Aviation Investigation Final Report

Location:	Cherokee, Alabama	**Accident Number:**	ERA15FA178
Date & Time:	April 6, 2015, 13:00 Local	**Registration:**	N555JC
Aircraft:	Hughes 369D	**Aircraft Damage:**	Substantial
Defining Event:	Loss of visual reference	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The commercial pilot of the helicopter positioning flight delayed the takeoff for inclement weather to pass. However, about 1/2 hour after taking off, the helicopter encountered rain, fog, and low-visibility, gray-lighting conditions. The helicopter approached a 1-mile wide river, landed briefly onshore, then took off again and began a low-altitude crossing while paralleling a bridge. The helicopter was observed at an estimated 25 feet above the river before it began descending at a 10- to 15-degree angle into the water about mid-way through the crossing. It impacted the water nose-low, left side down, at a sufficient speed for the witness to see the tail "kick over" the main rotor blades and snap off. There were no onboard recording devices to confirm what occurred. No preexisting anomalies were found with the helicopter, and no medical issues were identified that would have affected the pilot's performance. The reason that the pilot landed before crossing the river could not be determined. Although the pilot's attention could have been momentarily diverted, it was more likely that the rainy, gray, reduced-visibility conditions resulted in low altitude spatial disorientation.

Probable Cause and Findings

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

The pilot's spatial disorientation during a low-level river crossing in rainy, gray, reduced visibility meteorological conditions, which resulted in the helicopter's subsequent descent and impact with the water. Contributing to the accident was the pilot's decision to attempt the low-level crossing under those meteorological conditions.

Findings

Aircraft	Altitude - Not attained/maintained
Personnel issues	Spatial disorientation - Pilot
Personnel issues	Decision making/judgment - Pilot

Factual Information

History of Flight

Enroute-cruise	Loss of visual reference (Defining event)
Enroute-cruise	Altitude deviation
Enroute-cruise	Controlled flight into terr/obj (CFIT)

On April 6, 2015, about 1300 central daylight time, a Hughes 369D, N555JC, operated by Haverfield Aviation, Inc., was substantially damaged when it impacted the Tennessee River adjacent to the Natchez Trace Bridge, near Cherokee, Alabama. The commercial pilot was fatally injured. Low ceilings and fog prevailed. A company flight plan was filed for the flight, which originated at Roscoe Turner Airport (CRX), Corinth, Mississippi, about 1230, destined for Scottsboro Municipal Airport-Word Field (4A6), Scottsboro, Alabama. The positioning flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

According to a witness, a former private pilot, he heard the helicopter land in a National Park Service field contiguous to his property, on the north side of the river, about 3,900 feet from the 1-mile-long, north-south Natchez Trace Parkway Bridge. He couldn't see the bridge at the time due to fog and light mist.

The helicopter remained on the ground for about 45 seconds, still powered with rotors turning; then power increased and it took off smoothly, clearing trees by about 30 feet. The helicopter subsequently headed toward the bridge, and after about 10 to 15 seconds, the witness lost sight of it in the fog. As the helicopter flew, the witness heard no anomalies, and the engine sounded "healthy." He subsequently heard the helicopter hit the water with no change in sound until impact.

According to another witness, he was fishing under the south end of the bridge when the accident occurred. The weather was foggy with low visibility and rain.

The witness heard the helicopter for about 10 to 15 minutes before eventually seeing it crossing the river, then saw it coming toward him, paralleling the west side of the bridge. When he first saw the helicopter through the fog, it was level with the top of the bridge. It began a gradual descent, then about 10 seconds before water impact, dropped to about 25 feet above the water. It subsequently descended at a 10- to 15-degree angle (and from a partial reenactment, described as a "gradual flight in"), and impacted the water near the center of the river, about 50 to 100 feet east of a green buoy (about 100 yards west of the bridge.)

There was no change in sound before the helicopter hit the water, with the same "whining" noise until impact. At impact, the witness saw the helicopter's tail "kick over" the top of the main rotor blades and snap off. The helicopter did not hit the bridge.

Pilot Information

Certificate:	Commercial	**Age:**	54
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 29, 2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 27, 2013
Flight Time:	6884 hours (Total, all aircraft), 2079 hours (Total, this make and model), 5259 hours (Pilot In Command, all aircraft), 110 hours (Last 90 days, all aircraft), 52 hours (Last 30 days, all aircraft)		

The pilot, age 54, held a commercial pilot certificate with helicopter rating. He also held an instrument-helicopter rating. According to a report submitted by the operator, the pilot had accumulated 6,884 hours of flight time, all in rotorcraft, 2,079 hours in make and model, and 52 hours in the previous 30 days. The pilot's latest FAA second class medical certificate was obtained on February 1, 2015.

The mechanic reported to company personnel that he had picked up the pilot at Memphis International Airport, Memphis, Tennessee, the night before and they had dinner together. They also had breakfast the morning of the accident, and that the pilot's "demeanor was great." They spoke about the pilot's health and he said he just completed a flight physical and his cholesterol was low; "he felt great."

