Aviation Investigation Final Report

Location:	North Charleston, South Carolina	**Accident Number:**	ERA23LA319
Date & Time:	August 1, 2023, 15:30 Local	**Registration:**	N31PB
Aircraft:	BELL HELICOPTER TEXTRON CANADA 407	**Aircraft Damage:**	Substantial
Defining Event:	Flight control sys malf/fail	**Injuries:**	1 Minor
Flight Conducted Under:	Public aircraft		

Analysis

The pilot reported that, about 35 minutes into the flight, he noticed that the helicopter began to yaw to the right and his pedal inputs did not correct the situation. He contacted the tower at his destination and declared an emergency. As he approached the runway for a straight-in landing, the helicopter yawed again. He lowered the collective, but the helicopter continued to yaw right. He then reduced the throttle and attempted to maintain a level attitude. The helicopter struck the ground at a high rate of descent, coming to rest in the grass adjacent to runway. The helicopter sustained substantial damage to the fuselage, main rotor system, and tail rotor system.

A postaccident examination of the helicotper found one of the two bolts that secured the tail rotor pitch change lever assembly was missing. The lever assembly was disconnected from the trunnion, resulting in the loss of tail rotor control. The other bolt that connected the levers to the rod assembly was in place, but loose; the cotter pin for its attachment nut was missing.

A review of the maintenance records revealed that a 300 hour/3 month inspection was performed on the helicopter about 15.4 flight hours before the accident. According to the helicopter manufacturer, that recent inspection would not have required removal of the lever assembly bolts; however, the nuts and bolts should have been clearly visible during the inspection of the area. The mechanic who performed the inspection stated that he must have overlooked them.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A failure of the tail rotor pitch change lever assembly due to incorrectly installed bolts and maintenance personnel's inadequate inspection of the tail rotor control system.

Findings

Aircraft	(general) - Inadequate inspection
Personnel issues	Scheduled/routine inspection - Maintenance personnel
Personnel issues	(general) - Maintenance personnel

Factual Information

History of Flight

Approach-VFR pattern final	Flight control sys malf/fail (Defining event)
Landing	Hard landing

On August 1, 2023, about 1530 eastern daylight time, a Bell Helicopter Textron Canada 407, N31PB, was substantially damaged when it was involved in an accident near North Charleston, South Carolina. The commercial pilot sustained minor injuries. The helicopter was operated as a public aircraft.

The helicopter, operated by the Charleston County Sheriff's Office, was on a positioning flight from Sumter Airport (SMS), Sumter, South Carolina, to Charleston AFB International Airport (CHS), North Charleston, South Carolina. The pilot reported that, after about 35 minutes of flight, the helicopter started to yaw slowly to the right. The pilot applied left pedal with no response. The pilot stated, "It felt as if the pedals were not attached." He contacted CHS tower and declared an emergency. He set up for a straight-in approach to runway 15. While crossing the runway threshold, about 20 ft above ground level, the helicopter started to yaw to the right. He lowered the collective, but the helicopter continued to yaw right. He then reduced the throttle and attempted to maintain a level attitude. The helicopter struck the ground adjacent to runway 15 at a high rate of descent, coming to rest in the grass. The tail rotor boom severed during the impact sequence.

Inspectors with the Federal Aviation Administration (FAA) responded to the accident site and examined the wreckage. They confirmed substantial damage to the fuselage, main rotor system, and tail rotor system. They found 1 of the 2 bolts that secured the tail rotor pitch change lever assembly was missing (Photo 1). The lever assembly was disconnected from the trunnion. The other bolt that connected the levers to the rod assembly was in place, but loose; the cotter pin for its attachment nut was missing (Photo 2).

