



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

December 3, 2019

AIRPLANE AND ENGINE EXAMINATION REPORT

WPR19LA198

This document contains 18 embedded photographs

Madras, Oregon

July 22, 2019

1300 PDT

Cessna 172G – N3761L

PARTICIPANTS IN THE EXAMINATION

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HISTORY OF FLIGHT

On July 22, 2019, about 1300 Pacific daylight time, a Cessna 172G, N3761L, was substantially damaged during a forced landing near Madras Municipal Airport (S33), Madras, Oregon. The flight instructor was not injured. Both the student pilot and passenger received serious injuries. The airplane was registered to and operated by Outlaw Aviation, LLC as an instructional flight, conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed and a flight plan was not filed, for the local flight that originated from Sisters Eagle Airport (6K5), Sisters, Oregon at 1230.

According to the flight instructor, she asked the student pilot to perform a preflight inspection of the airplane while she concluded a debrief with another student. When the instructor returned, she delivered a safety briefing and overview of the upcoming flight to the rear seat passenger. The engine started normally after two unsuccessful attempts and several shots of primer. They subsequently performed an engine run-up before they departed uneventfully from runway 20 at 6K5. As the airplane was about 15 nm from S33, the instructor and student retrieved weather information from the automated terminal information service, which did not show any hazards. They descended the airplane and made a radio call over the uncontrolled airport's common traffic advisory frequency to announce their position and intentions before they entered the extended base leg of the airport

traffic pattern for runway 34. After a successful touch and go maneuver they re-entered the airport traffic pattern and heard an advisory call over the radio from a nearby airplane with intentions of entering the pattern. Abeam the runway 34 designation numbers, the student pilot applied carburetor heat, reduced engine power to 1,500 pm and configured the airplane to land.

The instructor recounted that the approach progressed normally as she scanned the area for the incoming traffic. After another radio call from the incoming airplane, the instructor observed the traffic and issued instructions to the student pilot to turn to the final approach leg. Almost immediately after she announced their position she heard the student pilot say “it won’t go in, it won’t go in!” While instructor attempted to comprehend the student pilot’s statement she noticed that the rpm indication on the tachometer showed 1,000 rpm. She immediately recycled the throttle, advanced the mixture to FULL RICH, and then recycled the throttle again, but did not observe any response from the engine. From about 300 ft above ground level, the instructor took control of the airplane and instructed both the student pilot and passenger to brace for impact. The airplane touched down in a field south of runway 34, impacted a barbed wire fence, traversed an embankment and paved road before it came to rest on its nose.

Postaccident examination of the airplane by the Federal Aviation Administration revealed substantial damage to the forward fuselage.

