Aviation Investigation Final Report

Location:	Panacea, Florida	**Accident Number:**	ERA14FA115
Date & Time:	February 8, 2014, 19:45 Local	**Registration:**	N571AC
Aircraft:	ROBINSON HELICOPTER COMPANY R44 II	**Aircraft Damage:**	Substantial
Defining Event:	Collision during takeoff/land	**Injuries:**	2 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and two passengers departed on a local flight to a nearby airport. They arrived near sunset, dined at a local restaurant, and returned about 1 hour later. Multiple witnesses reported that the area where the helicopter was parked was dark on the night of the accident; the airport manager stated that the runway lights did not illuminate the trees at the end of the runway. After a preflight inspection, the pilot started the helicopter and announced his position and intentions over the common traffic advisory frequency. A passenger reported that she heard the pilot say, "here we go." The helicopter then impacted the tops of 50-ft-tall trees about 350 ft from the departure location. Examination of the airframe and wreckage revealed no mechanical malfunctions or anomalies that would have precluded normal operation.

The pilot had accumulated 1 hour of night flight experience in the 11 months before the accident flight. Given the dark night conditions at the time of departure and his lack of recent night flight experience, it is likely that the pilot was unaware of the trees and did not successfully navigate above the trees and away from the airport.

Review of the pilot's medical records and toxicology report revealed that he had been taking a disqualifying medication (pramipexole) since 2006. He reported the use of the medication during his aviation medical exam in 2012, and, although the medication should have been disqualifying, the aviation medical examiner issued the pilot a medical certificate. While symptoms of the disqualifying medication included "falling asleep while engaged in activities of daily living, including operation of motor vehicles," witnesses reported no abnormalities in the pilot's sleep patterns or behavior, including on the day of the flight. Based on witness statements and the pilot's long history of using this medication, it is likely that he was not affected by the medication's published symptoms during the flight.

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 adequate clearance from trees during a takeoff at night. Contributing to the accident was the pilot's lack of recent night flight experience.

Findings

Personnel issues	Monitoring environment - Pilot
Environmental issues	Tree(s) - Awareness of condition
Environmental issues	Dark - Contributed to outcome
Personnel issues	Recent experience - Pilot
Environmental issues	Dark - Effect on personnel

Factual Information

History of Flight

Takeoff	Collision during takeoff/land (Defining event)

On February 8, 2014, about 1945 eastern standard time, a Robinson R44 II, N571AC, was substantially damaged when it impacted trees after takeoff from Wakulla County Airport (2J0), Panacea, Florida. The private pilot and one passenger were fatally injured, and another passenger sustained serious injuries. The helicopter was registered to Capital Helicopters, LLC, and was operated by a flight school. Night visual meteorological conditions prevailed and no flight plan was filed for the flight, which was destined for Tallahassee Regional Airport (TLH), Tallahassee, Florida. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to the surviving passenger, the pilot planned to fly three passengers to 2J0 for dinner and return directly to TLH, which was a common flight for the pilot. On the day of the accident, the fourth occupant became ill and elected to stay home. The pilot and two passengers departed TLH about 1720 bound for 2J0. They flew a scenic route along the waterfront and landed at the north end of the airport. The pilot and his passengers finished dinner about 1935 and were then driven to the airport, which was located about 1 mile north of the restaurant. After a preflight inspection, the pilot started the helicopter and announced his position and intentions over the common traffic advisory frequency. The surviving passenger heard the pilot say, "here we go" and seconds later they impacted trees and came to rest inverted in shallow water.

Two witnesses observed the helicopter prior to the accident. One of the witnesses recalled seeing the helicopter parked at the end of runway 36 earlier that day with the tail facing north.

Witnesses who lived in the vicinity of the accident site were interviewed separately shortly after the accident and were asked to describe the weather and lighting conditions that prevailed at the time. The witnesses consistently described the lighting conditions as "dark" or "very" dark and overcast. The surviving passenger recalled a "thin misty fog" that was present at the time of the accident. A witness who lived about 1 mile south of the accident site described the weather conditions at the time of the accident as a dark night, overcast, with no fog. He also stated that the accident site was very dark and added there were no lights from the sky, airport or street that reached the accident site.

