



# Aviation Investigation Final Report

|                                |   |                         |             |
|--------------------------------|---|-------------------------|-------------|
| <b>Location:</b>               | Abbeville, Louisiana                      | <b>Accident Number:</b> | CEN23LA199  |
| <b>Date &amp; Time:</b>        | May 23, 2023, 10:15 Local                 | <b>Registration:</b>    | N451PH      |
| <b>Aircraft:</b>               | BELL HELICOPTER TEXTRON<br>CANADA 407     | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         | Hard landing                              | <b>Injuries:</b>        | 2 None      |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Instructional |                         |             |

## Analysis

The check pilot and the pilot receiving instruction were performing initial new hire training for the commercial operator. The pilot previously performed three practice 180° autorotations, terminating with a power recovery. The pilot then performed a practice, straight-in, full down autorotation to touchdown on the sod area parallel to the runway. During the touchdown, the two pilots heard a “loud bang.” The helicopter came to rest upright on the sod area and both pilots were able to egress from the helicopter without further incident. A postflight inspection revealed that the main rotor blades struck the tail boom, severing the tail rotor driveshaft. The main rotor blades, the tail boom, and the tail rotor system sustained substantial damage.

The operator reported there were no preimpact mechanical malfunctions or failures with the airframe or the engine that would have precluded normal operation. According to another helicopter manufacturer, main rotor blowback occurs when the forward portion of the helicopter’s main rotor disk is displaced upward, while the rear portion of the main rotor disk is displaced downward. If the resulting blowback is excessive, the main rotor blades may impact the tail boom. A review of the accident helicopter rotorcraft flight manual (RFM) found no information listed to provide awareness to pilots about the main rotor blowback condition.

## Probable Cause and Findings

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

The pilot's failure to maintain proper helicopter control during autorotation that resulted in an abnormal ground contact which caused the subsequent main rotor strike on the tail boom that severed the tail rotor driveshaft. Contributing to the accident was the main rotor blowback condition, due to the aft tilting of the main rotor disk.

## Findings

|                         |   |
|-------------------------|---|
| <b>Personnel issues</b> | Aircraft control - Pilot                          |
| <b>Personnel issues</b> | Monitoring other person - Instructor/check pilot  |
| <b>Aircraft</b>         | Main rotor control - Incorrect use/operation      |
| <b>Aircraft</b>         | Main rotor blade system - Incorrect use/operation |
| <b>Aircraft</b>         | Prop/rotor parameters - Not attained/maintained   |

## Factual Information

### History of Flight

|                     |                                |
|---------------------|--------------------------------|
| <b>Autorotation</b> | Miscellaneous/other            |
| <b>Autorotation</b> | Attempted remediation/recovery |
| <b>Autorotation</b> | Hard landing (Defining event)  |
| <b>Autorotation</b> | Part(s) separation from AC     |

### Check pilot Information

|                                  |  |  |                  |
|----------------------------------|--|--|------------------|
| <b>Certificate:</b>              | Commercial; Flight instructor  | <b>Age:</b>                              | 31,Male          |
| <b>Airplane Rating(s):</b>       | None   | <b>Seat Occupied:</b>                    | Left             |
| <b>Other Aircraft Rating(s):</b> | Helicopter   | <b>Restraint Used:</b>                   | 4-point          |
| <b>Instrument Rating(s):</b>     | Helicopter   | <b>Second Pilot Present:</b>             | Yes              |
| <b>Instructor Rating(s):</b>     | Helicopter; Instrument helicopter  | <b>Toxicology Performed:</b>             |                  |
| <b>Medical Certification:</b>    | Class 1 Without waivers/limitations  | <b>Last FAA Medical Exam:</b>            | July 29, 2022    |
| <b>Occupational Pilot:</b>       | Yes  | <b>Last Flight Review or Equivalent:</b> | December 4, 2022 |
| <b>Flight Time:</b>              | (Estimated) 1689 hours (Total, all aircraft), 714 hours (Total, this make and model), 1602 hours (Pilot In Command, all aircraft), 35 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft) |  |                  |

### Pilot Information

|                                  |  |  |                |
|----------------------------------|--|--|----------------|
| <b>Certificate:</b>              | Commercial; Flight instructor  | <b>Age:</b>                              | 41,Male        |
| <b>Airplane Rating(s):</b>       | None   | <b>Seat Occupied:</b>                    | Right          |
| <b>Other Aircraft Rating(s):</b> | Helicopter   | <b>Restraint Used:</b>                   | 4-point        |
| <b>Instrument Rating(s):</b>     | Helicopter   | <b>Second Pilot Present:</b>             | Yes            |
| <b>Instructor Rating(s):</b>     | Helicopter; Instrument helicopter  | <b>Toxicology Performed:</b>             |                |
| <b>Medical Certification:</b>    | Class 1 Without waivers/limitations  | <b>Last FAA Medical Exam:</b>            | March 15, 2023 |
| <b>Occupational Pilot:</b>       | Yes  | <b>Last Flight Review or Equivalent:</b> | May 23, 2023   |
| <b>Flight Time:</b>              | (Estimated) 1800 hours (Total, all aircraft), 8 hours (Total, this make and model), 1500 hours (Pilot In Command, all aircraft), 8 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft) |  |                |

