

National Transportation Safety Board

Office of Aviation Safety

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WRECKAGE EXAMINATION

October 30, 2024

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A. ACCIDENT

Location: Vienna Center, Ohio
Date: July 19, 2024
Time: 1904 EDT
2304 UTC
Airplane: N23553; Beech B-60

B. WRECKAGE EXAMINATION

Investigation Team:

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C. SUMMARY

On July 19, 2024, about 1904 eastern daylight time, a Beech B-60 airplane, N23553, was destroyed when it was involved in an accident near Vienna Center, Ohio. The private pilot and two passengers 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

The airplane crashed in a flat, grassy field, about ¼ nm west of the departure end of runway 32 at Youngstown/Warren Regional Airport (YNG). Accident site coordinates (GPS) were 41.2732, -80.69714.

Accident site elevation was 1,093 ft. The majority of the wreckage was consumed in a postaccident fire.

The magnetic heading of the aircraft wreckage was 310°.

Ground imprints were consistent with the aircraft at an upright attitude and right wing low at impact.

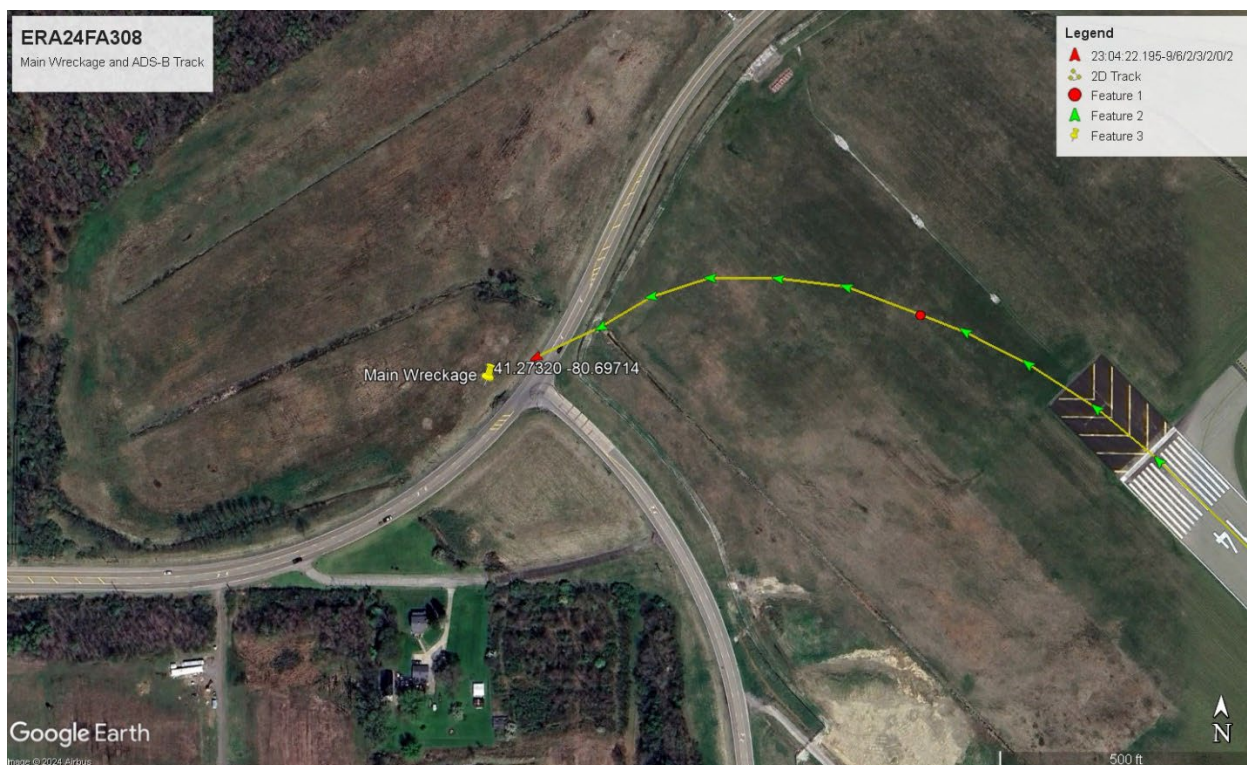


Figure 1 – Flight Path and Accident Site

2.0 Airframe Examination

The wreckage was examined and documented at the accident site on July 20, 2024. A follow-up examination at AMF Aviation LLC, Springfield, Tennessee was performed on October 29-30, 2024.

2.1 Fuselage

A majority of the top section of the cockpit, cabin, baggage compartment, and empennage was consumed by the postimpact fire with the exception of the rudder, which was separated and found approximately two feet south of the thermally-damaged ground silhouette of the empennage (outside the burn area).

All primary flight control surfaces (elevators, ailerons, and rudder) with their appropriate trim tabs and flaps were accounted for at the wreckage site. Continuity of all primary flight control cables was confirmed from the cockpit to their respective flight control surfaces.

2.2 Empennage

The elevator trim actuator extension was measured and found to be approximately 4.5 inches, which corresponded to approximately 8° trim tab trailing edge down. The rudder trim actuator extension was measured and found to be approximately 3.3125 inches, which corresponded to approximately 0°/neutral trim tab position.

