Aviation Investigation Final Report

Location:	Wichita, Kansas	**Accident Number:**	CEN16LA381
Date & Time:	September 22, 2016, 10:55 Local	**Registration:**	N432BD
Aircraft:	Scottish Aviation SERIES 100 MDL 101	**Aircraft Damage:**	Substantial
Defining Event:	Fuel exhaustion	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot reported that the engine "sputtered and went to idle" during cruise flight while returning to the departure airport after a local flight. His attempts to restore engine power were not successful. The pilot subsequently conducted a forced landing, during which the airplane impacted a fence and sustained substantial damage.

During postaccident examination, the fuel totalizer indicated that 7.3 gallons of fuel remained; however, only about 1.5 gallons of fuel was recovered from the airplane. After fuel was added to each tank, an engine run was conducted, and the engine ran smoothly at idle and about 1,000 rpm, and no anomalies were noted.

The pilot reported that the airplane fuel gauges were unreliable, so he used the fuel totalizer for fuel quantity information. However, the totalizer's operating instructions stated that the instrument does not provide a measurement of the fuel in the tanks and that it "should never be used as the primary indicator of the fuel quantity." The pilot should not have used the totalizer to determine the amount of fuel onboard the airplane and his reliance on the instrument without ensuring that sufficient fuel was on board for the flight led to fuel exhaustion and a total loss of engine power.

Probable Cause and Findings

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

The pilot's improper preflight inspection during which he relied on the fuel totalizer and failed to ensure that sufficient fuel was onboard for the flight, which resulted in fuel exhaustion and a total loss of engine power.

Findings

Personnel issues	Preflight inspection - Pilot
Personnel issues	Decision making/judgment - Pilot
Aircraft	Fuel - Fluid level
Environmental issues	Fence/fence post - Contributed to outcome

Factual Information

History of Flight

Enroute	Fuel exhaustion (Defining event)
Enroute	Loss of engine power (total)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On September 22, 2016, about 1055 central daylight time, a Scottish Aviation Series 100 Model 101 airplane, N432BD, was substantially damaged during a forced landing following a loss of engine power near Wichita, Kansas. The pilot and pilot-rated passenger were not injured. The airplane was registered to the pilot-rated passenger and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight originated from the Augusta Municipal Airport (3AU), Augusta, Kansas, about 1040.

The pilot reported that he planned to complete a three-leg local flight from 3AU to the Cpt Jack Thomas Memorial Airport (EQA), to the Col. James Jabara Airport (AAO), and return to 3AU. He proceeded to EQA and completed a takeoff and landing. He then flew to AAO for two additional takeoffs and landings. After departing from AAO to return to 3AU, about 2,500 ft mean sea level, the engine "sputtered and went to idle." His attempts to restore engine power were not successful. The airplane struck a wooden fence during the subsequent forced landing. The airplane sustained damage to the leading edges of the wings.

A postaccident examination was conducted by a Federal Aviation Administration (FAA) inspector. During that examination, about 1.5 gallons of fuel was recovered from the accident airplane. The inspector did not observe any evidence of a fuel spill at the accident site. The fuel totalizer indicated that 7.3 gallons remained. A postrecovery engine exam was conducted under the supervision of an FAA inspector. Five gallons of fuel were added to each fuel tank. A slow leak (approximately 1 drip every 10 seconds) was observed from the left-wing fuel tank at two rivets near the area of the fence post strike. No leaks were observed from the right-wing fuel tank. The engine started and ran smoothly at idle and about 1,000 rpm. No anomalies with respect to the engine were observed.

The pilot reported that about 16 gallons of fuel were on-board upon the initial departure from 3AU, with about 8 gallons remaining at the time of the takeoff from AAO. He added that "the aircraft utilizes a fuel totalizer to calculate fuel on board. A method to verify the totalizer's measurement of fuel remaining versus the actual fuel in [the] tanks is suggested." The pilot informed an FAA inspector that the airplane fuel gauges were unreliable so he used the fuel totalizer for that information.

The fuel totalizer operating instructions noted that "the fuel remaining displayed by the FP-5(L) is not a measurement of the fuel in the tanks. . . . Even after verifying the calibration of the FP-5(L) it should never be used as the primary indicator of fuel quantity in the tanks." The instructions also added that

"the use of the FP-5(L) does not eliminate or reduce the necessity for the pilot to use good flight planning, preflight and in-flight techniques for managing fuel."

Federal regulations [14 CFR 91.205(b)(9)] require an operable fuel gauge indicating the quantity of fuel in each tank for all types of operations.

Pilot Information

Certificate:	Private	**Age:**	66,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 31, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 27, 2016
Flight Time:	108 hours (Total, all aircraft), 5 hours (Total, this make and model), 65 hours (Pilot In Command, all aircraft), 2 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Scottish Aviation	**Registration:**	N432BD
Model/Series:	SERIES 100 MDL 101	**Aircraft Category:**	Airplane
Year of Manufacture:	1972	**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	163
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	March 10, 2016 Condition	**Certified Max Gross Wt.:**	2350 lbs
Time Since Last Inspection:	28 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5370 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-A1B6
Registered Owner:	On file	**Rated Power:**	200 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:	AAO,1421 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	10:54 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	27°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Augusta Muni, KS (3AU)	**Type of Flight Plan Filed:**	None
Destination:	Augusta Muni, KS (3AU)	**Type of Clearance:**	None
Departure Time:	10:40 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Col. James Jabara AAO	**Runway Surface Type:**	
Airport Elevation:	1421 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	37.747501,-97.221107(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Chad Landes; FAA Flight Standards; Wichita, KS
Original Publish Date:	September 6, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94065