Aviation Investigation Final Report

Location:	London, Ohio	**Accident Number:**	CEN17LA358
Date & Time:	September 17, 2017, 16:00 Local	**Registration:**	N35170
Aircraft:	Cessna 177B	**Aircraft Damage:**	Substantial
Defining Event:	Fuel exhaustion	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor and the student pilot were in a cruise descent toward the destination airport when the engine experienced a total loss of power. The instructor performed a forced landing to a corn field, during which the airplane sustained substantial damage. The instructor reported that the airplane had 25 gallons of fuel onboard before takeoff and that the duration of the accident flight was 1.3 hours. Due to a recent engine overhaul, the instructor was operating the airplane at a high power setting with the mixture full rich. He noted that, during previous flights, the fuel consumption was about 11 gallons per hour and calculated that the airplane should have burned about 14.3 gallons of fuel during the accident flight. Since the engine was not being operated at normal cruise power settings, fuel burn based on information in the pilot's operating handbook could not be calculated; however, examination of the airplane after the accident revealed no usable fuel remaining in either wing fuel tank, and no breaches of the fuel system. Subsequent testing revealed no fuel leakage and no excessive fuel consumption during ground runs.

Based on the available evidence, it is likely that the engine lost power due to fuel exhaustion; however, whether the pilot overestimated the fuel quantity before departure or underestimated the fuel consumption during the flight could not be determined.

Probable Cause and Findings

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

The flight instructor's inadequate in-flight fuel management, which resulted in a total loss of engine power due to fuel exhaustion.

Findings

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

Factual Information

History of Flight

Enroute-cruise	Fuel exhaustion (Defining event)
Landing	Collision with terr/obj (non-CFIT)

On September 17, 2017, about 1600 eastern daylight time, a Cessna 177B airplane, N35170, sustained substantial damage during a forced landing following a complete loss of engine power near London, Ohio. The flight instructor and student pilot were not injured. The airplane's right-wing spar was bent, and the fuselage was wrinkled aft of the cabin. The airplane was registered to an individual and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as an instructional flight. Visual meteorological conditions prevailed for the flight, which was not on a flight plan. The local flight originated from the Madison County Airport (UYF), London, Ohio, about 1415, performed a landing at the Lima Allen County Airport (AOH), Lima, Ohio, and was returning to UYF when the accident occurred.

The instructor pilot reported that after making a full stop landing at AOH, they started to fly back to UYF and had just began a descent about 6 to 7 miles from UYF when the engine "sputtered" several times and then stopped producing power. He established a proper glide speed and checked the fuel selector to ensure that both fuel tanks were selected. He noted that the fuel pressure was low and fluctuating, and the engine restarted for several seconds after the electric fuel boost pump was turned on and then it stopped producing power again. After making several turns to find a more suitable landing area to no avail, he landed the airplane in a corn field.

The pilot noted that the airplane's engine was recently overhauled and was being operated at high power settings and a full rich mixture for engine break-in. He noted that during previous flights the fuel consumption was about 11 gallons per hour (gph). He stated that before the accident flight he checked the fuel quantity and was confident that there was 25 gallons of fuel on-board the airplane, and the engine recording tachometer read 2069.3 hours prior to the flight. The tachometer indicated 2,070.6 hours at the time of the accident. Based on the fuel consumption on previous flights and the tachometer readings the pilot calculated that the airplane should have consumed about 14.3 gallons of fuel.

Examination of the airplane at the accident site revealed no usable fuel in either wing tank and no breaches of the fuel system. Since the airplane was not being operated at normal cruise power settings, fuel burn calculations based on information in the Pilot's Operating Handbook could not be made.

A subsequent examination and testing of the airplane was performed by a third party after its removal from the accident site and after wing removal. The airplane was placed in a hangar and after one day minor fuel stains were observed under the airplane. To further investigate if there was significant fuel leakage, the airplane was outfitted with a temporary fuel container secured to the cabin roof and plumbed into the left and right wing tank fuel line assembly inlets. The airplane's engine was run on two separate occasion using left, right, and both fuel selector positions, and with and without the electric fuel

boost pump running. The engine speed that was attained during the test was 1,400 to 1,500 rpm, and the engine ran smoothly in all fuel configurations. Thorough examination of the airplane after each run did not reveal any fuel leakage and fuel consumption was not excessive.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	50,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:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 28, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	7825 hours (Total, all aircraft), 18 hours (Total, this make and model), 7367 hours (Pilot In Command, all aircraft), 239 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	None	**Age:**	Male
Airplane Rating(s):	None	**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:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	3 hours (Total, all aircraft), 3 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N35170
Model/Series:	177B B	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	17702245
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 21, 2017 Annual	**Certified Max Gross Wt.:**	2348 lbs
Time Since Last Inspection:	17 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2054 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	O-360-A1F6D
Registered Owner:		**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TZR,902 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	19:47 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Scattered / 5000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	28°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	LONDON, OH (UYF)	**Type of Flight Plan Filed:**	None
Destination:	LONDON, OH (UYF)	**Type of Clearance:**	None
Departure Time:	14:15 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	39.932777,-83.461944

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Paul Gillenwater; FAA-Columbus FSDO; Columbus FSDO, OH
Original Publish Date:	March 18, 2019
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96035