

# National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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## HELICOPTER COMPONENT EXAMS

August 26, 2024

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## **A. ACCIDENT**

Location: Hydro, OK  
Date: January 20, 2024  
Time: 2323 CST  
0523 UTC  
Helicopter: Bell 206

## **B. HELICOPTER COMPONENT EXAMS**

|                   |                                                                      |
|-------------------|----------------------------------------------------------------------|
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## **C. SUMMARY**

On January 20, 2024, about 2323 central standard time, a Bell 206L-3 helicopter, N295AE, was substantially damaged when it was involved in an accident near Hydro, Oklahoma. The pilot, flight nurse, and flight paramedic were fatally injured. The helicopter was operated as a Title 14 Code of Federal Regulations Part 135 positioning flight.

The helicopter dropped off a patient at the Mercy Health Center Heliport (OL16), Oklahoma City, Oklahoma, and the crew was returning to their home base, Air Evac 112 Heliport (4OK1), Weatherford, Oklahoma. The company GPS monitoring program stopped tracking the helicopter about 2330 and a search began for the helicopter. The wreckage was located in an open pasture about 1.5 miles east of Hydro, Oklahoma.

A preliminary review of Automatic Dependent Surveillance-Broadcast (ADS-B) data captured the accident flight as it departed OL16 and flew west towards Weatherford between 500 ft and 600 ft above ground level and about 110 knots groundspeed. The last ADS-B point was at 2323:39 about 210 ft east of the main wreckage location.

The carcasses of several geese were located in the debris field as well as one embedded in a flight control servo. Samples of the geese feathers were recovered for more detailed identification.

All major components of the helicopter were located at the accident site. The main wreckage consisted of the fuselage, engine, and tail rotor. The transmission had separated from the fuselage and was located at the site. The white main rotor blade

was fractured found in an adjacent field. The red main rotor blade was also fractured and found near the main rotor hub. The mast nut had separated and was located in the debris field.

## **D. DETAILS OF THE EXAMINATION**

A section of the main rotor mast, main rotor mast nut, and flap restraint were removed from the helicopter wreckage and transported to the Bell Helicopter Lab in Fort Worth, TX. The examination and documentation are listed below.

### **1.0 Main Rotor Mast**

The main rotor mast was bent just below the swashplate assembly and up towards the main rotor hub. The swashplate support assembly had fracture surfaces consistent with overload. Pieces of the mast's plastic cap were found inside the mast's upper end along with dirt. A large gouge was found at one of the lower splines. All of the upper splines had fairly uniform mechanical damage at the upper chamfered end which was slightly more pronounced on the side where the gouge was.

The upper mast threads had localized mechanical damage where only the crests of the threads were found to be sheared 360° around. The two bottom threads of the mast had minimal damage and were not sheared. Of note, according to the main rotor mast and mast nut drawings, full engagement of all of the threads does not occur. The mast's thread damage was not fully uniform.

No preaccident anomalies were detected in the threads measurement nor the hardness of its steel.

### **2.0 Main Rotor Mast Nut**

The main rotor mast nut was found separated from the mast assembly after the accident and still attached to the flap restraint. After removing the mast nut from the flap restraint, contact damage was observed on the outer diameter surface of the nut. The outer diameter met the engineering drawing requirements. The internal threads had mating damage, where the crests were observed to be rolled over to varying extents 360° around, due to excessive loading against the mast threads. The two upper threads of the nut showed minimal damage, which aligned with the damage observed on the mast threads. The mast nut thread's minor diameter of the upper two threads met the maximum drawing requirement. The mast nut thread's minor diameter of the damaged threads ranged from 1.945 - 1.948 inches. Roughly 0.011 inch of crests of the threads was removed. The mast nut's threads had a pitch that ranged from 0.0625 - 0.0631 inch. No evidence was observed to suggest the mast nut was improperly secured to the mast prior to the accident. The hardness of the steel mast nut met the engineering drawing requirement.

### **3.0 Flap Restraint**

The flap restraint had areas of damage on the inner diameter surface of the flap restraint support from contact with the mast nut. The inner diameter of the support met the engineering drawing requirement. The right-hand side arm assembly was fractured with signatures consistent with overload, and the left-hand side arm assembly was bent. There was significant mechanical damage found on the washers of the fractured arm assembly. The flap restraint assembly support was bowed. While lying flat on a granite table and pressing down on the ends of the support, the bow measured approximately 0.030 inch on the mast lock nut side and 0.027 inch on the opposite side using a feeler gauge.

The eye bolts and mast nut lock and bolt were still attached to the flap restraint assembly and the two screws were sheared below the support. There was mechanical damage found on the mast nut lock.

Submitted by:

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