According to the surviving passenger, the pilot had requested that she sit in the left rear seat to "even out the weight and balance." A few seconds after takeoff, the passenger observed trees ahead of the helicopter and called out to the pilot prior to impact.

The surviving passenger also remarked that the pilot was "probably trying to fly the fastest route home" as he was intent on returning home to spend time with his daughter and had been gone longer than planned.

An employee at the restaurant where the pilot and two passengers had dinner, reported that the group

arrived about 1815. According to a receipt, none of the three patrons consumed alcoholic beverages. The customers paid their bill promptly and then exited the restaurant. The restaurant owner drove the customers to the airport.

Pilot Information

Certificate:	Private	**Age:**	49
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:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 5, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 5, 2012
Flight Time:	334.7 hours (Total, all aircraft), 189.1 hours (Total, this make and model)		

The pilot, age 49, held a private pilot certificate with a rating for rotorcraft-helicopter. His most recent Federal Aviation Administration (FAA) second-class medical certificate was issued on April 5, 2012 with the limitation, "must wear corrective lenses for near and distant vision." The pilot did not possess an instrument rating.

The pilot obtained most of his flight training for his private pilot certificate through Tallahassee Helicopters. After he received his private pilot certificate in 2012, he continued to rent helicopters from the flight school.

According to the pilot's logbook, as of February 1, 2014 the pilot had accumulated 334.8 total hours of flight experience, 309 hours of which were in helicopters. The pilot recorded at least 189.2 hours of flight experience in the accident helicopter make and model. He had also accumulated 22.6 total hours of night flight experience and only one hour of night flight experience in the preceding 11 months.

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER COMPANY	**Registration:**	N571AC
Model/Series:	R44 II	**Aircraft Category:**	Helicopter
Year of Manufacture:	2005	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	10602
Landing Gear Type:	N/A; Skid	**Seats:**	4
Date/Type of Last Inspection:	November 15, 2013 100 hour	**Certified Max Gross Wt.:**	2500 lbs
Time Since Last Inspection:	51 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	997.3 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C91A installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-540-AE1A5
Registered Owner:	CAPITAL HELICOPTERS LLC	**Rated Power:**	225 Horsepower
Operator:	Tallahassee Helicopters, Inc.	**Operating Certificate(s) Held:**	None

The accident helicopter was based at TLH and operated by Tallahassee Helicopters. According to FAA records, the accident helicopter was manufactured in 2005. The helicopter was powered by a Lycoming IO-540-AE1A5 245 hp engine and driven by a two-blade main rotor system. The helicopter's most recent 100-hour inspection was completed on November 15, 2013; at the time it had accumulated 946.4 hours total time in service (TTIS). At the time of the accident the helicopter had accumulated 997.3 TTIS.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	KTLH,68 ft msl	**Distance from Accident Site:**	24 Nautical Miles
Observation Time:	00:53 Local	**Direction from Accident Site:**	5°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.14 inches Hg	**Temperature/Dew Point:**	11°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Panacea, FL (2J0)	**Type of Flight Plan Filed:**	None
Destination:	TALLAHASSEE, FL (TLH)	**Type of Clearance:**	None
Departure Time:	19:45 Local	**Type of Airspace:**	

A review of airports within a 50 nautical miles radius of the airport showed similar meteorological conditions.

The following weather observations were recorded at TLH, which was located about 24 nautical miles from the accident site, at an elevation of 83 feet msl:

At 0053, calm wind; visibility 10 statute miles; clear skies; temperature 11 degrees C, dew point 8 degrees C; altimeter 30.15 inches of mercury.

A representative of the National Weather Service (NWS) based in Tallahasee, Florida stated there were no weather reporting facilities closer than 24 nautical miles from the accident site that captured visibility and cloud ceilings at the time of the accident.

