

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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WRECKAGE EXAMINATION SUMMARY

October 25-26, 2022

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A. ACCIDENT

Location: Fort Myers, Florida
Date: October 8, 2022
Time: 1800 EST
2200 UTC
Helicopter: N5DF, Bell 505

B. WRECKAGE EXAMINATION SUMMARY

Participants:

NTSB IIC	Ralph Hicks National Transportation Safety Board Marietta, Georgia
Party Coordinator	Marquin Israel Federal Aviation Administration Tampa, Florida
Technical Advisor	Gary Howe Bell Helicopter Textron Inc. Fort Worth, Texas
Technical Advisor	Bryan Larimore SAFRAN Helicopter Engines Grand Prairie, Texas

C. SUMMARY

On October 8, 2022, about 1800 eastern daylight time, a Bell 505 helicopter, N5DF, was substantially damaged when it was involved in an accident at Fort Myers, Florida. The private pilot and one passenger had serious injuries, and two passengers had minor injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

D. DETAILS OF THE EXAMINATION

1.0 General

The wreckage was recovered to Florida Air Recovery in Ft. Pierce, FL. The wreckage examination was conducted on October 25-26, 2022.

2.0 Fuel and Hydraulics

The components of the fuel system, including the fuel cell, prime pump, feed lines, fuel shutoff valve and cable suffered various degrees of damage.

Examination revealed fuel was present in the fuel cells and no pre-existing fuel leaks were observed. Fuel was clear with no abnormal odor (Photo 1). No fuel system issues were suspected or reported by the pilot.



Photo 1: Fuel Sample (Courtesy Bell Helicopter Textron)

The components of the hydraulic system, including the hydraulic pump, pressure and return lines, hydraulic reservoir-filter module (HRFM), hydraulic control switch and pump assembly were present along with the three servo actuators and support assembly. No pre-existing hydraulic leaks were observed. No hydraulic issues were suspected or reported by the pilot.

3.0 Airframe Examination

No pre-impact anomalies were observed with the landing gear. The skid gear was spread due to ground impact with the fuselage contacting the ground. The right skid tube remained attached to the crosstubes with the left skid tube found separated. Floats remained attached to the skid tubes and the right side deployed and the left side did not deploy.

All windows and doors suffered various degrees of damaged by impact forces.

No pre-impact anomalies were observed with the fuselage. The fuselage and cabin exhibited multiple impact fractures and crushing.

4.0 Main Rotor and Main Rotor Drive Examination

No pre-impact anomalies were observed with the main rotor. The mast nut and flap restraint assembly were present along with all associated hardware (Photo 2). The main rotor hub and blade assembly was observed to be separated from the main rotor mast. Additionally, the swashplate and support assembly had separated from the mast. Both pitch links exhibited mechanical overload fracturing which is consistent with the main rotor departing. Both main rotor blades fractured at the end of the doublers which is consistent with a sudden stoppage and/or ground contact (Photo 2).



Photo 2: Main Rotor Blades (Courtesy Bell Helicopter Textron)

No pre-impact anomalies were observed with the main rotor drive system. The mast was bent due to impact forces. Main rotor continuity was confirmed by rotating the KAflex® (main rotor driveshaft) drive shaft by hand. Movement was confirmed from the drive shaft through the transmission to the mast. No abnormal sounds or binding were noted with rotation of the main transmission. The transmission was visually inspected, and no pre-impact anomalies observed. Oil was present within the main transmission and exhibited a normal color. Both chip detectors were removed and visually inspected with no particulate matter observed (Photo 3).



Photo 3: Transmission Chip Detectors (Courtesy Bell Helicopter Textron)

5.0 Tail Rotor and Tail Rotor Drive Examination

The crosshead, pitch links, pitch horns, and yoke assembly were unremarkable. Both tail rotor blades had fractured in the near the yoke attachment bolts. The tail rotor flap stops exhibited evidence of contact with the yoke assembly. Only one fractured blade section was recovered (Photo 4).



Photo 4: Tail Rotor (Courtesy Bell Helicopter Textron)

No pre-impact anomalies were observed with the tail rotor drive system. All tail rotor drive shaft segments were recovered. A continuity check was performed on the tail rotor drive system from the forward driveshaft (under the engine) to the fan shaft assembly. The aft driveshaft was pulled from the splined adapter of the fan shaft assembly. The aft end of the number 5 drive shaft segment was disconnected from splined adaptor of the tail rotor gear box. All hanger bearings had been fractured and the disc packs suffered various degrees of damage. The tail rotor gearbox had separated from the mount. All bolts had sheared, and the front left corner of the case had fractured (Photo 5). The tail rotor gearbox was visually inspected, and no pre-impact anomalies observed. The chip detector was removed and visually inspected with no particulate matter observed (Photo 6). A trace amount of oil was present within the tail rotor gearbox. The tail rotor was able to be rotated by hand in both directions with no binding or abnormal sounds coming from the tail rotor gearbox. Continuity could only be demonstrated from the tail rotor through the tail rotor gear box.



Photo 5: Tail Rotor Gearbox (Courtesy Bell Helicopter Textron)



Photo 6: Tail Rotor Gearbox Chip Detector (Courtesy Bell Helicopter Textron)

6.0 Flight Controls Examination

The components of the flight controls, including collective pitch controls, cyclic controls, and tail rotor controls, suffered various degrees of damage. The flight controls on the left side had been removed prior to the flight. Flight control continuity was observed from the cyclic/collective to the servo actuators and to the right/left control tubes that were fractured going to the rotating controls.

Directional control continuity was observed from the pedals to the fractured cables near the tail boom attach point. Directional control from the fractured cable to the tail rotor gear box could not be established due to long rod being bent near the tail rotor gear box from impact forces.

7.0 Powerplant Examination

The SAFRAN Arrius 2R engine was sent to SAFRAN in Grand Prairie, TX for further examination. The ECU will be downloaded at SAFRAN. See NTSB Powerplant Examination Summary in the public docket for this accident investigation.

8.0 Instruments and Electrical System Examination

A complete examination of the instrument system was not conducted; no issues were suspected or reported. The GARMIN primary flight display, multi-function display, GIA (Integrated Avionics Unit) and GEA (Engine and Airframe Interface Unit) were removed for further examination, if needed.

A complete examination of the electrical system was not conducted. No electrical issues were suspected or reported by the pilot.

9.0 Avionics Examination

A complete examination of the avionics was not conducted and no avionics issues were suspected or reported by the pilot.

The Garmin GDU-1050H high-definition cockpit display was sent to the NTSB Vehicle Recorders Laboratory for examination and download of data. See NTSB Cockpit Display Specialist's Factual Report in the public docket for this accident.

Submitted by:

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