

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23LA232

AIRFRAME AND ENGINE EXAMINATION

N1347T, PA-28-180

A. ACCIDENT DETAILS

Location: Selma, Alabama
Date: May 11, 2023
Time: 1915 CDT
Airplane: N1347T, Piper PA-28-180

B. EXAMINATION PARTICIPANTS

Investigator In Charge	Lynn Spencer NTSB/AS-ERA Washington, DC
Group Member	Jon Hirsch Piper Aircraft Vero Beach, FL
Group Member	J. Mike Childers Lycoming Engines Williamsport, PA

C. SUMMARY

On May 11, 2023, about 1915 central daylight time, a Piper PA-28-180, N1347T, was substantially damaged when it was involved in an accident near Selma, Alabama. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that he switched from the right to the left fuel tank about 30 minutes into the flight from Pell City to Monroeville, Alabama. About 25 minutes later, the airplane engine “slow(ed) to what appeared to be an idle power setting.” He attempted to restore engine power; however, the engine did not regain power. The airplane continued to descend, and the pilot attempted a forced landing to a field; however, the airplane impacted an area of pine trees before the field. Examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed substantial damage to the wings, fuselage, and empennage.

Examination of the airframe revealed that the left wing fuel sump drain was in the up and locked open position, which would have allowed fuel to drain during the flight. Photos of the airplane “minutes after” the accident were e-mailed on the day of the examination showing fuel staining on the left flap aft of the fuel drain, consistent with fuel leakage during the flight.



Photo 1 - Photo of airplane after impact with fuel stains on left flap. (Photo courtesy of owner)



Photo 2 - Enlarged close-up view of fuel staining on left flap. (Photo courtesy of owner)

Examination of the engine revealed no mechanical malfunctions or failures that would have precluded normal operation of the airplane.

D. MAINTENANCE RECORDS REVIEW

The logbooks were not present at the examination; however, photos of the most recent logbook entries were provided by the FAA Inspector and reviewed. The review revealed that the most recent airframe and propeller annual inspections were completed on July 14, 2022, at a total time in service of 2,373.80 hrs and PSMOH 519.76 hrs. No annual or 100-hr engine examination was apparent in the provided logbook photos; however, the engine logbook included an entry from October 29, 2022, for the change of the oil filter and the addition of 8 qts of oil, and an entry from October 26, 2022, at tachometer time 2,471.98 hrs, TTE 2,471.98 hrs, and TSMOH 617.94 hrs for the replacement of the oil temperature sender. The engine logbook general information page showed that the engine, a Lycoming O-360-A4A, was installed on the airplane October 16, 2001, at tachometer time 1,854 hrs.

E. AIRFRAME EXAMINATION AND PHOTOS

The airplane was a low-wing, fixed tricycle landing gear equipped airplane. Its fuselage was an all-metal construction, with four seats: two front seats with dual flight controls and two aft seats. Only one aft seat was observed in the airplane during the examination, and it was not attached to its mounts. An airframe layout and examination took place on June 14, 2023, at Atlanta Air Salvage in Griffin, Georgia.

Airframe

As first viewed, the fuselage and empennage remained intact, the engine remained attached at its mounts the fuselage, and the wings and left portion of the stabilator were detached. The airplane was still loaded on the trailer that had been used to transport it to the recovery facility. The airplane and wings were removed from the trailer. The fuselage was impact damaged above the cockpit and by both wing roots. The empennage was intact except for the left portion of the stabilator which had been cut. The rudder was attached to the vertical stabilizer and was deformed left about 5 inches from the top. The right stabilator with elevator attached was damaged at the leading edge. The removed left portion of the stabilator was substantially damaged on all surfaces and the elevator was partially detached. Both wings were impact separated at their roots and substantially damaged with impact signatures spanning the leading edges consistent with tree impact.

