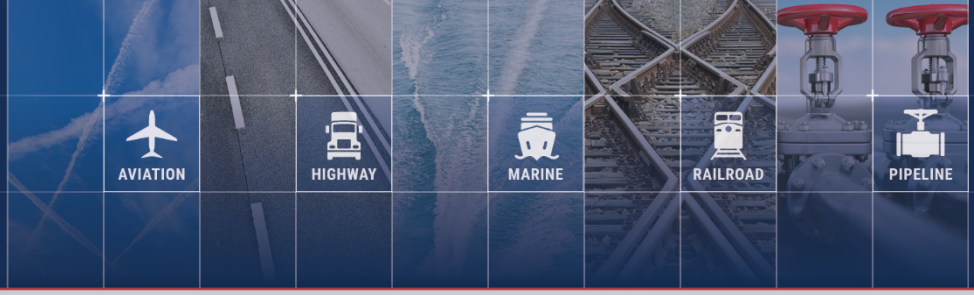

Aviation Investigation Final Report

Location:	Lago Vista, Texas	**Accident Number:**	CEN20LA421
Date & Time:	September 28, 2020, 13:52 Local	**Registration:**	N104RK
Aircraft:	Beech A36	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	2 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was conducting a personal cross-country flight when there was a loss of engine power while in the traffic pattern at the destination airport. The pilot's attempts to restore engine power, including switching fuel tanks, were unsuccessful. The pilot heard the airplane's stall warning horn shortly before the airplane rolled right and entered an aerodynamic stall at a low altitude. The airplane impacted vegetation and terrain in a nose low attitude. The airplane came to rest inverted, with the fuselage suspended above the ground, against vegetation. The airplane sustained substantial damage to both wings and the fuselage.

The pilot did not directly ascertain how many gallons of fuel were in the main fuel tanks before departure. The wingtip auxiliary fuel tanks were empty at departure. The pilot estimated that the flight departed with about 56 gallons of fuel available; however, based on available information, the investigation could not determine with an appreciable level of accuracy how many gallons of fuel was available before the flight and how it was distributed between the two 40-gallon (37 gallon usable) main fuel tanks.

The pilot stated that the flight departed with the fuel selector positioned on the left main fuel tank where it remained until the airplane lost engine power while in the traffic pattern at the destination airport. According to track data, about 2 hours of flight time had elapsed when the accident occurred. The pilot repositioned the fuel selector valve to the right main fuel tank after the loss of engine power, but that action did not restore engine power.

Postaccident examination revealed that the fuel selector valve was positioned to use fuel from the right main fuel tank. First responders to the accident site reported that there was fuel leaking from the damaged right wing. There was no evidence of fuel in the left main tank or the auxiliary wingtip fuel tanks. Additionally, there was no evidence of fuel in the lines connected at the fuel selector valve, in the fuel lines forward of the firewall, fuel strainer assembly, engine-

driven fuel pump, fuel manifold valve, or the fuel injector lines. About ½ tablespoon of fuel was recovered from the fuel metering assembly. A disassembly of the engine-driven fuel pump confirmed the drive coupler remained intact. A postaccident engine examination did not reveal a mechanical failure that would have prevented normal operation; the loss of engine power was likely due to an interruption of fuel flow to the engine.

Based on available performance data for the cruise altitudes flown during the flight, the expected fuel consumption rate at 75% engine power is 13.5-15.2 gallons per hour (gph). However, the airplane was not equipped with an engine monitor or fuel flow meter with the ability to record how the engine was operated during the flight and, as such, the amount of fuel used during the flight could not be calculated with an appreciable level of accuracy.

Based on the available evidence, if the pilot switched to the fullest main fuel tank before landing, as required by the airplane's Before Landing Checklist, there likely would have been sufficient fuel remaining to safely land at the destination airport. The loss of engine power was likely due to fuel starvation resulting from the pilot's mismanagement of the fuel system.

Probable Cause and Findings

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

The pilot's mismanagement of the fuel system which resulted in fuel starvation and a total loss of engine power. Contributing to the accident was the pilot's failure to maintain airspeed which resulted in the airplane exceeding its critical angle of attack and an aerodynamic stall at a low altitude.

