



ERA17LA185

West Chester, Pennsylvania

May 21, 2017

Cessna 182S – N378ES

NTSB ENGINE EXAMINATION REPORT

June 2, 2017

PARTICIPANTS IN THE EXAMINATION

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National Transportation Safety Board
Ashburn, Virginia

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HISTORY OF FLIGHT

On May 21, 2017, about 1355 eastern daylight time, a privately owned and operated Cessna 182S, N378ES, was substantially damaged when it impacted a utility pole and terrain during a forced landing near West Chester, Pennsylvania. The private pilot was not injured. The flight departed Trenton Mercer Airport (TTN), Trenton, New Jersey at about 1330, and was destined for Montgomery County Airpark (GAI), Gaithersburg, Maryland. Visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the personal flight, which was conducted under the provisions of 14 Code of Federal Regulations Part 91.

According to the pilot, about 20 minutes into the flight at an altitude of about 5,000 ft mean sea level, he noticed a loss of oil pressure, and the oil pressure warning light illuminated about 1 minute later. The cylinder head temperature and oil temperature indications were normal. He declared an emergency with air traffic control and received vectors to the Brandywine Airport (OQN), West Chester, Pennsylvania. A few minutes later the engine began to “shudder” making it difficult to control the airplane. At that time, the oil temperature was “high up on the gauge” and he decided to shut down the engine. About 3 miles from OQN, he determined the airplane would likely not reach the airport, and he prepared for an off-airport landing in a nearby field. During the approach to the field he noticed powerlines obstructing his path. Unable to climb above them, he descended and attempted to fly underneath the wires; however, the left wing stuck a utility pole. The airplane impacted the ground and came to rest about 200 ft beyond the pole.

ENGINE INFORMATION

Engine Manufacturer: Lycoming

Engine Model Number: IO-540-AB1A5

Engine Serial Number: L-25913-43A

Recent Inspection: Annual Inspection - September 9, 2016 – Hobbs time 2,200 hrs

Last Overhaul: June 13, 2007 – Hobbs time 1,341 hrs (due to prop strike)

Hobbs time after accident May 21, 2017: 2,459 hrs

TSMOH: 1,118 hrs

Lycoming Recommended TBO: 2,000 hrs

SERVICE BULLETIN COMPLIANCE RECORD			
TOTAL TIME IN	TIME OUT	NEXT COMPLIANCE	AUTHORIZED SIGNATURE
 INFINITY Since Last Inspection: 82.4 REG #: N378ES MAKE: Lycoming MODEL: IO-540-AB1A5 SIN: L-25913-43A DATE: 09-09-2016 W/O #: 1609001 TACH: 2200.0 TSMOH: 859.5			
- CW Annual Inspection and servicing IAW Cessna Inspection Guide 182S MM Chap. 5-10-01, REV 1 and requirements of 14 C.F.R. 43 Appendix D. - Compressions checked @ 80 PSI #1) 78 #2) 74 #3) 77 #4) 77 #5) 76 #6) 79. - Drained oil. Inspected filter and screen. Installed new AA48110-2 oil filter and 9 Qts. Aeroshell 15W50 oil. - Cleaned, Gapped, Tested and Rotated Spark Plugs IAW Lycoming SI. 1042AA. Installed 1 new Champion REM. Installed 1 new Champion REM8E Spark Plug. - Checked ADS through Bi-weekly 2016-18. - Complied with the following: 13-11-11 Engine Oil Pressure Switch Replacement Due: 5117.6 Tach. 15-19-07 Fuel Injector Lines by visual inspection; next due at Tach 2300.0, 09-2017, or any maintenance to lines. - Slick 500-hour Magneto Service IAW L-1363F Manual. Installed new M3081 Contact Assemblies both mags. Timed mags to factory spec. - Ground run, operational and leak checks satisfactory.			
I certify that this Engine has been inspected IAW Cessna 182S Annual Inspection and 14 C.F.R. 43 Appendix D requirements, and was determined to be in airworthy condition. Pertinent details of the inspection are on file at this agency under the work number shown above. [Redacted Signature] for Infinity Flight Group, LLC Matthew L. Miller [Redacted Signature]			

Picture 1. Most Recent Inspection (annual inspection)

INITIAL EXAMINATION (FAA)

FAA Inspectors Gary Banas and Bob Drapula from the Philadelphia FSDO initially responded to the accident scene. They reported that oil streaks were present all along the underside of the airplane. About ¼ quart of oil was in the engine sump. The oil suction screen contained metal fragments, and piston No. 6 would not move when the propeller was rotated by hand.

FOLLOW-UP EXAMINATION

A follow-up examination was performed by NTSB and FAA investigators on June 2, 2017 at Anglin Aircraft Recovery in Clayton, Delaware. The spark plugs were removed, thumb compression and suction were obtained on all cylinders with the exception of No. 6.

Spark Plugs

All spark plugs were removed from the engine. The spark plugs were massive electrode type plugs. The No. 4 bottom spark plug and No. 6 top and bottom plugs were oil soaked.



Picture 2. View of All Spark Plugs

Cylinder No. 6.

Cylinder No. 6 was removed from the engine case. The No. 6 crankshaft connecting rod journal was discolored, smeared, and contained gouges, consistent with thermal damage.



Picture 3. No. 6 Crankshaft Journal



Remnants of connecting rod bearing material were found loose inside the crankcase.



Picture 4. Bearing Material

The crankshaft end of the connecting rod was spread open, discolored, and damaged. The rod end cap was separated from the rod, deformed, discolored and damaged. Both were consistent with thermal damage.



Picture 5. Connecting Rod and Cap



The piston top had impact marks consisting with contact from both valves.



Picture 6. Piston Top

The exhausted valve hydraulic lifter was fractured circumferentially.



Picture 7. Fractured Exhaust Valve Lifter

Cylinders 1-5

A borescope examination of the remaining cylinders did not reveal and damage or unusual marks.

Oil Pump.

The engine oil pump was removed. The safety wire on the housing bolts was intact. The housing cover was removed. The drive coupling, gears, and housing were intact with no damage noted. The shaft turned freely by hand. was removed from the engine. An unmeasured amount of oil and metal particles were noted inside the oil sump



Picture 8. Oil Pump

SUMMARY

The examination revealed that the No. 6 connecting rod and bearing exhibited lubrication and heat distress. In addition, the crankcase contained about $\frac{1}{4}$ quart of oil. An on-site inspection by the FAA revealed that oil was streaking along the bottom of the airplane fuselage.