



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

AIRFRAME AND ENGINE EXAMINATION

WPR17LA020

This document contains 9 embedded photos.

A. ACCIDENT

Location: Taylor, AZ
Date: November 12, 2016
Aircraft: Piper PA 28-235, Registration Number: N9398W, Serial #: 28-11095
NTSB IIC: Elliott Simpson

B. EXAMINATION PARTICIPANTS:

Elliott Simpson
Senior Aviation Accident Investigator
National Transportation Safety Board
Western Pacific Regional Office

C. SUMMARY

Examination of the recovered airframe and engine was conducted on November 17, 2016 at the facilities of Air Transport, Phoenix, AZ.

D. DETAILS OF THE INVESTIGATION

1.0 Examination

The combination belly-mounted fuel selector/strainer was full of fuel. The fuel was tested with Sartomer water-detecting paste, and no water was present. The fuel selector valve moved freely through all of its detents, and all fuel lines and fittings throughout the airframe and through to the engine were secure.

Engine Model: O-540-B4B5 Superior Millennium (Lycoming) engine
Engine Serial: L-12420-40

The engine sustained minimal damage during the accident sequence, the majority of the damage being sustained by the propeller, each blade of which was bent aft about midspan. All engine controls were continuous from their respective control arms through to the cabin controls, and moved smoothly through their full range of travel when operated. The inlet air filter and associated induction air lines, although damaged during impact, were free of obstruction. The oil sump contained about 9 quarts of oil when viewed utilizing the dipstick. All fuel and oil lines were secure, and remained attached at their respective fittings.

The top spark plugs were removed, and examined. They were Tempest massive-electrode types, and their electrodes remained mechanically undamaged, coated in black soot, and displayed normal wear signatures when compared with the Champion Spark Plugs AV-27 Check-A-Plug chart (Photo 1). The crankshaft turned freely when rotated by hand utilizing the propeller, and cylinder “thumb” compression was present on all cylinders.

The magneto-to-engine timing was checked, and was 25 degrees for each magneto, which was correct when compared to the engine’s data plate.

The propeller was removed and replaced with an undamaged unit, and an engine test run was performed. A fuel tank was routed directly into the main fuel supply line within the cabin, on a direct route to the engine driven fuel pump. Damage to the wings precluded a connection to the fuel selector valve.

The engine started on the fourth attempt, and immediately began to idle at about 750 rpm. The fuel and oil pressures remained within the green arcs as the engine warmed up. Having reached operating temperature, a magneto check was performed, with 75 a rpm drop observed on each side. A propeller check was performed, and the engine speed dropped appropriately each time.

The engine was then operated throughout its speed range for an additional 10 minutes, with multiple throttle “chops” and rapid accelerations initiated in an attempt to simulate the accident scenario. The engine responded appropriately at all times, with no hesitation or speed fluctuations. The JPI engine monitor revealed that the exhaust gas temperatures for cylinder number 3 were slightly higher than the other cylinders. The engine was shut down and examined further. The top spark plugs for cylinder 1, 3, and 5 were removed and now exhibited a grey coloration (Photo 2). The inner surface of the exhaust pipe was coated in light grey deposits, and were free of oil residue.

The gasket sealing the number 3-cylinder intake manifold to the cylinder head appeared to have become displaced on one of its sides (Photo 3). The manifold was removed, and the gasket appeared broken into two distinct pieces (Photo 4). Dark-soot discoloration was present on about 3/8 of the mating surfaces of the manifold and adjoining cylinder head flange where the gasket had broken free (Photo 5,6).

The carburetor (PN: 10-44-4, SN: R4297) was removed, disassembled, and examined. The accelerator pump port ejected fuel when the throttle lever was activated. The carburetor bowl was full of fuel, and contained no foreign objects (Photo 7). The floats were of the hollow white plastic type, and did not appear to be leaking (Photo 8). The floats moved freely on their respective pivot assembly. The main jet was clear, and the mixture metering valve assembly was undamaged and free of obstruction.

The engine driven fuel pump was removed, disassembled, and examined. All internal diaphragms and valves were intact, and the unit contained fuel (Photo 9).

