle body and metering valve at the engine manufacturer's facility revealed no evidence of preimpact failure or malfunction.

The No. 1 fuel injector nozzle was blocked by debris that appeared to be organic. The Nos. 2 through 4 fuel injector nozzles were covered with oil. After the oil was removed, they were free of obstructions. The Nos. 5 and 6 fuel injector nozzles were clear.

Operational testing of the manifold valve, fuel injector lines, and nozzles at the engine manufacturer's facility revealed that all nozzles passed the spray pattern test but that testing at various fuel flow rates revealed slight out-of-tolerance conditions. Disassembly of the manifold valve revealed that the screen was clean and that the diaphragm and spool had no issues.

Impact damage was noted to the engine-driven fuel pump and surrounding area. The drive coupling of the engine-driven fuel pump was intact. Operational testing of the engine-driven fuel pump at the engine manufacturer's facility revealed slight leakage from the seal drain but no evidence of preimpact failure or malfunction.

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Michael Tremblay; FAA/FSDO; Orlando, FL Henry J. Soderlund; Textron Aviation; Wichita, KS
Original Publish Date:	May 10, 2023
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=103010