



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

April, 2016

MAGNETO SYSTEM EXAMINATION

WPR15LA262

This document contains 7 embedded photos.

A. EXAMINATION PARTICIPANTS:

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B. SUMMARY

Examination of the LASAR Ignition system was conducted April 15, 2016 at the facilities of Champion Aerospace, Liberty, South Carolina.

C. DETAILS OF THE INVESTIGATION

1.0 Examination

LASAR Part Number: LC-1011-03 (Rev H)
Serial Number: 06178-01

The LASAR controller unit was examined and appeared undamaged. It was connected to a Unison LASAR tester, and an ATP test was performed. The unit passed all applicable tests except the left and right coil current test which registered a current flow of 5.77 amps.

Right Magneto

Model: 4755

Serial Number: 07102212

The right magneto case appeared undamaged (Photo 1). The magneto rotated smoothly when turned at geared rotor shaft. The drive gear and wire cap were removed to facilitate installation in the Champion magneto test stand.

The magneto was installed in the test stand, which was configured for the "Magneto Mode Test", and operated at speeds of between 500 and 2,800 rpm. Sparks were observed intermittently at all four output leads, and the timing gauge indicated that the internal timing was set to 41 degrees, rather than the nominal 25 degrees (Photo 2).

The test stand was then set to the "Lasar/Epic Mode Test" and sparks were observed in firing order at all output leads, at all speeds from 500 to 2,800 rpm.

The magneto was then removed from the test stand, and its housing assembly removed. All internal components were intact, clean, and free of indications of arcing (Photo 3).

The group then "pinned" the rotor plastic drive gear in the X location, the notches on the rotor and distributor gear did not appear to line up. The pin was removed and the notches were lined up, and the "E" gap was observed in the fully open position, which indicated a timing misconfiguration (Photo 4).

The group then adjusted the points visually to the correct timing utilizing an exemplar magneto for reference, and the magneto was again tested on the test stand. It operated in both Lasar and Magneto modes, sparking at all output posts at speeds of between 500 and 2,800 rpm, and the magneto timing gauge indicated 26 degrees.

Left Magneto

Model: 4771

Serial Number: 07102617

The left magneto case appeared undamaged. The shaft of the drive gear had separated at the input bearing. The fracture surfaces exhibited uniform and granular surface features (Photo 5, 6), with no indication of "beach" marks or propagation lines. All drive gear teeth remained attached; one of the teeth exhibited a 3 mm long gouge to its upper surface (Photo 7), the remaining teeth were intact and undamaged.

The magneto housing was removed. All internal components were intact, clean, and free of indications of arcing. The Hall Effect sensor was still attached to its mount, and the sensor trigger remained affixed to its rotor gear.

In order to test the approximate internal timing with the drive gear missing, the rotor plastic drive gear was "pinned" in the X location, the notches on the rotor and distributor gear appeared to line up, and the "E" gap was checked - the points were just opening which indicated correct internal timing.

