Aviation Investigation Final Report

Location:	Dawsonville, Georgia	**Accident Number:**	ANC18LA006
Date & Time:	October 30, 2017, 08:26 Local	**Registration:**	N4213F
Aircraft:	Piper PA 32R-300	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was conducting a personal flight and reported that, while the airplane was climbing after takeoff, the engine began to run roughly and lose power. The pilot began a descent for an emergency landing and, during the descent, he sensed a "bad" engine vibration, which was followed by a complete loss of engine power. The pilot selected an area on an asphalt-covered automobile racetrack to make a forced landing, which resulted in substantial damage to the airplane's wings and fuselage.

A postaccident engine examination revealed a crack in the accessory case and a large hole in the crankcase near the No. 6 cylinder pad. A subsequent internal examination revealed damage to the engine's internal components, including the main bearings and the No. 6 connecting rod, that was consistent with oil exhaustion.

The airplane was equipped with a remotely mounted oil filter. A B-nut on one of the oil filter lines was found to be loose with about 2 ½ threads showing. The B-nut was tightened by hand and rotated about 1 ¾ turns, which resulted in about ½ thread showing.

The pilot stated that he was not an airframe and powerplant mechanic but that he had replaced the oil line about 1 week before the accident. The accident flight was the first flight after that maintenance.

Probable Cause and Findings

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

The failure of the pilot, who was not a certified mechanic, to tighten the B-nut on a remotely mounted oil filter line, which resulted in oil exhaustion, a total loss of oil pressure, and a subsequent total loss of engine power.

Findings

Aircraft	Oil - Fluid level
Aircraft	Eng oil dist (airframe furn) - Inadequate inspection
Aircraft	Eng oil dist (airframe furn) - Incorrect service/maintenance
Personnel issues	Replacement - Pilot

Factual Information

History of Flight

Enroute	Loss of engine power (total) (Defining event)
Enroute	Off-field or emergency landing

On October 30, 2017, about 0826 eastern daylight time, a Piper PA-32R-300 airplane, N4213F, sustained substantial damage during a forced landing on an asphalt-covered automobile race track about 4 miles west-northwest of Dawsonville, Georgia. The private pilot sustained serious injuries. The airplane was registered to Peavy LLC and was being operated as a 14 *Code of Federal Regulations* Part 91 instrument flight rules (IFR) flight. Visual meteorological conditions prevailed and an IFR flight plan had been filed. The flight departed Gainesville, Georgia (GVL) about 0807, destined for Gary, Indiana (GYY).

According to the pilot, while climbing through 8,000 ft mean sea level (msl) to an assigned altitude of 10,000 ft msl, he heard a sound consistent with a propeller overspeed, which lasted about 5 seconds before returning to normal. Coinciding with the sound, was a low oil quantity light and a reading of zero on the oil pressure gauge. After declaring an emergency, the pilot began a descent for an emergency landing. As the airplane descended through about 5,000 ft msl, the pilot heard a loud "pop or bang" and saw a puff of smoke emit from under the engine cowling, and smoke entered the cockpit through the cabin heat system. Around 3,500 ft msl, the pilot tried to add some power before sensing a "bad vibration" that felt as if a propeller blade had separated. About the same time as the vibration, the engine lost all power.

Seeing an asphalt-covered automobile racetrack below, the pilot selected one of the straight sections of track for landing. As the airplane neared the surface, a white truck moved in the way, and the pilot veered the airplane left to avoid a collision. Following the maneuver, the airplane's right wing struck a dirt berm, resulting in substantial damage to the wings and fuselage.

An on-site examination of the airplane by a Federal Aviation Administration (FAA) aviation safety inspector revealed that the bottom of the fuselage was coated in oil and the engine crank case was fractured at the upper aft attach bolts of the number six cylinder. All three propeller blades were present, with only one blade exhibiting signs of damage. The damaged blade was bent aft with no significant signs of leading edge damage or scaring. The two remaining blades were free of impact damage.

The airplane was equipped with a Lycoming IO-540 series engine, which was examined on November 16, 2017. The engine is a six-cylinder, air cooled, direct drive, horizontally opposed, normally aspirated, fuel injected, internal combustion engine. Extensive fracturing of the engine crankcase above the #6 cylinder was present. The engine was disassembled for inspection and the crankcase was opened. The #3 and #4 main bearings on both the left and right side of the crankcase were wiped with copper flashing and bearing material was extruding. The connecting rod and crankshaft journals for the #5 cylinder exhibited signs consistent with thermal damage with the bearing extruded. The connecting rod and

crankshaft journals for the #6 cylinder were fragmented, however both connecting rod bolts remained in place and attached. The piston and wrist pin remained attached with about 3 inches of the fractured connecting rod.

The airplane was equipped with an Air Wolf remote mounted oil filter (P/N 0FB 10). The kit consists of two hoses, an adapter that mounts to the engine's accessory case, and an oil filter bracket that mounts to the airplane's firewall. When the kit is installed, the oil filter is remotely mounted to the airplane's firewall. A B-nut on one of the remote mounted oil filter lines was observed to be loose with about 2 ½ threads showing. The B-nut was tightened by hand and rotated about 1 and ¾ turns with about ½ thread showing.

According to the pilot, he was not an airframe or powerplant mechanic, but he said that he replaced the line about a week before the accident, and this was the first flight since that installation.

The closest official weather observation station is GVL, which is located about 20 miles southeast of the accident site. At 0753, a METAR was reporting, in part, wind 270° at 8 knots; visibility 10 statute miles; clouds and ceiling clear; temperature 36° F; dew point 28° F; altimeter 29.96 inches of Mercury.

Pilot Information

Certificate:	Private	**Age:**	50,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:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 1, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 15, 2016
Flight Time:	1300 hours (Total, all aircraft), 1000 hours (Total, this make and model), 1200 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N4213F
Model/Series:	PA 32R-300	**Aircraft Category:**	Airplane
Year of Manufacture:	1976	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R-7680432
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	July 31, 2017 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	15 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5527.91 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO540-K165D
Registered Owner:	On file	**Rated Power:**	300 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:	KGVL,1275 ft msl	**Distance from Accident Site:**	20 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	119°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/ Unknown
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	/ Unknown
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	2°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	GAINESVILLE, GA (GVL)	**Type of Flight Plan Filed:**	VFR/IFR
Destination:	GARY, IN (GYY)	**Type of Clearance:**	IFR
Departure Time:	08:00 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	34.434444,-84.176666

Administrative Information

Investigator In Charge (IIC):	Williams, David
Additional Participating Persons:	Dave Detscher; FAA; Altanta, GA
Original Publish Date:	November 15, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96269