

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23LA197

FUEL INJECTION SYSTEM EXAMINATION

June 21, 2023

A. ACCIDENT

Location: Redding, California
Date: May 20, 2023
Airplane: Cessna 210, N9433T

B. FUEL INJECTION SYSTEM EXAMINATION

IIC Elliott Simpson
NTSB

C. DETAILS OF THE EXAMINATION

1.0 Fuel Controller Examination

PN: 625219-2
SN: E229506AR

The unit appeared intact and undamaged, and all fittings were tight. Both the mixture and the metering control arms could be rotated through their full travel, but neither had smooth action, and a ratcheting effect could be felt.

The fuel inlet screen was clear. All fittings were removed, and all were internally clear.

The retaining screws for the mixture and metering shafts were safety wired in place, with a "TCM" seal. The screws were removed, and both shaft assemblies were pulled out. Both appeared to be partially bound within the cavity and dark grey carbon-like deposits fell out of the compression spring sections (see figures 1, 2). According to representatives from Continental motors, the deposits were likely degraded molybdenum grease, which is used during assembly.

The O-rings for both shafts were hard and square rather than round and pliable (see figure 1,2). The internal passages within both the controller casing and the fuel metering plug were clear.

The rotational mating surfaces between the metering plug and both the metering and mixture shaft ends displayed evidence of gouging and rotational wear (see figures 3, 4, 5, 6).

According to representatives from Continental motors, the unit was last overhauled at the factory in 1995. There was no record of the unit having been returned for service since.

1.1 Engine Driven Fuel Pump

The fuel pump was intact and undamaged. The input drive shaft could be rotated by hand and was smooth, and the drive coupling was intact. The pump was completely disassembled revealing multiple areas of internal corrosion, primarily within the area of the pump cavity (figure 7), and bypass valve. However, the pump still appeared to be functional. The relief valve diaphragm was intact and pliable. All passages were free of blockage.

1.2 Fuel Injectors

All fuel injectors were clear and did not show evidence of blockage.

2.0 Examination Photos



Figure 1 - Mixture control shaft with carbon deposits

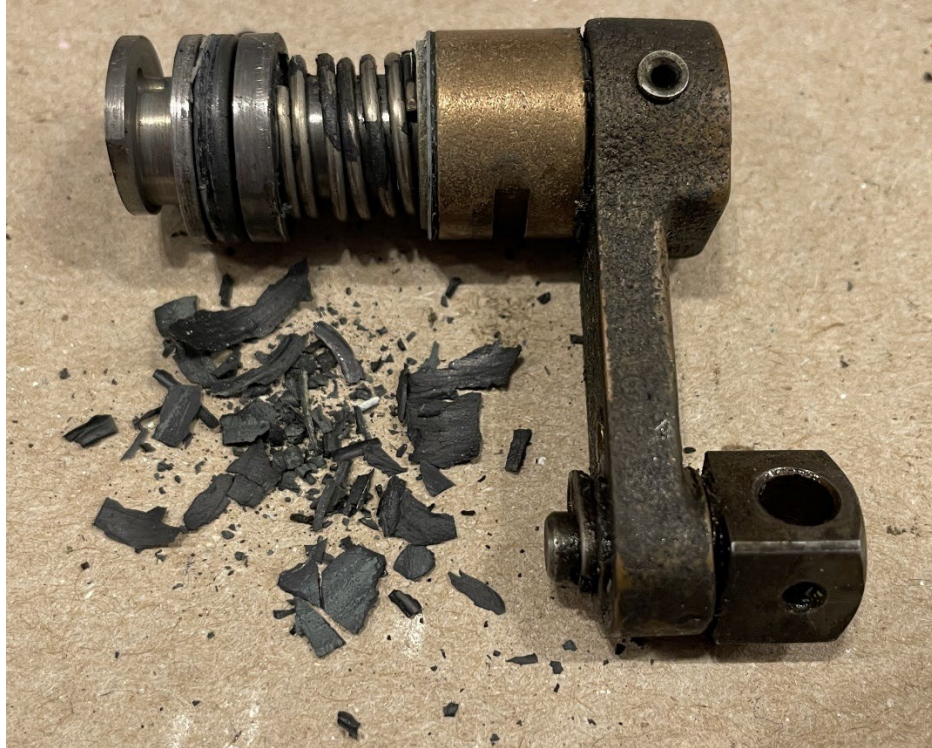


Figure 2 - Metering shaft with carbon deposits



Figure 3 - Metering shaft mating surface with metering plug



Figure 4 - Mixture shaft mating surface with metering plug



Figure 5 - Metering plug mating surface



Figure 6 - Metering plug mating surface

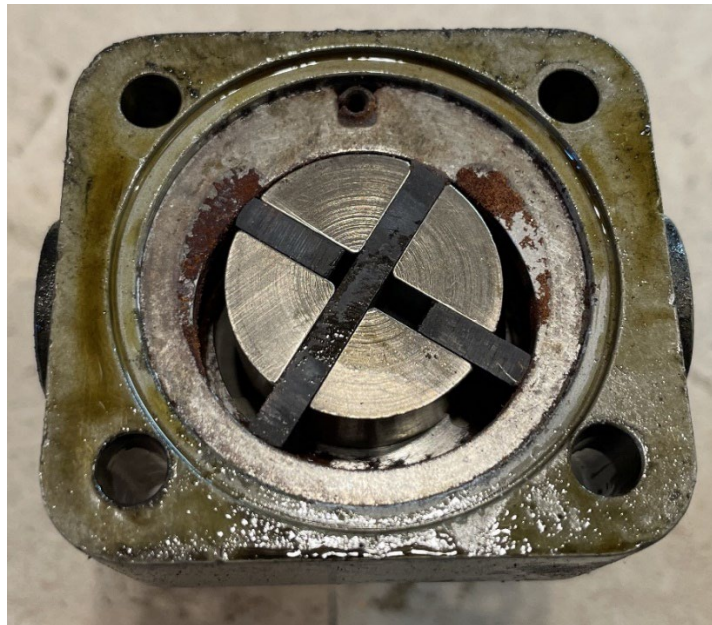


Figure 7 - Fuel pump cavity and blades

Submitted by:
Elliott Simpson
Senior Aviation Accident Investigator