



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

FACTUAL EXAMINATION

WPR22LA287

A. ACCIDENT

Location: Livermore, California
Date: July 30, 2022
Aircraft: Cessna 177RG, N2591V
NTSB IIC: Elliott Simpson

B. EXAMINATION PARTICIPANTS:

Elliott Simpson
Senior Aviation Accident Investigator
National Transportation Safety Board

Peter Neilson
Precision Airmotive LLC

C. SUMMARY

The examination was conducted at the Precision Airmotive facility in Arlington, Washington on September 22, 2022. The servo unit had a Bendix core, and was fitted with a Precision dataplate, indicating that it had been overhauled since manufacture. Maintenance records indicated the overhaul was last performed by Western Skyways in 1999.

Both the servo and manifold valve were tested in accordance with Precision Airmotive overhaul test standards, the results of which came within 5% of factory new results, but within the field values required for following a field overhaul.

Disassembly of the servo revealed significant internal corrosion and corrosion deposits. The diaphragm cavities revealed “water lines” and corrosion on the metered and unmetered fuel side consistent with water contamination.

DETAILS OF THE INVESTIGATION

1.0 Examination

Fuel Injection Servo

Model: RSA-5AD1
Serial Number: 49624

Parts List Number: 2524054-11

All safety wire was in place; however, no factory seals had been used. The regulator nut on the diaphragm assembly displayed a “G” stamp, indicating Service Bulletin PRS-107, R4 had been complied with.

There was no external damage noted, however play was observed to the idle mixture link, and the screw that holds the idle mixture stop and the idle mixture assembly, although safety wired, was loose. The inlet fuel filter screen was free of debris.

The unit was installed on an airflow bench. The unit was then tested in accordance with Precision Airmotive overhaul test standards. The results indicated that the unit fell just outside of the factory test parameters by values of about 5% on average but met the field service parameter values.

The unit was then disassembled, and removal of the mixture and idle valve assemblies required much more force than was appropriate. Disassembly revealed significant internal corrosion and corrosion deposits throughout the unit. Specifically, “water lines” and corrosion and rust deposits were observed within the cavities on the metered (figure 1) and unmetered (figure 2) side of the diaphragm assembly. Corrosion deposits were on the lower side of the mixture control arm spring assembly (figure 3).

Corrosion was observed on the surfaces of both the idle and mixture valve plugs (figure 4), and their assembly housing bore (figure 5). The alternate fuel outlet plug which was at the lowest point of the system, was removed and corrosion deposits were noted on the plug (figure 6) and its bore (figure 7).

Corrosion deposits were present on the servo valve seat cavity (figure 8).

The air diaphragm and effort spring were removed; the air side and bellows assembly was dry, and there were no cracks to any diaphragms.

Flow Divider

Model: AMS4290

Serial Number: 15533

Parts List Number: 2524232-2

The flow divider was tested in a flow bench. The lower flow values fell within the nominal results. The upper pressure for three of the ports fell within nominal values, with the fourth showing a pressure value of 87, when the nominal should have been between 90 and 100. The results were consistent with normal idle mixture settings, with a slightly lean setting the fourth port at high power.

No leaks were observed during test. The unit was disassembled, and no anomalies were noted.