According to the U.S. Naval Observatory, on the date of the accident, sunset occurred at 1820 and civil twilight ended at 1845. The moon rise was recorded at 1320, and was observed in transit at 2019 and set at 0320 on the following day. About 68% of the moon disc was illuminated at the time of the accident.

Airport Information

Airport:	WAKULLA COUNTY 2J0	**Runway Surface Type:**	Grass/turf
Airport Elevation:	11 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	2590 ft / 70 ft	**VFR Approach/Landing:**	None

The departure airport was located about 350 feet east of the accident site. The airport comprised of one turf runway, which measured 2,590 feet long and 70 feet wide and was equipped with low intensity runway edge lights. There was a clear area at the north end of the

airport, where the helicopter had departed from. According to the manager, the runway lights did not illuminate the trees that bordered the west side of the runway. A rural neighborhood surrounded the airport to the east and west. There was also a highway adjacent to the northern tip of the airport that ran northwest.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal, 1 Serious	**Latitude, Longitude:**	29.989444,-84.391113

The accident site was located in a marsh area bordered by trees about 350 feet from the helicopter's departure point. The initial impact point was identified by several damaged tree limbs about 50 feet above the ground, which were about 25 feet from the helicopter's final resting location. The wreckage path was oriented about 340 degrees magnetic and extended from the initial impact point to where the main wreckage came to rest. The main wreckage was inverted in water and oriented on a northerly heading. The middle wire of a three strand power line, also located in the wreckage path, was severed during the accident and repaired before NTSB investigators arrived on scene. There were no indications of pre or postimpact fire.

The wreckage was subsequently recovered from the accident scene and examined at a nearby law enforcement facility.

The tailboom remained attached to the fuselage and was severed about three feet from the tail rotor section. The severed tail section consisted of the tailboom structure, horizontal stabilizer, the upper and lower vertical stabilizers, and the tail rotor. The forward 10-foot section of the tailboom was canted to the left. There was no visible damage to both tail rotor blades, which also remained attached to the tail rotor gearbox. The horizontal and upper vertical stabilizers were intact, and the lower vertical stabilizer exhibited some compression damage.

The main rotor mast was impact separated from the helicopter and co-located with the main wreckage. For reference purposes, the two main rotor blades were arbitrarily designated "A" and "B". Blade "A" was bent about 45 degrees downward and segmented into thirds with most of the blade spar still intact and attached to the main rotor hub. The remaining 10 inches of "Blade A" blade spar were not recovered. The middle third section of the blade was partially separated and the remaining outboard third of the blade was fracture-separated parallel to the blade chord. Blade "B" was bent down about 30 degrees and remained intact to the blade tip. The skin and honeycomb section of the remaining 2 feet of blade had separated. Both blades exhibited compression and impact damage.

The drive belts were broken, but exhibited no signs of rolling. Both the upper and lower actuator bearings rotated freely and the sprag clutch locked and free-wheeled normally. The main rotor gearbox was detached from the airframe, broken into several pieces, and rotated freely.

The engine starter ring gear exhibited linear scoring that was parallel in direction to the gear's rotation. The aft surface of the upper sheave displayed circular scoring and the upper drive belt sheave exhibited multiple scores across its grooves that were consistent with machining marks.

Examination of the flight control system revealed separations consistent with overload on multiple push-pull tubes. There were additional separations within the cyclic stick assembly, cyclic torque tube, and the Blade "B" pitch change link. Control continuity for the cyclic, collective, and anti-torque systems was established and all separations were consistent with overload fractures. All separations in the tail rotor driveshaft were consistent with bending overload. Main and tail rotor gearbox continuity was confirmed.

Both fuel bladder tanks were separated from the main wreckage. The fuel caps remained attached to their respective fuel tanks. The fuel lines were torn at the line outlets, but intact from the tear to the engine. Fuel line continuity was confirmed through the vent lines in the mast fairing, vent fittings on both tanks, interconnect hose, vent hoses and main tank rollover valve.

The engine remained mounted within the engine compartment. The crankshaft was rotated by hand and valve-train continuity and thumb compression were observed on all cylinders. Both magnetos remained attached to the engine and produced spark at their respective spark plug ends when tested by hand rotation of the engine.