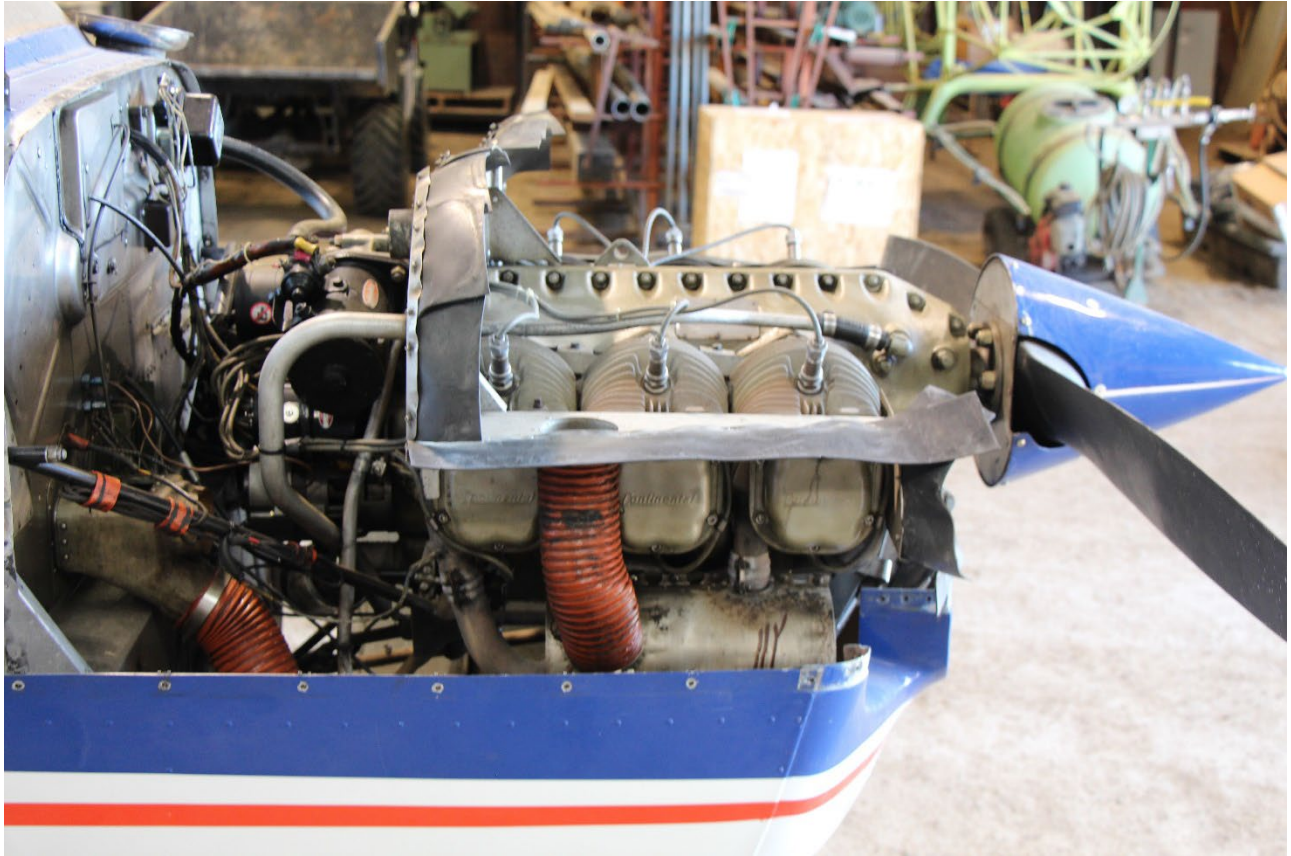


Photograph 1: Airplane at Accident Site

Airplane Examination

An examination was performed at a recovery facility by representatives of the airframe and engine manufacturers with oversight from the National Transportation Safety Board Investigator-in-Charge. Flight control continuity was established for the rudder, aileron, and elevator from the cockpit to their respective control surfaces. Continuity of the fuel system was verified by transferring air through the supply and vent system. Most of the fuel system was free of blockages with the exception of a small piece of rolled up masking tape that was recovered from the left wing fuel tank vent line. The throttle, mixture, and carburetor heat control systems were continuous from the cockpit to the engine and full travel was established for each control linkage.

Engine Examination



Photograph 2: Engine prior to examination

Engine Information

Engine Manufacturer: Continental Motors, Inc.

