



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Lynchburg, Virginia	Accident Number:	ERA19LA019
Date & Time:	October 18, 2018, 10:57 Local	Registration:	N924MM
Aircraft:	Cessna 172	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (partial)	Injuries:	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor reported that, shortly after the student pilot conducted the takeoff for the instructional flight, they felt the engine vibrate and the airplane shudder. They then noticed that the rpm had decreased and that the engine's performance had degraded. The instructor took the controls and lowered the nose to prevent a stall. He attempted to land on the intersecting runway, and the airplane touched down with about 100 ft of runway remaining. Realizing that the airplane could not be stopped within the remaining runway, the instructor steered the airplane right to avoid a steep drop-off past the runway end. The airplane subsequently impacted a ditch and then came to rest in grass in a nose-down position. The left wing sustained substantial damage.

Postaccident examination of the engine revealed that the No. 2 cylinder exhaust valve was stuck open. Given this evidence, it is likely that the stuck exhaust valve resulted in the partial loss of engine power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The stuck No. 2 cylinder exhaust valve, which resulted in a partial loss of engine power and a subsequent forced landing and impact with a ditch.

Findings

Aircraft

Recip eng cyl section - Malfunction

Factual Information

History of Flight

Initial climb	Powerplant sys/comp malf/fail
Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Landing-landing roll	Runway excursion
Landing-landing roll	Collision with terr/obj (non-CFIT)

On October 18, 2018, about 1057 eastern daylight time, a Cessna 172S, N924MM, was substantially damaged following a partial loss of engine power and forced landing after takeoff from Lynchburg Regional Airport (LYH), Lynchburg, Virginia. The flight instructor and the student pilot were not injured. The airplane was operated by Liberty University under the provisions of Title 14 Code of Federal Regulations part 91 as an instructional flight. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight that was originating at the time of the accident.

The flight instructor, who was in the right cockpit seat, reported that ground operations were normal, including pretakeoff engine indications. The student performed the takeoff on runway 4. After flap retraction, about 200 feet above the ground, they observed an engine vibration and the airplane shuddered. They noted a decrease in engine RPM with degraded performance. The flight instructor took the controls and noted that the airspeed had dropped to just above stall speed and the stall warning horn sounded. He lowered the airplane's nose to prevent a stall and attempted to land on the intersecting runway 35. The airplane touched down with about 100 feet of runway remaining. Realizing that he could not stop the airplane within the remaining runway, the instructor steered the airplane to the right to avoid a steep drop-off under the extended centerline of the runway. The airplane departed the runway surface, collided with a drainage ditch, and came to a stop in the grass in a nose down position. The pilots egressed the airplane and were met by first responders.

A Federal Aviation Administration inspector responded to the accident site and examined the wreckage. He reported that the outboard portion of the left wing sustained structural damage during the landing. The propeller struck the ground during the event. The inspector examined the engine after the recovery of the wreckage. A cylinder pressure/leak check (with 80 psi input pressure) was performed. The Nos. 1, 3, and 4 cylinder readings were 74, 74, and 78 psi, respectively. The No. 2 cylinder read 22 psi. The No. 2 cylinder spark plugs were oil soaked. The No. 2 exhaust valve was stuck open; air could be heard escaping past the valve. There were no cracks or leaks observed in the cylinder body. The engine had accumulated 2,106 hours since overhaul, and the manufacturer's overhaul interval on the engine was 2,200 hours.

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	22,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	December 21, 2017
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	May 21, 2018
Flight Time:	328 hours (Total, all aircraft), 282 hours (Total, this make and model), 278 hours (Pilot In Command, all aircraft), 81 hours (Last 90 days, all aircraft), 37 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	Age:	20,Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	December 14, 2017
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	4 hours (Total, all aircraft), 4 hours (Total, this make and model), 0 hours (Pilot In Command, all aircraft), 4 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N924MM
Model/Series:	172 S	Aircraft Category:	Airplane
Year of Manufacture:	2010	Amateur Built:	
Airworthiness Certificate:	Normal; Utility	Serial Number:	172S11056
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	August 17, 2018 100 hour	Certified Max Gross Wt.:	2550 lbs
Time Since Last Inspection:	78 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	3592 Hrs at time of accident	Engine Manufacturer:	Lycoming
ELT:	C126 installed, not activated	Engine Model/Series:	IO-360-L2A
Registered Owner:		Rated Power:	180 Horsepower
Operator:		Operating Certificate(s) Held:	Pilot school (141)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	LYH,938 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	10:54 Local	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	360°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.45 inches Hg	Temperature/Dew Point:	12°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lynchburg, VA (LYH)	Type of Flight Plan Filed:	None
Destination:	Lynchburg, VA (LYH)	Type of Clearance:	VFR
Departure Time:	10:56 Local	Type of Airspace:	Class D

Airport Information

Airport:	Lynchburg Regional LYH	Runway Surface Type:	Asphalt
Airport Elevation:	938 ft msl	Runway Surface Condition:	Dry
Runway Used:	04	IFR Approach:	None
Runway Length/Width:	7100 ft / 150 ft	VFR Approach/Landing:	Forced landing

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:	37.330001,-79.199996(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Randy Clark; FAA/FSDO; Richmond, VA Andrew Walton; Liberty University; Lynchburg, VA
Original Publish Date:	April 13, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=98509

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](#).