



National Transportation Safety Board Aviation Accident Final Report

Location:	Gainesville, Florida	Accident Number:	ERA19LA206
Date & Time:	June 24, 2019, 22:00 Local	Registration:	N911GV
Aircraft:	Bell OH58C	Aircraft Damage:	Substantial
Defining Event:	Miscellaneous/other	Injuries:	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

During an night instructional flight in a helicopter, the flight instructor was demonstrating a straight-in autorotation to landing following a simulated engine failure. At touchdown, the heels of the landing skids touched first and the helicopter “rocked” forward, which was followed by several more “throws” in a counterclockwise motion that became progressively more “violent.” The instructor described that the helicopter was experiencing pylon whirl and continued to manipulate the flight controls during the ground run until helicopter came to rest. The helicopter’s tailboom was substantially damaged during the accident sequence.

Probable Cause and Findings

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

The flight instructor’s failure to maintain control of the helicopter during a simulated forced landing autorotation, which resulted in pylon whirl that substantially damaged the helicopter.

Findings

Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	Landing flare - Not attained/maintained

Factual Information

On June 24, 2019, about 2200 eastern daylight time, a Bell OH-58C, N911GV, was substantially damaged when it was involved in an accident at Gainesville Regional Airport (GNV), Florida. The pilot receiving instruction and flight instructor were not injured. The helicopter was operated as a public aircraft instructional flight.

The pilot receiving instruction and instructor planned to perform standard maneuvers in unaided and aided (with night vision goggles [NVG]) night visual meteorological conditions. According to the pilot receiving instruction, both pilots were wearing NVGs when the instructor took control of the helicopter to demonstrate a standard, straight-in autorotation for landing on the parallel taxiway. After entry, the instructor made trim and alignment adjustments during the descent and announced “100 feet” above ground level prior to initiating the decelerative flare. The pilot receiving instruction said the radar altimeter displayed 75 feet at the announcement and described the flare, the remainder of the descent, and the leveling of the helicopter prior to touchdown.

The pilot receiving instruction stated that, at touchdown, “I immediately felt like we were driving down a pothole filled dirt road and after several quick bumps, up and down while skidding across the taxiway, I felt a massive whip forward and to the left followed by several more throws in a counterclockwise motion. The throws became more intense and violent and ... braced myself for the aircraft to come apart or tip over.” During the ground run, the instructor announced the helicopter was experiencing “pylon whirl.” The instructor continued to adjust the flight controls until the ground run ended and the “throws” subsided.

The instructor described the descent and the “initial pitch pull” to slow the descent and level the helicopter for touchdown. At touchdown, the heels of the landing gear skids touched “first”, and the helicopter “rocked” forward, “grabbed,” and began to oscillate “uncontrollably.” The instructor stated that he adjusted the flight controls to keep the helicopter “straight and level” and lowered the collective control “to prevent pylon whirl.”

The instructor repositioned, shut down, and inspected the helicopter after the landing and said that the “effects of pylon whirl were readily apparent.”

A Federal Aviation Administration (FAA) examined the helicopter after the accident and noted damage to the tail boom, isolation mount, and the upper cowling around the rotor mast of helicopter.

According to the OH-58A/C Technical Manual, *“Pylon whirl is a condition which occurs after blade flapping and mast bumping. The resultant motion of the pylon is elliptical, and spike knock is apt to occur. If the frequency of motion coincides with a particular natural frequency of the helicopter, and the amplitude and direction of the force is large enough, damaging vibrations can occur in the aft section tailboom of the helicopter. Motion of this type could occur during touchdown autorotations, if operational limits are exceeded.”*

The Transportation Safety Board of Canada cited in Aviation Investigation Report A16P0161:

The fuselage of the Bell 206B is suspended from the main-rotor transmission by 2 A-frame pylons. Spherical bearings allow the pylons, and hence the main-rotor transmission and mast, to move in relation to the fuselage, with the motion dampened by the isolation mount. Main-rotor thrust and dynamic forces normally maintain the main-rotor transmission and fuselage in alignment; however, certain maneuvers can cause unbalanced pylon motion. This phenomenon, known as pylon whirl, can lead to spike knock, which is described as follows:

Spike knock is the contact of the transmission drag pin with the roof mounted static stop plate as a result of pylon motion or pylon whirl. This results in an audible knocking noise. Low rotor RPM, extreme asymmetric loading, poor execution of an auto-rotational landing, and low G maneuvers are factors that may contribute to the occurrence of spike knock.

History of Flight

Landing-flare/touchdown	Miscellaneous/other (Defining event)
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Pilot Information

Certificate:	Commercial	Age:	30, 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):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	October 19, 2018
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	January 23, 2019
Flight Time:	327 hours (Total, all aircraft), 327 hours (Total, this make and model), 293 hours (Pilot In Command, all aircraft), 61 hours (Last 90 days, all aircraft), 17 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	Age:	50, Male
Airplane Rating(s):	Single-engine land; Single-engine sea	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Helicopter; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	March 1, 2019
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	5788 hours (Total, all aircraft), 3602 hours (Total, this make and model), 44 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	Registration:	N911GV
Model/Series:	OH58C	Aircraft Category:	Helicopter
Year of Manufacture:	1970	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	70-15212
Landing Gear Type:	Skid	Seats:	4
Date/Type of Last Inspection:	May 23, 2019 100 hour	Certified Max Gross Wt.:	3000 lbs
Time Since Last Inspection:		Engines:	1 Turbo shaft
Airframe Total Time:	11444.1 Hrs at time of accident	Engine Manufacturer:	Allsion
ELT:	C126 installed, not activated	Engine Model/Series:	250-C20C
Registered Owner:		Rated Power:	420 Horsepower
Operator:		Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night
Observation Facility, Elevation:	KGNV, 123 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	22:00 Local	Direction from Accident Site:	157°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	260°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.04 inches Hg	Temperature/Dew Point:	28° C / 23° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Gainesville, FL (GNV)	Type of Flight Plan Filed:	None
Destination:	Gainesville, FL (GNV)	Type of Clearance:	VFR
Departure Time:	21:30 Local	Type of Airspace:	Class D;Class E

Airport Information

Airport:	GAINESVILLE RGNL GNV	Runway Surface Type:	Asphalt
Airport Elevation:	151 ft msl	Runway Surface Condition:	Dry
Runway Used:	Taxiway A	IFR Approach:	None
Runway Length/Width:	4785 ft / 40 ft	VFR Approach/Landing:	Simulated forced landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	2 None	Latitude, Longitude:	29.693301,-82.277253(est)

Administrative Information

Investigator In Charge (IIC):	Hill, Millicent		
Additional Participating Persons:	Michael Corrigan; FAA FSDO; Orlando, FL		
Original Publish Date:	June 3, 2022	Investigation Class:	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=99742		

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