Engine Model Number: O-300-D

Engine Serial Number: 33714-D-5-D

Recent Inspection: 100 hour – June 4, 2019

Recent Recorded TSMOH: 3,254.9 hours – Recorded at 100 hour inspection

Time Since Inspection: 70 flight hours

YEAR:	RECORDING TACH TIME	TODAY'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations Entries must be endorsed with Name, Rating and Certificate Number of Technician or Repair Facility. (See back pages for other specific entries.)
DATE				
				DATE: 6/4/2019
				AIRCRAFT: N3761L C-172, S/N 17253930; TACH: 1187.4 AFTT: 4412.2
				ENGINE MODEL: TCM O-300D, S/N: 33714-D-5-D, TSMOH: 3254.9, ETT: 4412.2
				PROPELLER: McCAULEY 1C172, S/N: 71239; TSN: 3511.3
				PERFORMED 100-HOUR INSPECTION IAW CESSNA 100 SERIES M-M AND 14CFR 43, APPX D. INSPECTED ELT I/A/W 14CFR91.207D. NEXT BATTERY DUE DATE DECEMBER 2027. C/W AD 2011-10-09, 06-17-2011 (SEATRAILS BY VISUAL. NEXT DUE AT 1287.4 HRS. C/W AD96-09-06, 06/07/1996 (BRACKETT AIR FILTER) BY VISUAL. NEXT DUE 1287.4 HRS. C/W AD 76-07-12 08/30/1977 (IGN SWITCH) BY OPS TEST. NEXT DUE AT 1287.4 HRS. CHANGED OIL AND OIL FILTER. INSPECTED OIL FILTER AND FOUND NO METAL. FILLED WITH 7 QT OF AVIATION OIL PHILLIPS XC 20W-50. LEAK CHECKED GOOD. GROUND RAN AIRCRAFT, NO LEAKS NOTICED AT THIS TIME. GREASED BEARINGS. CHECKED COMPRESSION AND FOUND 1=78, 2=78, 3=72, 4=76, 5=62, 6=74 /80 PSI. DRESSED PROPELLER, CHECKED TIMING, I CERTIFY THAT THIS AIRFRAME, ENGINE AND PROPELLER HAVE BEEN INSPECTED IAW A 100-HOUR INSPECTION AND BEEN DETERMINED TO BE IN AIRWORTHY CONDITION.
				
				Brian Lansburgh

Photograph 3: Recent Inspection

INITIAL EXAMINATION AS RECEIVED

The engine was shipped from a maintenance facility in Pleasant Grove, California to Continental Aerospace Technologies' facilities in Mobile, Alabama via crate and bonded shipment. Upon receipt the engine was immediately logged and placed in bonded/secure storage and was not opened. The crate was viewed by the IIC as unopened and subsequently photographed and opened for examination. The carburetor separated from the engine mount and one of the mount studs had been pulled from the engine case. The carburetor was shipped to another facility for functional testing and a teardown.



Photograph 4: Crated Engine as Received



Photograph 5: Engine after Crate Removed

DETAILED EXAMINATION

After removal of the rear accessory drive rotation was achieved from the propeller flange to the rear of the engine utilizing a wrench and rotating by hand. Rotation was smooth and unremarkable. Crankshaft end play was 0.0013 inches as measured at the propeller flange. Minimum range is 0.005 inches with a maximum of 0.025 inches. Deflection was 0.003 inches and runout was 0.005 inches. The engine condition was optimal for testing and did not require any replacement of parts.