1.1 Examination Photos

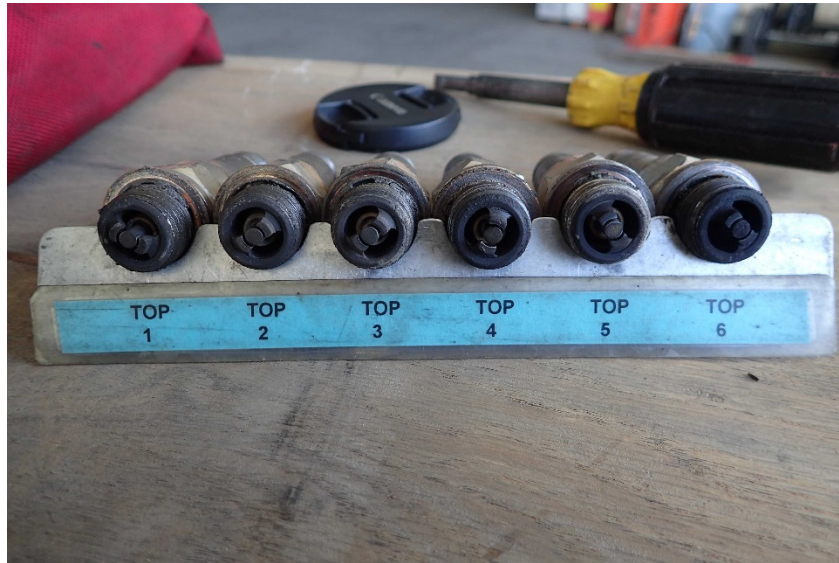


Photo 1 – Top Spark Plugs



Photo 2 – Top Spark Plugs after Engine Run



Photo 3 – Number 3 Cylinder Intake Manifold Gasket



Photo 4 – Number 3 Intake Manifold Gasket



Photo 4 – Number 3 Intake Manifold Flange



Photo 6 - Number 3 Intake Cylinder Head Flange

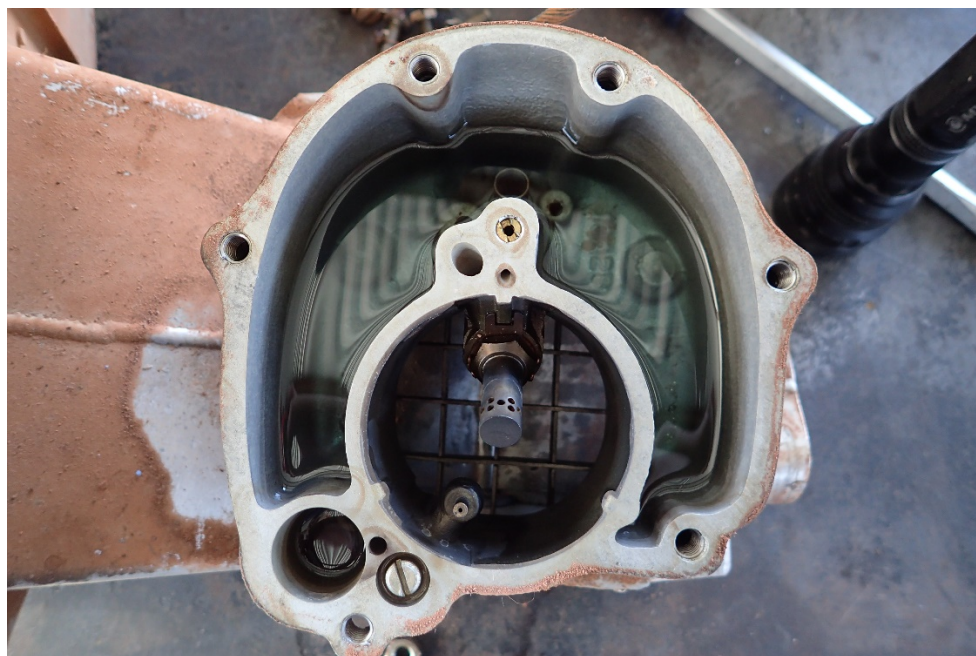


Photo 7 – Carburetor Bowl

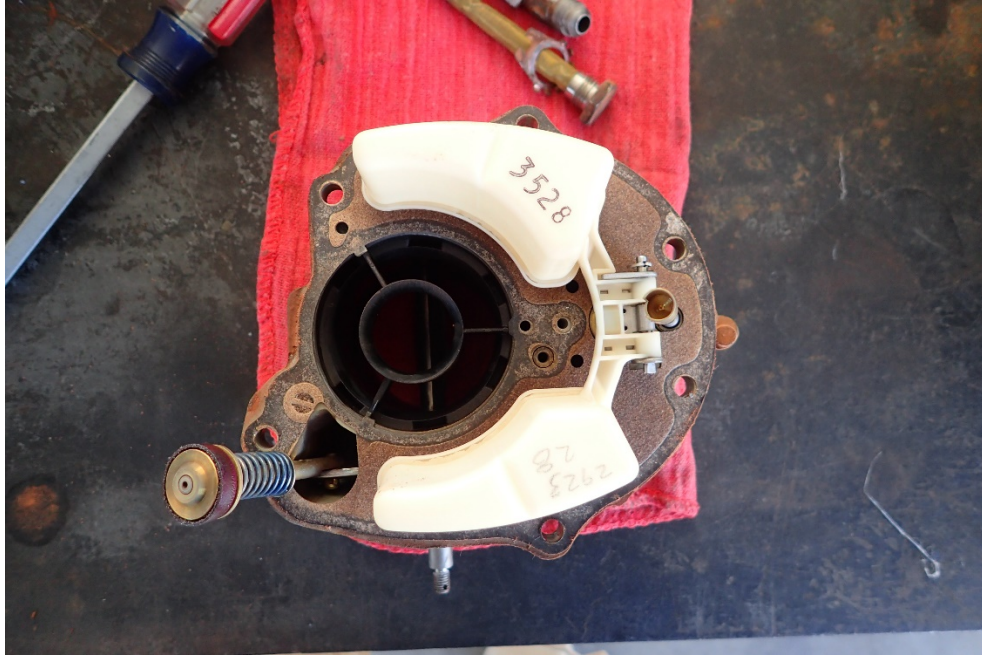


Photo 8 – Carburetor Floats



Photo 9 – Engine Driven Fuel Pump

Submitted by: Elliott Simpson