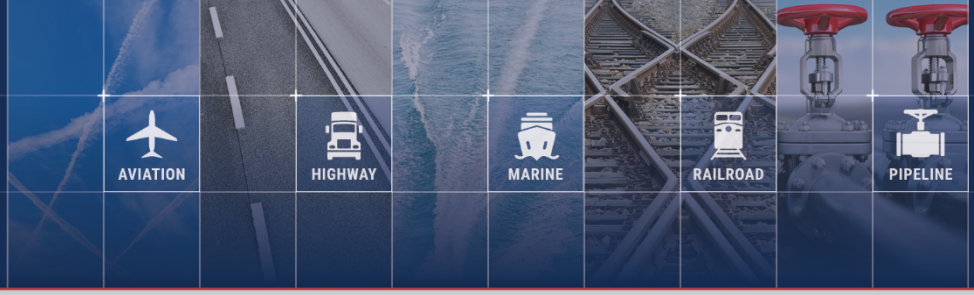

Aviation Investigation Factual Report

Location:	Port O'Connor, Texas	**Accident Number:**	CEN23FA125
Date & Time:	March 6, 2023, 21:57 Local	**Registration:**	N494SH
Aircraft:	ROBINSON HELICOPTER COMPANY R44	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of visual reference	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On March 6, 2023, about 2157 central standard time, a Robinson Helicopter Company (RHC) R-44II helicopter, N494SH, was destroyed when it was involved in an accident near Port O'Connor, Texas. The pilot and passenger sustained fatal injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

A review of ADS-B data showed that earlier on the day of the accident, the helicopter departed from the pilot's residence in Port O'Connor, Texas, and flew to the Pearland Regional Airport (LVJ), Pearland, Texas. The helicopter then returned to the pilot's residence.

The helicopter was equipped with a Garmin Aera 796 unit. The limited data available for the unit showed the helicopter departed from a road next to the pilot's residence and traveled to the northwest, with the data terminating shortly thereafter.

The limited ADS-B data for the accident flight showed a fight path starting from an area just to the north of the pilot's residence. The helicopter traveled to the east, passing over a lake, and then performed a turn to the north near a road. The helicopter climbed and then descended toward the south. The ADS-B data terminated over an open field next to a home. The direct distance from the departure location to the accident site was about 0.25 miles on a northeast heading. The area to the east of the accident site consisted of swamp with no observed ground lighting sources. The helicopter came to rest on a flat grass field, where a postimpact fire consumed most of the wreckage.

According to the passenger's daughter, the destination at the time of the accident was LVJ.

A neighbor, whose home was about 1,000 ft southwest of where the helicopter took off, observed the helicopter's red anti-collision (strobe) light operating as it departed from the road. She reported that it was "extremely foggy" when the helicopter took off and she could "barely see" her boat dock from her living room, which was about 75 ft away.

Another witness who lives in the neighborhood reported that the estimated visibility from his home looking toward the lake to be about 400 ft or so due to the presence of fog. He estimated that the fog arrived in the neighborhood around 1900.

Pilot Information

Certificate:	Private	**Age:**	56,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	BasicMed Without waivers/limitations	**Last FAA Medical Exam:**	February 23, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 1, 2021
Flight Time:	(Estimated) 912 hours (Total, all aircraft)		

The non-instrument-rated pilot was employed as a medical doctor. The pilot had attended the RHC Pilot Safety Course at the factory in Torrance, California, in September 2008. The RHC flight instructor reported that the pilot had a “good attitude to aviation safety” on the pilot evaluation form.

The pilot’s logbook was not available for review.

