

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23FA208

ON-SCENE AND WRECKAGE EXAMINATION FACTUAL SUMMARY

6/7/2023

A. ACCIDENT

Location: Tupelo, MS
Date: 6/4/2023
Time: 8:16
1316 UTC
Airplane: Piper PA-31-325; N4077W

B. ON-SCENE AND WRECKAGE EXAMINATION FACTUAL SUMMARY

IIC	Scott Johnson National Transportation Safety Board Federal Way, WA
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Aviation Accident Investigator	Albert Nixon National Transportation Safety Board Federal Way, WA
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Aviation Accident Inspector	Michael Jones Federal Aviation Administration Jackson, MS
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Senior Air Safety Investigator	John Hirsch Piper Vero Beach, FL
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Senior Air Safety Investigator	Mike Childers Lycoming Williamsport, PA
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C. SUMMARY

On June 3, 2023, about 0811 central daylight time, a Piper PA-31-325, N4077W, was destroyed when it was involved in an accident near the Tupelo Regional Airport (TUP), Tupelo, Mississippi. The pilot and pilot rated passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

Examination of the accident site revealed that the airplane struck terrain inside the Tupelo MS Army Aviation Support Facility, which was attached to the Tupelo Regional Airport.

The airplane impacted on a grassy 25° sloped hill side which led to a drainage area with an elevation of 330 feet mean sea level, (msl). The first identified point of contact (FIPC) was an area of disturbed dirt about 1,524 ft east of the centerline of runway 36, east of two large fire suppression water tanks. Two additional impact craters, consistent with both engines, were located at the FIPC and the right crater was about 3 ft northeast of the FIPC. The left main gear was embedded within the terrain and the right above ground in the burned fuselage. The debris pattern remained within 70 feet of the FIPC and mostly consisted of windshield fragments that were scattered in a rotating impact pattern north and south of the impact site.

The left propellor hub had 3 blades attached to the hub. One of the blades had minimal leading-edge abrasion and the other two blades exhibited leading edge gouges, chord-wise scoring and twisting along the longitudinal axis and blade aft bending. Three of the right propellor blades were attached to the hub and exhibited a small amount of leading-edge abrasion, the fourth was imbedded in the ground bent back and appeared to have absorbed most of the rotational stopping energy. Ground prop strikes in the terrain appeared symmetrical.



Figure 1: View of accident site north view

2.0 Airframe Examination

2.1 Fuselage

Most of the airplane was consumed by post impact fire. Post-crash fire had largely destroyed the upper fuselage from the cockpit aft to just forward of the empennage. The fuselage came to rest upright orientated to a 345° northwest magnetic heading. The forward baggage cargo door was found 10 ft west of the main wreckage, against a water storage tower, and was in the latched position. All avionics equipment, switches, gauges, and cockpit controls were impact and thermally damaged.

2.2 Empennage

The empennage had been mostly destroyed by fire. Little was recognizable central to the empennage and inboard wings. The vertical and horizontal stabilizer were identifiable. The rudder and elevator were thermally damaged. Rudder and elevator control continuity was established from the rudder pedals aft to the rudder and control wheel to the elevators.

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2.3 Wings

Right Wing

Observed on scene, the right wing was laying on the ground adjacent to the fuselage. The inboard half of the wing was thermally damaged and largely consumed by fire. The outboard portion of the wing exhibited impact and thermal damage. The outboard portion of the wing appeared to be displaced from its normal position relative to the fuselage with the wing tip moved aft. The aileron remained partially attached to the wing and the bellcrank remained attached to its mount. The aileron and balance cables remained attached to the bellcrank arms and the stops were intact and unremarkable. The aileron drive and balance cables were continuous from the bellcrank to the center fuselage.

About 18" of the outboard portion of the flap remained attached to the wing and exhibited thermal damage on the inboard edges. The flap jackscrew was fractured and extended with 13 threads exposed which corresponds to a flap setting of 15°.

Left Wing

Observed on scene, the left wing was laying on the ground adjacent to the fuselage. The wing appeared to be displaced from its normal position relative to the fuselage with the wing tip moved forward. The wing was thermally damaged throughout with the inboard portion being mostly consumed. The aileron remained partially attached to the wing by its hinges and the bellcrank remained attached to its mount. The aileron and balance cables remained attached to the bellcrank arms and the stops were intact and unremarkable.

The aileron drive and balance cables were continuous from the bellcrank to the center fuselage.

About 18" of the outboard portion of the flap remained attached to the wing and exhibited thermal destruction on the inboard edges. The flap jackscrew was extended with 13 threads exposed which corresponds to a flap setting of 15°. The Main and Auxiliary fuel tank filler caps were intact in their respective filler neck openings. The engine nacelle aft of the firewall was destroyed and consumed by fire. during the post-recovery examination of the wreckage the following was observed, the left aileron balance cable was separated in the center fuselage area with "broomstraw" signatures on both ends consistent with failure under overload.

The aileron balance cable from the right wing bellcrank was found separated from the eye end terminal at the center of the fuselage. The eye end terminal remained attached to the fork end terminal on the left aileron balance cable. Which is being sent off to the National Transportation Safety Board materials lab for examination.

The aileron trim jack screw was extended approximately ½ inch and corresponds to a neutral trim setting.

2.4 Fuel/Fuel System

The fuel sample provided by Tupelo Aviation who sold the pilot the fuel tested negative for water and was free of contaminants.

The fuel selector controls in the cockpit were impact and thermally damaged. The left fuel selector lever was in the “off” detent however, the right fuel selector lever was not in a detent and was positioned inboard of the inboard tank detent.



