



ENGINE EXAM NOTES

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Eastern Region

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ENGINE EXAMINATION

ERA16LA331

This document contains 1 embedded photos.

(5 pages)

A. SUMMARY

On September 30, 2016, about 1745 eastern daylight time, a Piper PA32RT-300T, N39686, was substantially damaged during a forced landing after a total loss of engine power near Camden, South Carolina. The airline transport pilot and passenger sustained minor injuries. An instrument flight rules flight plan was filed for the personal flight that originated at Florence Regional Airport (FLO), Florence, South Carolina, destined for Hartsville Regional Airport (HVS), Hartsville, South Carolina. Visual meteorological conditions prevailed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

Examination of the airplane's wings and fuselage revealed that they had sustained substantial damage, and the right wing separated from the main spar at the wing root.

B. DETAILS OF THE INVESTIGATION

1.0 Engine Examination

The engine installed in N39686 was a Lycoming TIO-540, 300 horsepower, 6-cylinder piston engine, engine serial number L-5575-6LA. The engine remained attached to the airframe for examination.

The propeller was manually rotated, continuity of the drive train, crankshaft, and camshaft were established, and thumb compression obtained on all cylinders. Examination of the engine confirmed engine control continuity from the cockpit to the respective engine components. The sparkplugs appeared new and normal wear.

A borescope was used to exam the cylinders, all contained high levels of carbon. Numbers 1,2,3,4 had a swirl pattern on the top of the piston. The throttle control moved freely between the forward and aft stops. The mixture control movement was impeded by impact damage.

The impulse coupling was audible when the propeller was rotated. The magneto was removed and manually rotated. The Bendix dual magneto, Kelly Aerospace part # 10-382560-13, did not have any impact damage to the housing or to the leads. The left magneto did not produce a spark pnm any of the leads, the right produces a spark on 4 of the 6 leads.

NO Spark:	Spark:
Top: 1,3,5	Top: 6
Bottom: 2,4,6	Bottom: 1,3,5

Fuel nozzles were removed and inspected, all were free of debris. The fuel lines were secure and there was no staining around. The fuel screen from the throttle body was removed and was also free of debris.

The Hartzell two-bladed propeller remained attached to the hub, both blade tips were bent aft.

1.1 Engine Exam Photos



Figure 1 Right side of the engine

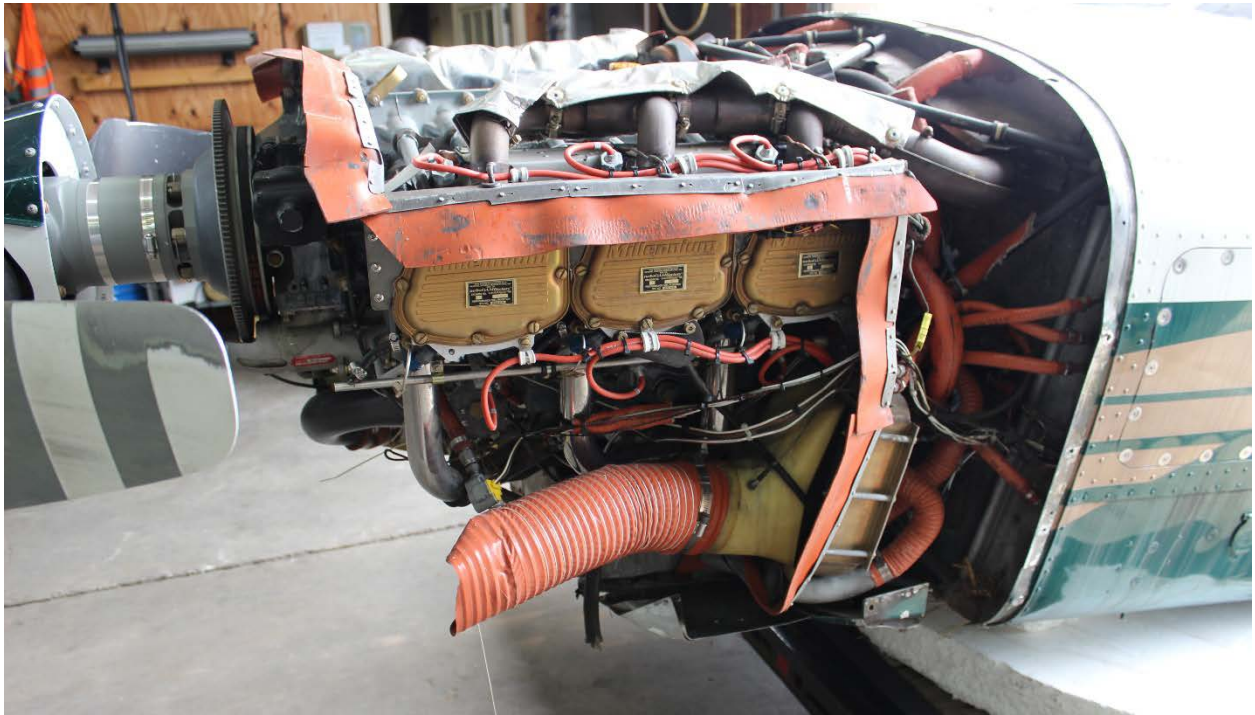


Figure 2 Left side of the engine

2.0 Magneto Examination

The single drive dual magneto was placed on a test stand, the left side of the magneto did not produce spark. During initial testing the right side produced spark on four of the six leads when

