

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA076

ENGINE EXAMINATION

N571CJ, B206L-1

A. ACCIDENT DETAILS

Location: Walland, TN
Date: December 28, 2023
Time: 1340 EST
1840 UTC
Aircraft: N571CJ, B206L-1

B. EXAMINATION PARTICIPANTS

Investigator In Charge	Lynn Spencer NTSB/AS-ERA Washington, DC
FAA	Stephen Travis Federal Aviation Administration/FSDO Louisville, KY
FAA	Louis Wiseheart Federal Aviation Administration/FSDO Louisville, KY
FAA	Benjamin Vost Federal Aviation Administration/FSDO Louisville, KY
Group Member	David Riser Rolls Royce Engines Indianapolis, IN

C. SUMMARY

On December 28, 2023, about 1340 eastern standard time, a Bell 206L-1 helicopter, N571CJ, was substantially damaged when it was involved in an accident near Walland, Tennessee. The pilot and five passengers were not injured. The helicopter was operated by Whirl'd Helicopters, Inc. doing business as Scenic Helicopter Tours as a Title 14 *Code of Federal Regulations* Part 91 aerial observation flight.

The pilot reported the illumination of the engine chip light on his instrument panel and, soon after, the engine oil temperature and pressure indicated zero and the engine stopped producing power. He performed an autorotation to a field.

The examination took place at Thoroughbred Aviation in Lexington, Kentucky, on January 30, 2024, under the oversight of the Investigator-In-Charge. Borescope examination of the stage four turbine wheel through the exhaust collector support revealed the absence of much of the wheel shroud. Additionally, rotation of the N1 drivetrain resulted in N2 drivetrain rotation.

D. MAINTENANCE LOGBOOK REVIEW

The most recent airframe annual inspection was completed on September 1, 2023, at Hobbs time 2,742.7 hours, aircraft total time of 24,001.7 hours and engine total time of 13,378.7 hours. The most recent 100/300-hr engine inspection was completed at that time, at 8,565 engine cycles.

E. ENGINE EXAMINATION

The helicopter was equipped with a Rolls Royce M250-C28B, SN CAE860608. The Hobbs time was 2,800.2 hours at the time of examination.

The helicopter was positioned upright in its normal position on its skids. The fuselage exhibited no visible damage however the aft portion of the fuselage displayed oil streaking on both the right and left sides extending from below the engine bay area aft. The tail boom and main rotor had been removed for transport.



Photo 1 - Front view of helicopter before examination.



Photo 2 - Side view of helicopter before examination.

The engine to airframe oil tank lines were found secure with no evidence of leakage. During the engine removal, residual oil was observed in the supply line from the oil tank to the engine. The return line was void of oil. The engine oil tank contained less than half a tank of oil. 16 ounces of oil was drained from the accessory gear box.



Photo 3 - View of engine and oil supply lines from engine to airframe oil tank.



Photo 4 - View of engine oil tank.

Application of battery power revealed all master caution panel lights to be operational. Additionally, the TOT gauge over temp light was illuminated.

An exterior examination of the engine revealed the engine to have remained in position within the engine bay with all three mounts appearing intact. All engine oil, fuel and pneumatic lines were found secure with all "B" nuts at least hand tight and with no evidence of leakage. Engine control continuity was confirmed from the throttle to the fuel control unit. The power turbine governor remained in position and the governor arm was free from stop to stop.

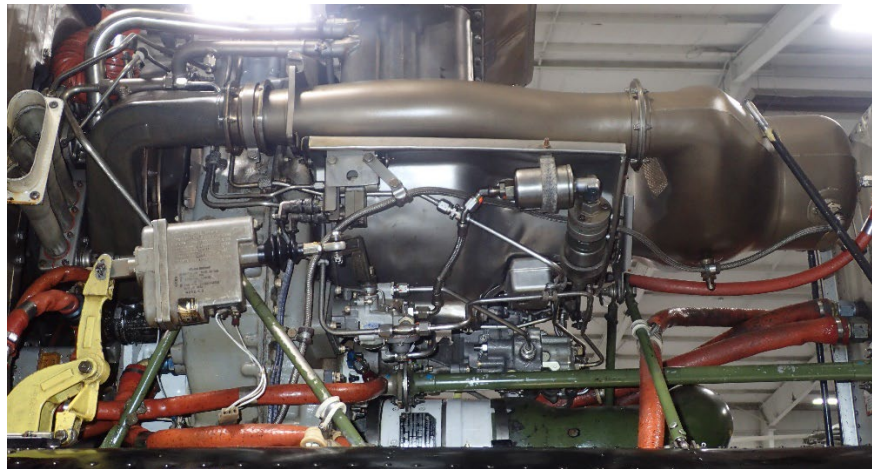


Photo 5 - Engine before examination.

The fuel nozzle was visually normal with fuel noted at the fuel line. The fuel pump was in position and visually normal. The compressor remained in position and exhibited no external damage. Visible portions of the impeller blades revealed no damage however light oil and dirt adhesion was noted in and around the inlet. The accessory gear box remained in position and displayed no visible exterior damage. The exhaust collector support displayed no visible damage however was soot coated.