Findings

Aircraft	Fuel - Fluid management
Personnel issues	Use of equip/system - Pilot
Personnel issues	Use of checklist - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Capability exceeded
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Approach-VFR pattern base	Fuel starvation (Defining event)
Approach	Loss of engine power (total)
Approach	Aerodynamic stall/spin

On September 28, 2020, about 1352 central daylight time, a Beech A36 airplane, N104RK, was substantially damaged when it was involved in an accident near Lago Vista, Texas. The pilot and one passenger were seriously injured, and another passenger sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that the airplane was fueled on the evening of September 24, 2020, at Rusty Allen Airport (RYW), Lago Vista, Texas, in preparation for a cross-country flight the following afternoon from RYW to South Padre Island International Airport (BRO), Brownsville, Texas. The pilot fueled the airplane using the self-serve fuel pump at RYW and the airplane was not flown again before he departed for BRO on the afternoon of September 25, 2020. The pilot stated that he preselected 20 gallons to be dispensed at the self-serve fuel pump; that the right tank was filled to the point of overflowing, but the self-serve pump shutoff before left tank was completely full. The airplane's analog fuel tank quantity gauges for both main fuel tanks indicated "full" before he departed on the outbound flight to BRO. The pilot reported that the wingtip auxiliary tanks were empty at departure.

The pilot reported that after departing RYW he made an intermediate landing at Cameron County Airport (PIL), Port Isabel, Texas, due to thunderstorm activity along his planned route-of-flight to BRO. According to automatic dependent surveillance-broadcast (ADS-B) track data, about 1.8 hours of flight time elapsed during the flight from RYW to PIL. The pilot stated that he waited for the weather to improve before he departed PIL and continued toward BRO. According to ADS-B track data, about 0.2 hours of flight time elapsed during the second flight leg from PIL to BRO. The pilot stated that he only used fuel from the right main fuel tank during both flight legs from RYW to BRO. The combined flight time for both flight legs was about 2 hours.

On September 28, 2020, before he departed BRO for the return flight to RYW, he asked the fixed-base operator to add 10 gallons of fuel to the right main tank that was "slightly below half." The pilot noted that he did not use fuel from the left main fuel tank during the flight legs from RYW to BRO and, as such, the left main fuel tank remained "nearly full" from the previous fueling on September 24, 2020. Based on his flight planning, the pilot estimated that he departed on the accident flight with 56 gallons of fuel; however, he did not directly ascertain how many gallons of fuel were in the main fuel tanks before departure. The wingtip auxiliary

tanks remained empty. The pilot stated that the flight departed with the fuel selector positioned on the left main fuel tank where it remained until the airplane lost engine power while in the traffic pattern at RYW.

The pilot reported that the cross-country flight was uneventful until the landing approach at RYW. He stated that the airplane was not stabilized on his first landing approach to runway 33 at RYW, so he made a go-around and entered left traffic for a second landing attempt. The airplane had a loss of engine power while the airplane was on a left base leg to runway 33. The propeller continued to windmill after the loss of engine power, but there was no indication that the engine was operating. The pilot was unable to restore engine power by switching fuel tanks (from the left main fuel tank to the right main fuel tank), verifying that the mixture control was full rich, and selecting each magneto separately before returning the ignition switch to BOTH. As he prepared his passengers for a forced landing, the pilot heard the airplane's stall horn shortly before the airplane rolled right. The pilot does not recall the final moments of the flight after the airplane entered an aerodynamic stall at a low altitude.

The airplane impacted vegetation and terrain in a nose low attitude. The airplane came to rest inverted, with the fuselage suspended above the ground, against vegetation. The airplane sustained substantial damage to both wings and the fuselage.

According to ADS-B track data, the airplane flew at various cruise altitudes between 8,500 and 10,500 ft mean sea level, and the elapsed time enroute was about 1 hour 57 minutes. At 1351:47, the final ADS-B track datapoint was about 50 ft above ground level and about 78 ft west of the accident site.