All spark plugs were removed and inspected with the exception of cylinder No. 6 top spark plug, which could not be removed due to airframe damage. Each spark plug electrode was intact and displayed "normal" combustion signatures when compared with a spark plug wear chart, with the exception of cylinder No. 5 top spark plug, which was oil fouled. A borescope examination of all cylinders did not reveal any abnormalities.

Examination of the airframe, engine, and drive systems did not reveal any evidence of preimpact mechanical malfunctions.

Medical and Pathological Information

An autopsy was performed on the pilot by the District Two Office of the Medical Examiner, Tallahassee, Florida. The cause of death was listed as "multiple blunt force trauma."

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on the pilot. No carbon monoxide or ethanol were detected in the samples submitted. The testing detected the presence of Citalopram and n-desmethylcitalopram in the blood in quantities of 0.398 ug/mL and 0.533 ug/mL, respectively. Citalopram, marketed under the trade name Celexa, is a selective serotonin reuptake inhibitor antidepressant and desmethylcitalopram is the

metabolite. The testing also detected an unquantified amount of desmethylsildenafil, dextromethorphan, dextrorphan, and pramipexole in the blood and liver samples submitted. Dextrorphan is the metabolite of dextramoethorphan, a cough suppressant found in common over the counter medications. Unquantified amounts of Citalopram and n-desmethylcitalopram were also detected in the pilot's liver.

Review of the pilot's personal medical history revealed that he had been taking pramipexole since 2006. Pramipexole, marketed under the trade name Mirapex, is a dopamine agonist used to treat Parkinsons disease and restless leg syndrome. Mirapex use is associated with serious risks including "falling asleep while engaged in activities of daily living, including operation of motor vehicles;" hypotension, hallucinations, and major behavioral changes. On April 5, 2012, the pilot reapplied for a second class medical certificate, at which time he reported Zocor, Trilipix, and Mirapex. Although Mirapex is a disqualifying drug, the pilot's Aviation Medical Examiner noted it as "previously reported" and subsequently issued him a second-class medical certificate.

Additional Information

72-hour History

Follow-up interviews with both the pilot's daughter and the pilot's girlfriend were used to construct a 72-hour history. On the night of Thursday, February 6, 2014, the pilot drove home to Tallahassee, Florida, from Jacksonville, Florida after a work related meeting. The following day the pilot drove to his girlfriend's house about 1600 and subsequently returned home about 1830. He conversed with his daughter for about 30 minutes before going to dinner with his girlfriend. At 1530 on the day of the accident, the pilot and his girlfriend picked up the second passenger from his home and subsequently drove to the pilot's house to collect his airport badge before driving to the airport. The pilot's daughter and girlfriend observed no abnormalities in the pilot's behavior or sleep patterns during these three days.

Night Flight

According to the Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25A),

"While the cones adapt rapidly to changes in light intensities, the rods take much longer. Walking from bright sunlight into a dark movie theater is an example of this dark adaptation period experience. The rods can take approximately 30 minutes to fully adapt to darkness. A bright light, however, can completely destroy night adaptation, leaving night vision severely compromised while the adaptation process is repeated."

According to the Robinson Helicopter Company R-44 Helicopter Pilot's Operating Handbook (2-7 Limitations),

"Orientation during night flight must be maintained by visual reference to ground objects illuminated solely by lights on the ground or adequate celestial illumination."

Airport Lighting Safety Advancement

The investigation revealed there were no lights to illuminate the trees that were struck by the helicopter during the accident. The Florida Department of Transportation installed a light at the northwestern end of the airport in March 2015 to illuminate the affected trees.

Administrative Information

Investigator In Charge (IIC):	Stein, Stephen
Additional Participating Persons:	Linda Nevins; FAA/FSDO; Tampa Bay, FL Ken Martin; Robinson Helicopter Company; Torrance, CA John Butler; Lycoming Engines; Dallas/Ft. Worth, TX
Original Publish Date:	September 29, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=88777