Flight Control System

Flight control cable continuity was confirmed for the stabilator, pitch trim, and rudder. The aileron cable forward chain segment remained intact but was displaced from the right control column sprocket. The right aileron drive cable exhibited a cut through the turnbuckle near the cabin side wall consistent with recovery processes. The left aileron drive cable was separated in the center cabin near the right side wall and exhibited a "broomstraw" separation. A segment of the aileron balance cable remained in the center cabin and exhibited "broomstraw" separations on each end near the wing roots.

Cockpit Controls

The instrument panel was intact. Most of the cockpit instruments, including the attitude indicator, directional gyro, turn coordinator, airspeed indicator, and vertical airspeed indicator were removed and replaced by a Garmin flight displays. The rudder pedals were intact. The flap control handle was positioned to full UP (handle to the floor). When the electrical master switch was placed in the on position the two Garmin flight displays powered on. The electric fuel boost pump switch was placed in the on position and the pump was heard to operate.

Carburetor heat - OFF
Throttle - full aft (closed)
Mixture - full aft (idle/cutoff)
Primer - Stowed and locked
Tachometer - 2,564.5 hrs
Airspeed - 0
Key - not in place, magnetos to OFF position
Hobbs: 1,763.8 hrs
ELT - Armed
Battery - OFF
Fuel Pump - OFF
Landing Light - OFF
Beacon/Strobe - OFF
Pitot Heat - OFF
Fuel selector - Left tank

Seats and Seatbelts

The front seats were attached to their bases. The seatbelts and shoulder harnesses were unlatched and remained attached at all attachment points and operated normally.

Airframe Fuel System

A small amount of liquid was drained from the fuel strainer sump drain. The liquid was blue in color and had an odor consistent with 100LL avgas. The liquid was tested with water finding paste and tested negative. The fuel strainer bowl was intact and secured

with a cotter pin. The cotter pin was removed, and the fuel strainer bowl was removed. The fuel strainer screen was intact and appeared free from blockage.

The fuel selector valve, handle, and cover were intact in the left cabin side wall. The fuel lines from the left and right wing tanks were cut near the wing spar carry through on the left side of the fuselage consistent with recovery processes. Low pressure air was applied to the cut ends of the fuel lines and was heard to expel from the fuel strainer fitting after the bowl had been removed.

The left wing fuel tank was mostly intact and contained a small amount of fluid. The wing's fuel sump drain was found in the open and locked position, and fluid drained from the sump as soon as the wing was up righted. The fluid was tested with water-finding paste and tested positive for water. No fluid consistent with fuel was evident in this sample. The sump drain was closed, the wing was again up righted, and about a cup of fluid was drained from the tank. It tested positive for water when tested with water-finding paste. No bluish fluid consistent with fuel was observed. The right wing fuel tank was breached and devoid of fuel. The right wing's fuel sump drain was in the closed position. Both fuel caps remained seated in place.

Other Systems

The emergency locator transmitter (ELT) was attached to its mount t was in the armed position and remained attached to the ELT antenna.



Photo 3 - View of airplane from right before examination.



Photo 4 - View of underside of left wing showing leading edge impact damage before examination.



Photo 5 - View of right wing leading edge with impact damage prior to examination.



Photo 6 - View of tachometer showing 2,564.5 hrs



Photo 7 - View of fuel selector selected to left wing tank.



Photo 8 - View of fuel drain sump in open and locked position on left wing.



Photo 9 - Close-up view of left wing fuel sump in open and locked position.



Photo 10 - Liquid drained from left wing fuel sump testing positive for water.



Photo 11 - Close-up view of right wing fuel sump in closed position.



Photo 12 - View of fuel strainer bowl and sump drain with drained fluid.



Photo 13 - Test of fluid from fuel strainer sump showing no water contamination.