2.0 Photos

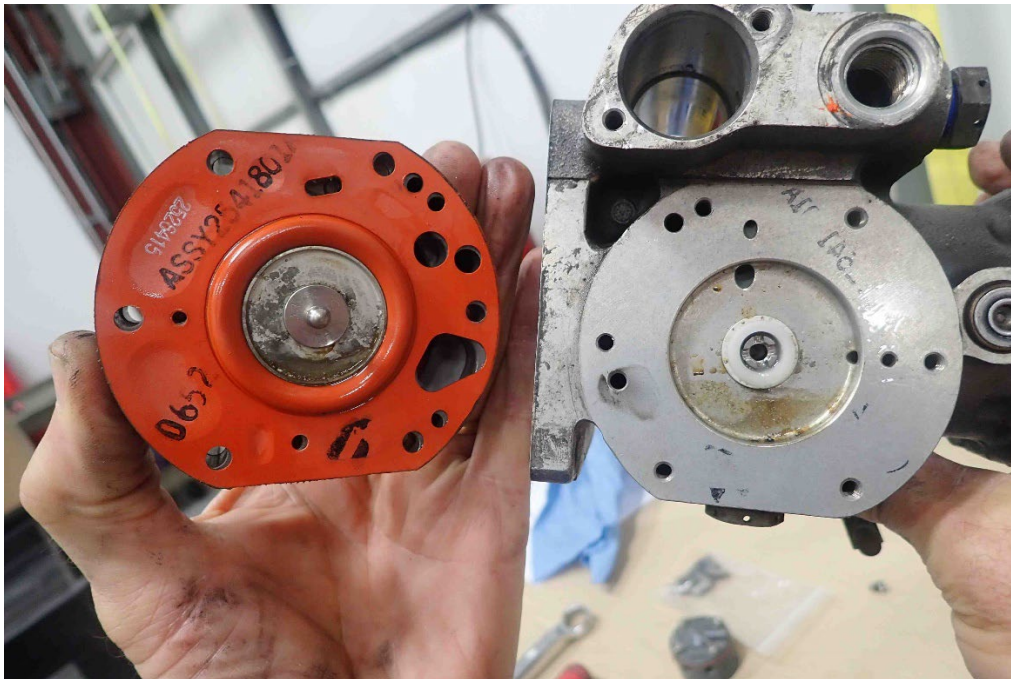


Figure 1 - Water line and corrosion on metered side



Figure 2 - Water line and corrosion on unmetered side



Figure 3 - Corrosion deposits on the lower side of the mixture control spring



Figure 4 - Corrosion on the surfaces of the idle and mixture valve plugs



Figure 5 - Corrosion on the surfaces of the idle and mixture valve housing bore



Figure 6 - Corrosion on alternate fuel outlet plug

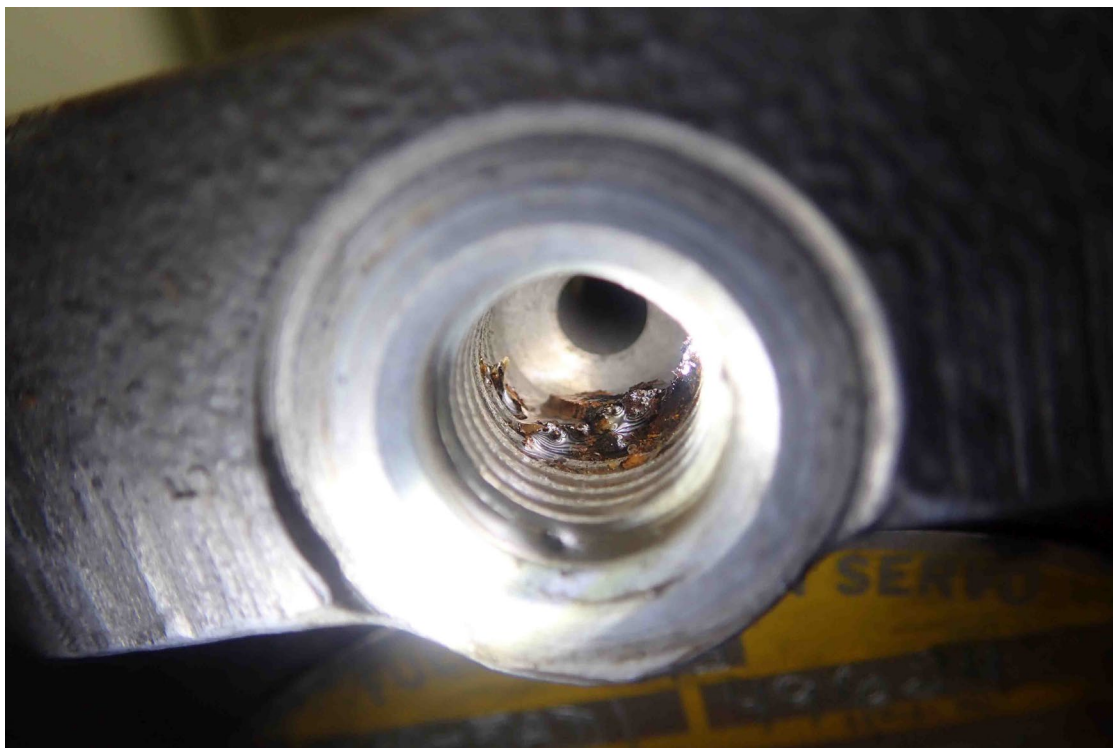


Figure 7 - Corrosion on alternate fuel outlet plug bore



Figure 8 - Corrosion deposits on the servo valve seat cavity

Submitted by: Elliott Simpson