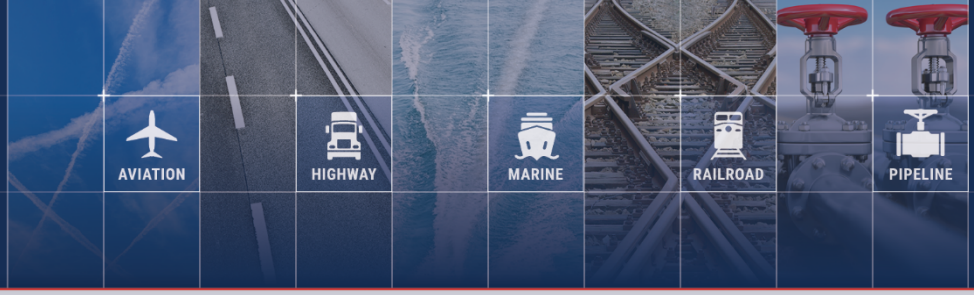

Aviation Investigation Final Report

Location:	Placerville, California	**Accident Number:**	WPR19LA102
Date & Time:	March 31, 2019, 16:30 Local	**Registration:**	N7033Q
Aircraft:	Cessna 172	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the climb after takeoff the engine lost partial power. The pilot performed troubleshooting steps and initiated a return to the airport. The airplane was not able to maintain altitude and landed in trees about 300 ft short of the approach end of the runway.

Postaccident examination revealed sooting signatures on the spark plug electrodes and inner surfaces of the exhaust pipe, indicating an excessively rich fuel-to-air mixture. Examination of the carburetor revealed multiple maintenance-related discrepancies, including an incorrectly adjusted float and a loose carburetor bowl. The discrepancies likely resulted in mixture irregularities and a loss of engine power.

Maintenance instructions and a series of service bulletins had been published by the carburetor manufacturer to address these issues. The discrepancies appeared to have been present for a while and were likely present at the time of the last annual inspection. The carburetor had not been overhauled or serviced in at least 19 years even though the manufacturer recommended overhaul at 10-year intervals.

Probable Cause and Findings

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

The partial loss of engine power due to an improperly maintained carburetor.

Findings

Aircraft	Fuel control/carburetor - Not serviced/maintained

Factual Information

History of Flight

Enroute-climb to cruise	Loss of engine power (partial) (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

On March 31, 2019, about 1630 Pacific daylight time, a Cessna 172L, N7033Q, was substantially damaged when it was involved in an accident near Placerville, California. The pilot was not injured. The airplane was operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight.

The pilot reported that after departing the traffic pattern, the engine began to run rough. He checked the throttle position, mixture control, fuel tank selection, and engine oil pressure. He then turned on the carburetor heat and the roughness increased without an increase in engine speed. The airplane was about 1,500 to 2,000 ft above ground level (agl) and the pilot decided to return to the airport for landing. The airplane was not able to maintain altitude and landed in trees about 300 ft short of the approach end of runway 23.

Postaccident examination revealed that both fuel tanks and the gascolator were full of fuel, and all fuel lines were secure and unobstructed. The engine air inlet filter was free of debris, and all the internal passages of the filter box and carburetor heat ducting were clear. The engine contained 7 quarts of oil (maximum 8) and there was no evidence of catastrophic engine failure. The propeller blades along with the engine and its ancillary components did not appear to sustain any evidence of impact damage.

The inner surface of the exhaust pipe appeared coated in black soot, and similar sooting was present on the electrodes of all spark plugs.

The data tag for the carburetor had partially worn away such that the manufacturer could not be determined, although it appeared to be of the Marvel-Schebler type, with a part number of 4SPA and serial number 10-3678-12.

Further examination revealed evidence of a fuel leak at the body-to-bowl join, and all four bowl securing screws were loose. The bowl was loose and could be moved by hand, and disassembly revealed fretting and polishing on the bowl and body join surfaces.

The accelerator pump plunger assembly shaft appeared loose, and both its packing and washer had detached from the carburetor body and were floating freely on the shaft.

Further disassembly revealed that the carburetor was equipped with a brass-type float and the float level (distance between the top of the float and the body-to-bowl join) was 3/32 inch rather than the required 7/32 inch. The float was intact and did not leak when tested in a bowl of fuel.

During disassembly Teflon-tape pipe sealing material was present on the threads of the carburetor inlet fuel fitting.

Maintenance records indicated that the engine was last overhauled in January 2000, about 1,587.8 flight hours prior to the accident. The records did not indicate that the carburetor had been overhauled at that time, and there were no entries indicating any work had been performed on the carburetor over the next 19 years until the accident. The last documented maintenance event performed on the engine was for an annual inspection and occurred on November 13, 2018, 37.8 flight hours prior to the accident.

The 4SPA carburetor was the subject of a series of service bulletins (SBs):

MSA-3, issued by Precision Airmotive Corporation in 1991, established a 10-year overhaul period for the carburetor.

SB-17 issued by Marvel-Schebler Aircraft Carburetors, LLC., dated August 12, 2010, with a subject of, "Body to Bowl Fuel Leaks", directed an inspection of the carburetor every 100 hours of engine operation. The SB described reports of loose body-to-bowl joints, with resulting leakage past the body-to-bowl gasket. Compliance required a visual inspection of the carburetor for evidence of movement, with remedial repairs should such evidence be found.

Lycoming mandatory SB 366C, dated June 2, 2016, also directed a similar inspection of the carburetor every 50 hours of engine operation.

The pilot stated that he had about 1 hour of flight experience in the accident airplane and that when operating other Cessna 172s, the engine speed would usually drop during the carburetor heat check by between 100 and 200 rpm. He stated that the rpm drop for the accident airplane was about 400 rpm. The pilot provided documentation from the airplane's owner who stated that he was aware that pilots had experienced a similar rpm drop but that the airplane had been examined and no anomalies were discovered. The owner's recommendation was to lean the fuel/air mixture when necessary.

The before takeoff checklist in the Cessna 172L Owner's Manual includes a carburetor heat check. It does not specify an appropriate rpm drop but instead simply requires that the pilot, "check operation".

Pilot Information

Certificate:	Private	**Age:**	61,Male
Airplane Rating(s):	Single-engine land	**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:	BasicMed Without waivers/limitations	**Last FAA Medical Exam:**	September 5, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 27, 2017
Flight Time:	310.2 hours (Total, all aircraft), 310.2 hours (Total, this make and model), 151 hours (Pilot In Command, all aircraft), 2.2 hours (Last 90 days, all aircraft), 0.6 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N7033Q
Model/Series:	172 L	**Aircraft Category:**	Airplane
Year of Manufacture:	1971	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	17260333
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 13, 2018 Annual	**Certified Max Gross Wt.:**	2299 lbs
Time Since Last Inspection:	38 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5851.6 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91A installed, not activated	**Engine Model/Series:**	O-320-E2D
Registered Owner:		**Rated Power:**	150 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KPVF,2583 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	23:55 Local	**Direction from Accident Site:**	198°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	18°C / -1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Placerville, CA	**Type of Flight Plan Filed:**	None
Destination:	Placerville, CA (PVF)	**Type of Clearance:**	None
Departure Time:	16:20 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Placerville PVF	**Runway Surface Type:**	Asphalt
Airport Elevation:	2585 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	23	**IFR Approach:**	None
Runway Length/Width:	3910 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	38.728054,-120.745277

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott		
Additional Participating Persons:	Stanley (Mike) Phillips; Federal Aviation Administration FSDO; Sacramento, CA		
Original Publish Date:	April 21, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99196		