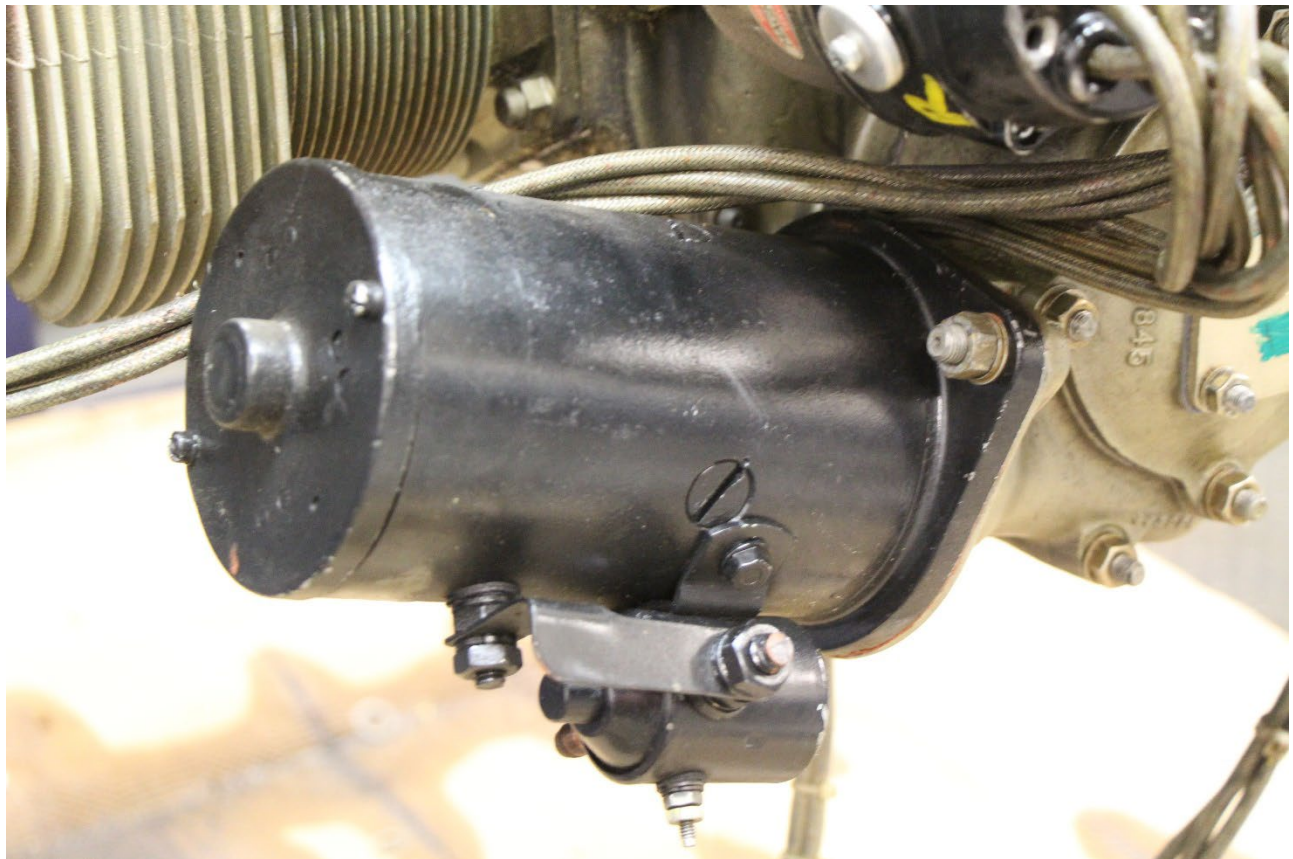
Compression Test

	Pre-Engine Run
Cylinder No. 1	08/80 (exhaust)
Cylinder No. 2	16/80 (exhaust)
Cylinder No. 3	55/80 (exhaust)
Cylinder No. 4	17/80 (exhaust)
Cylinder No. 5	60/80 (rings)
Cylinder No. 6	07/80 (exhaust)
Master Orifice	43 psi

The engine was borescoped to examine the valves, pistons, and cylinder walls. The examination revealed no anomalies with the intake and exhaust valves.

Starter Motor

The starter motor was manufactured by Delco Remy; model no. 1109514, serial no. 4409.



Photograph 6: Starter Motor

Vacuum Pump

The vacuum pump was manufactured by Rapco, Inc., part no. 211CC, serial no. 181370.



Photograph 7: Right Vacuum Pump

Alternator

The alternator was manufactured by National Airparts, Inc., part no. F424R, serial no. F003831.

