Aviation Investigation Final Report

Location:	Winter Haven, Florida	**Accident Number:**	WPR19LA136
Date & Time:	May 4, 2019, 11:00 Local	**Registration:**	N2134T
Aircraft:	Piper PA28R	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The instructional flight was in-bound to the initial approach fix to practice a simulated instrument approach when the engine began to fluctuate and sputter. The flight instructor switched fuel tanks and turned on the fuel pump to no avail. The airplane was unable to reach a nearby airport, so the flight instructor accomplished a forced landing in an open field. During the forced landing, the airplane's left wing sustained substantial damage when the landing gear struck a rut in the field.

Postaccident examination of the airplane revealed no pre-impact anomalies. During the first of several engine runs, the engine started uneventfully but subsequently surged and stopped. Pressure was applied to the fuel system and fuel was observed leaking out of the top two vent holes of the fuel selector. The fuel selector was subsequently bypassed, and the engine started and ran with no additional anomalies noted.

The fuel selector was removed and examined. During a pressure test, when the fuel valve was positioned to the left or right tank position, a fuel leak occurred again from the vent holes. Subsequently, the fuel valve was disassembled to examine the housing, shaft, and four O-rings. No anomalies were observed to the housing or shaft. Microscopic examination revealed that two O-rings appeared to have frictional interactions with the inner surface of the housing bore, and the other two O-rings exhibited wear on the surfaces in contact with the inner surface of the housing bore. No additional anomalies were noted.

The circumstances of the accident are consistent with air entering the fuel system where the fuel leaks occurred in the fuel selector valve. Air in the fuel lines would have interrupted the flow of fuel to the engine, resulting in a loss of engine power.

Probable Cause and Findings

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

A partial loss of engine power due to worn fuel valve O-rings, which allowed air into the fuel system and resulted in a forced landing to unsuitable terrain.

Findings

Aircraft	Fuel selector/shutoff valve - Damaged/degraded
Environmental issues	Rough terrain - Effect on equipment

Factual Information

History of Flight

Approach-IFR initial approach	Loss of engine power (partial) (Defining event)
Approach-IFR initial approach	Off-field or emergency landing

On May 4, 2019, about 1100 Eastern daylight time, a Piper PA-28R-200 airplane, N2134T, was substantially damaged when it was involved in an accident near Bartow, Florida. The flight instructor and the pilot receiving instruction were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The flight proceeded south to their normal practice area. Steep turns, slow flight and stalls were performed. Subsequently, they proceeded north to intercept the initial approach fix. According to the flight instructor, as they flew toward the initial approach fix for a simulated instrument approach at BOW, the engine experienced a power fluctuation. The flight instructor switched tanks and turned on the fuel pump but shortly thereafter, the engine began to "sputter." He therefore decided to land at Winter Haven Regional Airport (GIF) Winter Haven, Florida, but was unable to make it to the runway. A forced landing was accomplished to an open field, about 2 miles northeast from GIF. During the landing sequence, the airplane's left wing sustained substantial damage when the landing gear struck a rut in the field.

Examination of the engine revealed no anomalies that would have prevented the normal production of power.

The airplane was secured for an engine run. The airplane's battery was charged, and a fuel source was secured to the right tank fuel line leading into the fuel selector. The engine started uneventfully but subsequently surged and stopped. An external fuel tank was then secured inside the cockpit to manually pump the primer ball and allow pressure in the system. The ball was pumped four times and fuel was observed leaking out of the top two vents (weep holes) in the fuel selector. There were no fuel stains or evidence of a fuel leak observed on the fuel selector valve before the engine run.

The fuel selector was removed, and the external fuel source was connected directly to the fuel line past where the fuel selector would be situated. The engine was started and run at various low to medium power settings, with no anomalies noted.

The fuel selector was removed for pressure tests and examination. The pressure bench checks of the fuel selector valve were accomplished in accordance with Piper Service Letter No. 1273, dated March 29, 2021, which provided instructions for a recurring bench check of the valve. The airplane's fuel valve was pressurized to the appropriate psi and checked for evidence of leaks. The valve passed the test, and no leaks were observed. The second pressure test was accomplished with valve's left and right outlet ports capped. A relatively small amount of fuel leaked around the shaft when it was positioned to the off

position. However, when positioned to the left or right positions, a substantial fuel leak occurred. Another exemplar fuel valve was tested in a similar manner and no leaks were observed.

The fuel valve was disassembled to examine the housing, shaft, and O-rings, for any potential damage or wear. No corrosion or damage was observed to the housing or shaft. The microscopic examination of the four O-rings revealed that the No. 3 and No. 4 O-rings appeared to have frictional interactions with the inner surface of the housing bore. Additionally, the No. 1 and No. 2 O-rings exhibited wear on the surfaces in contact with the inner surface of the housing bore. No additional anomalies were noted.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	46,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	February 27, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 20, 2018
Flight Time:	(Estimated) 5500 hours (Total, all aircraft), 200 hours (Total, this make and model), 4300 hours (Pilot In Command, all aircraft), 200 hours (Last 90 days, all aircraft), 90 hours (Last 30 days, all aircraft)		

Pilot Information

Certificate:	Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 24, 2018
Occupational Pilot:		**Last Flight Review or Equivalent:**	February 16, 2019
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N2134T
Model/Series:	PA28R 200	**Aircraft Category:**	Airplane
Year of Manufacture:	1971	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	28R7135142
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 24, 2019 100 hour	**Certified Max Gross Wt.:**	2600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	5635 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, not activated	**Engine Model/Series:**	IO-320-C1C
Registered Owner:		**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:	KGIF,145 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	225°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	23°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Bartow, FL (BOW)	**Type of Flight Plan Filed:**	None
Destination:	Bartow, FL (BOW)	**Type of Clearance:**	None
Departure Time:	10:20 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	WINTER HAVEN RGNL GIF	**Runway Surface Type:**	Asphalt
Airport Elevation:	145 ft msl	**Runway Surface Condition:**	Dry;Vegetation
Runway Used:	23	**IFR Approach:**	RNAV
Runway Length/Width:	5006 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	28.063055,-81.753334(est)

Administrative Information

Investigator In Charge (IIC):	Nixon, Albert		
Additional Participating Persons:	John Breen; Federal Aviation Administration; Orlando, FL Damian Galbraith; Piper Aircraft; Vero Beach, FL		
Original Publish Date:	May 3, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99397		