RECORD OF EXAMINATION

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NTSB Accident Number: CEN22FA298
Date: July 3, 2022

Narrative:

The airplane impacted terrain and was resting in an upright attitude in a field southeast of the departure end runway 13. The airplane wings, fuselage, and empennage exhibited vertical crush/deformation and low-speed impact features. The airplane was destroyed by impact forces.

Postaccident examination of the airplane fuel system revealed both wing fuel lines were attached and secured to their respective fuel tanks and to the fuel selector assembly. The fuel lines were unbroken and did not exhibit fuel leakage. There was no useable fuel in the left and right wing fuel tanks.

Air was heard flowing from the wing's respective fuel filler ports and into their respective fuel tanks when it blown into the left and right wing fuel tank underwing vent tubes.

Fuel system diagraming shows that the airplane main fuel tank lines connect to the fuel selector assembly, which provide left, right, and off positions. Fuel cannot flow from a fuel tank when the selector is selected to the opposite tank. The postaccident fuel selector handle position was the right fuel tank. The fuel selector handle was rotated by hand and no detents were felt.

When air was blown into the output fuel line of the fuel selector, the fuel selector handle was positioned to the right and then the left fuel tank, and the resultant airflow could be heard from each wing's respective filler port. Air could not be blown through the fuel selector when the fuel selector handle was in the off position.

The fuel flow transducer, which was part of the cockpit fuel flow indicator, was tested and met the manufacturer's test specifications.

Removal of left and right wing fuel tank fuel senders revealed that the metal float arm of the left fuel tank sender float arm had an acute angular bend near its midpoint and near its float. The right fuel tank

sender float arm had an approximate 45° angular bend near its midpoint. The shapes of both fuel sender arms were not in accordance with the airplane manufacturer's design specifications.

Both sender float arms were able to free fall without binding in both directions of travel and their respective floats did not display weighting from fluid within the floats.

Resistance measurements of both senders at the bottom stop, mid-travel, and top stop, showed values of:

> Left fuel tank: bottom stop - 3 ohms, mid-travel – mid-travel - fluctuated 13-35 ohms, top stop - 32 ohms
>
> Right fuel tank: bottom stop 3 ohms, mid-travel - 20 ohms, top stop - 35 ohms

The Piper Comanche Service Manual for PA-24-250 (May 1, 2010), section 8-10, Fuel Quantity Indicating System, specifies the fuel sender resistance when the fuel sender arm was at the bottom stop as: 0.0 to 0.5 ohms. There is no mid-travel resistance specification in the service manual. The fuel sender resistance, when the sender arm is at the top stop, is: 29.6 to 31.3 ohms. The manual states that if incorrect resistance or fluctuation is found, the sender should be replaced.

Examination of the wing tank fuel tank bladders revealed that the left and right wing tank fuel bladders were collapsed and those areas of collapse were equipped with bayonet attachment clips.

The left wing fuel tank bladder was collapsed at the inboard and forward middle sections from the wing filler port. Three inboard and one forward middle bladder mounting clips were not connected to the top of wing. The left wing tank fuel bladder was part number (P/N): 524, serial number (S/N) CR544, which replaced original equipment manufacturer (OEM) P/N 454-324, manufactured 6/1998.

The right wing fuel tank fuel bladder was collapsed at the inboard section of the wing filler port. Three inboard bladder mounting clips were not connected to the top of wing. The right wing fuel tank bladder was P/N: 525, S/N: CR564, construction number: P-2393, which replaced OEM P/N: 454-325, manufactured: 11/1999.

The electric driven fuel pump was drained of approximately of 1 oz of liquid, consistent in smell and color of 100 low lead (100LL), through the inlet and outlet lines. A 12V source of DC power was then applied to the pump, and the pump motor was heard operating. The captured liquid that was drained was tested with water sensing paste and there was no change in paste color indicated the prescind of water. The fuel pump screens did not contain debris.

The engine driven fuel pump was disassembled, and the diaphragm was intact and pliable. There was residual liquid consistent in smell with 100LL and was less than the pump's internal capacity within the assembly that spilled out during disassembly.

The carburetor sustained impact damage and upon removing the carburetor bowl, there was approximately two ounces of liquid consistent in smell and color with that of engine oil and 100LL fuel and the electric driven fuel pump contained about one ounce of a similar liquid.

Examination of the engine and engine accessories revealed no mechanical anomalies that would have precluded normal engine operation. Examination of the airframe revealed no other mechanical

anomalies, aside from those noted within the fuel system, that that would have precluded normal airplane operation.

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