



Aviation Investigation Final Report

Location:	Tampa, Florida	Accident Number:	ERA21LA264
Date & Time:	June 21, 2021, 21:45 Local	Registration:	N512TP
Aircraft:	Bell 407	Aircraft Damage:	Substantial
Defining Event:	Hard landing	Injuries:	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilot and flight instructor were practicing straight-in, full touch down power off landings (autorotations) in the helicopter at night, with the aid of night vision goggles (NVGs). The pilot determined where on the runway he was going to land and entered the autorotation at an approximate airspeed of 60 knots. When the helicopter was about 90 to 100 ft above the ground, and the engine rpm was at 99-100%, he entered the flare. At the bottom of the flare, the pilot “bumped” up the collective to arrest the rate of descent and leveled out at what he thought was about 7-10 ft above the runway. At that point, the pilot said it felt like the bottom of the helicopter started to fall out from underneath him. He added more collective to arrest the sink rate, but it had no impact on stopping the vertical sink rate. The low rotor rpm horn sounded right before the helicopter landed hard on the runway. The impact was sufficient to flex the main rotor blades and sever the tail boom. The main rotor blades were also substantially damaged. . The operator reported there were no mechanical deficiencies of the helicopter that contributed to the accident.

The runway had been recently paved and was very dark in color. The pilot had conducted “hundreds” of NVG power off landings to this runway in the past, but this was his first time after the runway had been re-paved. This was the flight instructor’s first time executing a practice NVG power off landing to this runway. As such, the visual cues that the pilot was used to experiencing had changed, and most likely affected his ability to judge the helicopter’s height and speed above the ground, which resulted in a higher-than-normal flair, low rotor rpm, and subsequent hard landing.

Probable Cause and Findings

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

The pilot's improper landing flare while making a power off practice autorotative landing. Contributing was the decreased visual cues provided by the recently paved runway during the night landing conducted with the aid of night vision goggles.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Landing flare - Not attained/maintained
Personnel issues	Visual illusion/disorientation - Pilot
Environmental issues	(general) - Effect on personnel
Environmental issues	Dark - Effect on personnel

Factual Information

History of Flight

Landing-flare/touchdown	Hard landing (Defining event)
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Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor; Private	Age:	44, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Helicopter; Instrument helicopter	Toxicology Performed:	
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	December 21, 2020
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	November 27, 2020
Flight Time:	2721 hours (Total, all aircraft), 1472 hours (Total, this make and model), 2412 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Flight instructor Information

Certificate:	Airline transport; Flight instructor	Age:	31, Male
Airplane Rating(s):	None	Seat Occupied:	Front
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 2 Without waivers/limitations	Last FAA Medical Exam:	March 8, 2021
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	June 11, 2021
Flight Time:	2047 hours (Total, all aircraft), 112 hours (Total, this make and model), 1909 hours (Pilot In Command, all aircraft), 124 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	Registration:	N512TP
Model/Series:	407	Aircraft Category:	Helicopter
Year of Manufacture:	2002	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	53546
Landing Gear Type:	None; High skid	Seats:	7
Date/Type of Last Inspection:	April 28, 2021 Continuous airworthiness	Certified Max Gross Wt.:	5250 lbs
Time Since Last Inspection:	34 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	9643 Hrs as of last inspection	Engine Manufacturer:	Rolls Royce
ELT:	Installed, not activated	Engine Model/Series:	250-647B
Registered Owner:	CITY OF TAMPA	Rated Power:	650
Operator:	CITY OF TAMPA	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Night
Observation Facility, Elevation:	VDF,22 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	08:15 Local	Direction from Accident Site:	95°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	170°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.09 inches Hg	Temperature/Dew Point:	27°C / 26°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tampa, FL (TPA)	Type of Flight Plan Filed:	None
Destination:	Tampa, FL	Type of Clearance:	VFR
Departure Time:	21:18 Local	Type of Airspace:	Class G

Airport Information

Airport:	TAMPA EXEC VDF	Runway Surface Type:	Asphalt;Concrete
Airport Elevation:	21 ft msl	Runway Surface Condition:	Dry
Runway Used:	05/23	IFR Approach:	None
Runway Length/Width:	5000 ft / 100 ft	VFR Approach/Landing:	Full stop;Simulated forced landing

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:	28.014049,-82.345625

Administrative Information

Investigator In Charge (IIC):	Read, Leah
Additional Participating Persons:	Greg King; FAA/FSDO; Tampa, FL
Original Publish Date:	October 19, 2021
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=103315

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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](#).