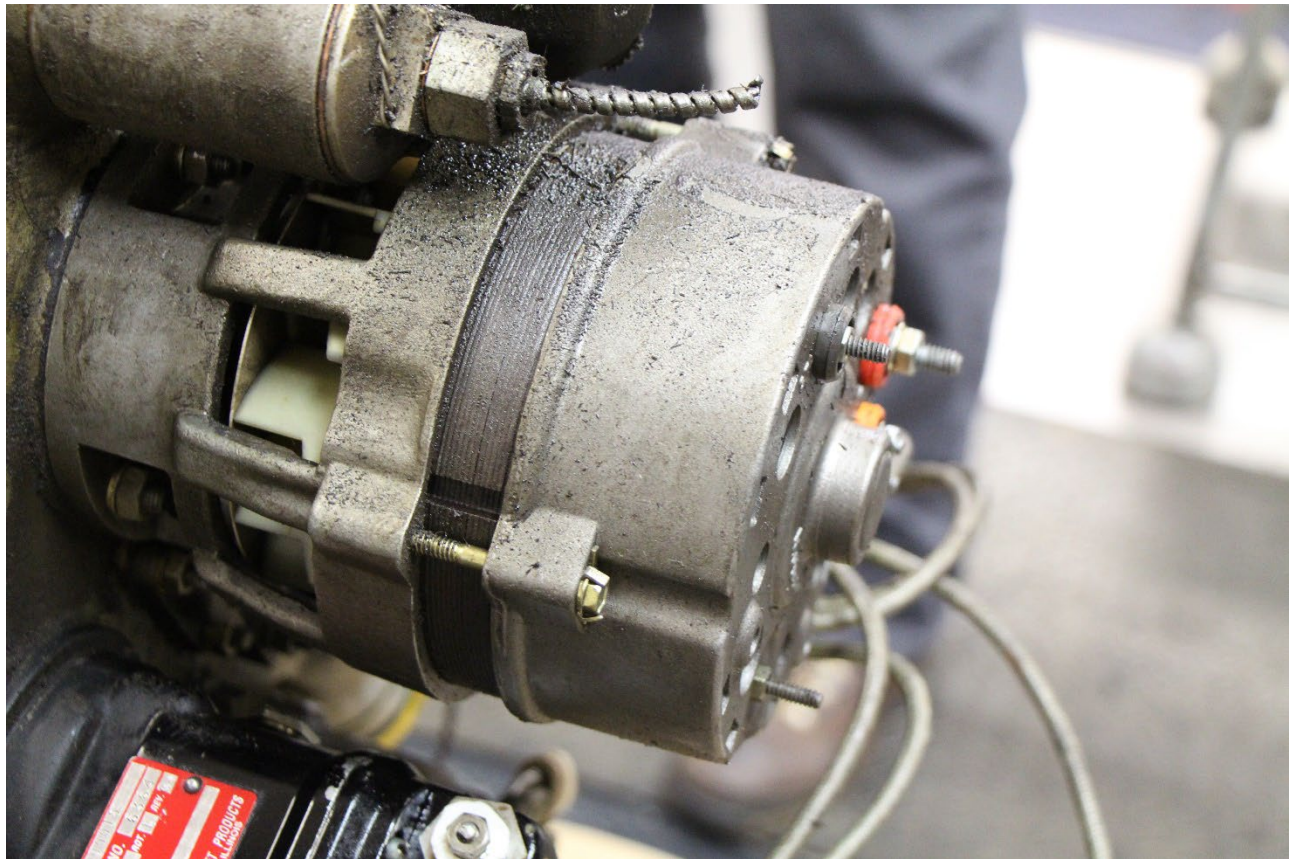


Photo 15: Alternator

Left Magneto

The left magneto, manufactured by Slick Aircraft Products (model no. 6364, serial no. 95090002), remained attached the engine case. The magneto was timed to 28° BTDC. According to the manufacturer, the specification for the left magneto is 28°. There were no signatures on the magneto to indicate that it had been moved during the impact sequence.

