

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24FA218

WRECKAGE EXAM

June 15, 2024

A. ACCIDENT

Location: Gainesville, Texas
Date: June 11, 2024
Time: 2045 CST
0145 Zulu
Airplane: Cessna 172R

B. WRECKAGE EXAM

IIC	Laura Abraham NTSB Aurora, Colorado
FAA	Baker Nase North Texas Flight Standards District Office Irving, Texas
Party Member	Paul Beavers Textron Aviation Wichita, Kansas
Party Member	David Harsanyi Lycoming Engines Williamsport, Pennsylvania

C. SUMMARY

The airplane impacted a grassy cow pasture about .5 miles northwest of GLE. On the north end of the cow pasture, there were telephone wires about 35 ft above ground level (AGL). The left wingtip struck the ground first about 95 ft south of the telephone wires. There were shards of red plastic embedded in the dirt where the left navigation light broke off when the left wingtip impacted the ground. About 32 feet south of the left wingtip impact location, the propeller, still attached at the flange, was found partially embedded in the dirt. One blade was buried about 8 inches deep, and the other blade was resting on the ground. About 9 inches north of the propeller was a single propeller strike about 5 inches deep. Lying next to the propeller was the starter gear ring. Lying about 18 feet south of the propeller was the bottom part of the cowling. The main wreckage was found about 39 feet south of where the bottom part of the cowling was located.

From the left wingtip strike to the main wreckage was about 89 feet in length along a heading of about 180°. The main wreckage came to rest on a heading of about 055°. The airplane remained relatively intact during the impact sequence. However, the 89 foot debris field contained pieces of broken windshield, a small piece of the outboard side of the left aileron, and the left door. Both wings, and the empennage were still attached to the fuselage. The engine was still attached at the firewall.

D. ITEMS EXAMINED

1.1 Fuselage

The fuselage exhibited tearing, crushing, and buckling. All four seats remained in the airplane. The throttle quadrant was still attached. The throttle and mixture were found in the full forward position. The right hand yoke was snapped at the base and found dangling by wires. The left hand yoke was still attached.

1.2 Empennage

The empennage was fully intact and attached to the fuselage. It contained the vertical and horizontal stabilizer. The rudder was firmly attached to the vertical stabilizer, and the elevator was firmly attached to the horizontal stabilizer. The rudder and elevator cables were confirmed from the cockpit to their respective flight control surfaces. The elevator trim tab was found to be in the neutral position.

1.3 Wings

The left wing was partially attached to the fuselage. The left wing separated at its aft attachment point to the fuselage and was only connected by a small portion of the forward attachment point. The left outboard portion of the wing was curled upward in a scorpion tail. The flap and aileron were still attached to the left wing. However, a small outboard portion of the left aileron was separated and found along the debris path. The left wing aileron drive and balance flight control cables and flap control cables were separated when the left wing separated at its aft attachment point. The cables had a broom-straw-tensile-overload appearance. Continuity was confirmed either visually or by pulling on the cable at one end and watching the associated control surface move.

The right wing was attached to the fuselage. The leading edge of the right wing was crushed and folded in like an accordion. The flap and aileron were still attached to the right wing. Control cable continuity for the right flap and aileron were confirmed.

Both left and right flaps were fully retracted. The flap actuator was found in the fully retracted position.

1.4 Landing Gear

The nosewheel landing gear was sheared off and was laying underneath the fuselage. The left and right main gear were still attached at their attachment points.

1.5 Cockpit

The left and right yoke were present. However, the right yoke was snapped at the base and dangling outside the cockpit by wires.

The master switch was found in the on position (battery and alternator). The magnetos were on "both." The throttle and mixture controls were full forward. The navigation light switch was in the "on" position. The altimeter was set to 29.88.

1.6 Survivability

The student pilot was occupying the left seat. The flight instructor was occupying the right seat. Both occupants were still seated in their respective seat. However, the flight instructor was found leaning out of the right door.

1.7 Fuel/Fuel System

Eight ounce glass jars were utilized to collect remaining fuel from the left and right fuel tanks. Forty ounces of fuel was removed from the left wing fuel tank, and fifty-six ounces of fuel was removed from the right wing fuel tank. Both wing fuel tanks were filled with water to check for breaches. The left wing fuel tank was breached at the inboard, aft end of the fuel tank where the left wing separated from the wing aft attachment point. The right wing fuel tank exhibited no leaks. The fuel line between the fuel shutoff valve and fuel strainer bowl was found separated. A strong aviation fuel smell was detected at the main wreckage area. Once the wreckage was removed, there was evidence of fuel blight in a small compact area where the main wreckage was resting.