F. ENGINE EXAMINATION AND PHOTOS

The engine remained attached to the engine mount and the engine mount remained attached to the fuselage. The upper cowling had been removed and the lower cowling remained installed. The lower cowling was removed to facilitate examination of the engine. The magnetos appeared intact and secure to their mounts. The magneto timing was found to be 25° BTC (left) and 23° BTC (right). The top spark plugs and rocker covers were removed and the crankshaft was rotated manually. The engine was rotated by turning the propeller and continuity of the crankshaft to the rear gears and to the valvetrain confirmed. Compression and suction were observed from all four cylinders. The interiors of the cylinders were viewed using a lighted borescope and no anomalies noted other than oil in the Nos. 2 and 4 cylinders.

The throttle and mixture cables remained attached at the carburetor and moved in conjunction with movement of the controls in the cockpit. The carburetor heat cable

was bent upwards consistent with impact damage. The cable was returned to a normal position and functioned normally when the lever in the cockpit was manipulated. The carburetor remained attached to the engine and was removed and partially disassembled. About a tablespoon of oily liquid was observed in the carburetor float bowl. The liquid tested negative for water using water finding paste. No damage to the foam floats or other carburetor internal components was observed. The carburetor fuel inlet screen was absent of debris. The engine driven fuel pump remained attached to the engine and no damage was noted. A few drops of liquid drained from the pump when it was removed. The pump produced air at the outlet port when actuated by hand. It was partially disassembled and no damage to the rubber diaphragms or internal check valves observed. The electric fuel pump was actuated and heard to operate using the aircraft onboard electric system. The airplane fuel strainer screen was unobstructed.

The air induction housing and filter element were intact and unremarkable. The filter appeared free from blockage. The oil pressure line fitting on the accessory housing was fractured and separated.



Photo 14 - Engine before examination.

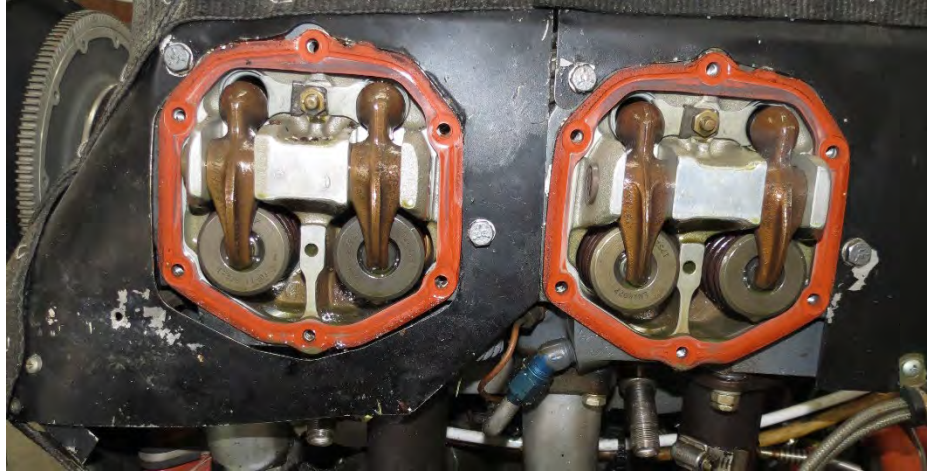


Photo 15 - Cylinder Nos. 2 and 4 after rocker cover removal.

