Aviation Investigation Final Report

Location:	Edgefield, South Carolina	**Accident Number:**	ERA19LA143
Date & Time:	April 4, 2019, 12:15 Local	**Registration:**	N7622M
Aircraft:	Cessna 175	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane had not been flown for about 6 years before being purchased about a week before the accident. A stuck exhaust valve was noted as part of an inspection for purchase. The pilot, who was also an airframe and engine mechanic, performed an annual inspection on the airplane the day before the accident. The pilot did not use a checklist and relied on memory during the inspection. The pilot noted a stuck exhaust valve on the No. 2 cylinder. Instead of removing the cylinder and conducting an inspection, as suggested by the engine manufacturer, the pilot staked the valve to correct the condition. The valve stuck again during a predeparture check on the day of the accident. The pilot staked the valve again and performed several additional run-ups without noting anymore problems with the valve. An additional predeparture engine run-up was performed prior to the accident flight. The pilot departed and reported the engine began running rough after about 20 minutes of level flight. He turned toward a nearby airport but the engine subsequently lost all power. Attempts to restart the engine were unsuccessful so the pilot performed a forced landing to a field. The left wing struck a pole during landing as the pilot maneuvered to avoid livestock.

A postaccident engine run was conducted with the engine installed in the airplane. The engine run was limited to 1,500 rpm due to safety concerns. A noticeable “skip” was noted during the engine run. The engine subsequently ran rough and then lost power when the left magneto was selected but continued to run when the right magneto was selected. Timing of the left magneto could not be performed due to lack of available tools, and the reason the engine lost power when the left magneto was selected was not determined. Additional examination of the engine found that the exhaust valve guide of one cylinder was pulled from the cylinder and seized to the valve stem. Additionally, the pushrod socket of a second cylinder was separated, which also likely occurred because of a stuck valve. The accident would have likely been mitigated had the pilot/mechanic properly addressed the recurring sticking exhaust valve issue. Although the

postaccident engine run noted an unidentified anomaly with the left magneto, the valve failures were likely the reason for the 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 total loss of engine power due to a stuck engine exhaust valve. Contributing to the loss of engine power was the pilot's failure to properly address the recurring stuck exhaust valve issue.

Findings

Aircraft	Recip eng cyl section - Malfunction
Aircraft	(general) - Inadequate inspection
Personnel issues	Decision making/judgment - Pilot

Factual Information

History of Flight

Enroute-cruise	Loss of engine power (partial)
Enroute-cruise	Loss of engine power (total) (Defining event)
Other	Off-field or emergency landing
Landing-landing roll	Collision with terr/obj (non-CFIT)

On April 4, 2019, about 1215 eastern daylight time, a Cessna 175, N7622M was substantially damaged when it was involved in an accident near Edgefield, South Carolina. The pilot and pilot-rated passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The airplane had not been flown for about 6 years before being purchased about a week before the accident. The individual who inspected it for purchase noted a stuck valve during his examination of the engine and also during an engine run. After purchase, the wings were removed and the airplane was transported to an airport for reassembly. The pilot, who was also an airframe and powerplant mechanic, reinstalled the wings and performed an annual inspection the day before the accident. The pilot performed the annual inspection from memory without a checklist. During the inspection the pilot noted low compression in the No.2 cylinder, which he attributed to a stuck exhaust valve. He did not conduct a differential cylinder compression test. The corrective action consisted of staking the valve. Afterwards the engine was operated with no discrepancies noted. He then flew the airplane about 1 hour during 2 separate flights with no reported discrepancies.

The pilot stated that during the engine run-up check for the accident flight, the No. 2 cylinder exhaust valve stuck again. He secured the engine, staked the valve, and performed another engine run-up with no discrepancies noted. He performed an engine run-up before departure noting each magneto drop was about 150 rpm. He also performed several full throttle static engine runs noting that the maximum rpm attained was between 2,500 and 2,600 rpm. He then departed and after about 20 minutes of level flight the engine began to run "a little shaky" like there was a stuck valve. The pilot turned towards a nearby airport but the engine began to run rougher then lost power completely He spotted a field and set up for a forced landing. During the landing roll, while maneuvering to avoid livestock, the left wing collided with a power pole.

Postaccident examination of the airplane was performed by several Federal Aviation Administration (FAA) inspectors. An initial inspection revealed no contaminants of either fuel tank or fuel strainer; the airplane had about 25 gallons of fuel on-board. The carburetor bowl contained an unquantified amount of fuel, and the fuel strainer was full of uncontaminated fuel. There was no blockage from either tank through the fuel selector to the engine on any of the positions of the fuel selector valve. The air induction and exhaust systems were free of

obstructions. Two ignition leads for the right magneto were noted to be swapped. The engine was started and operated to only 1,500 rpm due to safety concerns.

During operation of the engine there was a "noticeable skip coming from the engine." A check of the magnetos at low engine rpm revealed the engine "backfired and sputtered bad before shutting down" when the left magneto was selected, but the engine continued to run when the right magneto was selected. The inspectors did not have tools to determine the magneto-to-engine timing, or internal timing of the left magneto, which was removed and examined. It was disassembled completely in the field except for removing the coil and contactor and internally appeared to be in good condition. No further examinations of the left magneto were conducted, and the reason the engine lost power when it was selected was not determined.

The pilot later stated that following recovery of the airplane, he examined the engine and found the exhaust valve guide of one cylinder came out of the cylinder and attached to the valve. He also indicated that, on another cylinder, he found the pushrod socket out of position. The pilot did not respond to requests to clarify which two cylinders were affected.

According to Continental Aerospace Technologies Standard Practices Manual, cylinder removal and inspection is specified if one or more of the valves in the valve train are sticking.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	76,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	Lap only
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:**	April 4, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 20000 hours (Total, all aircraft), 100 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N7622M
Model/Series:	175 Undesignat	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	55922
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 3, 2019 Annual	**Certified Max Gross Wt.:**	2350 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1498 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	GO-300-A
Registered Owner:		**Rated Power:**	175 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:	DNL,422 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	188°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	Unknown / Unknown
Wind Direction:		**Turbulence Severity Forecast/Actual:**	Unknown / Unknown
Altimeter Setting:	30.38 inches Hg	**Temperature/Dew Point:**	20°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Augusta, GA (DNL)	**Type of Flight Plan Filed:**	None
Destination:	Boone, NC (NC14)	**Type of Clearance:**	None
Departure Time:	12:00 Local	**Type of Airspace:**	

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:**	33.76889,-81.986663

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy		
Additional Participating Persons:	James W Cook; FAA/FSDO; West Columbia, SC		
Original Publish Date:	March 30, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99228		