Aviation Investigation Final Report

Location:	New Salem, North Carolina	**Accident Number:**	ERA20FA012
Date & Time:	October 17, 2019, 15:38 Local	**Registration:**	N167AG
Aircraft:	Bell 206	**Aircraft Damage:**	Substantial
Defining Event:	Collision with terr/obj (non-CFIT)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The pilot was conducting an aerial application flight in the helicopter. During the relocation flight from the previous site, the pilot overflew the application area and a powerline before landing on a truck near the northwest end of the field to refill the helicopter's chemical reservoir. A witness described a normal liftoff and departure from the truck. The helicopter proceeded north along the west side of the field before turning south, then he heard a "pop" that he attributed to the helicopter striking a powerline wire before he saw the helicopter descend and impact the field. Postaccident examination of the helicopter revealed that a section of a nearby powerline was entangled with the main and tail rotor drive systems, consistent with the helicopter having struck those wires.

Probable Cause and Findings

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

The pilot's inadequate visual lookout, which resulted in impact with a powerline.

Findings

Personnel issues	Identification/recognition - Pilot
Environmental issues	Wire - Awareness of condition

Factual Information

History of Flight

Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT) (Defining event)

On October 17, 2019, about 1538 eastern daylight time, a Bell 206B Helicopter, N167AG, was substantially damaged when it was involved in an accident near New Salem, North Carolina. The commercial pilot was fatally injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 137 local aerial agricultural application flight.

According to the operator's lead ground crew member for the spraying missions on the day of the accident, the pilot performed a preflight inspection of the helicopter about 0745 at their local base. After completing a total of 21 spraying loads at the other locations, the team transitioned to the field where the accident occurred. The ground support truck arrived first and was staged near the northwest corner of the field.

The ground crew member reported that the helicopter approached the area from the north, overflew the field to be sprayed, then landed on the truck to refill the chemical reservoir. After refilling, he dispatched the helicopter using hand signals. He reported that the helicopter departed to the north, turned left to a southerly heading, and flew along the west side of the field. Shortly thereafter, he heard a pop that he attributed to a [powerline] wire breaking, then he turned around and saw the helicopter travel about 30 yards before impacting the ground.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	54,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 None	**Last FAA Medical Exam:**	February 19, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 1, 2018
Flight Time:	5670 hours (Total, all aircraft), 5427 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N167AG
Model/Series:	206 B	**Aircraft Category:**	Helicopter
Year of Manufacture:	1974	**Amateur Built:**	
Airworthiness Certificate:	Normal; Restricted (Special)	**Serial Number:**	1482
Landing Gear Type:	Skid	**Seats:**	5
Date/Type of Last Inspection:	October 4, 2019 100 hour	**Certified Max Gross Wt.:**	3200 lbs
Time Since Last Inspection:	62 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	9799.2 Hrs as of last inspection	**Engine Manufacturer:**	Rolls-Royce
ELT:	Not installed	**Engine Model/Series:**	250C20
Registered Owner:	Vertical Flight Technologies	**Rated Power:**	370 Horsepower
Operator:	Vertical Flight Technologies	**Operating Certificate(s) Held:**	Agricultural aircraft (137), Commercial space transp. experimental permit

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:	19:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	19°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Albemarle, NC	**Type of Flight Plan Filed:**	None
Destination:	Albemarle, NC	**Type of Clearance:**	None
Departure Time:	08:15 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	35.149166,-80.36222

Examination of the accident site area revealed damage to powerlines that were oriented south to north. (see Figure 1.) The helicopter was on a north-northwest heading when it struck the wire between poles 1 and 2, near pole 2.