## Aircraft and Owner/Operator Information

|                                      |                                 |                                       |  |
|--------------------------------------|---------------------------------|---------------------------------------|--|
| <b>Aircraft Make:</b>                | BELL HELICOPTER TEXTRON CANADA  | <b>Registration:</b>                  | N451PH   |
| <b>Model/Series:</b>                 | 407 NO SERIES                   | <b>Aircraft Category:</b>             | Helicopter   |
| <b>Year of Manufacture:</b>          | 2012                            | <b>Amateur Built:</b>                 |  |
| <b>Airworthiness Certificate:</b>    | Normal                          | <b>Serial Number:</b>                 | 54127  |
| <b>Landing Gear Type:</b>            | Emergency float; High skid      | <b>Seats:</b>                         | 7  |
| <b>Date/Type of Last Inspection:</b> | May 20, 2023 AAIP               | <b>Certified Max Gross Wt.:</b>       | 5250 lbs   |
| <b>Time Since Last Inspection:</b>   |                                 | <b>Engines:</b>                       | 1 Turbo shaft  |
| <b>Airframe Total Time:</b>          | 9305.86 Hrs at time of accident | <b>Engine Manufacturer:</b>           | Rolls-Royce  |
| <b>ELT:</b>                          | C126 installed, not activated   | <b>Engine Model/Series:</b>           | 250-C47B   |
| <b>Registered Owner:</b>             | PHI AVIATION LLC                | <b>Rated Power:</b>                   | 675 Horsepower   |
| <b>Operator:</b>                     | PHI AVIATION LLC                | <b>Operating Certificate(s) Held:</b> | Rotorcraft external load (133), On-demand air taxi (135) |
| <b>Operator Does Business As:</b>    | PHI, Inc.                       | <b>Operator Designator Code:</b>      | HEEA   |

## Meteorological Information and Flight Plan

|   |                                  |   |                  |
|---|----------------------------------|---|------------------|
| <b>Conditions at Accident Site:</b>     | Visual (VMC)                     | <b>Condition of Light:</b>                  | Day              |
| <b>Observation Facility, Elevation:</b> | KIYA, 50 ft msl                  | <b>Distance from Accident Site:</b>         | 0 Nautical Miles |
| <b>Observation Time:</b>                | 10:15 Local                      | <b>Direction from Accident Site:</b>        | 37°              |
| <b>Lowest Cloud Condition:</b>          | Clear                            | <b>Visibility</b>                           | 10 miles         |
| <b>Lowest Ceiling:</b>                  | None                             | <b>Visibility (RVR):</b>                    |                  |
| <b>Wind Speed/Gusts:</b>                | /                                | <b>Turbulence Type Forecast/Actual:</b>     | None / None      |
| <b>Wind Direction:</b>                  |                                  | <b>Turbulence Severity Forecast/Actual:</b> | N/A / N/A        |
| <b>Altimeter Setting:</b>               | 29.96 inches Hg                  | <b>Temperature/Dew Point:</b>               | 27°C / 15°C      |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |   |                  |
| <b>Departure Point:</b>                 | Lafayette, LA (LFT)              | <b>Type of Flight Plan Filed:</b>           | Company VFR      |
| <b>Destination:</b>                     | Abbeville, LA                    | <b>Type of Clearance:</b>                   | Traffic advisory |
| <b>Departure Time:</b>                  | 09:25 Local                      | <b>Type of Airspace:</b>                    | Class G          |

## Airport Information

|                             |                                 |                                  |  |
|-----------------------------|---------------------------------|----------------------------------|--|
| <b>Airport:</b>             | ABBEVILLE CHRIS CRUSTA MEML IYA | <b>Runway Surface Type:</b>      | Grass/turf   |
| <b>Airport Elevation:</b>   | 15 ft msl                       | <b>Runway Surface Condition:</b> | Dry;Vegetation                                     |
| <b>Runway Used:</b>         | 34                              | <b>IFR Approach:</b>             | None   |
| <b>Runway Length/Width:</b> | 5000 ft / 75 ft                 | <b>VFR Approach/Landing:</b>     | Full stop;Simulated forced landing;Traffic pattern |

## Wreckage and Impact Information

|                            |        |                             |                           |
|----------------------------|--------|-----------------------------|---------------------------|
| <b>Crew Injuries:</b>      | 2 None | <b>Aircraft Damage:</b>     | Substantial               |
| <b>Passenger Injuries:</b> | N/A    | <b>Aircraft Fire:</b>       | None                      |
| <b>Ground Injuries:</b>    | N/A    | <b>Aircraft Explosion:</b>  | None                      |
| <b>Total Injuries:</b>     | 2 None | <b>Latitude, Longitude:</b> | 29.975151,-92.084742(est) |

## Administrative Information

|  |   |
|--|---|
| <b>Investigator In Charge (IIC):</b>     | Hodges, Michael   |
| <b>Additional Participating Persons:</b> | Robert Hardwick; FAA Baton Rouge FSDO; Baton Rouge, LA<br>Beverly Harvey (Accredited Representative); Transportation Safety Board of Canada; Gatineau, OF<br>Gary Howe (Technical Advisor); Bell Flight; Fort Worth, TX<br>Dean Ciaschini (Technical Advisor); Transport Canada; Ottawa, OF |
| <b>Original Publish Date:</b>            | July 27, 2023   |
| <b>Last Revision Date:</b>               |   |
| <b>Investigation Class:</b>              | <a href="#">Class 4</a>   |
| <b>Note:</b>                             | The NTSB did not travel to the scene of this accident.  |
| <b>Investigation Docket:</b>             | <a href="https://data.nts.gov/Docket?ProjectID=192228">https://data.nts.gov/Docket?ProjectID=192228</a>   |

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).