Aviation Investigation Final Report

Location:	Santa Ana, California	**Accident Number:**	WPR19LA050
Date & Time:	December 22, 2018, 16:22 Local	**Registration:**	N15321
Aircraft:	Piper PA28	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

Shortly after takeoff on the instructional flight, the engine lost total power. The flight instructor took the airplane controls and returned to the airport for a forced landing, during which the airplane landed hard on a taxiway, resulting in substantial damage.

Postaccident examination revealed that the carburetor bowl was loose and displayed evidence of a fuel leak. The leak likely resulted in fuel flow irregularities and the loss of engine power. Although service bulletins had been published by both the carburetor and engine manufacturer to address this issue, there was no evidence to suggest that the accident airplane had undergone the inspections specified by the service bulletins.

Probable Cause and Findings

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

A total loss of engine power due to a loose carburetor bowl.

Findings

Aircraft	Fuel control/carburetor - Damaged/degraded

Factual Information

History of Flight

Initial climb	Fuel related (Defining event)
Initial climb	Loss of engine power (total)
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On December 22, 2018, about 1622 Pacific standard time, a Piper PA28-140, N15321, was substantially damaged when it was involved in an accident near Santa Ana, California. The flight instructor and student pilot were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 instructional flight.

The instructor stated that the student was flying the airplane during takeoff from runway 20L. After they reached about 250 ft above ground level, the engine lost total power. The instructor took the airplane controls and began to look for a landing site. He declared an emergency and initiated a return to the airport with the intention of landing on runway 2R. The instructor stated that, just before landing, the airplane encountered a strong wind shear, and they landed hard on an intersecting taxiway. The airplane sustained substantial damage to both wings and the forward fuselage.

Evidence of 100 low-lead aviation gasoline was found in the fuel supply system. All fuel lines were intact at their respective fittings, and all filters and screens were free of debris. The engine's internal drivetrain was intact and there was no evidence of catastrophic failure. Both magnetos produced sparks when tested. The spark plugs exhibited dark grey deposits and wear signatures consistent with a short service life. The throttle, mixture, and carburetor heat controls were intact, and their linkages were continuous through to their respective cabin controls.

The airplane was equipped with an MA-4SPA carburetor. Removal and examination of the carburetor revealed that two of the four screws that mounted the carburetor bowl to the throttle body (aft, data tag side) were loose, and although lock-tab washers were installed, the screws could still be turned by hand, and the bowl could be moved. The bowl-to-body contact surface and corresponding area of the bowl gasket were dark in color, and evidence of fluid flow was present on the lower outer surfaces of the bowl.

Maintenance records indicated that the engine was last overhauled in August 2011, about 1,568 flight hours before the accident. The records indicated that the carburetor had been overhauled at that time, and there were no entries indicating any work had been performed on the carburetor in the 7 years leading up to the accident. The last documented maintenance inspection event was an annual inspection on December 19, 2017, 42.2 flight hours before the accident.

Service Bulletin SB-17 dated August 12, 2010, issued by Marvel-Schebler Aircraft Carburetors, LLC., with a subject of, "Body to Bowl Fuel Leaks," directed an inspection of the carburetor every 100 hours of engine operation. The bulletin 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 Service Bulletin SB 366C, dated June 2, 2016, also directed a similar inspection of the carburetor every 50 hours of engine operation.

Maintenance records did not specifically state that SB-17 or SB 366C had ever been performed; however, compliance with service bulletins is not mandatory for aircraft operated under 14 *CFR* Part 91.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	45,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 single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	November 28, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 25, 2018
Flight Time:	770 hours (Total, all aircraft), 425 hours (Total, this make and model), 620 hours (Pilot In Command, all aircraft), 29 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	16,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 3 Without waivers/limitations	**Last FAA Medical Exam:**	December 3, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	23 hours (Total, all aircraft), 10 hours (Total, this make and model), 14 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N15321
Model/Series:	PA28 140	**Aircraft Category:**	Airplane
Year of Manufacture:	1972	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	28-7325039
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	December 19, 2017 Annual	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:	42.2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	13795 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-E3D
Registered Owner:		**Rated Power:**	150 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:	TRC Aviation Academy	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSNA,56 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	00:37 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 21000 ft AGL	**Visibility**	5 miles
Lowest Ceiling:	Broken / 25000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	230°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.04 inches Hg	**Temperature/Dew Point:**	17°C / 12°C
Precipitation and Obscuration:	Moderate - None - Haze		
Departure Point:	Santa Ana, CA (KSNA)	**Type of Flight Plan Filed:**	None
Destination:	Santa Ana, CA (KSNA)	**Type of Clearance:**	VFR
Departure Time:	15:10 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	John Wayne Airport KSNA	**Runway Surface Type:**	Asphalt
Airport Elevation:	56 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	2R	**IFR Approach:**	None
Runway Length/Width:	2887 ft / 75 ft	**VFR Approach/Landing:**	Forced landing;Full stop;Traffic pattern

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:**	33.675277,-117.86888(est)

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott		
Additional Participating Persons:	Russel Parker; Federal Aviation Administration FSDO; Long Beach, CA		
Original Publish Date:	April 1, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98820		