



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	State College, Pennsylvania	Accident Number:	ERA19LA024
Date & Time:	October 24, 2018, 00:36 Local	Registration:	N8319D
Aircraft:	Beech 35	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airline transport pilot reported that he departed on a long, cross-country flight at night with full fuel tanks. The pilot stated that the fuel selector was set to the left main fuel tank on departure and that he moved the selector to the auxiliary tank about 1 hour later. About 1 to 2 hours after that, the pilot moved the fuel selector switch to the right main fuel tank, where it remained for the remainder of the flight (about 30 minutes). The flight was uneventful until it was on final approach to land and between about 400 and 500 ft above ground level, at which point, the engine suddenly stopped producing power. The pilot recalled the passenger saying there was no fuel pressure, and he immediately pushed the throttle and mixture full forward and retracted the flaps. He also turned on the auxiliary fuel pump and pressed the starter button to restart the engine to no avail. The pilot did not switch the fuel selector to another tank. Due to the low altitude, the pilot slowed the airplane and conducted an emergency landing in trees, during which both wings, the fuselage, and the tail section sustained substantial damage.

Postaccident examination of the engine and fuel system revealed no evidence of any preaccident mechanical malfunctions or failures that would have precluded normal operation. The fuel selector was found set to the right main fuel tank, which was found empty of fuel. However, measurable fuel was found in the remaining three tanks. Therefore, the loss of engine power was likely due to the pilot's mismanagement of the available fuel, which resulted in the loss of all engine power due to fuel starvation.

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 available fuel, which resulted in a total loss of engine power due to fuel starvation.

Findings

Personnel issues	Use of equip/system - Pilot
Aircraft	Fuel - Fluid management
Aircraft	Fuel - Fluid level

Factual Information

History of Flight

Approach-VFR pattern final	Fuel exhaustion
Approach-VFR pattern final	Loss of engine power (total) (Defining event)
Approach-VFR pattern final	Attempted remediation/recovery
Emergency descent	Collision with terr/obj (non-CFIT)

On October 24, 2018, about 0036 eastern daylight time, a Beech J35, N8319D, was substantially damaged during a forced landing to wooded terrain while on a visual approach to runway 24 at University Air Park (UNV), State College, Pennsylvania. The airline transport pilot and the passenger sustained minor injuries. The airplane was registered to and operated by the passenger. Night visual meteorological conditions prevailed at the airport at the time of the accident. An instrument flight rules flight plan was filed for the flight that was operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 personal flight. The airplane departed Portsmouth International Airport at Pease (PSM), Portsmouth, New Hampshire, about 2140 and was destined for UNV.

The pilot stated that the passenger had purchased the airplane that day in Ossipee, New Hampshire, and they were flying it back to Texas. He reviewed the maintenance logbooks prior to departure but did not conduct a test flight of the airplane. The first time the pilot flew the airplane was the flight the flight before the accident flight from Windsock Airport (NH69), Ossipee, New Hampshire, to PSM.

The passenger purchased 42.7 gallons of 100LL at PSM, conducted a preflight inspection, and confirmed all four fuel tanks were topped off with fuel. The passenger also tested the fuel and it was absent of water and debris. The airplane's fuel system consisted of two 20-gallon main tanks (17 usable gallons) in each wing and two interconnected 10-gallon auxiliary tanks (9.5 usable) in each wing, for a total of 53 usable gallons. The pilot said that he did not visually check the fuel level before taking off.

The pilot said that on take-off he had the left main fuel tank selected and flew for about one hour to burn off approximately 10 gallons of fuel. He then switched to the auxiliary fuel tank and flew for approximately 1 to 2-hours, before switching to the right main fuel tank for the last 30 minutes of the flight. The flight was normal until they were 1.5-miles out on final approach at an altitude of 400-500 ft above the ground, when the engine suddenly stopped producing power. There was no sputter or warning and the engine "just stopped", but the propeller continued to windmill. The pilot recalled the passenger saying there was no fuel pressure, and he immediately pushed the throttle and mixture full forward and retracted the flaps. He also turned on the auxiliary fuel pump and "hit" the starter button to re-start the engine, but to no avail. The pilot did not switch the fuel selector to another tank. Due to the low altitude, the pilot slowed the airplane and "aggressively" pitched the nose of the airplane up to make a soft landing into trees.

A postaccident examination of the airplane revealed that it came to rest upright with the nose pointed uphill on a northerly heading. There was no post-impact fire. The airplane sustained substantial damage to both wings, the fuselage, and tail section. The engine also sustained damage.

According to a police officer, when he first arrived on-scene, both pilots were standing outside the airplane. They reported that they were not injured and "...also indicated that there was no fuel leaking." Another officer, who was on-scene, reported that he "...did not smell any odors of fuel or observe any fluids leaking from the plane."

Visual examination of left main, left auxiliary and right wing auxiliary tanks revealed they each contained fuel; however the right main tank was empty. The fuel selector valve was found fully seated on the right main tank. When the selector handle was manually tested, it moved freely to each tank and the detent was clearly felt on each tank. Examination of the fuel manifold, the main fuel line to the manifold, and each cylinder injector line revealed there was no fuel found in the lines. When the airplane was recovered, no fuel was found or drained from the right main tank and about 4.5 gallons was drained from the auxiliary tank. About 10 gallons was recovered from the left wing main tank and about 1 gallon was drained from the auxiliary tank. A sample of fuel drained from the airplane revealed the fuel was light blue and absent of debris and water.