Figure 2: View of both engine during the examinations

3.0 Engine Examination

3.1 Left Engine

The left engine was laying upright about 30 degrees nose down in the impact crater. The engine remained partially attached to the firewall through the tubular mount. The engine was fire damaged, and the engine cowling partially burned away. The exhaust system pipes were impact damaged. The induction air filter was fire destroyed. The rear mounted accessories were impact and fire damaged.

The engine crankshaft was rotated by turning the propeller and continuity of the crankshaft to the rear gears and to the valve train confirmed. Compression and suction were observed from all six cylinders. The interiors of the cylinders were viewed using a lighted borescope and no anomalies noted.

The fuel injector servo remained attached to the engine and was fire damaged. The throttle control cable and mixture control cable remained attached to the servo throttle and mixture control arms. The servo was partially disassembled, and the rubber diaphragm was destroyed, consistent with heat damage. No other damage was observed apart from thermal and impact damage. The servo fuel injection screen was absent of debris.

The fuel flow dividers remained attached to the engine end no other anomalies were noted.

The 2-piece fuel injector nozzles were unobstructed. The No. 1 fuel injector line "B" nut was observed not attached to the #1 fuel injector nozzle. It could not be determined if the loose "B" nut attachment was pre or post impact. It was determined both engines were developing power on impact + or - 150 RPM. The engine driven fuel pump remained attached to the engine and was discolored consistent with exposure to the post-impact fire. The pump drive assembly rotated freely by hand.

The engine driven fuel pump remained attached to the engine and was discolored consistent with exposure to the post-impact fire. The pump drive assembly was rotated freely by hand. Oil was observed in the engine; The oil suction screen was absent of debris. The oil filter media was charred but no metallic debris was observed.

The spark plug electrodes exhibited gray coloration and worn normal condition. The #5 top spark plug was not observed. The #1 and #3 bottom spark plugs were impact destroyed.

Left Turbo System Remarks:

The turbocharger was partially separated from the engine and impact and fire damaged. The turbine/compressor wheel assembly was rotated freely by hand and no contact marks observed between the wheels and their respective housings. The differential and density controllers remained attached and were fire damaged. The manifold pressure relief valve was not observed. The exhaust by-pass was open. The valve mounting bracket was impact damaged. The valve was open and no damage to the by-pass valve controller was observed.

3.2 Right Engine

The right engine was laying upright about 3 feet behind the impact crater. The engine remained partially attached to the firewall through the tubular mount. The engine was fire damaged, and the engine cowling partially burned away. The exhaust system pipes were impact damaged. The induction air filter was fire destroyed. The rear mounted accessories were impact and fire damaged.

The engine crankshaft was rotated by turning the propeller and continuity of the crankshaft to the rear gears and to the valve train was confirmed. Compression and suction were observed from all six cylinders. The interiors of the cylinders were viewed using a lighted borescope and no anomalies noted.

The fuel injector servo remained attached to the engine and was fire damaged. The throttle control cable remained attached to the servo throttle control arms. The mixture control cable and servo mixture control arm were impact separated from the servo. The servo was partially disassembled and the rubber diaphragms observed heat damaged. No other damage was observed apart from thermal and impact damage. The servo fuel injection screen was absent of debris.

The fuel flow dividers remained attached to the engine end no damage was noted. The 2-piece fuel injector nozzles were unobstructed. The engine driven fuel pump remained attached to the engine and was discolored consistent with exposure to the post-impact fire. The pump drive assembly was rotated freely by hand. Oil was observed in the engine; The oil suction screen was absent of debris. The oil filter media was charred but no metallic debris was observed.

The spark plug electrodes exhibited gray coloration and worn normal condition. The #1 bottom spark plug was impact damaged. The #3 and #4 bottom spark plugs electrodes were oil soaked.

Right Turbo System Remarks:

The turbocharger was partially separated from the engine and impact and fire damaged. The turbine/compressor wheel assembly was rotated freely by hand. No

contact marks observed between the turbine wheels and its housing. The compressor wheel vanes were damaged consistent with ingestion of debris at impact. No excess play in the bearing on the shaft between the turbine and compressor wheels could be felt. The density controller was not observed. The differential controller was impact separated and fire damaged. The manifold pressure relief valve was impact fragmented. The exhaust by-pass was open. The valve mounting bracket was impact damaged. The valve was open and no damage to the by-pass valve controller was observed.

4.0 Propeller Examination

The blades were not in a feathered position. All blades were located at the scene and had markings consistent with high rotational energy. Spinners were still attached. Right side spinner sustained multiple impact damage. Blades that were not buried had substantial thermal damage.

Left Propeller

Four blade Hartzell "Q-Tip" propeller was attached to the engine crankshaft propeller flange. Multiple propeller striations were observed in the soil beside the engine impact crater. The propeller dome was partially separated from the hub. One propeller blade was separated from the hub and embedded in the soil in the impact crater.

Right Propeller

The four blade Hartzell "Q-Tip" propeller remained attached to the engine crankshaft propeller flange. The propeller was partially buried in the terrain. Propeller striations were visible in the terrain aft of the propeller. The propeller hub was fractured and almost completely separated from the crankshaft mounting flange. One propeller blade was displaced in the hub and bent aft which interfered with the cylinders when attempting to rotate the crankshaft. The blade was cut just beyond the hub to facilitate rotation of the crankshaft.

Submitted by:

Scott Johnson
Air Safety Investigator
National Transportation Safety Board