



Memorandum of Record

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Subject: CEN21FA125, N8080G, Wreckage Examination

Parties to the investigation, including inspectors from the Federal Aviation Administration (FAA), Lycoming Engines, and Textron Aviation joined the NTSB IIC to inspect the airplane wreckage at the accident site and during recovery.

Summary of Findings - No anomalies that would have contributed to the accident were noted with the airframe or engine during the examination.

Impact Sequence and Airframe Structure

The aircraft impacted trees at approximately 20' AGL at the edge of a wooded area adjacent to an empty farm field. The wreckage path was about 200' long on an approximately 210° heading. The left and right wing outboard ends were impact separated near the aileron/flap wing station. The outboard wing fragments were found near the beginning of the wreckage path along with the right stabilator. The left and right aileron remained attached to their respective wing fragments. The plastic wing tips were also fragmented and found near the beginning of the wreckage path. The right stabilator trim tab was separated.

The inboard aft section of the left wing was found about 50' from the initial tree impact with an approximately 5' long section of the inboard end of the left flap attached. The outboard end of the left flap was found about 30' further along the wreckage path. The flap actuator was found in the left wing fragment; the actuator was extended 1.5" which equates to approximately 10° to 20° flap extension. The center spar remained attached to the left wing fragment and an approximately 4' section of the inboard right wing was attached to the opposite side of the center spar. The next pieces found were the left stabilator, right flap, and a section of the right fuel tank with the fuel cap attached. The left stabilator was relatively undamaged and the trim tab remained attached. The right flap displayed multiple tree impact signatures. The right fuel cap rubber seal and vent were normal.

The fuselage came to rest on the left side. The tail was fractured around the circumference and remained attached by control cables. The tail cone was bent downward and came to rest with the bottom of the tail cone next to the belly. The vertical stabilizer and rudder remained attached to the tail cone and were relatively undamaged. The engine and propeller remained attached to the aircraft. The instrument panel sustained impact damage and several instruments were dislodged.

A second propeller that was being transported by the pilot was found in front of the aircraft. It appeared relatively undamaged.

A medium suitcase, three duffle bags, a flight bag, and two headset cases were recovered from the cabin. A red "walker" typically used by elderly or handicapped individuals was found next to the tail.

Control cable continuity was established for the stabilator, rudder, and trim tab cables from the forward cabin to the bell cranks and trim actuator located in the tail. The Garmin autopilot stabilator and rudder bridle cables remained attached to the servos; the bridle cables remained attached to their respective control cables.

Aileron control cable continuity was not established due to tree impact damage and fragmentation. The flap cables were continuous from the flap actuator located in the left wing root to the right flap bellcrank.

The stabilator trim indicator was in the full nose down position. The pedestal located directly below the indicator was partially separated from the instrument panel and was pulled downward. The trim cables appeared to be pulled downward at the pedestal and in the aft fuselage where the tail had been bent downward.

The trim tab actuator was extended 1.00" which was beyond the maximum trim position of 5° tab up. Per the Type Certificate Data Sheet, the trim tabs have a range of UP 5° +/-1° and DOWN 13° +/-1°. Per manufacturer data, the typical 177RG stabilator trim actuator would be extended 1.20" for 5° tab up and 1.60" for 13° tab down. Thus, a measurement of 1.00" is beyond the maximum limit of 5° tab up and is indicative of the cables being pulled beyond design specifications.

The fuel strainer assembly drain lever located on the right side of the engine was actuated; approximately 1/3 cup of blue fuel was drained into a glass jar. The fuel sample appeared clean and clear. A Sar Gel water finding paste test did not indicate water in the fuel. Both fuel tanks were breached. A small amount of blue colored fuel was observed dripping from the left wing fuel tank when the wing fragment was recovered.

The pitot heat switch was ON. The pitot tube mast was found with approximately 1/4" of ice on the leading edge. Other than pitot heat, the aircraft was not equipped with any anti-ice or deice systems. Some window and wing skin fragments exhibited frost covered surfaces. The forceful tree impact damage and post-impact snow fall made identification of pre-impact and post-impact ice accumulation on the window fragment surfaces and pitot tube mast indistinguishable and inconclusive.

A portable oxygen tank and cannulas were found in a storage bag near the forward cabin.

The landing gear handle was UP; the landing gear remained in the wheel wells.

Seat #1 and #2 were found separated from the seat rails. Per the FAA Airworthiness Directive, the seat rail holes did not exhibit excessive wear and there were no visible cracks across the seat rails. The seat #1 and #2 outboard seat rails exhibited witness marks where the seat roller assemblies separated from the rails. The seat adjustment pins on each seat remained intact and the spring tension was good. Seat adjustment pin depth engagement was not tested due to the condition of the wreckage. The seat roller assemblies on seat #1 were normal and the tangs were normal. The seat roller assemblies and tangs on seat #2 were also normal with the exception of the aft outboard roller assembly; the roller portion of the assembly was separated. The seat #1 lap belt was found unbuckled. The shoulder harness remained attached to the lap belt. The shoulder harness fuselage attachment point was impact separated from the structure. The seat #2 lap belt remained buckled with the shoulder harness attached. The outboard portion of the lap belt had been cut by first responders. The shoulder harness fuselage attachment point was impact separated from the structure.

The traditional analog instrumentation in the aircraft had been replaced with digital Garmin avionics. The instrument panel was equipped with a Garmin G3X touch screen GDU-470, Garmin G5 primary electronic attitude indicator, Garmin GNS 480, and a Garmin GFC 500 autopilot.

Engine

Engine compression and continuity were established. The top spark plugs appeared normally worn and were dark black in color. The left and right magneto produced spark at all leads. The fuel pump expelled fuel when the propeller was turned by hand. The fuel distribution valve contained trace amounts of fuel. The fuel servo screen was clean. The magnetic alternate air door appeared to operate normally; a small portion of organic material was observed wedged in the corner of the door. The muffler heat shields were removed; the mufflers appeared normal with no indications of exhaust gas leakage or soot damage.

Propeller

The 2-bladed McCauley propeller remained attached to the engine. Both propeller blades were twisted and bent slightly aft. Each blade displayed chordwise scratches and one blade had leading edge impact damage near the tip.