Examination of all four fuel tanks revealed they were not breached and no leaking or staining of fuel was evident. Shop air was blown thru the fuel lines from the wing route to the fuel selector valve. The valve was moved to each detent and no obstructions were evident. Shop air was then blown thru the main fuel lines leading to the fuel manifold and no obstructions were noted. The manifold was removed and disassembled. The manifold screen was absent of debris and the diaphragm was intact and dry. All six fuel delivery lines and each fuel injector valve were absent of debris.

The previous owner stated that he had owned the airplane for about five years. He said the airplane operated well and had a good running engine; however, if a pilot was not familiar with the fuel system, it could result in a fuel exhaustion/power loss. He said the engine burned about 12.5 gallons per hour when operated at 65% power and properly leaned. The previous owner said the new owner planned to fly the airplane "much faster than 65%" on their trip back to Texas.

The previous owner explained that the airplane was equipped with two main fuel tanks (one in each wing) that were interconnected with two auxiliary tanks (one in each wing). If the pilot departed with full fuel, he'd have to first fly for one hour on the left tank to make head room because if the pilot flew on the auxiliary tank, any unused fuel would automatically be returned to the left main tank by design. So, to avoid excess fuel being ported overboard, the pilot needed to make sure there was enough room in the left tank to capture any unused fuel. The auxiliary tanks only had about 45 minutes of fuel and should only be selected after using fuel from the main tanks. The auxiliary tanks pump fuel faster than what the engine can consume, so that is why any unused fuel gets returned to the left main tank and has a higher depletion rate than the main tanks. He also said that when operating on the auxiliary tanks, it was important to fly straight and level.

The previous owner said that he once flew the airplane in "ideal" conditions (65% power, at 6,000 ft altitude, in good weather) for 3 hrs and 25 minutes. When he landed he was shocked to find he only had about 3-5 gallons left in the tanks. After that experience, he never flew the airplane longer than a few hours. There was also one time, when he forgot to switch from the auxiliary tanks in flight and the

engine shut down without warning. He was able to switch to a fuller tank and re-start the engine within a few seconds.

Examination of the engine produced compression and valve train continuity to each cylinder via manual rotation of the propeller. Both magnetos were removed. When manually rotated, spark was generated to all ignition leads. No mechanical deficiencies were noted that would have precluded normal operation of the engine.

The pilot held an airline transport pilot certificate with a rating for airplane multiengine land as well as commercial pilot privileges for airplane single-engine land and sea. His last Federal Aviation Administration (FAA) first-class medical certificate was issued on September 10, 2018. At that time, the pilot reported a total of 10,400 flight hours.

Weather reported at UNV at 0053 was wind from 320° at 9 knots, visibility 10 miles, scattered clouds at 6,000 ft, broken clouds at 7,500 ft, temperature 9° C, dewpoint 1° C, and an altimeter setting of 30.09 in Hg.

Pilot Information

Certificate:	Airline transport; Commercial	Age:	47, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Lap only
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	Toxicology Performed:	No
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	September 10, 2018
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	10400 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	Registration:	N8319D
Model/Series:	35 J35	Aircraft Category:	Airplane
Year of Manufacture:	1958	Amateur Built:	
Airworthiness Certificate:	Normal; Utility	Serial Number:	D-5452
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	December 24, 2017 Annual	Certified Max Gross Wt.:	
Time Since Last Inspection:	7 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	5106.7 Hrs at time of accident	Engine Manufacturer:	CMI
ELT:	Installed, not activated	Engine Model/Series:	IO-470-C
Registered Owner:		Rated Power:	230 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night
Observation Facility, Elevation:	UNV, 1231 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	00:53 Local	Direction from Accident Site:	60°
Lowest Cloud Condition:	Scattered / 6000 ft AGL	Visibility	10 miles
Lowest Ceiling:	Broken / 7500 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	9 knots /	Turbulence Type Forecast/Actual:	Unknown / Unknown
Wind Direction:	320°	Turbulence Severity Forecast/Actual:	Unknown / Unknown
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	9°C / 1°C
Precipitation and Obscuration:			
Departure Point:	Portsmouth, NH (PSM)	Type of Flight Plan Filed:	IFR
Destination:	State College, PA (UNV)	Type of Clearance:	IFR
Departure Time:	21:40 Local	Type of Airspace:	Class D; Class E

Airport Information

Airport:	University Park UNV	Runway Surface Type:	Asphalt
Airport Elevation:	1231 ft msl	Runway Surface Condition:	Vegetation
Runway Used:	24	IFR Approach:	None
Runway Length/Width:	6701 ft / 150 ft	VFR Approach/Landing:	Forced landing;Full stop

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Minor	Latitude, Longitude:	40,-77(est)

Administrative Information

Investigator In Charge (IIC):	Read, Leah
Additional Participating Persons:	Henry Tscha; FAA/FSDO; Harrisburg, PA
Original Publish Date:	December 16, 2019
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=98539

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).