

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA139

WRECKAGE EXAMINATION

October 21, 2024

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A. ACCIDENT

Location: Front Royal, VA
Date: March 12, 2024
Time: 1902 Eastern
Airplane: N59MK, Beech K35

B. WRECKAGE EXAMINATION

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C. SUMMARY

On March 12, 2024, about 1902 eastern standard time, a Beech K35, N59MK, was substantially damaged when it was involved in an accident near Front Royal, VA. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 aerial observation flight.

The airplane departed from Shannon Airport (EZF), Fredericksburg, VA at 13:01 for a survey flight. The pilot reported that propeller control was unresponsive when attempting to reduce RPM while approaching the survey area. However, the propeller control began to respond just prior to entering the intended survey area, so the pilot continued the flight. While conducting the survey work, the pilot noted that the No. 3 cylinder exhaust gas temperature was lower than normal, the pilot became uncomfortable and elected to pause the survey work and climb. At 6,300ft MSL, the pilot adjusted the propeller control to reduce RPM but there was no response. Shortly after, the RPM spiked followed by a loss of engine power. The pilot reviewed the emergency checklist and pitched for best glide. While heading towards Front Royal airport, the pilot began preparing for a forced landing and picked a field to his left. The airplane contacted trees on the edge of the field before coming to rest upright. The pilot was uninjured.

Post accident examination revealed that both wings sheared at approximately mid-span and the fuselage was wrinkled aft of the cabin, resulting in substantial damage.

The engine was test ran while installed on the airplane. The engine reached full RPM, and the propeller governor responded to control inputs.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

As first viewed, the airplane was positioned on stands with both wings removed about 1 foot from the root. The wings were placed on the floor with the landing gear folded. The engine and propeller remained attached to the fuselage. The propeller blades displayed minimal rotational signatures and both blades were partially bent aft.



Wreckage Layout Overview

1.1 Fuselage

The airplane fuselage sustained substantial damage and wrinkling aft of the rear windows on the left and right sides, and on the belly. The lower cowling was dented and sustained abrasions.



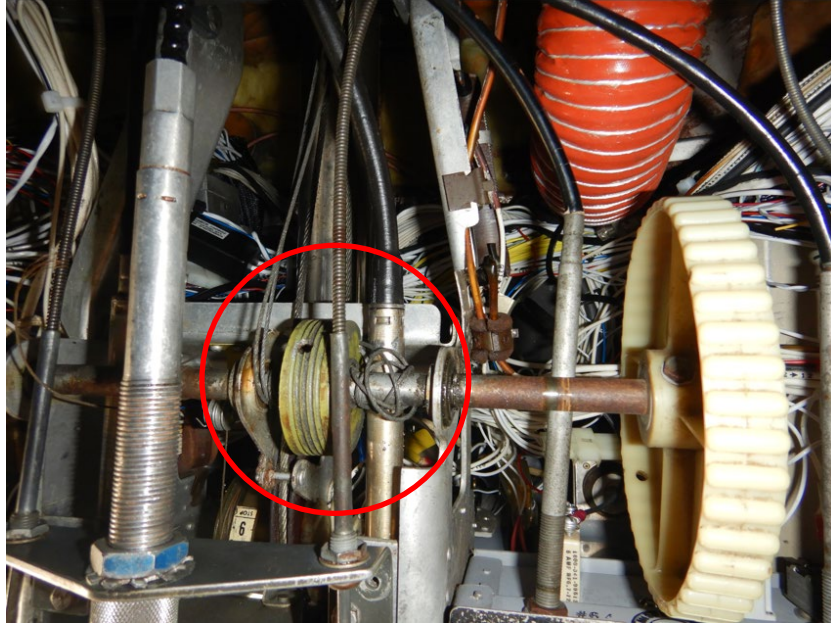
Wrinkling to the Fuselage

1.2 Empennage

The empennage remained undamaged. Continuity from the rudder and elevator controls was established with no binding noted. The elevator trim did not actuate, and further examination revealed that the control cable was cut and bound. The pilot reported that the elevator trim was working as expected during the accident flight.



View of the Empennage



Broken and Bound Elevator Control Cable (Courtesy of Textron Aviation)

1.3 Wings

Both wings were fracture separated near the flap-aileron intersection. Each fracture was common to a tree impact signature on the wing leading edge. The wings were cut off by recovery personnel approximately one foot outboard of the wing root. Flight control continuity was established from the cockpit to the ailerons. The flaps were observed in the fully retracted.



Damage to the Wings (Courtesy of Textron Aviation)

1.4 Landing Gear

The tricycle style retractable landing gear were found in the up position. The gear selector was in the extended position with the landing gear circuit breaker pulled. The gear selector and the gear breaker were moved by the recovery company.



Stowed Main Landing Gear



Gear Position Indicator (Courtesy of Textron Aviation)



Pulled Landing Gear Breaker (Courtesy of Textron Aviation)

1.5 Cockpit

The cockpit was equipped with a combination of electronic navigational and engine instrumentation and traditional steam gauges. The instrumentation remained installed and undamaged. A single control yoke was installed with the right-side rudder pedals stowed. As first viewed, the master, alternator, and light switches were in the "off" position. The keys were removed. The throttle control was in the idle position and the mixture and propeller controls were full forward. The auxiliary fuel pump switch was in the off position. The landing gear knob was in the "down" position. All the circuit breaks in the cockpit were pushed in, with the exception of the landing gear breaker which was pulled. The fuel selector was in the off position. The tip tank transfer pump switches were in the off position.

