

National Transportation Safety Board

Office of Aviation Safety

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AIRCRAFT EXAMINATION

November 2, 2022

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A. ACCIDENT

Location: West Fargo, North Dakota
Date: August 10, 2021
Time: 1545 Central Daylight Time
Airplane: Cessna 210D, N3944W

B. AIRCRAFT EXAMINATION

Air Safety Investigator Mitchell Gallo
NTSB / Senior Aerospace Engineer
Denver, CO

C. SUMMARY

The aircraft examination was performed and completed at Wentworth Aircraft Inc., Lakeville, Minnesota, on November 2, 2022. The aircraft wings had been removed from the fuselage during recovery from the accident site. The fuselage, wings, and engine firewall exhibited impacted related deformations. There was no residual fuel in the fuel system leading to and forward of the cockpit fuel selector, except for approximately an 1/8 oz of fuel in the engine driven fuel pump. The examination found no mechanical failure/malfunction of the engine, engine accessories, and fuel delivery system that would have precluded normal engine operation.

D. DETAILS OF THE EXAMINATION

1.1 Cockpit

The tachometer indicated 3029.2. The instrument panel had an Aerospace Logic Inc. ASL-EGT100, which was a digital exhaust gas temperature gauge. The engine primer control knob was in the forward position. The cockpit engine, mixture, and propeller controls were in their forward positions.

The fuel selector handle was in the LEFT ON position and was unable to be rotated by hand due to impact related deformation of the cockpit floor that impinged the fuel selector shaft leading from the handle to the fuel selector body. All the fuel lines leading to the fuel selector were attached, secure, and did not display evidence of fuel leakage around their fittings and below the fuel selector. The fuel selector was removed and was able to be rotated through all fuel selector positions by rotating the fuel selector shaft; the fuel selector moved smoothly, detents were felt, and a click

was heard when the selector shaft was rotated through all detent positions. The fuel selector was disassembled and the ports at each detent position were fully engaged with their respective ports as the selector was moved through these positions. There was no debris and no residual fuel in the fuel selector or lines leading to the fuel selector from the left- and right-wing tank fuel lines.

Engine, mixture, and propeller control continuity was confirmed from the cockpit controls to the engine and propeller governor.

1.2 Fuel/Fuel System

The areas around the fuel filler caps did not exhibit any fuel stains. Both fuel filler caps had fuel grade placard of "100 OCTANE" and the fuel filler caps had "40 U.S. GALLON" inscribed.

The left and right wing fuel tanks were of a bladder type. The bladders in both tanks were secured by their attaching hardware and not collapsed. There was some wrinkling of the bladders adjacent to wing structure that exhibited impact damage.

The left and right wing vent system was unobstructed.

The left and right wing tank fuel line pick up screens did not contain debris.

The left and right wing tank fuel senders were intact and secured to the wing root structure. The electrical wiring leading to the senders was intact and secure and were cut during wreckage recovery. The left fuel sender had two stickers: "P/N#0726110-1 S/N#202964" and "11/17/20 AIR PARTS OF LOCK HAVEN 202964." The left and right sender float arms moved freely and smoothly when exercised by hand. An ohm meter was used to check resistances of both senders when their float arms were positioned at the bottom mechanical stop, approximate mid-range of float arm travel, and at the top mechanical stop. The approximate resistance values for the left fuel sender were: bottom stop - 28 ohms, mid-range - 110 ohms, top stop - 210 ohms. The approximate resistance value for the right fuel sender were: bottom stop - 38 ohms, mid travel - 150 ohms, top stop - 300 ohms. According to the aircraft manufacturer, the resistance values of fuel senders are: max value is 255 ohms +/- 15 ohms and the minimum value is 33.5 ohms +/- 2 ohms.

All the fuel lines from leading to the fuel selector and from the fuel selector to the engine were intact, secure, and did not exhibit fuel leakage. There was no debris within the fuel system. There were no fuel stains on the aircraft consistent with leakage during aircraft operation.

The gascolator was mounted to the aircraft structure and its bowl was intact and secure. The fuel bowl drain valve was closed. Upon unscrewing the bowl there

was no fuel and no debris present. The gascolator screen was intact and secure by a retaining ring that was removed to remove the screen for examination for the presence of debris; there was no debris present in the screen.

The electric fuel pump was mounted to the aircraft structure, and the electric wiring to the pump was attached and secure. The pump was removed, and its wiring was connected to a 12V battery, upon which the pump operated and no residual fuel internal to the pump was expelled.

The examination of the engine driven pump was accomplished by the removal of its fuel inlet and outlet lines. There was no fuel present in these lines. The pump drive shaft was rotated by hand and its internal rotation was heard. When the pump was disassembled, about 1/8 oz of fuel drained from the unit. There was no internal debris. The pump's internal diaphragm was pliable and did not exhibit failure.

2.0 Engine Examination

The engine was separated from its engine mounts, which exhibited features of overstress. The engine remained attached by control cables, fuel lines, hoses, and electrical wires.

There was no obstruction in the induction and exhaust systems.

The oil filter canister did not possess annotations in the areas for: date, tach time, aircraft registration. The canister was safety wired and upon removal contained residual oil. The oil canister was cut open and its filter element was separated from the canister. The oil filter element did not contain metallic debris.

The fuel injection manifold valve was disassembled and upon disassembly the internal screen did not contain debris. The internal diaphragm of the manifold did not display failure and was pliable. About 1/4 of the internal radius of the diaphragm was wetted with a fluid that had a smell consistent with fuel.

Visual inspection of the fuel injectors revealed no obstructions.

Both magnetos were attached and secured onto their engine mounting pads and could not be moved on their mounts using hand pressure. The magnetos' retaining hardware was attached and secure. The ignition harness was attached and secured to the magneto and their respective spark plugs.

During removal of the top spark plugs, it was difficult to remove due to corrosion that developed along their threads due to a lack of anti-seize compound. The removed spark plugs were of the massive electrode type. The top spark plugs all

had their center electrode in place and contained a gap between their ground electrodes. The spark plugs exhibited normal combustion features.

The engine was rotated through by hand using the propeller, during which air was expelled and drawn into each spark plug hole. Thumb compression was confirmed through each top spark plug hole during propeller rotation. During rotation, the exhaust intake valves exhibited valve lift in proper sequence without sticking and rotation of accessory gears within the engine. A spark was obtained in correct firing order through each lead when the engine was rotated.

Mitchell Gallo
Senior Aerospace Engineer