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER COMPANY	**Registration:**	N494SH
Model/Series:	R44 II	**Aircraft Category:**	Helicopter
Year of Manufacture:	2005	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	10878
Landing Gear Type:	Skid	**Seats:**	4
Date/Type of Last Inspection:	February 17, 2023 Annual	**Certified Max Gross Wt.:**	2500 lbs
Time Since Last Inspection:	4.21 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2762.51 Hrs at time of accident	**Engine Manufacturer:**	Lycoming Engines
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-AE1A5
Registered Owner:	Ihde Investments LP	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None
Operator Does Business As:	None	**Operator Designator Code:**	None

A review of FAA records showed that the pilot purchased the helicopter on June 4, 2008. The helicopter was previously involved in an accident on February 14, 2014; however, the pilot was not on board the helicopter when the previous accident occurred.

The helicopter was found to be equipped for instrument flight; however, the helicopter was not certified for instrument flight rules (IFR) by the FAA. The helicopter was not equipped with a radar altimeter, nor was it required to be by the FAA.

The FAA-approved RHC R-44II Pilot's Operating Handbook and Rotorcraft Flight Manual discusses the lighting system and states in part:

A red anti-collision light is installed on the tail cone and is controlled by the strobe switch. Position lights are installed on each side of the cabin and in the tail and are controlled by the navigation lights switch.

The red anti-collision (strobe) light contains light emitting diodes (commonly referred to as LEDs).

The FAA Pilot's Handbook of Aeronautical Knowledge FAA-H-8083-25C discusses night vision illusions and defines flicker vertigo:

A light flickering at a rate between 4 and 20 cycles per second can produce unpleasant and dangerous reactions. Such conditions as nausea, vomiting, and vertigo may occur. On rare occasions, convulsions and unconsciousness may also occur. Proper scanning techniques at night can prevent pilots from getting flicker vertigo.

The FAA Helicopter Flying Handbook FAA-H-8083-21B discusses flicker vertigo and states in part:

Flashing anticollision strobe lights, especially while the aircraft is in the clouds, can also produce this effect.

The FAA Office of the Chief General Counsel released a letter on January 11, 2011, that discusses the usage of anticollision lights under 14 *CFR* Part 91.209 and states in part:

The FAA agreed that "the use of a high intensity anticollision light," such as a strobe light, could create unsafe conditions by "inducing vertigo and causing spatial distortion."

14 *CFR* Part 91.209, Aircraft Lights, discusses the use of anticollision lights and states in part:

However, the anticollision lights need not be lighted when the pilot-in-command determines that, because of operating conditions, it would be in the interest of safety to turn the lights off.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KPKV,30 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	21:55 Local	**Direction from Accident Site:**	324°
Lowest Cloud Condition:		**Visibility**	5 miles
Lowest Ceiling:	Broken / 500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.99 inches Hg	**Temperature/Dew Point:**	23°C / 21°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Port O'Connor, TX	**Type of Flight Plan Filed:**	None
Destination:	Pearland, TX (LVJ)	**Type of Clearance:**	None
Departure Time:	21:56 Local	**Type of Airspace:**	Class E

The closest official weather reporting location was the Calhoun County Airport (PKV), Port Lavaca, Texas, located about 20 miles northwest of the accident site. At 2155, the Automated Weather Observation System reported wind from 160° at 6 kts, visibility 5 miles with mist, and the ceiling broken at 500 ft above ground level. Airmen's Meteorological Information Sierra for IFR conditions was issued at 2200 for ceilings below 1,000 ft and visibility below 3 miles with mist and fog present.

At the time of the accident, the sun was more than 15° below the horizon, while the moon was about 50° above the horizon at an azimuth of 109°.The phase of the moon was a full moon and was 99.7% illuminated.

The FAA contract Automated Flight Service Station provider Leidos had no contact with the pilot on March 6, 2023, for any weather briefing or to file any flight plans. No third-party vendors using the Lockheed Flight Service (LFS) system had contact with the pilot. A separate search of ForeFlight indicated that they also had no account with the pilot and no record of any weather briefings or flight plans being filed.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	28.415122,-96.48012(est)

Examination of the airframe revealed flight control continuity. The removable collective and cyclic controls were not installed; however, the removable anti-torque pedals were installed. The navigation light switch and the anti-collision (strobe) light switch were both found in the on positions. All the cockpit warning lights were found intact, and the filaments were checked with no signs of filament stretching present. An unknown make and model emergency locator transmitter (ELT) was found with fire damage. The ELT antenna was found connected and the ELT was found in its mount attached to the airframe.

