

National Transportation Safety Board

Office of Aviation Safety

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ERA24FA102

WRECKAGE EXAMINATION

February 2, 2024

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A. ACCIDENT

Location: Weedon Field Airport (EUF), Eufaula, Alabama

Date: January 31, 2024

Time: 1248

Aircraft: Piper PA-24-180

Registration: N5520P

B. WRECKAGE EXAMINATION

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C. SUMMARY

D. On January 31, 2024, about 1248 Central Standard Time, a Piper PA-24-180, N5520P, was destroyed when it was involved in an accident at Weedon Field Airport (EUF)Eufaula, Alabama. The commercial pilot was fatally injured. The

airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

E. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane came to rest oriented on a magnetic heading of about 70°. All primary flight control surfaces remained attached to the airplane. The nose of the airplane was crushed aft to the cockpit and partially separated from the fuselage. Flight control continuity was established for all primary flight control surfaces. The engine and avionics instruments were destroyed by impact. The empennage displayed crush damage and remained partially attached. The horizontal and vertical primary control surfaces remained connected to the empennage and were unremarkable. The wings remained attached to the fuselage and exhibited impact damage.



Figure 1 - Wreckage Diagram

2.0 Airframe Examination

The wreckage was examined and documented at the accident site on February 1, 2024. A follow-up examination on the engine was performed on 2/2/2024 at Atlanta Air Recovery, Griffin, GA.

2.1 Fuselage

The fuselage exhibited significant compression on the top of the cabin. The cabin roof separated at the instrument panel and was compressed aft. The firewall was deformed downward and aft, with the engine positioned beneath the instrument panel. The instrument panel, multiple instruments, and flight control columns were damaged, rotated upward and aft, and came to rest approximately 75° nose-down from their original orientation.

A area of compression damage was noted on the cabin top just aft of the wing trailing edge, where the fuselage was torn open along the sides and bottom surfaces.

2.2 Empennage

The stabilator remained attached to the empennage. The right side exhibited minor buckling on the top surface and was removed by recovery personnel, while the left side remained intact with no notable damage. The stabilator trim surface remained attached at the hinges.

The vertical stabilizer and rudder remained attached to the empennage with no significant damage. Rudder balance weights were intact on the top of the rudder. Stabilator, stabilator trim, and rudder control cables remained attached at the empennage and could be moved by hand from the aft cabin to the empennage. Deformation of the main cabin floor prevented movement of these cables to their respective control interfaces at the control column, rudder pedals, or ceiling-mounted stabilator trim control. Both rudder cables remained attached to the rudder bar.

The stabilator trim actuator rod was extended 0.2 inches on the top side of the drum, indicating a mid-range nose-down trim position.

2.3 Wings

The left wing remained attached to the fuselage and exhibited leading-edge compression along its entire span. Approximately 63 inches of the left aileron separated from the wing, torn near the inboard chord, leaving about 10 inches still attached to the wing and the aileron control rod. The control rod remained connected to the left bellcrank, and both aileron cables were attached to the

bellcrank. Distortion of the left wing interior and cabin floor prevented movement of the aileron cables from the bellcrank to the control column. The left flap remained attached at all three hinges but was buckled near mid-span.

The right wing also remained attached to the fuselage and was removed during recovery. Both the right aileron and flap were attached at all hinges, though the right flap control rod was broken. The right aileron could be actuated manually at the wing root by pulling the cables. Buckling was observed on the top surface of the wing just outboard of the fuel filler port and outboard of the flap, with downward bending in the latter area. Distortion of the cabin floor prevented movement of the right aileron cables from the wing root to the control column.

2.4 Landing Gear

The fixed main landing remained attached to the fuselage and was retracted

2.5 Cockpit

The cockpit was crushed aft, and the flight instrument were impact damaged. Due to post-accident impact damage, the engine control positions at the time of ground impact could not be determined.

