



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

FOLLOW UP MAGNETO EXAMINATION

WPR19LA011

Accident Date: October 21, 2018
Exam Date: November 29, 2018

This document contains 6 embedded images

A. ACCIDENT

Location: Indianapolis, IN
Date: October 21, 2018
Aircraft: Piper PA-32-300, N2920Q
NTSB IIC: Maja Smith

B. EXAMINATION PARTICIPANTS:

Maja Smith
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C. SUMMARY

The magneto was overhauled on February 8, 2018. According to the pilot, it accumulated 87 hours of operational time after the overhaul. The pilot reported no previous issue before the accident flight.

Following the initial magneto testing which resulted in an inability of the magneto to produce any sparks, subsequent examination was conducted with the CMI's magneto specialist. After the initial examination, magneto was reassembled to its initial state.



Figure 1. Magneto body

D. OPERATIONAL TESTING

Through the timing hole in the top of the magneto, you can see the ink stencil on the rotor magnet. E-gap in the dual mag is found when the "K" is positioned in the center of the hole and the red painted teeth are visible in timing holes located in each side of the mag housing. The "L" or "R" on either side of "K" is the mark designated for contact point opening, depending on rotation. After the magneto cover was removed, the impulse coupling was rotated by hand and the magneto was tested using the Synchronizer brand timing light. It was observed that, when the impulse coupling was rotated to neutral (K) position, points were open when they should have been closed. When impulse coupling was rotated counterclockwise approximately 8° to the L mark, the timing light indicated that the points were closed when they should have been open.



Figure 2a – Impulse coupling at the K mark



Figure 2b – Timing lights indicate open ports

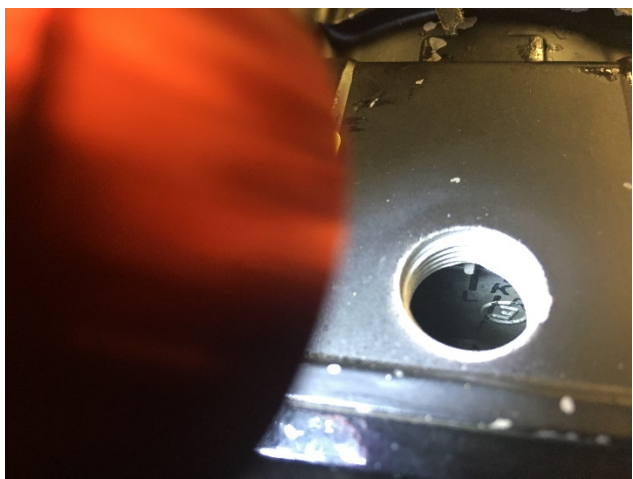


Figure 3a – Impulse coupling at the L mark

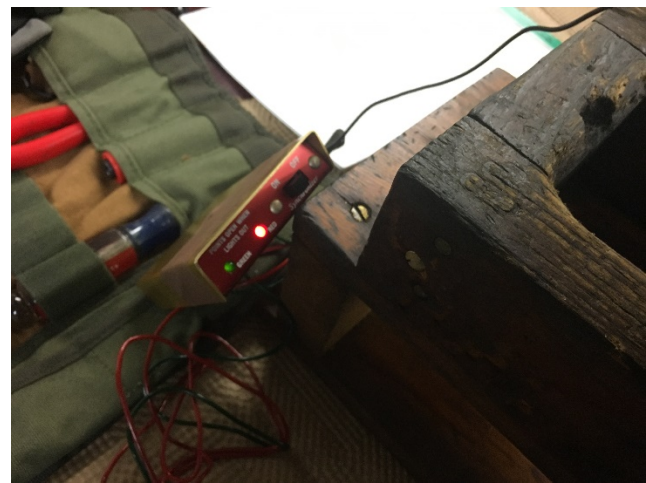


Figure 3b – Timing lights indicate closed ports

The internal gear timing for the right magneto was observed to be correct; the red line was in the middle of the window which indicated that the points were open.



Figure 4 – Red mark in the middle of the window indicates open points

The internal gear timing for the left magneto was observed to be correct; the red line was in the middle of the window which indicated that the points were open.



Figure 4 – Red mark in the middle of the window indicates open points

Camshaft in the middle showed when in neutral, open points where they should have been closed. When rotated approximately 8 degrees, they should have been opened but they were closed at that position. The amount of cam position displacement was significant; which would result in the magneto's inability to start. The Cam was supposed to be positioned so it forced the points open at

the L mark on the shaft; what we found the points were closed at the L mark .The cam was not positioned in such a way that it would be open at the L mark; that's what caused the loss of power (Cam being out of position caused the magneto not to fire and caused the engine to lose power).

The next step was to measure the torque needed to lose or tighten the retaining screw located on the top of the camshaft. According to the specification, the screw should be tightened between 21 to 25 pounds per inch with allowable error of 1. The retaining screw measured 20 pounds per inch when tightened.



Figure 5- - Tightened screw at 20 lbs per in

Next, the cam was popped out from the shaft and there was a noticeable resistance which was a strong indication that cam was properly seated in the shaft.

The magneto was then assembled again to it specifications, tested and it produced sparks on all leads.

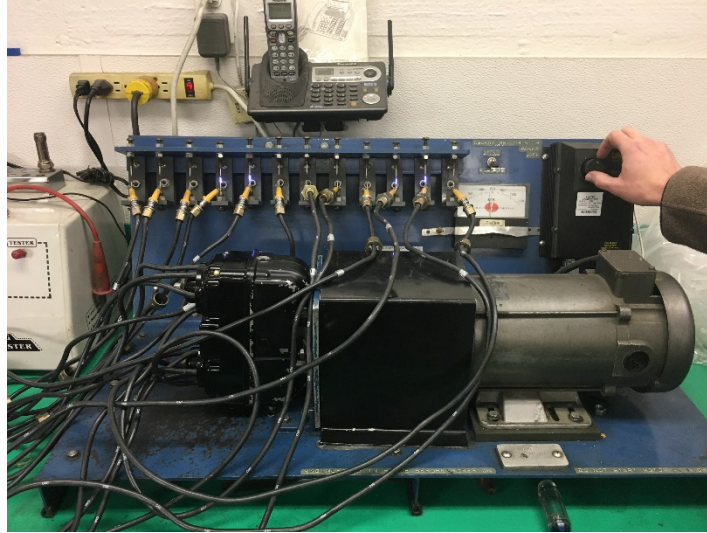


Figure 6 – Magneto testing

The retaining screw from the magneto, and the retaining screw from the manufacturer were sent to the NTSB lab for further analysis for the material composition.