Examination of the N1 and N2 drive trains revealed that during manual rotation of either the N1 or N2 drive trains at their respective pads would result in movement and rotation of the opposite drive train as well. Both the N1 and N2 drive trains exhibited light to moderate drag during rotation. The turbine module remained in position and displayed no visible exterior damaged. Borescope examination of the stage four turbine wheel through the exhaust collector support revealed the absence of much of the wheel shroud.



Photo 6 - Missing wheel shroud on stage four turbine wheel as viewed through the exhaust collector support via borescope.

The outer combustion case was in position and displayed no damage. Both left and right compressor air discharge tubes were in position and properly seated at both ends.



Photo 7 - View of the outer combustion case.

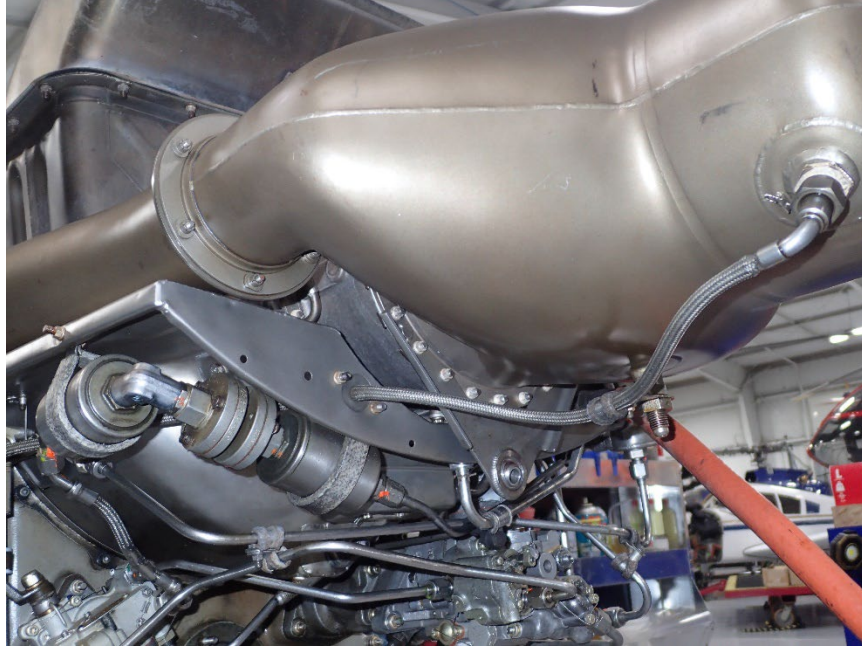


Photo 8 - Outer combustion case with air discharge tube.

Both the upper and lower chip detectors were removed and inspected. The upper chip detector exhibited paste and several small chips. The lower chip detector was void of material.

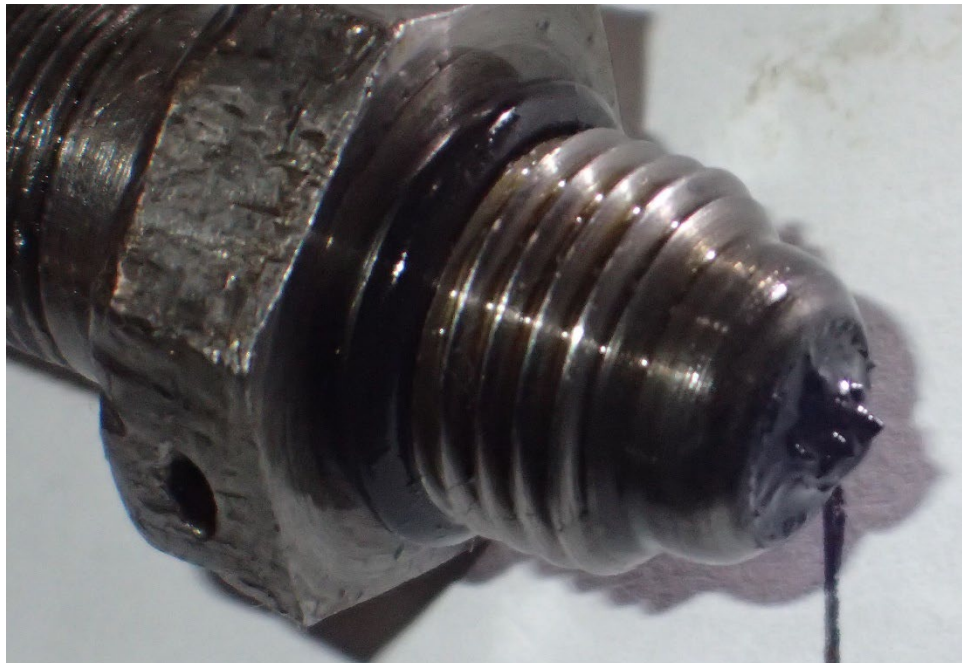


Photo 9 - View of the upper chip detector.



Photo 10 - View of lower chip detector.

The determination was made to ship the engine to an appropriate facility for further disassembly and examination.

Submitted by:

Lynn Spencer
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