2.6 Survivability

The accident was not survivable. The cockpit seats were fitted with 3-point restraints; all seats and restraints were impact damaged.

2.7 Fuel/Fuel System

The left fuel selector was positioned to "OFF" and securely in the detent, while the right fuel selector was positioned to the right main tank and also secured in the detent. Using low-pressure air introduced at a breached line forward of the No. 2 pilot seat, approximately 1 ounce of fuel was expelled from the right main tank fuel line at the wing root, and 2-3 ounces from the right tip tank line. Water-detecting paste testing showed no presence of water. Function checks of both fuel selectors using low-pressure air confirmed proper operation. (See Photo 1)

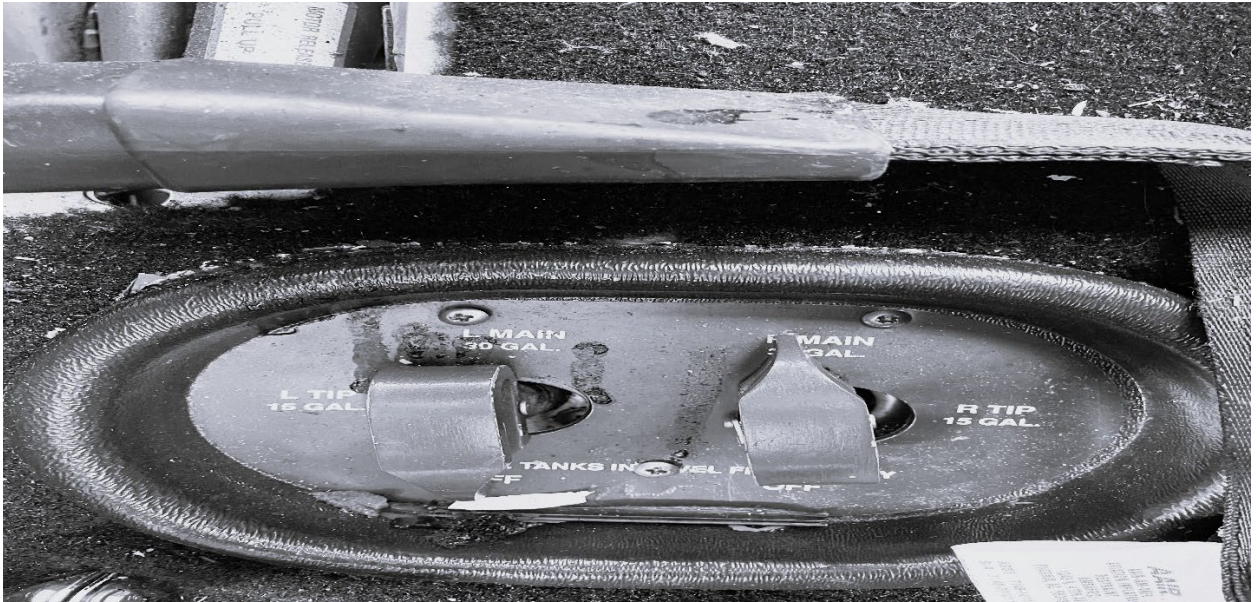


Photo 1-Fuel Selectors

The left main 30-gallon bladder tank was ruptured during impact and contained no fuel. Its filler cap was secure, with intact and pliable rubber. No hydraulic deformation was observed in the left wing. Air blown through the left tip tank line caused fuel to exit at the inboard end of the left aileron, confirming the main tank breach. Escaping air was audible at the wing root during testing.

The right main bladder tank also contained no fuel at the impact site. Its filler cap was secure, with intact and pliable rubber. Off-site testing with low-pressure air confirmed the tank's integrity: the tank inflated inside the wing, and removal of the fuel cap produced a loud rush of air. No hydraulic deformation was noted in the right wing.