The fuel selector position was found just to the right of the BOTH detent position. No fuel was noted at the fittings when removing the valve from the airplane. An undetermined amount of air was blown backward through the fuel selector at the engine fitting port. Air was felt at the right-wing fuel tank fitting port. No air was felt at the left-wing fuel tank fitting port. The bent fuel selector valve shaft was moved to the BOTH detent position and air could be felt at the left and right wing fuel tank fitting ports. The fuel selector valve was operated by hand to each detent and confirmed correct operation. The fuel header tank was removed. The tank was intact. The tank was emptied into a glass jar. A brown-tinted and cloudy liquid that had a smell

consistent with 100LL fuel came out of the header tank. After a few minutes, the debris settled, and the liquid was blue. The liquid was tested for water with water finding paste and no water was present. The fuel strainer bowl was removed and approximately 2 ounces of liquid that smelled and looked like 100LL was drained.

2.0 Engine Examination

The engine was hung from a forklift to facilitate an examination. Exhaust tubes and muffler were observed to have impact damage in the form of dents and crushing from the impact sequence. Both magneto harnesses sustained impact damage in the form of abrasion and cuts. The oil filter remained attached to the accessory section of the engine but sustained heavy crushing from the impact sequence and the oil filter adapter was cracked. The starter ring gear was found separated along with the crankshaft flange as the crankshaft fractured at the nose section of the engine during the impact sequence. The starter was found impact fractured from the engine. The starter housing showed teeth marks and minimal scoring from contact with the starter ring gear during the impact sequence.

The top spark plugs were removed from each cylinder. The engine was rotated through its normal cycle by rotating the crankshaft through the vacuum pump drive port. Thumb compression and suction were noted on each cylinder during crankshaft rotation along with full rocker arm travel on each cylinder.

Both the top and bottom vacuum pumps were found tightly installed to their respective pads. The pumps were removed and found to have no damage to the rotor or vanes within each unit, and their drive couplers were intact.

The oil suction screen was found tightly installed and safety wired to the oil sump. The screen was removed and found to be unobstructed. The oil filter was found tightly installed but no date or time was marked on the outside of the filter can.

Both magnetos were found tightly installed to the rear of the engine. Both ignition harnesses sustained varying amounts of cuts and abrasions from the impact sequence. Both magnetos were removed and their respective harnesses cut to facilitate testing of the magnetos. Each magneto was rotated by hand and with an electric drill which produced spark at all points.

The engine driven fuel pump was found tightly installed to the accessory section of the engine. The pump was removed along with its inlet and outlet hoses; trace amounts of fuel were noted coming from the pump. The top 5 Phillips screws on the top of the pump were found loose when a screwdriver was put to them. Two fingers on a screwdriver were enough to turn each fastener. The decision was made

to retain the pump for further testing later to verify its condition (the pump is being kept in a box at Air Salvage of Dallas). The fuel line from the fuel pump to the inlet side of the fuel servo was found to have approximately 1 ounce of fuel in it while the line from the outlet of the servo to the fuel manifold had trace fuel. A trace amount of fuel was also found within the fuel manifold, and no fuel was in any of the 4 injector fuel lines. All fuel injectors were found tightly installed to each cylinder, removed, and found to be free and clear of debris. The fuel manifold was tightly installed to the top of the engine with all injector lines tight and no signs of leaks. The manifold was disassembled, and an orange Vaseline-like substance was noted on the cap, spring, and top of diaphragm. The decision was made to retain the cap of the manifold, which held most of the Vaseline-like substance and send it to the NTSB laboratory for testing. The fuel servo was found tightly installed to the lower side of the engine. No damage was noted to the unit but both throttle and mixture cables were kinked and damaged and could not be used to actuate their respective arms. The cables were cut and the throttle arm and mixture arms both moved freely. The brass nut on the diaphragm side was noted to have the "G" stamp, and all screws were found safety wired and tight. The unit was disassembled and both diaphragms were found free and clear of tears. The air side diaphragm was found to have a greenish blue oil mixture within it, but no debris was present. The fuel inlet screen was removed and found free and clear of any debris.

The spark plugs were of the massive electrode type, Champion REM38E. When compared to a Champion Check-A-Plug chart, the plug coloration and wear were consistent with normal engine operation. All 4 lower plugs had varying amounts of combustion type deposits present within the insulator portion of the sparkplug.

3.0 Propeller Examination

The McCauley fixed-pitch 2-bladed propeller separated from the engine crankshaft. One propeller blade was slightly bend aft, and the other was straight. Both exhibited leading edge polishing and chordwise scratch marks.

4.0 Pilot Information

The instructor pilot was a 27 year-old female. She had a 1st class medical with no restrictions or limitations. The date of her medical was August 29, 2019. The student pilot was a 26 year-old male. He had a 1st class medical with no restrictions or limitations. The date of his medical was July 27, 2023.

5.0 Aircraft Information

The aircraft was a 2000 Cessna 172R.

6.0 Meteorological Information

KGLE 120155Z AUTO 08003KT 10SM CLR 25/20 A2994

Submitted by:

Laura Abraham
Air Safety Investigator