Aircraft and Owner/Operator Information

Aircraft Make:	Hughes	**Registration:**	N555JC
Model/Series:	369D	**Aircraft Category:**	Helicopter
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	180256D
Landing Gear Type:	Skid	**Seats:**	5
Date/Type of Last Inspection:	February 23, 2015 100 hour	**Certified Max Gross Wt.:**	3000 lbs
Time Since Last Inspection:	48 Hrs	**Engines:**	Turbo shaft
Airframe Total Time:	9813 Hrs as of last inspection	**Engine Manufacturer:**	Rolls Royce
ELT:	C126 installed, not activated	**Engine Model/Series:**	250-C20B
Registered Owner:	HAVERFIELD INTERNATIONAL INC	**Rated Power:**	420 Horsepower
Operator:	HAVERFIELD INTERNATIONAL INC	**Operating Certificate(s) Held:**	Rotorcraft external load (133), On-demand air taxi (135), Agricultural aircraft (137)
Operator Does Business As:		**Operator Designator Code:**	HXFA

The helicopter was powered by a Rolls Royce 250-C20B engine, driving a rotor head with five metal rotor blades. The airframe had accumulated 9,813 hours of operation, and the engine had accumulated 13,181 hours of operation. There were no recording devices onboard the helicopter. Flight instrumentation was limited to an airspeed indicator, an attitude indicator, an altimeter, and a vertical speed indicator.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MSL,550 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	18:18 Local	**Direction from Accident Site:**	100°
Lowest Cloud Condition:		**Visibility**	1 miles
Lowest Ceiling:	Overcast / 800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	17°C / 16°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Corinth, MS (CRX)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Scottsboro, AL (4A6)	**Type of Clearance:**	None
Departure Time:	12:30 Local	**Type of Airspace:**	Class G

Weather, recorded at Northwest Alabama Regional Airport (MSL), Muscle Shoals Alabama, about 20 miles to the southeast, at 1318, included calm winds, 1 statute mile visibility, heavy rain, fog, and an overcast cloud layer at 800 feet.

Photographs taken from under the southern end of the bridge, just before the accident, revealed medium gray skies, and in the distance (from the shoreline where the helicopter came), a darker gray band of trees and terrain partially shrouded in fog. The water was a darker gray interspersed with bands of lighter gray.

The helicopter's mechanic noted that the pilot and he had waited at their hotel until bad weather had passed, and once that occurred, pilot then launched to pass behind it.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.842777,-87.934448(est)

The helicopter was recovered from the river on April 9, 2015. It was missing the aft part of the tail boom, including the tail rotor and gear box, from about 33 inches (fuselage station 230) aft of the tail boom mount, and only remnants of one main rotor blade were subsequently recovered; the other blades remained missing. The left skid was also missing.

Damage began at the helicopter's front, lower left side, and extended upwards. There was no hydraulic crushing (water impact damage) to the bottom of the fuselage.

Control continuity was confirmed from the cockpit to the rotor head, both vertically through the collective, and laterally and longitudinally through the cyclic. Yaw control through the rudder pedals was confirmed from the cockpit to the remnants of the "long tail rotor control rod" in the severed tail boom.

Rotor system drive continuity was confirmed from the engine to the transmission, the transmission to the rotor hub, and from the transmission aft to where the tail rotor drive shaft was severed along with the tail boom.

Three of the five rotor blades were fractured just outboard of the doubler at the main rotor root fitting, and two blades were fractured through the strap assemblies and blade pitch housings, consistent with full power on the rotor system at water impact. Extensive damage was also found on the hub upper shoe in the vicinity of all five pitch change housings, consistent with a medium-to-high collective setting at the time of impact.

The longitudinal and lateral trim actuator assemblies were subsequently removed and the ram positions were measured with both indicating mid-travel positions. The actuator motors were also tested, with one initially being able to run full travel, but subsequently failing to run, and, the other, which had an indent mark on it, not being able to run.

Medical and Pathological Information

The pilot's body was recovered on April 14, 2015, about 7 miles downriver from the accident site. The next day, an autopsy was performed at the Alabama Department of Forensic Sciences, Huntsville, Alabama, where cause of death was determined to be "blunt force injuries and drowning," and manner of death was determined to be "accident."

Toxicological testing was subsequently performed at the FAA's Civil Aerospace Medical Institute, Oklahoma City, Oklahoma, where pseudoephedrine was found in a liver sample and urine, and ephedrine was found in urine.

According to the National Institute of Health website, pseudoephedrine is an over-the-counter decongestant, and ephedrine is its metabolic byproduct.

Ethanol, butanol and propanol were also found in various samples, consistent with postmortem production from the body's extended time in the water.

Additional Information

Because the helicopter was not initially located, NTSB did not immediately respond. The helicopter was located on April 7, 2015, and the NTSB Investigator in Charge arrived early on April 8, 2015. Initial witness information was obtained by Haverfield Aviation personnel on April 7, 2015, with follow-up information obtained as needed by NTSB. In addition, FAA Flight Standards District Office inspectors from Birmingham, Alabama, would have normally responded to the accident, but due to office-wide training, inspectors from the Nashville, Tennessee, office responded.

Administrative Information

Investigator In Charge (IIC):	Cox, Paul
Additional Participating Persons:	Richard Horner; FAA/FSDO; Nashville, TN John Hobby; The Boeing Company; Mesa, AZ Joan Gregoire; MD Helicopters; Mesa, AZ Stan Braun; Haverfield Aviation; Gettysburg, PA Jon Michael; Rolls Royce; Indianapolis, IN
Original Publish Date:	June 27, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91003