



# Aviation Investigation Final Report

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<b>Location:</b>	Tampa, Florida	<b>Accident Number:</b>	ERA21LA264
<b>Date &amp; Time:</b>	June 21, 2021, 21:45 Local	<b>Registration:</b>	N512TP
<b>Aircraft:</b>	Bell 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		

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## 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

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

## Factual Information

### History of Flight

<b>Landing-flare/touchdown</b>	Hard landing (Defining event)
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### Pilot Information

<b>Certificate:</b>	Airline transport; Commercial; Flight instructor; Private	<b>Age:</b>	44, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Helicopter; Instrument helicopter	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	December 21, 2020
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	November 27, 2020
<b>Flight Time:</b>	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

<b>Certificate:</b>	Airline transport; Flight instructor	<b>Age:</b>	31, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Front
<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 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	March 8, 2021
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	June 11, 2021
<b>Flight Time:</b>	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

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

## Meteorological Information and Flight Plan

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

## Airport Information

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

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	28.014049,-82.345625

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Read, Leah
<b>Additional Participating Persons:</b>	Greg King; FAA/FSDO; Tampa, FL
<b>Original Publish Date:</b>	October 19, 2021
<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.ntsb.gov/Docket?ProjectID=103315">https://data.ntsb.gov/Docket?ProjectID=103315</a>

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](#).