



NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety

Engine Examination

A. ACCIDENT ERA22LA366

Location: Carolina Bch, NC
Date: June 29, 2022
Aircraft: Piper Pa-32RT-300
Engine: Lycoming IO-540-K1G5D sn L-19009-48A
Registration: N4321M

B. ENGINE EXAMINATION PARTICIPANTS:

IIC: Peter Wentz
 National Transportation Safety Board
 Ashburn, Virginia

Participant: Mike Childers
 Lycoming Engines
 Williamsport, PA

C. ENGINE EXAMINATION LOCATION:

Atlanta Air Salvage
Griffin, GA
October 12, 2022

D. SUMMARY

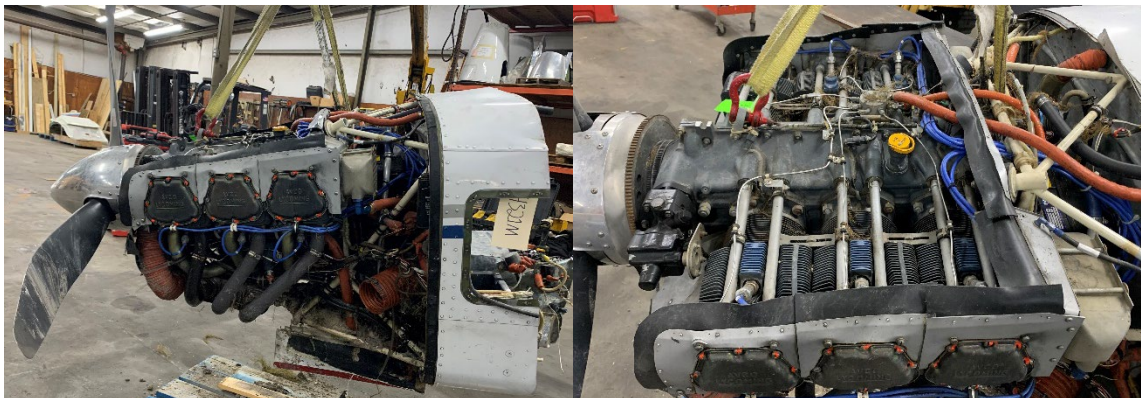
On June 29, 2022, about 1143 eastern daylight time, a Piper PA-32RT-300, N4321M, was substantially damaged when it was involved in an accident near Carolina Beach, North Carolina. The pilot sustained minor injuries and the passenger was not injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

According to the pilot, an annual inspection of the airplane had just been completed, and he performed a preflight inspection and reported no anomalies. After conducting an engine run-up, he taxied to the active runway for takeoff at Pilots Ridge Airport (03NC), Carolina Beach, North Carolina. During the subsequent takeoff, the airplane became airborne and established a climb, but within seconds the “engine hesitated and stopped developing normal takeoff power.” The pilot aborted the takeoff and landed on the remaining 500 ft of the runway; however, due to light rain the runway was wet, and the pilot was unable to stop the airplane on the runway. The airplane continued off the runway, coming to rest in a shallow retention pond.

An On-scene examination of the wreckage by a Federal Aviation Administration inspector revealed that the airplane was in about 5 ft of water in a nose low attitude with substantial damage to the right wing.

E. DETAILS OF THE EXAMINATION

The engine was submerged and had not been preserved during the 3 ½ months between the date of the accident and the date of the engine exam. Water drained from the engine crankcase when the oil sump oil suction screen was removed. As first viewed, the fuselage had been cut and the propeller, engine, engine mount, and firewall were laying on a pallet at the facilities of Atlanta Air Recovery (AAR), in Griffin, GA. The engine was suspended from a lift, removed from the nose of the aircraft with the engine firewall and partially disassembled to facilitate the examination.



Photograph 1 – Accident engine pre-examination.

An attempt to rotate the crankshaft by turning the propeller was unsuccessful. The interiors of the cylinders were viewed using a lighted borescope. Water and corrosion debris were observed in the cylinders. The cylinder barrel walls exhibited heavy corrosion.