Control continuity of the propeller, throttle, and mixture cables was established with no binding noted. All electronic instrumentation illuminated and appeared functional when the master switch was turned on. The engine data monitor (EDM) was retained.



Cockpit



Fuel Selector (Courtesy of Textron Aviation)

1.6 Survivability

The pilot did not receive any injuries during the accident. The pilot's seat was equipped with a 3-point safety belt that the pilot was utilizing. The airplane was equipped with an ACK, E-04 ELT that did activate during the accident.



Pilots Seat

1.7 Fuel/Fuel System

The aircraft was equipped with two, 25-gallon bladder type main fuel tanks, one per wing, with three gallons of unusable fuel each, and two 20-gallon bladder type auxiliary fuel tanks, one per wing, with one gallon of unusable fuel each. The aircraft was also equipped with STC installed D'Shannon fiberglass wing tip tanks.



Left Tip Tank



Right Tip Tank

The main and auxiliary fuel tanks did not appear to be breached upon impact. The STC installed tip tanks remained attached to the wings but were both ruptured. The wing main tanks were cut adjacent to wing skin cuts made by wreckage recovery personnel to facilitate transportation. Portions of the wing fuel vent plumbing was also cut into sections adjacent to wing recovery cuts. The wing vent plumbing for each main and bladder tank was examined and found to be free from blockage. The right-wing siphon-break plumbing was partly obstructed by dirt near the wing port. The STC installed tip tank vent plumbing was free from obstructions.

The fuel supply lines from each auxiliary fuel tank to the fuel selector were cut adjacent to wing recovery cuts. The fuel supply plumbing was examined, and found to be free from obstructions, by passing air through both the main wing and auxiliary bladder tank plumbing, the fuel selector, and out the fuel strainer outlet. The STC installed wing tip tank plumbing was examined and found to be free from obstructions. The aircraft battery was connected, and the auxiliary fuel pump was satisfactorily tested. The STC installed fuel transfer pumps and solenoid valves were connected to a 12-volt aircraft battery and satisfactorily tested. The fuel strainer and fuel strainer bowl were clean.



Fuel Lines and Vents on Left Side (Courtesy of Textron Aviation)



Unobstructed Airframe Fuel Filter (Courtesy of Textron Aviation)

The engine driven fuel pump was removed and examined with no discrepancies noted. The geared fuel pump was re-installed to facilitate engine testing. An external fuel tank was utilized to supply fuel through the left-wing auxiliary fuel tank plumbing via the airframe boost pump and the fuel selector in the AUX position for the engine test run.

2.0 Engine Examination

The engine is a Continental IO-470-C, serial number 87559-1-C-R, rated for 250HP at 2600RPM according to the data plate. According to maintenance records, the engine was recently field overhauled. The engine appeared to be undamaged, and a engine test run was attempted. The top spark plugs were removed, and the coloration was consistent with normal engine operation. The oil filter was cut open with no debris noted. The oil sump held about 9 quarts of clean engine oil when the oil level gauge was checked. The cylinders were examined with a lighted borescope and no discrepancies were observed. The engine rotated 720° when force was applied to the propeller. Continuity of the crankshaft to the camshaft was established and thumb compressions were observed on all cylinders.



View of the Right Side of the Engine



View of the Left Side of the Engine



Clean Oil Filter Element

3.0 Propeller Examination

The two-bladed aluminum Beech propeller remained installed on the crankshaft and displayed minimal rotational signatures. Both blades were bent aft at their respective midpoints. A servicing sticker on the blades showed the last inspection date on July 6, 2023. The propeller blades were cut during the examination with a bandsaw and straightened to facilitate the engine test run.

The Woodward propeller governor, A210680, serial number 1451224, remained attached to the front of the engine and was undamaged. Control continuity from the governor to the cockpit was established. The propeller governor was removed prior to the engine test run and the gasket screen was unobstructed. The propeller governor pumped oil when the drive was rotated by hand. The governor was reinstalled to facilitate the engine test run. The propeller governor was retained for further testing.



Propeller Governor as Installed



Unobstructed Propeller Governor Gasket



Damage to Propeller (Courtesy of Textron Aviation)

4.0 Pilot Information

The pilot holds a commercial certificate with rating for single engine-land and multiengine-land. At the time of the accident, he had accumulated 926 hours of total time with 640 hours in this make and model airplane. The pilot was not injured during the accident.

The pilot stated that previously in the flight, the propeller control would not respond to bring down the engine RPM's. However, the propeller began to respond, and the pilot elected to continue the flight. After several hours of flying, the pilot noticed that the #3-cylinder EGT was lower than expected and the pilot became uncomfortable with the engine. The pilot climbed to 6300ft. Once at altitude, the pilot stated that the RPM's "spiked" and the propeller control would not respond. Shortly after, the engine began to lose power, and the pilot attempted to reach a nearby airfield but ultimately made a forced landing in a field.

5.0 Aircraft Information

The airplane is a Beechcraft K35, serial number D-6152, manufactured in 1959. As first viewed, the airplane had both wings removed about 1 foot from their respective roots. The wings were substantially damaged as a result of the accident sequence. The engine remained attached to the airframe firewall and the propeller remained attached to the engine crankshaft flange. The empennage appeared undamaged. The fuselage was wrinkled aft of the baggage compartment.

6.0 Engine Test Run

The engine was test ran while installed on the airplane. The propeller blades were cut to facilitate the test run. The engine started and reached 2500RPM. The airplane's throttle, mixture, and propeller controls were utilized during the test run

with no discrepancies noted. The propeller lever controlled the engine RPM when inputs were applied. The engine ran for 5 minutes before testing was concluded.

Submitted by:
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