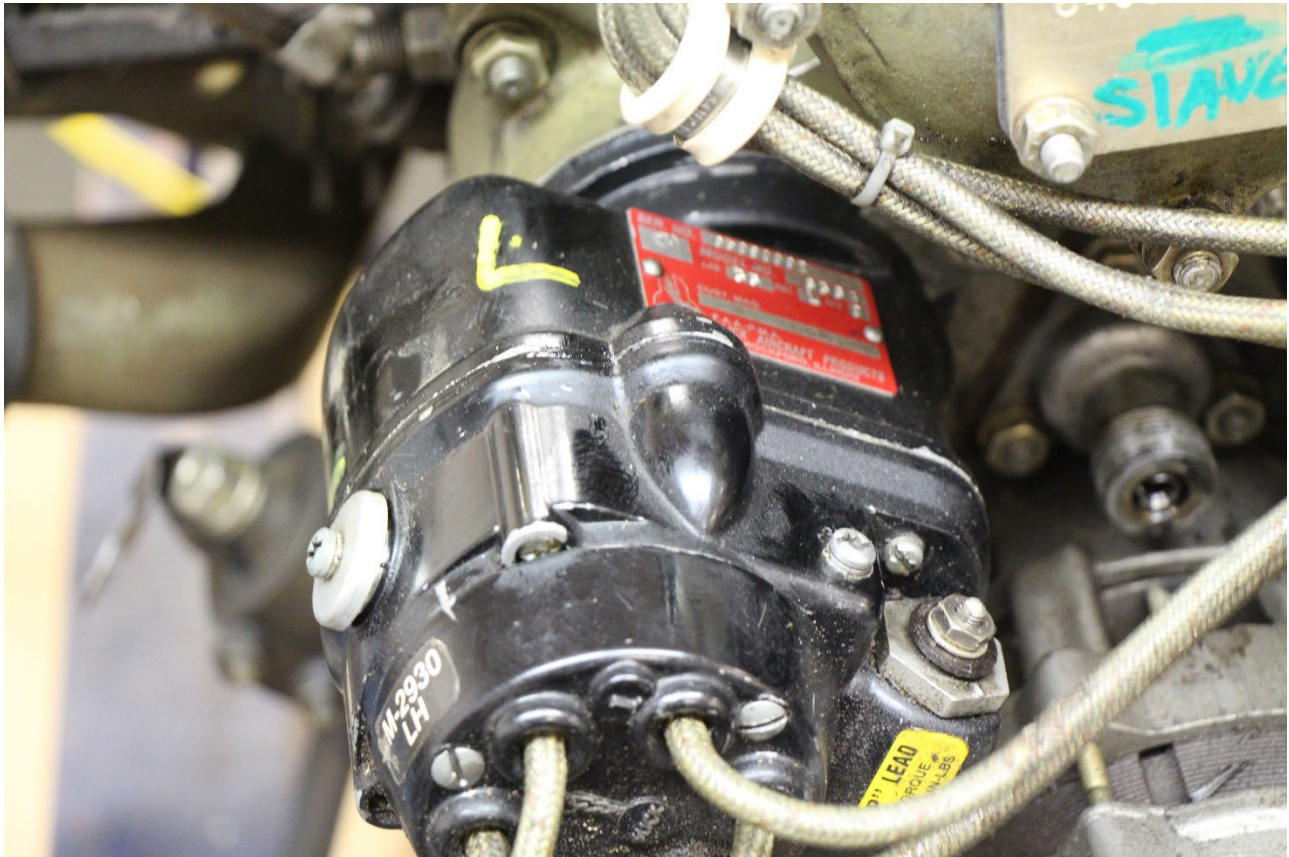


Photo 16: Left Magneto

Right Magneto

The right magneto, manufactured by Slick Aircraft Products (model no. 6364, serial no. 95090015), remained attached to the engine case. The magneto was timed to 27° BTDC. According to the manufacturer, the specification for the right magneto is 26°. There were no signatures on the magneto to indicate that it had been moved during the impact sequence.

