

NATIONAL TRANSPORTATIONS SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594

SUMMARY OF AIRCRAFT EXAMINATION

-- CEN22FA080 --

A. ACCIDENT

Location: Bloomington, Indiana
Date: December 17, 2021
Time: 2008 eastern standard time
Aircraft: Piper PA-32R-300 (s/n 32R-7780359), N5677V

B. PARTICIPANTS

Timothy Sorensen
Senior Aviation Accident Investigator
National Transportation Safety Board
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Piper Aircraft
Vero Beach, Florida

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C. ACCIDENT SUMMARY

On December 17, 2021, at 2008 eastern standard time, a Piper PA-32R-300 airplane, N5677V, was destroyed when it was involved in an accident near the Monroe County Airport (BMG), Bloomington, Indiana. The pilot fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

D. DETAILS OF AIRCRAFT EXAMINATION

A post-accident airframe examination was conducted under direct oversight of the NTSB investigator-in-charge at the accident site on December 18/19, 2021. Piper Aircraft provided technical support as a party to the investigation.

A post-recovery engine examination was conducted under direct oversight of the NTSB investigator-in-charge at AMF Aviation, Springfield, Tennessee, on March 30/31, 2022. Lycoming Engines provided technical support as a party to the investigation.

Summary of Aircraft Examination

E. DESCRIPTION OF ACCIDENT SITE

The accident site was located on a wooded hillside absent of ground lighting about 2 miles south of the BMG runway 35 approach threshold. The impact path from the initial tree strike to the main wreckage was about 250 feet long and oriented on an approximate 105° course.

The main wreckage consisted of the fuselage, engine, inboard portion of the left wing, and the left half of the stabilator. The outboard portion of the left wing, the right wing, the right half of the stabilator, the vertical stabilizer and rudder were separated from the fuselage, fragmented, and located within the debris path. This included all flight control surfaces.

F. SUMMARY OF AIRCRAFT EXAMINATION¹

Airframe – Piper PA-32R-300 (s/n 32R-7780359)

The airframe was fragmented. The fuselage came to rest upright. The fuselage structure including the cabin area was partially consumed by a post-impact fire. The cockpit instrumentation was destroyed. The cockpit flight control T-bar was fractured consistent with impact. The control wheels were consumed by the post-impact fire. The flap lever was in the stowed (flaps up) position. The flap supporting structure was consumed. The flap torque tube was observed against the stowed (flaps up) stops at the time of the exam. The cockpit fuel selector lever was positioned to the right tank. The fuel selector assembly was positioned to the left tank. Both sustained damage consistent with impact forces and the post-impact fire. The nose landing gear was partially extended and impact damaged.

The inboard left wing remained attached to the fuselage. The left-wing flap remained attached at the inboard hinge. The outboard portion of the left wing from near mid-span to the wing tip was separated. The wing sections exhibited discoloration consistent with post-impact fire exposure. The left-wing tip was separated. All were located within the debris path. The left main landing gear remained attached and was in the extended position. The left aileron was separated and located within the debris path. The aileron exhibited deformation consistent with the impact sequence. The aileron counterweight was separated and located within the debris path.

The right wing was separated at the root and fragmented. Leading edge crushing damage was consistent with tree impacts near the wing tip and mid-span. The inboard portion of the wing was discolored consistent with post-impact fire exposure. The inboard portion of the wing flap remained attached to the wing at the inboard hinge. The right main landing gear was separated and located within the debris path. The outboard portion of the flap was separated and located within the debris field. The right aileron was partially separated and located with the outboard wing section. The aileron counterweight was separated and located within the debris path.

The vertical stabilizer and rudder were fragmented and located within the debris field. The stabilizer spar remained attached to the aft fuselage. The lower rudder hinge and closure rib, bellcrank, and torque tube remained with the spar. The left half of the

¹ Directions related to accident site placement and component damage/deformation are with respect to an intact airframe unless otherwise noted.

Summary of Aircraft Examination

F. SUMMARY OF AIRCRAFT EXAMINATIONS *(continued)*

stabilizer remained attached to the aft fuselage. The right half of the stabilator was separated at the root and fragmented. The stabilator spar separation appeared consistent with overstress due to impact. The stabilator servo tab was separated and fragmented. The stabilator spar remained attached to the aft fuselage at the centerline hinge. The stabilator counterweight and counterweight mast remained securely attached.