Due to fire and impact damage, airframe to engine control continuity could not be established.

Examination of the engine revealed internal engine continuity. The crankshaft was rotated by turning the engine around the cooling fan. Continuity of the crankshaft to the rear gear and to the valvetrain was confirmed. Compression and suction were observed from all six engine cylinders. The interiors of the cylinders were viewed using a lighted borescope and no damage to the pistons, cylinder walls, or valves was observed.

Flight recorders

The helicopter was not equipped with a crashworthy flight data recorder, nor was it required by regulation.

Medical and Pathological Information

The Travis County Medical Examiner's Office performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was blunt trauma, and his manner of death was accident. Examination of the heart revealed ventricular and atrial dilatation, and the heart was described as enlarged. The pilot's coronary arteries were reported to be normal without atherosclerotic disease. The remainder of the autopsy including the heart did not reveal other significant natural disease.

The autopsy report stated that the Medical Examiner's Office performed postmortem toxicological testing that did not detect the presence of ethanol or common drugs of abuse or elevation of carbon monoxide.

The FAA Forensic Sciences Laboratory performed toxicology testing of postmortem specimens from the pilot. Ethanol was detected in cavity blood at 0.012 g/dL; ethanol was not detected in vitreous fluid or urine. N-propanol and acetone were detected in cavity blood and were not detected in vitreous fluid or urine. Cetirizine was detected in cavity blood at 121 ng/mL and in urine at 794 ng/mL. Norchlorcyclizine was detected in cavity blood and urine. Sildenafil was detected in urine; testing of cavity blood for sildenafil was inconclusive. Desmethylsildenafil and acetaminophen were detected in cavity blood and urine.

Additional Information

RHC has published Safety Notice SN-26, *Night Flight Plus Bad Weather Can Be Deadly*. This document states in part:

When it is dark, the pilot cannot see wires or the bottom of clouds, nor low hanging scud or fog. Even when he does see it, he is unable to judge its altitude because there is no horizon for reference. He doesn't realize it is there until he has actually flown into it and suddenly loses his outside visual references and his ability to control the attitude of the helicopter. As helicopters are not inherently stable and have very high roll rates, the aircraft will go quicky out of control, resulting in a high velocity crash which is usually fatal.

Be sure you never fly at night unless you have clear weather with unlimited or very high ceilings and plenty of celestial or ground lights for reference.

The FAA Civil Aeromedical Institute's publication, "Introduction to Aviation Physiology," defines spatial disorientation as a loss of proper bearings or a state of mental confusion as to

position, location, or movement relative to the position of the earth. Factors contributing to spatial disorientation include changes in acceleration, flight in instrument meteorological conditions (IMC), frequent transfer between visual meteorological conditions (VMC) and IMC, and unperceived changes in aircraft attitude.

The FAA Helicopter Flying Handbook FAA-H-8083-21B discusses visual flight rules flight into IMC and states in part:

Helicopter pilots that encounter inadvertent flight into instrument meteorological conditions (IIMC) may experience physiological illusions which can lead to spatial disorientation and loss of aircraft control.

Flying at night involves even more conservative personal minimums to ensure safety and avoidance of IIMC than daytime flying. At night, deteriorating weather conditions may be difficult to detect. Therefore, pilots should ensure that they not only receive a thorough weather briefing, but that they remain vigilant for unforecasted weather during their flight. The planned route should include preselected landing sites that will provide options to the pilot in the event a precautionary landing is required to avoid adverse weather conditions.

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Carl Newton; FAA San Antonio FSDO; San Antonio, TX Thom Webster; Robinson Helicopter Company; Torrance, CA Michael Childers; Lycoming Engines; Williamsport, PA
Report Date:	
Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=106842

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.