2.3 Wings

The left-wing attachment points remained attached to the fuselage. The majority of the left wing was consumed by the postimpact fire. The left wing STC-installed winglet was partially separated from the wing and was found folded over the top of the wing. The left engine with attached propeller remained in its proper position with the wing but the engine attachment points were thermally separated. The left engine cowling remained attached and exhibited heat and thermal damage. A majority of the left aileron and flap were consumed by the postimpact fire.

The right-wing attachment points remained attached to the fuselage. The majority of the right wing between the fuselage and engine was consumed by the postimpact fire. The right engine and attached propeller remained in its proper position with the wing. The right engine cowling remained attached but exhibited heat damage. The top and bottom engine attachment points all remained intact and attached. The right wing STC-installed winglet was found separated from the wing and found in the debris field behind the wing about five ft. The STC winglet exhibited heat and thermal damage. From approximately wing station 148.875 inches to 191.00 inches/STC-installed separated winglet was an aft diagonal buckle from the wing front spar to the wing aft spar. The wing in this area was buckled upward and aft. The right aileron remained attached to the wing. The aileron exhibited thermal damage on the top skin. The right flap remained attached to the wing via the outboard wing attachment point. The inboard flap attachment point was thermally separated. The flap exhibited thermal damage on the top skin.

The aileron trim actuator extension was measured and found to be approximately 1.3125 inches, which corresponded to approximately 5° trim tab trailing edge down.

The majority of the left and right flap actuator housings were consumed by the postimpact fire. After reviewing onsite photographs of the accident flap actuators, applicable illustrated parts catalog, flap actuator measurements, and drawings, the flap actuators were found in a fully extended (down) position.

2.4 Landing Gear

The physical positions of the retractable landing gear were not determined. The landing gear actuator positions were in the extended positions (nose, left main, and right main). The landing gear selector was in the extended position. The auxiliary landing gear handle was stowed.

2.5 Cockpit

The environmental system controls, pressurization system controls, icing system, and ELT all exhibited thermal damage.

The instrument panel exhibited thermal and heat damage.

Debris from the top cockpit structure was found melted on top the throttle quadrant.

The altimeter setting was found at 30.12 inHg. No other cockpit instruments were readable due to thermal damage.

2.6 Survivability

The accident was not survivable.

There was evidence that both cockpit seats and seat #6 (right seat, row 3) were occupied at the time of the accident. The restraints were thermally destroyed. The type of restraint was not determined.

All seat bases and backs were partially intact. The feet and rails of all seats were intact.

The ELT was thermally damaged and no identifying information was obtained.

2.7 Fuel/Fuel System

The wing fuel tanks were thermally damaged. The right-wing fuel tanks were either thermally damaged, heat damaged, or breeched. The left and right fuel selector valve was a three-position valve: OFF, MAIN, CROSSFEED. The left and right fuel selector valves top plates were removed to verify their position, and both were found in the main tank position. The left and right fuel strainer screens were clean.

3.0 Engine Examination

Left engine observations (Lycoming TIO-541-E1C4, S/N RL-1598-59):

All major components and accessories were still attached to the engine. The oil sump was found fractured and no oil was present within the engine at the time of the exam. The exhaust system showed signs of impact damage in the forms of bends and crushing. The engine remained attached to the engine mount and firewall and had to be cut from the engine mount for examination. The rear of the engine sustained varying degrees of thermal damage and was covered in soot and ash. The ignition harness for each magneto sustained impact damage in the form of cuts and abrasions and could not be tested.

The top spark plugs were all found tightly installed to each cylinder and removed for examination. A lighted borescope inspection was done on each cylinder and was unremarkable on all cylinders except cylinder no. 4. The piston face of cylinder no. 4 showed signs of detonation with an approximate 1-inch diameter deformation of material along with a missing section along the edge at the 8 o'clock position where material had been eroded and melted away.

The engine driven fuel pump was found securely installed to the rear of the engine and removed. Rotation was attempted by turning the drive shaft of the pump but not achieved. The pump showed signs of exposure to high heat and was soot covered.

Both magnetos were found tightly installed to the rear of the engine and were removed. Both magnetos were rotated by hand and produced spark at all points.

Engine rotation was attempted by rotating the engine's propellor by hand. Thumb compression was achieved on all cylinders except cylinder no. 4 through many rotations of the engine. Cylinder no. 4 was removed and detonation signatures were confirmed to the piston face. Continuity was confirmed throughout the engine to the valve train and accessory section of the engine.

The oil filter was found tightly installed to the rear of the engine and removed. The filter was cut open and the filter element inspected. The filter was found to have a large amount of metallic debris that mostly non-ferrous in nature. No suction screen was located with the engine and wreckage.

The propeller governor was found tightly installed to the engine and removed for examination. The screen was present and found to have some metallic debris present along with metal debris flowing out of the oil passageway on removal. The governor rotated freely by hand with no noted issues.