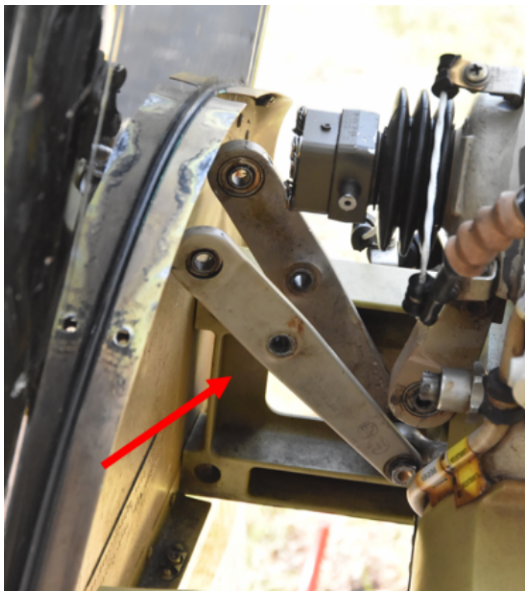

Photo 1: Tail rotor Pitch Change Lever Assembly. Red arrow points to area of missing bolt.

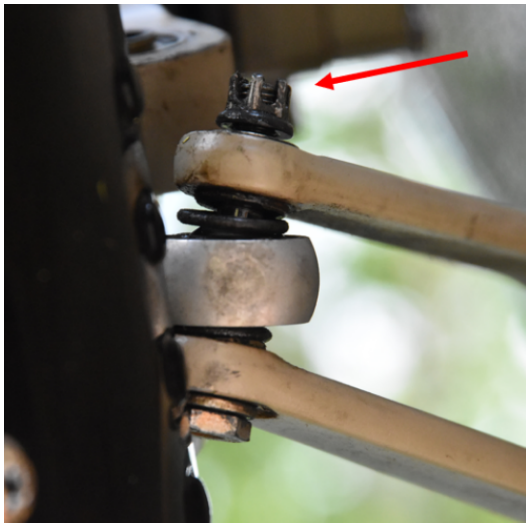

Photo 2: Pitch Change Lever Assembly. Red arrow points to loose nut on bolt; cotter pin was missing.

A review of the maintenance records by FAA inspectors revealed that a 300 hour/3 month inspection was performed on the helicopter on June 28, 2023. The helicopter had been flown about 15.4 hours since this inspection. According to Bell Helicopter technical support personnel, the inspection/lubrication procedure that was accomplished on June 28 would not require removal of the lever assembly bolts; however, the nuts and bolts should have been clearly visible during the inspection of the area. The mechanic who performed the inspection stated that he must have overlooked them.

Pilot Information

Certificate:	Commercial	**Age:**	57,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	October 28, 2022
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 2, 2022
Flight Time:	3743 hours (Total, all aircraft), 333 hours (Total, this make and model), 3505 hours (Pilot In Command, all aircraft), 15 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BELL HELICOPTER TEXTRON CANADA	**Registration:**	N31PB
Model/Series:	407	**Aircraft Category:**	Helicopter
Year of Manufacture:	2012	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	54321
Landing Gear Type:	Emergency float; High skid	**Seats:**	7
Date/Type of Last Inspection:	June 28, 2023 Annual	**Certified Max Gross Wt.:**	5250 lbs
Time Since Last Inspection:	15 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	4617 Hrs at time of accident	**Engine Manufacturer:**	Rolls-Royce
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	C47B
Registered Owner:	COUNTY OF CHARLESTON	**Rated Power:**	
Operator:	Charleston County Sheriff's Office	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCHS,48 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	15:56 Local	**Direction from Accident Site:**	165°
Lowest Cloud Condition:	Scattered / 4500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 5500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	110°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.03 inches Hg	**Temperature/Dew Point:**	31°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Sumter, SC (SMS)	**Type of Flight Plan Filed:**	None
Destination:	North Charleston, SC	**Type of Clearance:**	VFR
Departure Time:	14:45 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	Charleston AFB International CHS	**Runway Surface Type:**	Concrete
Airport Elevation:	46 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	15	**IFR Approach:**	None
Runway Length/Width:	9001 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	32.90605,-80.04328(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Charles Lewis; FAA/FSDO; Columbia, SC Nora Vallée; Transportation Safety Board of Canada; Gatineau, OF Gary Howe; Bell Helicopter; Ft. Worth , TX
Original Publish Date:	May 14, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=192772