Inline screens for both main and tip tanks were clean. The engine-mounted electric fuel pump operated smoothly under both dry and fuel-loaded conditions using a 12-volt source. The internal fuel screen of the pump was clean. Examination of the fuel strainer revealed no fuel, a clean screen, and minor debris in the bottom of the strainer bowl.

The aircraft was equipped with STC-installed Osborne 15-gallon tip tanks. The left tip tank was breached during impact, and its filler cap was not recovered. The right tip tank remained intact with minor impact damage; its filler cap was secure and intact, with pliable rubber. The tank was void of fuel.

3.0 Engine Examination

Examination of the engine revealed that the crankshaft flange had sheared from the crankshaft assembly due to impact forces at the nose section of the

crankcase. Mechanical continuity was verified by rotating the engine via the vacuum pump drive. Although the engine could be rotated through a full 720° (two complete rotations), resistance was noted because the bent, sheared forward end of the crankshaft was contacting the crankcase. Thumb compression was present on all four cylinders, and both intake and exhaust rocker arms displayed equal travel during rotation.

The carburetor was heavily fragmented due to impact forces. The throttle arm was impact-damaged but still held in place by its castle nut and cotter pin; the throttle linkage remained attached, though the throttle cable had sheared from its connecting link. The carburetor bowl had separated from the lower venturi section, and the floats were not available for examination. The mixture arm was still secured, but the mixture cable was detached. The inlet screen showed no contamination, and no fuel was present inside the carburetor.

The engine-driven fuel pump remained mounted and safety-tied to the accessory housing. Its plunger moved freely, and the rocker arm actuated normally, producing suction. Upon disassembly, no defects were found. Trace amounts of fuel were observed in both the fuel pump inlet line and within the pump itself. Cylinder No. 1 was a nitrided cylinder, while cylinders Nos. 2, 3, and 4 were chrome. After removal of the accessory housing, the idler gears and idler gear shafts were found in good condition. The crankshaft gear was securely attached, and its dowel was intact. The exhaust system exhibited crush damage.

Examination of the ignition system showed that the left magneto remained securely mounted to the accessory housing. Its impulse coupling functioned properly, and when driven with a drill, it produced spark from all four leads. The magneto drive was correctly secured with a castle nut and cotter pin. A timing check could not be performed due to the damaged crankshaft, which prevented establishing an accurate engine position.

The right magneto had been replaced with an EA-3000 Electronic Ignition System, and its Electroair drive was properly secured with a castle nut and cotter key.

Further examination revealed two different spark plug types installed on the engine. UREM40E plugs were installed in the top positions of cylinders Nos. 1 and 3 and the bottom positions of cylinders Nos. 2 and 4, corresponding to the left TCM magneto. Tempest/Electroair EAREM37HE plugs were installed in the bottom positions of cylinders Nos. 1 and 3 and the top positions of cylinders Nos. 2 and 4, corresponding to the right Electroair ignition system. The bottom No. 2 spark plug was sheared at the ignition lead attachment point due to

impact forces. Overall, spark plug conditions were consistent with “normal” per the Champion Aviation Check-A-Plug Card AV-27.

Oil was present in the sump; however, the quantity could not be determined because the sump had been breached and was leaking. The oil suction screen showed no contamination, and the oil filter—cut open for inspection—contained no debris within the filter media. The oil pump remained securely mounted and safety-tied to the accessory housing, and both the pump body and impellers were in good condition. No discrepancies were noted within the engine’s oil system.

4.0 Propeller Examination

The propeller assembly remained attached to the crankshaft propeller flange and starter ring gear, although the flange itself had sheared from the crankshaft at the crankcase nose section. The propeller showed no evidence of torsional twisting, S-bending, or major chordwise scoring, but it did display aft bending at the blade roots.

The propeller governor was firmly mounted to its drive, though the drive had sustained impact damage. The upper and lower right-hand mounting points had separated but were still held in place by the hardware. After removal, the governor and drive assembly were examined; the governor rotated freely by hand and the gasket screen was free of contamination.

Submitted by:

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