rotated by hand. When planed on a test stand the right side produced spark on all leads. Internal examination of the magneto revealed that the left side cam follower was melted, preventing opening of the points. The left and right capacitor fastenings were not properly torqued, the left nut was loosened by hand and the right nut was loosened easily with a wrench and removed by hand. The cam follower also displayed melting and signatures of intermittent arcing, consistent with inadequate torque observed on the capacitor fastenings.

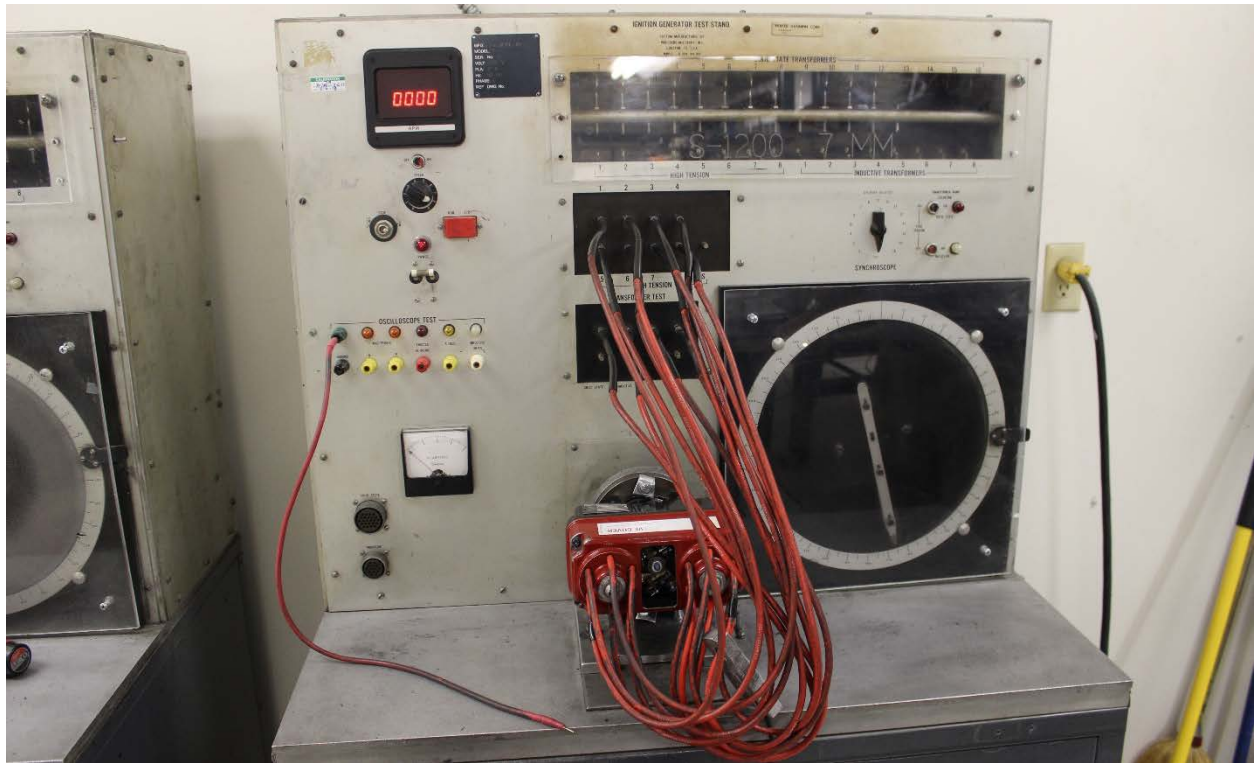


Figure 3 The single drive dual magneto on the test stand.

