

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23LA363

AIRFRAME AND ENGINE EXAMINATION

N1WN, Beech A36

A. ACCIDENT DETAILS

Location: Frankfort, KY
Date: September 4, 2023
Time: 1031 EDT
1431 GMT
Airplane: N1WN, Beech A36

B. EXAMINATION PARTICIPANTS

Investigator In Charge	Lynn Spencer NTSB/AS-ERA Washington, DC
FAA	Alex Whittington Federal Aviation Administration/FSDO Louisville, KY
FAA	Gary Austin Federal Aviation Administration/FSDO Louisville, KY
FAA	Stephen Travis Federal Aviation Administration/FSDO Louisville, KY
Group Member	Casey Love Textron Aviation Wichita, KS
Group Member	Chuck Cook Continental Aerospace Mobile, AL

C. SUMMARY

On September 4, 2023, about 1031 eastern daylight time, a Beech BE36, N1WN, was substantially damaged when it was involved in an accident near Frankfort, Kentucky. The pilot and three passengers were not injured. The flight was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

Examination of the airframe and engine revealed no preimpact mechanical malfunctions or failures that would have precluded normal operation of the airplane. The engine was started and operated on both magnetos, then the left and right magnetos, with no anomalies noted other than a vibration.

D. AIRFRAME EXAMINATION

The airplane was a low-wing, retractable landing gear equipped airplane. Its fuselage was an all-metal construction, seating four people: two front seats with dual flight controls and two in aft facing rear seats. An airframe layout and examination took place on September 22, 2023, at Flight Fixins in Frankfort, Kentucky. Mechanic Jeff Anderson of Flight Fixins assisted with the examination.

Airframe

The fuselage and empennage remained intact, the wings remained attached, and the engine remained attached at its mounts. The fuselage sustained lateral scraping and gouging along the belly skin and landing gear doors. The left wing sustained upward bending and upper skin wrinkles consistent with compression damage. The engine mount structure was bent upward approximately 3°. The belly skin aft of the firewall exhibited wrinkling. The aft fuselage structure aft of the baggage compartment sustained bending and skin wrinkles. The vertical stabilizer with rudder attached was undamaged. The horizontal stabilizer and elevators were undamaged.

The left wing, with aileron and flap attached, remained attached to the fuselage at the wing root. The left wing was crinkled and buckled consistent with ground contact. The right wing with aileron and flap attached was undamaged.

Oil level was checked and observed at 12 quarts.

Flight Control System

Flight control movement was observed with corresponding cockpit control input. The pilot did not report any control anomalies during the emergency landing. All flight controls were "free and correct."

Cockpit Controls

The avionics had been removed from the airplane at recovery. The instrument panel was undamaged. Controls were as follows:

Throttle - Idle

Propeller - Centered, about 2500 rpm setting

Mixture - Centered

Fuel selector - OFF

Fuel Boost Pump - OFF

Master switch - OFF

Flaps - Retracted

Elevator Trim - Neutral

Rudder Trim - Neutral

Aileron Trim - Left

Hobbs meter - 1189.9

Landing Gear

All landing gear remained attached at all attachment points. The aircraft landed gear up. The pilot reportedly did so intentionally. Upon examination, the landing gear had been extended manually and locked into place during recovery.

Airframe Fuel System

The fuel strainer screen and fuel strainer bowl were free from debris. The left wing tank gauge showed $\frac{1}{2}$ full, and the right tank gauge showed $\frac{3}{4}$ full. Both wing fuel tanks were intact with fuel tank caps seated in place. Both wing tanks contained fuel. About 50 gallons of fuel was drained from the tanks (left tank, 33 gallons; right tank, 17 gallons) using the electric boost pump. The fuel was tested with water finding paste and was free from contamination.

All fuel screens were free of obstructions. The fuel bladders were free of debris or obstructions. The fuel vent system was examined. It was determined that the right inboard vent tube leading to the NACA scoop was entirely obstructed, by what appeared to be a mud dauber nest, at the wye near the scoop opening. Air was passed through the remainder of the inboard and outboard vent system with no restriction to air flow noted. The left fuel vent system was partially obstructed in the same location by what also appeared to be an insect or nest. The outboard portion of the left fuel vent system was not obstructed. Fuel samples were taken from each sump, no water was detected. The fuel selector was cycled between left and right while the boost pump was being used to empty the fuel tanks and operated normally. For examination and fuel vent observation purposes, during operation of the boost pump to remove fuel from the right wing, masking tape was placed over the outboard vent system and a plastic cap was used to block the unrestricted portion of the inboard vent system. This created a vacuum on the fuel bladder causing it to slightly deform but did not appear to restrict the flow of fuel from the boost pump. The tape over the outboard

portion of the vent system was removed after approximately 20 gallons of fuel had been removed. The fuel continued to be pumped at what appeared to be the same rate and the vacuum was broken on the fuel bladder. The bladder partly regained its shape.