On September 28-29, 2020, an onsite examination completed by a Federal Aviation Administration (FAA) airworthiness inspector revealed that the airplane came to rest nose down and inverted in a wooded area. The fuel selector valve was positioned to use fuel from the right main fuel tank. First responders to the accident site reported that there was fuel leaking from the damaged right wing. There was no evidence of fuel in the fuel lines connected at the fuel selector valve, in the fuel lines forward of the firewall, fuel strainer assembly, engine-driven fuel pump, fuel manifold valve, or the fuel injector lines. About ½ tablespoon of fuel was recovered from the fuel metering assembly. A disassembly of the engine-driven fuel pump confirmed the drive coupler remained intact.

On January 7, 2021, before the wreckage was recovered, an additional onsite examination was completed by a FAA airworthiness inspector with the assistance of an airframe manufacturer investigator. The fuselage and both wings exhibited impact related damage. There was flight control cable continuity between the individual flight control surfaces and their respective cockpit controls. The landing gear and flaps were found fully extended. There was no evidence of fuel in the main fuel tanks or the auxiliary tip tanks. The fuel selector valve functioned as designed during an operational test.

The engine was found upside down and partially attached to the airframe through control cables. The propeller separated from the engine at the crankshaft flange. All blades remained attached to the hub and exhibited polishing and some minor leading-edge damage. The upper spark plugs exhibited features consistent with normal engine operation. Internal engine continuity and valve train continuity were confirmed while the crankshaft was rotated. Cylinder compression was confirmed by placing a finger over the open spark plug holes and feeling suction and expelled air from each cylinder while the crankshaft was rotated. Both magnetos provided spark when rotated by hand. There was no evidence of fuel in the engine fuel lines or fuel-related engine components.

The airplane was equipped with two 40-gallon (37 gallon usable) main fuel tanks and two 15-gallon wingtip auxiliary tanks. Based on available performance data for the cruise altitudes flown during the flight, the expected fuel consumption rate at 75% engine power is 13.5-15.2 gallons per hour (gph). However, the amount of fuel used during the flight could not be calculated with an appreciable level of accuracy because the airplane was not equipped with an engine monitor or fuel flow meter with data recording capability. Additionally, although the pilot estimated the airplane had about 56 gallons of fuel available at departure, the investigation could not determine with an appreciable level of accuracy how that fuel was distributed between main fuel tanks. According to the airplane's Pilot Operating Handbook, the Before Landing Checklist requires pilots to select the fullest main fuel tank before landing.

Pilot Information

Certificate:	Private	**Age:**	61,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	February 26, 2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 17, 2020
Flight Time:	191 hours (Total, all aircraft), 73 hours (Total, this make and model), 81 hours (Pilot In Command, all aircraft), 16 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N104RK
Model/Series:	A36	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Utility	**Serial Number:**	E-1450
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	September 10, 2020 Annual	**Certified Max Gross Wt.:**	3883 lbs
Time Since Last Inspection:	9.8 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5362.14 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	IO-550-B
Registered Owner:	FHLS LLC	**Rated Power:**	300 Horsepower
Operator:	FHLS LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KRYW,1231 ft msl	**Distance from Accident Site:**	1.5 Nautical Miles
Observation Time:	13:55 Local	**Direction from Accident Site:**	330°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots / 24 knots	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	20°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	23°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Brownsville, TX (BRO)	**Type of Flight Plan Filed:**	VFR
Destination:	Lago Vista, TX (RYW)	**Type of Clearance:**	VFR flight following
Departure Time:	11:54 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Lago Vista - Rusty Allen Airport RYW	**Runway Surface Type:**	Asphalt
Airport Elevation:	1230 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	33	**IFR Approach:**	None
Runway Length/Width:	3808 ft / 50 ft	**VFR Approach/Landing:**	Go around;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious, 1 Minor	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Serious, 1 Minor	**Latitude, Longitude:**	30.476117,-97.955389(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Brian F. Fricker; Federal Aviation Administration - San Antonio FSDO; San Antonio, TX Ricardo J. Asensio; Textron Aviation; Wichita, KS
Original Publish Date:	July 6, 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=102048