Aileron control continuity was confirmed from the cockpit to the wing roots. The control cables exhibited multiple separations. Each separation was frayed consistent with overload separations. Stabilator control continuity was confirmed from the cockpit to the aft fuselage. The stabilator trim control rod was fractured near mid-span consistent with impact forces. The stabilator trim barrel exhibited about 3 exposed threads which was indicative of a slight nose-down trim setting. Rudder control continuity was confirmed from the cockpit rudder pedals to the control surface.

The engine-driven vacuum pump was separated and located within the debris field. The pump housing was intact. Disassembly of the pump was unremarkable. The vanes and rotor were intact. The airplane was also equipped with an electrically driven standby vacuum pump. The pump remained attached to the firewall mounting bracket and the drive motor. Disassembly of the pump was unremarkable. The vanes and rotor were intact.

Engine – Lycoming IO-540-K1G5D (s/n L-16485-48A)

The engine exhibited impact damage at cylinder nos. 1 and 2. Portions of the no. 1 cylinder head were fractured consistent with impact. Remaining cylinders appeared intact. All cylinders remained securely attached to the crankcase. The propeller flanged appeared intact. The engine was rotated via the crankshaft/propeller flange. Internal engine and accessory section continuity was confirmed. Suction and compression obtained at all cylinders. Intake/exhaust valve operation appeared normal at each cylinder. Borescope examination of each cylinder revealed normal combustion signatures. The pistons and valves appeared intact. No anomalies were noted.

All spark plugs appeared intact. Several plugs were oil wetted. The remaining plugs exhibited normal combustion signatures. Ignition harness damaged consistent with impact. The dual magneto appeared undamaged. The lower attachment flange was observed to be offset from the engine accessory housing. The magneto housing flange was intact and resting on top of the clamp. The lower clamp was not fully secured to the engine housing. The upper clamp was intact and secure. The magneto produced a spark at all leads when rotated with a cordless drill.

The fuel servo housing was fractured consistent with impact forces and separated from the engine. It was retained by the mixture cable and fuel line. The throttle cable was separated at the rod end consistent with impact. The butterfly valve was intact. The throttle control arm was bent but otherwise intact. The valve was free to rotate; although, the range of motion was restricted due to the damage. The servo fuel screen was intact and free of debris or sediment. A small amount of fluid consistent with 100LL fuel was present. The servo diaphragms appeared undamaged.

The fuel distributor valve appeared intact. The fuel injector lines appeared secure. Examination of the valve revealed no anomalies. The diaphragm was intact. Fuel

Summary of Aircraft Examination

F. SUMMARY OF AIRCRAFT EXAMINATIONS *(concluded)*

injectors appeared intact. Minor debris was observed in one injector nozzle. (Contamination was possible during impact sequence or recovery handling.)

The engine driven fuel pump remained secured to the engine and appeared intact. Movement of the input drive produced suction and pressure at the pump inlet and outlet, respectively. The pump cavity exhibited minor corrosion.

The oil filter remained secured to the engine. It exhibited minor denting but was otherwise intact. The filter element was intact and free of debris. The engine oil screen was intact and unobstructed. Minor debris was present.

Intake ducting remained securely attached to the cylinders and to the air box. The intake air filter assembly and corresponding ducting was separated consistent with impact. Exhaust ducting exhibited minor deformation consistent with impact. The muffler assembly appeared intact. Borescope examination revealed that the muffler baffles were secure, and the exhaust appeared to be unobstructed.

The propeller governor was separated at the base consistent with impact forces. The gasket/screen remained with the engine and appeared intact. The gasket was contaminated with dirt as exposed during the impact sequence.

Propeller – McCauley B3D36C427/82NGA-2 (s/n 961454)

The propeller hub was fractured consistent with tree and terrain impacts. The fracture surfaces exhibited a dull, rough appearance consistent with overstress separation. A portion of the hub remained secured to the engine propeller flange.

Two propeller blades were separated from the hub and recovered within the debris field. Both blades exhibited deformation and scuffing consistent with impact forces. Both blades exhibited separation of the blade tips. One tip was recovered from the debris field. The second tip was not located. The fracture surfaces appeared consistent with overstress separations. The third propeller blade was not recovered.

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