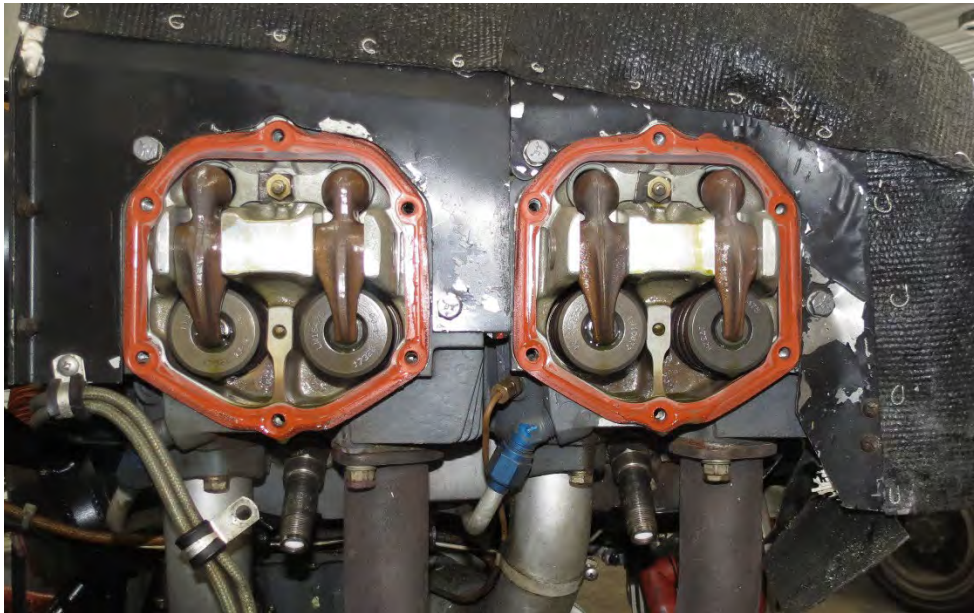


Photo 16 - Cylinder Nos. 1 and 3 after rocker cover removal.



Photo 17 - Disassembled carburetor and floats (note no hydraulic deformation).

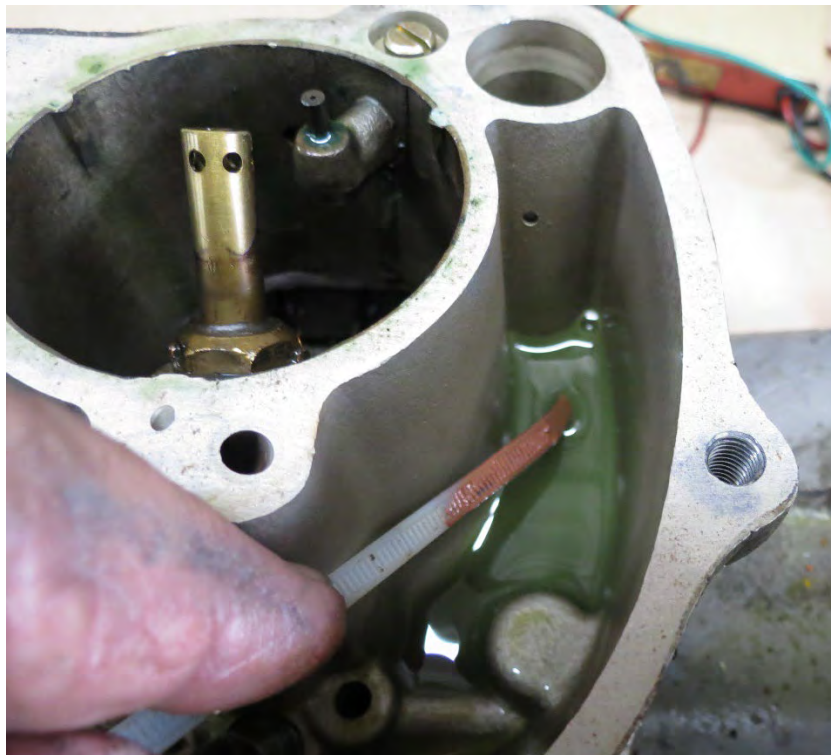


Photo 18 - Fuel in the carburetor bowl tested negative for water.



Photo 19 - Disassembled carburetor parts including fuel inlet screen (free from debris).



Photo 20 - Spark plugs after removal.



Photo 21 - Oil filter element after removal with no metallic debris.

G. PROPELLER EXAMINATION AND PHOTOS

The fixed pitch propeller remained attached to the crankshaft propeller flange and the two blades remained attached to the hub. The propeller spinner was impact damaged. No damage to the propeller blades was noted.



Photo 22 - View on propeller blade.



Photo 23 - View of propeller blade.

Submitted by:

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