Other Systems

The emergency locator transmitter (ELT) was attached at its mount, ARMED position, and attached to the ELT antenna.

E. AIRFRAME EXAMINATION PHOTOS



Photo 1 - View of aircraft from front before examination.



Photo 2 - View of aircraft from left before examination.



Photo 3 - View of aircraft from left rear before examination.



Photo 4 - View of empennage from left before examination.



Photo 5 - View of empennage from right before examination.



Photo 6 - View of aircraft from right side before examination.



Photo 7- Throttle quadrant before examination.



Photo 8 - Fuel selector in OFF position prior to examination.

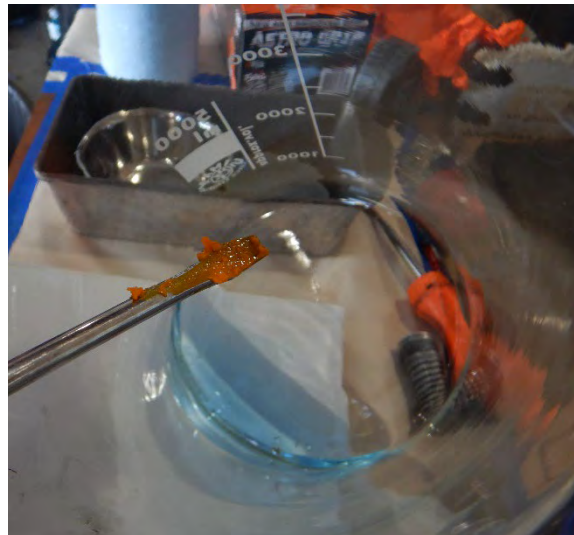


Photo 9 - Fuel was free from water contamination when tested.



Photo 10 - Fuel strainer screen free of debris.

F. ENGINE EXAMINATION AND PHOTOS

The engine as first viewed had the cowling opened, the rocker covers removed, and spark plugs removed. The impact damaged propeller had been replaced with a serviceable one by a mechanic hired to assist with the examination. All the digital avionics had been removed and stored to prevent theft. The aircraft was positioned on the ramp and the engine was started using the aircraft's battery, which had retained its charge since the accident. The alternator produced 24 volts. The engine idled at 700 RMP. The crankshaft was slightly bent and produced vibration, so the engine was not operated above idle.

All spark plugs showed normal wear when compared to a Champion Aerospace Aviation Check-A-Plug chart. The lower spark plugs were reinstalled. Borescope examination of the cylinders revealed no anomalies. Thumb compression was achieved on all cylinders when the propeller was rotated by hand. The fuel strainer was removed from the accessory case and contained a small amount of fuel. The oil pan was intact, and the oil filler cap was seated and showed 11 quarts of fuel.

The ignition key was not present for the examination; therefore, the ignition switch was jumped, and the engine started normally. The right magneto was disconnected, and the engine was started on the left magneto only and ran normally. The right magneto was reconnected, and the left magneto was disconnected, and the engine was started on the right magneto only and ran normally.

The fuel return check valve was installed or oriented correctly, and air was passed through the fuel return check valve. The fuel line to the engine driven fuel pump was removed, and when the fuel boost pump was engaged, fuel flow of 24.2 gph was observed. The fuel selector was moved between the left and right fuel tanks, and fuel flow was not reduced. The left fuel tank was drained of fuel.



Photo 11 - Engine upon first view before examination.



Photo 12 - Spark plugs showing normal wear.



Photo 13 - No. 1 cylinder piston face.



Photo 14 - No. 1 cylinder exhaust valve.



Photo 15 - No. 3 cylinder piston face.



Photo 16 - No. 3 cylinder exhaust and intake valves.



Photo 17 - No. 5 cylinder piston face.



Photo 18 - No. 5 cylinder exhaust and intake valves.



Photo 19 - Cylinder No. 2 piston face.



Photo 20 - Cylinder No. 2 exhaust and intake valves.



Photo 21 - Cylinder No. 4 piston face.



Photo 22 - Cylinder No. 4 exhaust valve.



Photo 23 - Cylinder No. 4 intake valve.



Photo 24 - Cylinder No. 6 piston face.



Photo 25 - Cylinder No. 6 exhaust and intake valves.

G. PROPELLER EXAMINATION AND PHOTOS

The impact damaged propeller had been replaced with a serviceable one by a mechanic on the field the NTSB hired to assist. The accident propeller blade tips all exhibited similar aft curling, gouging, and chordwise scoring.



Photo 26 - Propeller with tip curling and chordwise abrasion on all blades.

Submitted by:

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