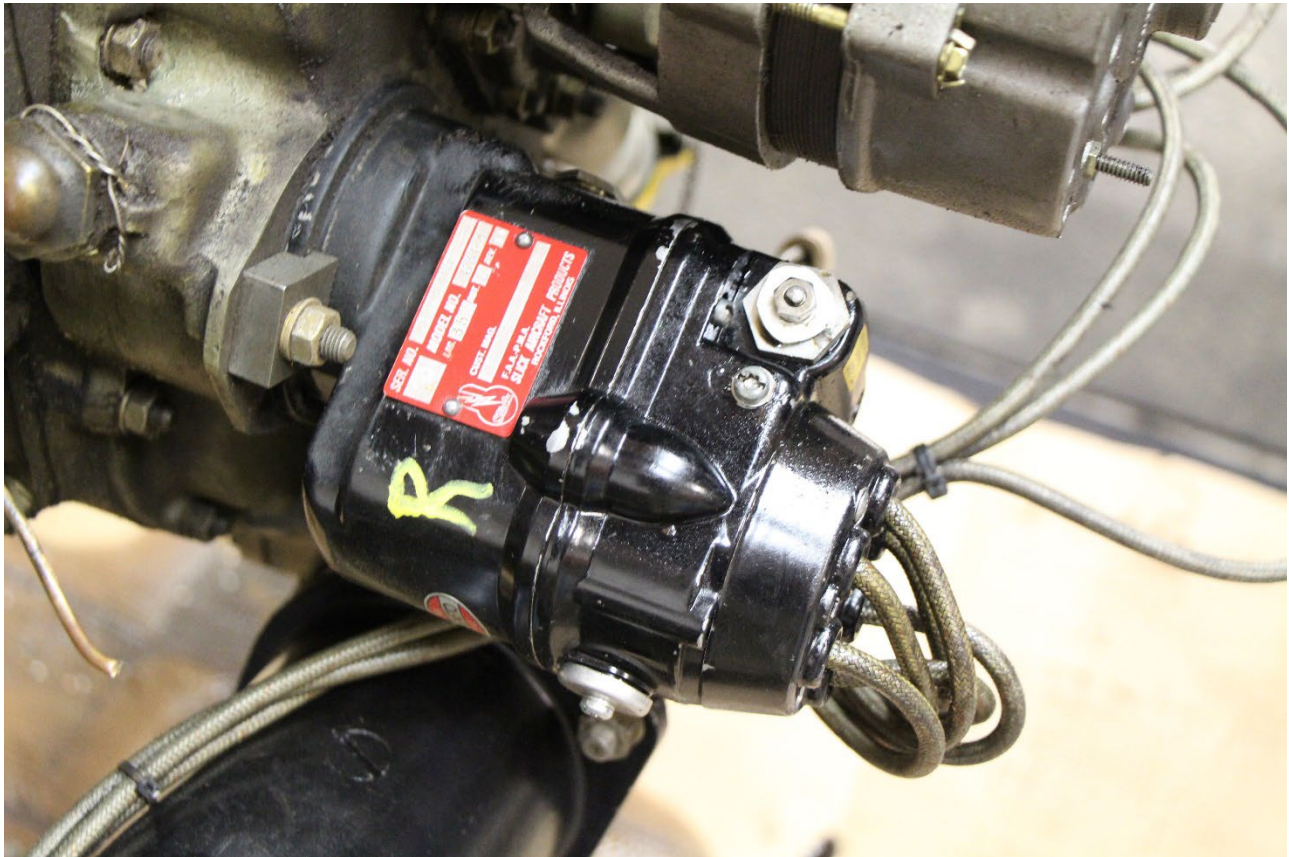


Photo 17: Right Magneto

Spark Plugs

The top and bottom spark plugs, manufactured by Tempest (part no. URE140E), were removed and examined. The plugs displayed normal wear and were slightly dark and sooty in appearance.



Photo 18: Spark Plugs

Ignition Harness

The ignition harness was manufactured by TCM, part no. 10-821674-3, serial no. K07C.

ENGINE TEST RUN

Engine ran sluggish until mixture was adjusted. The engine was mounted in the test stand and all fuel lines and heat probes were routed to their corresponding stations. Six test runs were completed. The first test run was completed with the left and right magnetos timed to approximately 12.5° and 11.5° BTDC, respectively, which were the units' positions when the engine was received at the manufacturer's facility. After the first engine run, the magnetos were timed to 20° BTDC (in accordance with the manufacturer's specification) and the engine was run again. Subsequent engine runs were completed with the fuel pump adjusted to enrichen the fuel/air mixture as the prior engine runs displayed unmetered fuel measurements that were not within the manufacturer's limitations. The fuel/air mixture was progressively enriched and the fuel pump unmetered pressure measurements were recorded. The engine ran smooth and continuous and no anomalous were noted.