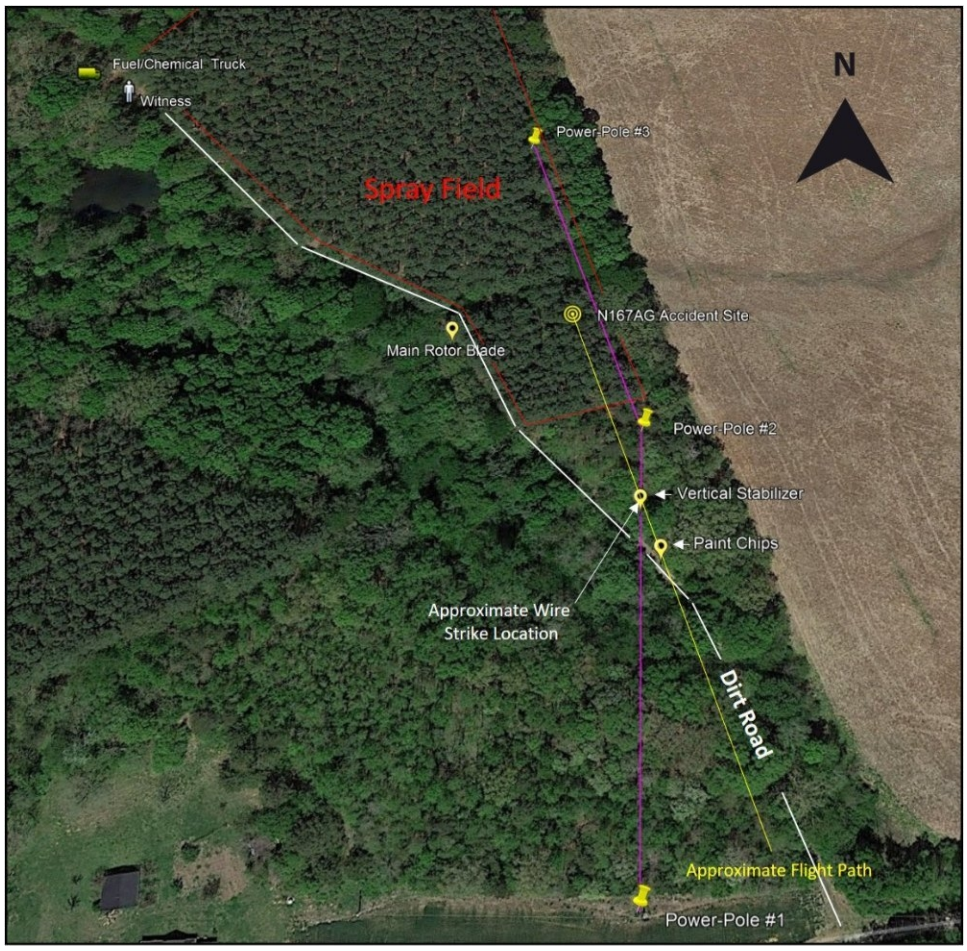

Figure 1 – Accident location.

The helicopter came to rest on its right side, nose low, oriented on a heading of 351°. All major components were located with the main wreckage, with the exception of two pieces. (1) a 9’ 5” section of one rotor blade was located 123 feet to the southwest of the main wreckage. (2) a 12-inch section of the vertical stabilizer was located 198 feet south/southeast of the main wreckage, directly below the wire

path between pole 1 and pole 2. The main rotor mast was fractured about 2 inches below the bottom of the hub. The hub and blades were located about 5 feet to the west side of the main wreckage with both blade grips attached and about 3 feet of each blade intact. The left side horizontal stabilizer was fractured from the tail boom and was found next to the tail rotor hub and blade assembly.

A section of powerline wire ran from the nose of the helicopter over the top of the cockpit, and about three rotations were wrapped around the main rotor mast and entangled in the spray system. About five rotations of wire were wrapped around the tail rotor hub and blade assembly. The fuel tank bladder remained in place but was breached. The debris field was on a heading of 339° from the vertical stabilizer to the main wreckage.

Flight control system continuity was established from the pilot side cyclic and collective controls through the push-pull control tubes to the three hydraulic servo actuators. Continuity was confirmed from the servos through overload breaks in the control tubes to the swashplate assembly on the main rotor mast. The blade pitch change links remained attached at both ends and were fractured consistent with overload. Control continuity was established from the anti-torque pedals to the tail rotor hub and blade assembly. The tail rotor blade pitch change links remained intact and attached. Examination of the throttle linkage confirmed throttle continuity to the engine. The copilot side cyclic and collective controls were not installed.

Postaccident examination of the engine, which remained attached to the engine mounts, revealed damage to the compressor air inlet. The compressor blades could not be rotated by hand, and rotational scoring was observed on the top of the air inlet housing.

The main gearbox was found rotated aft about 45°, and the engine to transmission drive shaft was pulled from the main gear box attachment fitting. The main gear box was repositioned upright, and the mast rotated freely by hand. The aft end of the engine to transmission shaft remained attached to the engine reduction gear box.

The tail rotor shaft was fractured just forward of the horizontal stabilizer. The shaft remained attached to the engine reduction gear box and showed rotational scoring just forward of the fracture. When the tail rotor shaft was rotated, the freewheeling unit engaged, and when it was rotated in the opposite direction, it turned freely. The shaft aft of the fracture was continuous to the tail rotor gear box, which turned freely when rotated by hand.

Medical and Pathological Information

An Autopsy of the pilot was performed by the Mecklenburg County Medical Examiner’s Office, Charlotte, North Carolina, the pilot's cause of death was blunt trauma injuries of the head and neck.

Toxicology testing performed at the FAA Forensic Sciences Laboratory detected no carbon monoxide, volatiles, or drugs.

Additional Information

Spray Information/GPS Data

The helicopter was equipped with an AGNAV GUIA Platinum P771 cockpit display recorded data about three times per second and recorded a portion of the accident flight. The device stopped recording about 35 to 40 seconds before the helicopter impacted the electrical wire.

According to the operator, “The incident could have been prevented with more thorough field recon” and “more eyes on the site prior to the aircraft arriving.” He also stated that relaying better information to the pilot about the ground conditions could have prevented the accident.

Administrative Information

Investigator In Charge (IIC):	Wentz, Peter
Additional Participating Persons:	Michael R Moran; FAA - FSDO; Charlotte, NC Paul E Fodor; FAA - FSDO; Charlotte, NC
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