



Aviation Investigation Final Report

Location:	Abbeville, Louisiana	Accident Number:	CEN23LA199
Date & Time:	May 23, 2023, 10:15 Local	Registration:	N451PH
Aircraft:	BELL HELICOPTER TEXTRON CANADA 407	Aircraft Damage:	Substantial
Defining Event:	Hard landing	Injuries:	2 None
Flight Conducted Under:	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

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

Factual Information

History of Flight

Autorotation	Miscellaneous/other
Autorotation	Attempted remediation/recovery
Autorotation	Hard landing (Defining event)
Autorotation	Part(s) separation from AC

Check pilot Information

Certificate:	Commercial; Flight instructor	Age:	31, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Helicopter; Instrument helicopter	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	July 29, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	December 4, 2022
Flight Time:	(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

Certificate:	Commercial; Flight instructor	Age:	41, Male
Airplane Rating(s):	None	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Helicopter; Instrument helicopter	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	March 15, 2023
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	May 23, 2023
Flight Time:	(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

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

Meteorological Information and Flight Plan

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

Airport Information

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

Wreckage and Impact Information

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

Administrative Information

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

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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](#).