1.1 Examination Photos



Photo 1 - Right Magneto

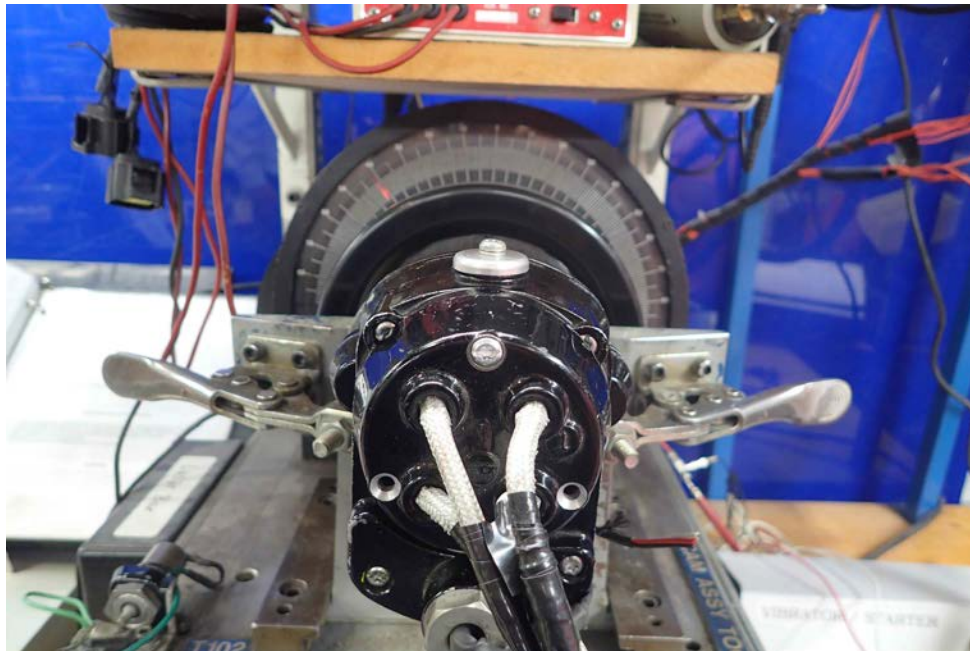


Photo 2 - Right Magneto on Test Stand

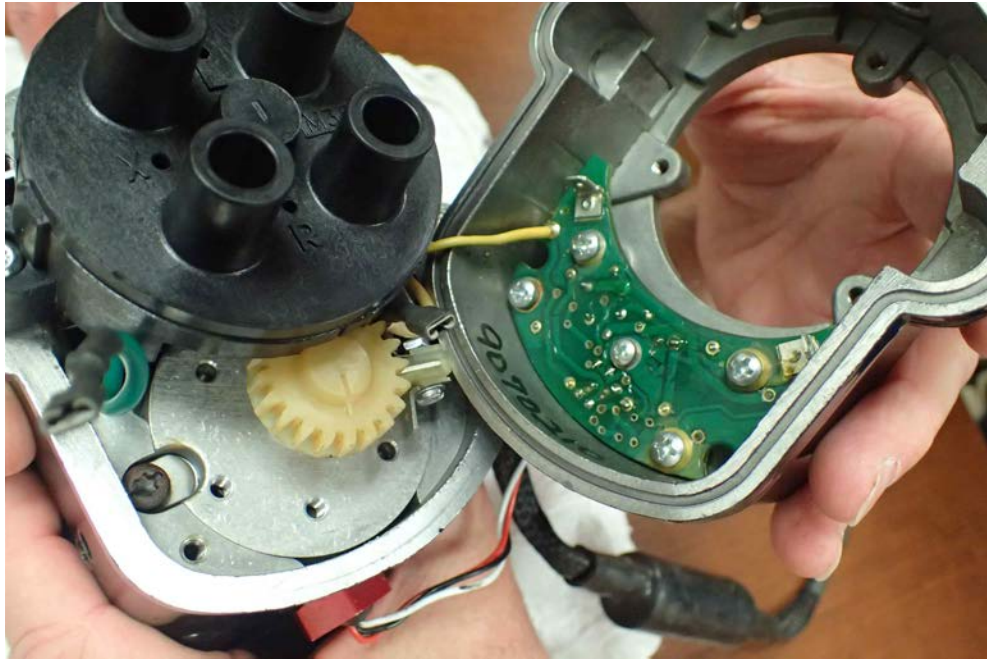


Photo 3 - Right Magneto

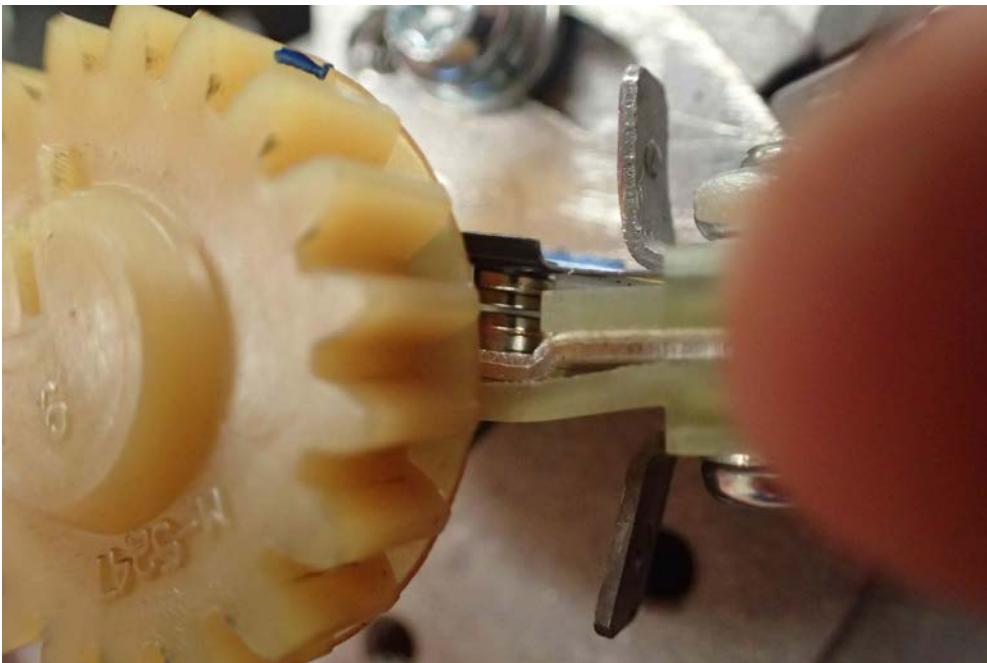


Photo 4 - Right Magneto "E" Gap



Photo 5 - Left Magneto Shaft at Magneto Bearing



Photo 6 - Left Magneto Shaft at Magneto Gear



Photo 7 - Left Magneto Drive Gear Tooth Face

Submitted by: Elliott Simpson