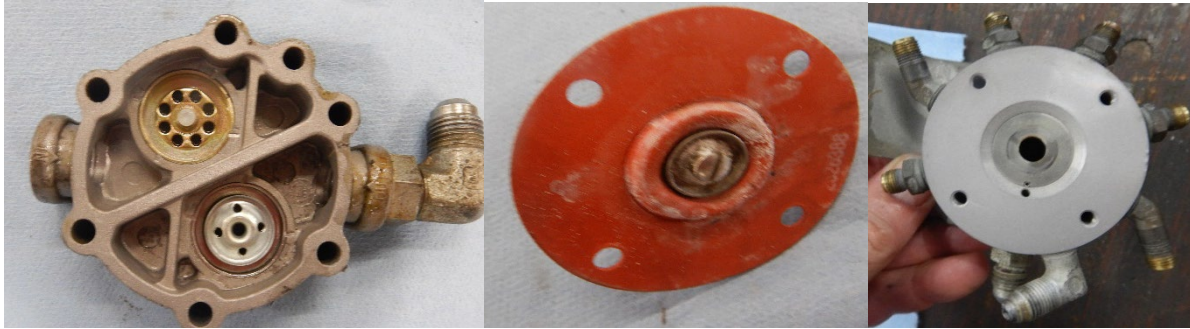


Photograph 2 – Cylinder 1-3-5



Photograph 3 – Cylinder 1-3-5

The #1, #3 and #5 cylinders were removed to gain visual access to the interior of the crankcase. Continuity of the crankshaft to the rear gears and to the valve train was confirmed by visual observation. The #1, #3 one #5 connecting rods rotated freely on their respective crankshaft rod journals. No damage to the crankshaft, camshaft or cam followers was observed through the #1, #3 and #5 cylinder mounting pads.



Photograph 4 – Fuel system components.

The fuel injector servo remained attached to the engine and no damage was noted. The throttle and mixture cables remained attached to the throttle and mixture control arms. Liquid with an odor consistent with aviation gasoline drained from the servo when it was tilted and from the fuel hoses from the engine driven fuel pump to the servo and from the servo to the flow divider. The servo fuel regulator section was partially disassembled, and no damage noted to the rubber diaphragms or other internal components. The servo fuel inlet screen was absent of debris. The fuel flow divider remained attached to the engine and no damage was noted. The metal fuel injector lines were secure. The flow divider was partially disassembled. A few drops of water drained from the flow divider. No damage to the rubber diaphragm or other internal components was noted. The fuel injector nozzles were secure and unobstructed.

The engine driven fuel pump remained attached to the engine and no damage was noted. Liquid with an odor consistent with aviation gasoline drained from the pump when it was removed and tilted. The pump produced air at the outlet port when it was operated by hand. The pump was partially disassembled and no damage to the rubber diaphragms or internal check valves observed.



Photograph 5 – Magneto.



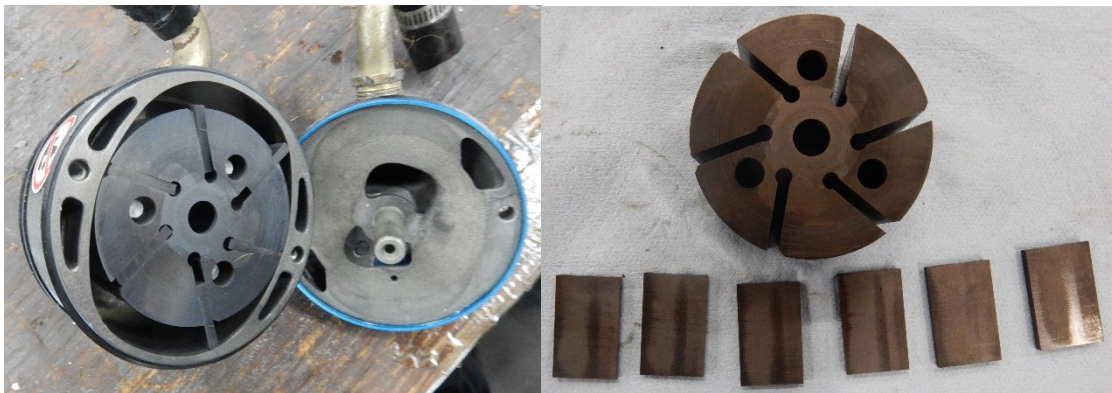
Photograph 6 – Magneto - internal view.

The magneto remained securely attached to the engine and no external damage was noted. The magneto was removed and rotated using an electric drill/driver. Spark was produced from all of the left magneto ignition towers but none of the right towers. The magneto was partially disassembled, and water and corrosion products observed on the internal components, including the contact points.



Photograph 7 – Accident engine spark plugs.

The spark plugs were a mixture of Autolite UREM38E and Champion REM38E manufacture. The spark plug electrodes exhibited dark gray coloration and worn normal condition. Water and corrosion were observed in the spark plug electrode wells. No damage to the ignition harness was noted. It was not tested.



Photograph 8 – Vacuum pump internal components.

The vacuum pump remained attached to the engine and no damage was noted. It was removed and produced air at the outlet port when rotated by hand. The pump was partially disassembled. The composite drive assembly, carbon vanes and carbon rotor were intact.



Photograph 8 – Oil filter.

Water and oil drained from the engine crankcase when the oil suction screen was removed. The oil suction screen exhibited wet, white corrosion products but no metallic debris. The oil filter media was absent of debris.