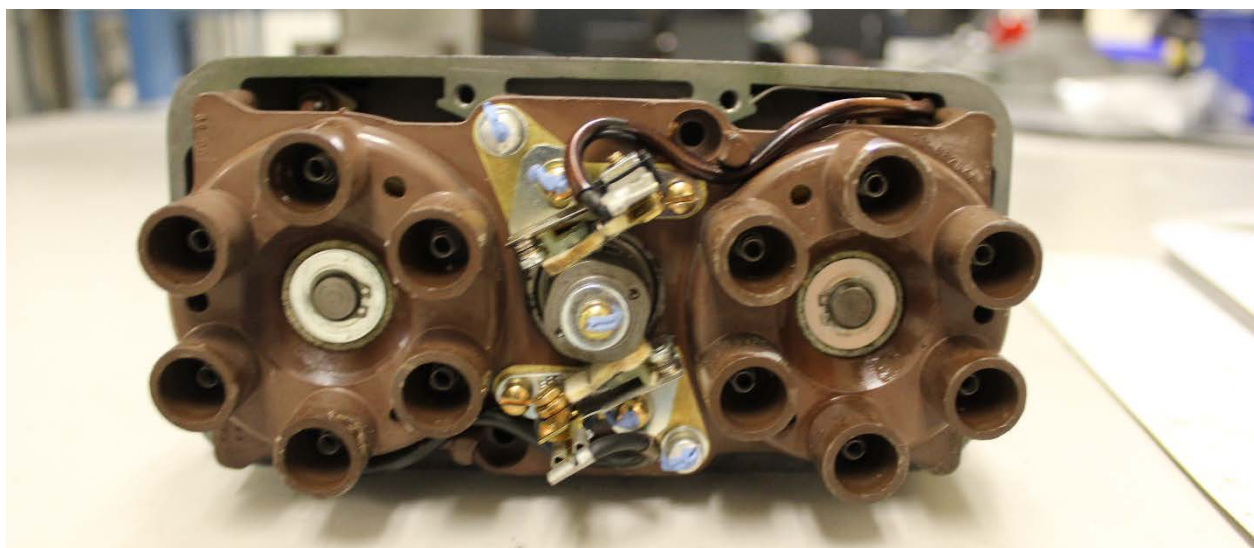


Figure 4 The internal examination of the single drive dual magneto.

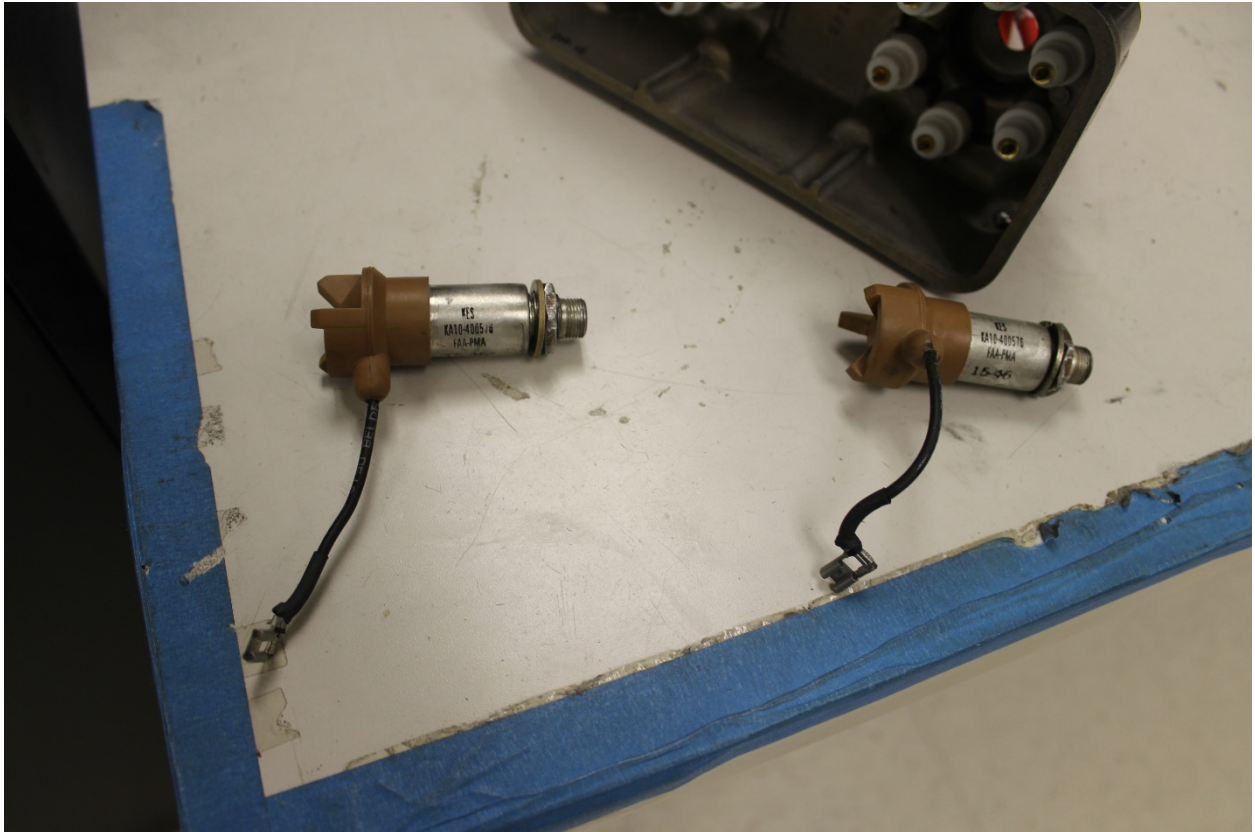


Figure 5 The left and right cam followers.