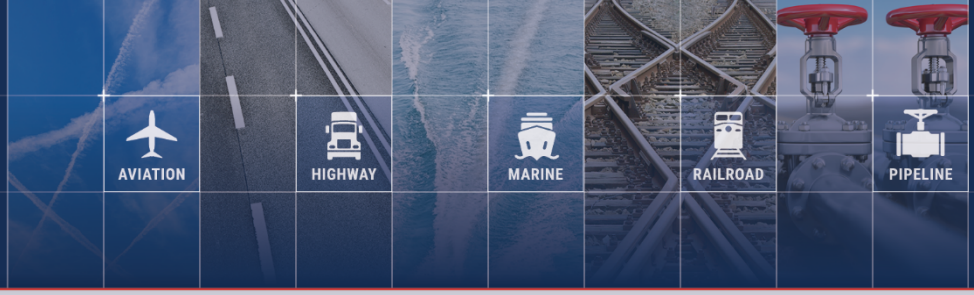

Aviation Investigation Final Report

Location:	Opelika, Alabama	**Accident Number:**	ERA19LA017
Date & Time:	October 15, 2018, 22:10 Local	**Registration:**	N9398G
Aircraft:	Cessna 182	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious, 2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During the climb after takeoff, the pilot noticed a drop in engine oil pressure and turned back toward the airport to land. Almost immediately thereafter, the engine began to run rough and eventually lost power completely. The pilot performed a forced landing to an interstate exit ramp, during which the airplane sustained substantial damage.

Examination of the engine revealed that the Nos. 2 and 4 connecting rods were separated from their respective rod journals. All rod journals were absent of lubrication and displayed heat damage. Disassembly of the engine and the separation of the case halves revealed abnormal wear and damage consistent with loss of lubrication. Examination and testing of engine accessories revealed no anomalies that would have prevented normal operation.

The engine was equipped with a screw-on oil filter adaptor required to be torqued to 65 ft/lbs at installation, and the integrity of the oil filter adaptor installation was required to be examined during every 100-hour and annual inspection. The adaptor on the accident engine was found loose and could be easily rotated by hand through a 90° arc, and oil seepage was found on the area surrounding the oil filter adapter attachment point. Given this information, it is likely that the loose adaptor allowed the engine oil to be pumped overboard, resulting in a loss of engine lubrication and catastrophic failure of the Nos. 2 and 4 connecting rods.

Probable Cause and Findings

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

The improper torque application and ongoing inspection of an oil filter adaptor by maintenance personnel, which resulted in a loss of lubrication and a catastrophic engine failure.

Findings

Aircraft	Recip eng oil sys - Not inspected
Personnel issues	Installation - Maintenance personnel
Personnel issues	Scheduled/routine maintenance - Maintenance personnel

Factual Information

History of Flight

Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Collision with terr/obj (non-CFIT)

On October 16, 2018, at 2210 central daylight time, a Cessna 182P, N9398G, was substantially damaged when it collided with trees during a forced landing in Opelika, Alabama. The forced landing followed a loss of engine power about 6 minutes after departure from Auburn University Regional Airport (AUO), Auburn, Alabama. The pilot was seriously injured, and two passengers were not injured. Night visual meteorological conditions prevailed, and no flight plan was filed. for the personal flight which was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

The pilot provided a written statement and was interviewed by telephone. He said he completed the preflight inspection, engine run-up, and before-takeoff checks with no anomalies noted. During the climb after takeoff, he noticed a drop-in engine oil pressure, so he reversed course for landing back at AUO. Almost immediately thereafter, the engine ran roughly, lost power, sparks "flew" from beneath the cowling, and the engine then stopped producing power.

While the pilot was maneuvering at low altitude and low airspeed when he rejected one roadway as a forced landing site, maneuvered to a four-lane divided highway, and ultimately selected the grass area adjacent to an exit ramp for the landing.

After touchdown, the airplane "slid back down the grade" struck trees and came to rest upright. The occupants egressed the airplane without assistance.

The pilot held a commercial pilot certificate with ratings for airplane single engine land, multiengine land, and instrument airplane. His Federal Aviation Administration (FAA) second class medical certificate was issued December 12, 2017, and he reported 13,422 total hours of flight experience at that time.

According to FAA records, the airplane was manufactured in 1971 and had accrued 5,398.9 total aircraft hours. Its most recent annual inspection was completed June 4, 2018 at 5,338.8 total aircraft hours. The engine had accrued 400.3 hours since its last overhaul, which was completed April 22, 2013. The three most recent annual inspections were completed by the same mechanic.

At 2146, the weather recorded at AUO included scattered clouds at 700 feet and wind from 020° at 5 knots. The temperature was 22°C, and the dew point was 21°C. The altimeter setting was 30.17 inches of mercury.

The airplane's wings, fuselage, and empennage all sustained substantial impact damage. In addition, holes were observed in the top of both engine crankcase halves on either side of the fuel manifold. A fractured connecting rod was visible outside the engine case wedged between the Nos. 1 and 3 cylinders.

Examination of the engine revealed the Nos. 2 and 4 connecting rods were separated from their respective rod journals. All rod journals were absent of lubrication and displayed heat damage. Disassembly of the engine and the separation of the case halves revealed abnormal wear and damage consistent with a loss of lubrication. Examination and testing of engine accessories revealed no anomalies which would have prevented normal operation.

The engine was equipped with a spin-on oil filter adaptor (STC SE09356SC). The installation instructions directed threading of the oil transfer cylinder into the oil screen housing, and once properly positioned, torqued to 65 ft/lbs. The adaptor on the accident engine was found loose and could be easily rotated by hand through a 90° arc, and oil was observed on the rear of the engine in the area surrounding the oil filter adaptor attachment point.

The maintenance instructions for the adaptor prescribed inspection for oil seepage, security and integrity of safety wire, and "integrity of fit" at each annual or 100-hour inspection.

Pilot Information

Certificate:	Commercial	**Age:**	64,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
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:**	December 7, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	13422 hours (Total, all aircraft), 100 hours (Total, this make and model), 125 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N9398G
Model/Series:	182 P	**Aircraft Category:**	Airplane
Year of Manufacture:	1971	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18260938
Landing Gear Type:	Tricycle	**Seats:**	
Date/Type of Last Inspection:	June 4, 2018 Annual	**Certified Max Gross Wt.:**	2348 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	5338.8 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:		**Engine Model/Series:**	O-470 SERIES
Registered Owner:		**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KAUO,650 ft msl	**Distance from Accident Site:**	7 Nautical Miles
Observation Time:	21:46 Local	**Direction from Accident Site:**	253°
Lowest Cloud Condition:	Scattered / 700 ft AGL	**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	20°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	22°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Auburn, AL (AUO)	**Type of Flight Plan Filed:**	None
Destination:	Athens, GA (AHN)	**Type of Clearance:**	VFR flight following
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	Auburn University Regional AUO	**Runway Surface Type:**	
Airport Elevation:	750 ft msl	**Runway Surface Condition:**	Soft
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 2 None	**Latitude, Longitude:**	32.633335,-85.368331(est)

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian		
Additional Participating Persons:	Kevin Atkins; FAA/FSDO; Birmingham, AL Andrew Hall; Textron Aviation; Wichita, KS Philip Grice; Continental Motors; Mobile, AL		
Original Publish Date:	December 3, 2020	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98503		