The fuel servo was found securely installed to the top of the engine with all lines tight and secure. Fuel was present upon removal of various lines to the servo and injectors. The fuel inlet screen was present within the servo and found contaminated with a sand-like substance both in the screen and within the screen port of the servo body. Light from a high lumen flashlight would not pass through the filter screen mesh after debris was removed from inside the screen. The brass plug on the diaphragm side of the servo was stamped with a "G" showing compliance with AD 2009-02-03. The diaphragms were removed and found to be free of any tears or damage. The fuel side diaphragm and servo body was found to have a small amount of the same sand like substance that was found within the fuel inlet screen.

All 12 spark plugs were removed, photo documented, and found to have varying coloration patterns when compared to a Champion Check-A-Plug chart. The top and bottom plugs for cylinder no. 4 showed melted material present. The top and bottom plugs for cylinder no. 5 both showed a black, sooty, rich condition while all other plugs were of normal coloration and wear patterns.

Right engine observations (Lycoming TIO-541-E1C4, S/N RL-1013-59):

All major components and accessories were still attached to the engine. The oil sump was found fractured and no oil was present within the engine at the time of the exam. The exhaust system showed signs of impact damage in the forms of bends and crushing. The engine remained attached to the engine mount and firewall and engine cowl sections and had to be cut from the engine mount for examination. The rear of the engine sustained varying degrees of thermal damage and was covered in soot and ash. The ignition harness for each magneto suffered impact damage and high thermal damage and could not be tested.

The top spark plugs were all found tightly installed to each cylinder and removed for examination. A lighted borescope inspection was conducted on each cylinder and was unremarkable. Exhaust valve on cylinder no. 2 showed a coloration consistent with high heat common with lean engine operation.

The engine-driven fuel pump was found securely installed to the rear of the engine and but was not removed.

Both magnetos were found tightly installed to the rear of the engine and were removed. Each magneto was rotated by hand, but spark was not produced at any of the leads. Both magnetos were exposed to high heat and showed signs of thermal damage.

Engine rotation was attempted by rotating the engines propellor by hand. Thumb compression was achieved on all cylinders with no noted issues.

The oil filter was found tightly installed to the rear of the engine and removed. The filter can was covered in soot and missing paint from thermal damage, but an oil change date of 7/2/2024 and hours of 1168.2 was legible. The filter was cut open and the filter was found thermally damaged, burned, and too brittle to examine. No suction screen was located with the engine and wreckage.

The propeller governor was found tightly installed to the engine but not removed or examined.

The fuel servo was found securely installed to the top of the engine with all lines tight and secure. Fuel was present upon removal of various lines to the servo and injectors. The fuel inlet screen was present within the servo and found compacted with a sand-like substance both in the screen and the fitting inlet. A small hole or passageway through the hard substance was present within the screen. The substance was removed, photo documented and retained by the NTSB for lab investigation. The brass plug on the diaphragm side of the servo did not show a "G" stamp showing compliance with AD 2009-02-03. The diaphragms were removed and found to be free of any tears, damage, or debris.

All 12 spark plugs were removed, photo documented, and compared to a Champion Check-A-Plug chart. Plugs showed a normal wear pattern with a light coloration pattern consistent with lean engine operation.

4.0 Propeller Examination

The left and right Hartzell constant speed, full feathering, three-bladed propellers remained attached to their respective engine.

Left Propeller (Hartzell HC-F3YR-2UF S/N DA1195):

The left propeller remained attached to the crankshaft flange with all three blades found in the feathered position. The propeller exhibited heat damage. None of the three blades exhibited any chordwise scratching and all three blades remained attached to the hub. The blade numbers could not be

identified, so the blades were arbitrarily identified as "1", "2", and "3" for investigative purposes.

The #1 blade exhibited an "S" bend with no twisting. From mid-blade to the tip on the camber side exhibited heat damage. The non-camber side was covered in black soot. The no. 2 blade was bent at about 7 inches from the root toward the non-camber side. Black soot was on both sides of the blade. A gouge mark was found at 9 inches from the tip on the trailing edge. The no. 3 blade exhibited black soot on both sides. It had a slight bend toward the camber side at about 14 inches from the hub.

Right Propeller (Hartzell HC-F3YR-2UF S/N DA1200):

The right propeller remained attached to the crankshaft flange with all three blades found in the feathered position. No heat damage was observed on any part of the propeller. The blade numbers could not be identified, so the blades were arbitrarily identified as "A", "B", and "C" for investigative purposes.

Blade "A" separated at mid-span and the outer portion of the separated blade could not be located at the accident site. The blade exhibited leading edge polishing. Chordwise scratches were observed on the non-camber side. About 7 inches from the hub the blade curled toward the camber side with a slight twist at the separation location. Blade "B" was bent at about 5 inches from the root toward the camber side. The tip of the blade was missing, and it exhibited a twist at about 19 inches from the root toward the non-camber side. Blade "C" was bent and twisted toward the non-camber side at about 12 inches from the root. A portion of the leading-edge tip had separated and chordwise scratches were observed on the non-camber side at the tip. About 3 inches from the tip the tip curled toward the camber side.

Submitted by:

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