



## National Transportation Safety Board Aviation Accident Preliminary Report

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|--------------------------------|--|-------------------------|--------------------|
| <b>Location:</b>               | Eden, NC                                       | <b>Accident Number:</b> | ERA21FA195         |
| <b>Date &amp; Time:</b>        | April 28, 2021, 13:24 Local                    | <b>Registration:</b>    | N53DE              |
| <b>Aircraft:</b>               | BELL HELICOPTER TEXTRON<br>CANADA 429          | <b>Injuries:</b>        | 1 Fatal, 2 Serious |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Aerial observation |                         |                    |

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On April 28, 2021, about 1324 eastern standard time, a Bell 429 helicopter, N53DE, was destroyed when it was involved in an accident near Eden, North Carolina. The commercial pilot was fatally injured, and two passengers were seriously injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 powerline patrol.

Preliminary Federal Aviation Administration Automatic Dependent Surveillance–Broadcast (ADS–B) data indicated the helicopter departed the steam station patrolling the transmission powerlines to the north, then returned on the west side of the powerlines heading south. As the helicopter approached the intersection of the north/south and east/west powerlines the pilot began to reverse course by turning to the right. As the helicopter turned right, witnesses reported hearing a “pop” followed by the helicopter descending until it impacted a tree.

A lineman onboard the helicopter seated in the forward left seat recalled that the pilot was reversing course and the helicopter was in a banking turn to the right, when he heard a very loud noise, “almost cannon like, very deep, within a second or two we were heading into the trees.”

The accident flight was witnessed by bystanders located near the steam station. One witness driving west bound observed the helicopter cross the road heading south bound flying low over the trees along the powerlines. The helicopter made a right turn before it disappeared behind trees. Two other witnesses observed the helicopter flying from east to west over the trees before making a steep left turn. The witnesses stated they could see the underside of the helicopter and skids before it “slid at an angle downward and disappeared into the woods.”

The helicopter came to rest on the right side of the fuselage about 393 ft from the powerlines, at an elevation of about 570 ft. All major components of the helicopter were accounted for at the accident site. The debris path was about 183 ft long on a 245° heading. Flight control continuity was not confirmed due to a postcrash fire that consumed the cockpit of the helicopter. Remnant carbon fiber layup was present in the area of the upper cowlings, fuselage skin, and doors. The cockpit, cabin floor, and the

transmission and engine deck were present but sustained heavy thermal damage. The avionics and wiring were strewn outside the nose section, with pieces of wood branches embedded within the wiring.

The main rotor hub remained attached to the main rotor mast. The two yoke assemblies remained installed with the mast nut intact. The main rotor blades remained installed to their respective grips via blade pins. All blade attachment hardware was present and secured. All four blade tips exhibited impact damage and their spars exhibited a broomstrawed appearance. Three separated leading edge pieces near the tip end, including the tip cap lap joint, were found in the debris field (surrounding the main wreckage). All four main rotor blade pitch horns remained intact, and all four pitch change links were connected to their respective pitch horns and the rotating swashplate. The main rotor gearbox was partially separated from the airframe due to impact and thermal damage.

The tail rotor was hanging to one side of the gearbox due to fracturing of the output shaft and bending of the pitch control rod. The two tail rotor yokes remained installed on the tail rotor output shaft and were whole. The tail rotor blades remained installed on the yokes. Each blade's entire span was present. The yaw hydraulic actuator remained attached to both the airframe and its control bellcrank within the tailboom. The control tube (aft of the yaw hydraulic actuator) was fractured in multiple locations. The forward tail rotor drive shaft assembly was continuous to the cooler fan shaft. The cooler fan remained attached to the airframe but was crushed from impact. The tail rotor drive train was fractured in multiple locations aft of the cooler fan.

The helicopter was configured with only the pilot flight controls installed in the right cockpit seat. Various thermally degraded control clevis connections and bellcranks were found in the main wreckage site, but the majority of the cockpit flight control system was consumed by the postcrash fire.

The left and right hydraulic pumps were found separated from the main gearbox and were thermally damaged.

The helicopter was equipped with two Pratt and Whitney PW207D1 engines, both of which remained installed on the engine deck.

The engine data monitors, electronic engine controls and health and usage monitoring system (HUMS) units were recovered and retained for data download.

The helicopter wreckage was recovered and retained for further examination.

## Aircraft and Owner/Operator Information

|                           |                                   |                                   |            |
|---------------------------|-----------------------------------|-----------------------------------|------------|
| Aircraft Make:            | BELL HELICOPTER<br>TEXTRON CANADA | Registration:                     | N53DE      |
| Model/Series:             | 429                               | Aircraft Category:                | Helicopter |
| Amateur Built:            |                                   |                                   |            |
| Operator:                 |                                   | Operating Certificate(s)<br>Held: | None       |
| Operator Designator Code: |                                   |                                   |            |

## Meteorological Information and Flight Plan

|                                  |                    |                              |                      |
|----------------------------------|--------------------|------------------------------|----------------------|
| Conditions at Accident Site:     | VMC                | Condition of Light:          | Day                  |
| Observation Facility, Elevation: | SIF,693 ft msl     | Observation Time:            | 13:15 Local          |
| Distance from Accident Site:     | 7 Nautical Miles   | Temperature/Dew Point:       | 27° C / 15° C        |
| Lowest Cloud Condition:          |                    | Wind Speed/Gusts, Direction: | 7 knots / , 220°     |
| Lowest Ceiling:                  |                    | Visibility:                  | 10 miles             |
| Altimeter Setting:               | 30.04 inches Hg    | Type of Flight Plan Filed:   | Company VFR          |
| Departure Point:                 | Danville, NC (DAN) | Destination:                 | Burlington, NC (BUY) |

## Wreckage and Impact Information

|                     |                    |                         |                            |
|---------------------|--------------------|-------------------------|----------------------------|
| Crew Injuries:      | 1 Fatal            | Aircraft Damage:        | Destroyed                  |
| Passenger Injuries: | 2 Serious          | Aircraft Fire:          | On-ground                  |
| Ground Injuries:    | N/A                | Aircraft Explosion:     | None                       |
| Total Injuries:     | 1 Fatal, 2 Serious | Latitude,<br>Longitude: | 36.497132,-79.718455 (est) |

## Administrative Information

|                                   |  |
|-----------------------------------|--|
| Investigator In Charge (IIC):     | Wentz, Peter   |
| Additional Participating Persons: | George T Kembro; FAA - FSDO; Greensboro, NC<br>Nora Vallee; Transportation Safety Board of Canada; Gatineau<br>Merryn Spielman; Pratt & Whitney Canada<br>Mona Polson; Bell Flight Safety; Ft Worth, TX<br>Philip Kangagy; Duke Energy Aviation; Charlotte, NC<br>Jason Sponsel; Duke Energy Aviation; Charlotte, NC<br>Allen Blankenship; Duke Energy Aviation; Charlotte, NC<br>Garrett Scott; Duke Energy Aviation; Charlotte, NC |
| Note:                             |  |