Aviation Investigation Final Report

Location:	Shepherd, Montana	**Accident Number:**	WPR13FA208
Date & Time:	April 27, 2013, 08:30 Local	**Registration:**	N150SP
Aircraft:	Bell 206B	**Aircraft Damage:**	Substantial
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was maneuvering at low altitude during cattle herding operations. The helicopter collided with power lines and subsequently impacted terrain. Power lines were found wrapped around the main rotor mast about 25 times. Postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

A small amount of acute blood was found in the left ventricle of the pilot's brain, but no significant traumatic injuries were found; thus, it is likely the hemorrhage occurred during an acute premortem event. Given the autopsy findings and that the pilot knew the flying area well and would have likely known where the power lines were located, it is likely that he was impaired or incapacitated by an acute neurologic event in the seconds before impact with the power lines.

Probable Cause and Findings

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

The pilot's loss of control while maneuvering during low-altitude operations due to sudden neurological impairment or incapacitation and the helicopter's subsequent collision with power lines.

Findings

Personnel issues	Neurological - Pilot
Environmental issues	Wire - Awareness of condition

Factual Information

History of Flight

Maneuvering	Controlled flight into terr/obj (CFIT) (Defining event)
Post-impact	Ground collision
Post-impact	Fire/smoke (post-impact)

On April 27, 2013, about 0830 mountain daylight time, a Bell 206B helicopter, N150SP, impacted power lines and terrain while maneuvering north of Shepherd, Montana. The helicopter was registered to Tongue Canyon Aviation, LLC, Worden, Montana, and operated by the pilot under provisions of Title 14 Code of Federal Regulations Part 91. The private pilot, the sole occupant of the helicopter, was fatally injured. The helicopter received substantial damage to the fuselage and rotor system. Visual meteorological conditions prevailed and no flight plan was filed. The local flight originated from the helicopter's home base in Worden, Montana at about 0730 to help with the herding of cattle on a field north of Shepherd.

A witness, who was a ranch hand, stated that the helicopter was maneuvering about 100-200 feet above the ground. The witness reported that the helicopter was north bound and flying in the direction of high tension power transmission lines. Shortly after losing sight of the helicopter, he heard two "whoosh" sounds, and about 5 seconds later, he heard a "boom" sound. He then saw black smoke in the direction of the sounds.

According to local law enforcement personnel, the helicopter impacted two single phase overhead power lines near the accident site.

Pilot Information

Certificate:	Private	**Age:**	81
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	June 23, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	7500 hours (Total, all aircraft)		

The pilot, age 81, held a private pilot certificate with an airplane single-engine land, multi-engine land, and instrument airplane rating. He also held a private pilot certificate for rotorcraft.

The pilot had been involved in a prior accident on March 5, 2007, (NTSB ID No. SEA07CA069), in which he failed to maintain clearance from a piece of farm equipment that had been parked near his landing location. The probable cause of that accident was "The pilot's failure to maintain clearance between the tail rotor of his helicopter and a piece of farm equipment during the landing sequence."

A third-class airman medical certificate was issued on June 23, 2011, with limitations that he must wear corrective lenses for near and distant vision. The pilot reported on his most recent medical certificate application that he had accumulated about 7,500 total flight hours and 50 hours in the last six months.

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N150SP
Model/Series:	206B	**Aircraft Category:**	Helicopter
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2216
Landing Gear Type:	High skid	**Seats:**	5
Date/Type of Last Inspection:	August 8, 2012 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	10417 Hrs as of last inspection	**Engine Manufacturer:**	Allison
ELT:	Installed, not activated	**Engine Model/Series:**	250-C20
Registered Owner:	On file	**Rated Power:**	317 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The five-seat, 2-bladed, Bell 206B helicopter, serial number (S/N) 2216, was manufactured in 1977, and was powered by an Allison 250-C20B engine, rated at 420 shaft horsepower. The helicopter was maintained under a manufacturer's approved inspection program. Its most recent required maintenance inspection was completed on August 8, 2012. At that time, the airframe and engine had accrued 10,417 total hours of operation.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KBIL,3570 ft msl	**Distance from Accident Site:**	21 Nautical Miles
Observation Time:	13:53 Local	**Direction from Accident Site:**	216°
Lowest Cloud Condition:	Few / 12000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	230°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	13°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Worden, MT	**Type of Flight Plan Filed:**	None
Destination:	Shepherd, MT	**Type of Clearance:**	None
Departure Time:	07:15 Local	**Type of Airspace:**	Class G

A review of recorded data from the Billings International Airport, Billings, Montana, automated weather observation station, about 24 nautical miles southwest of the accident site, revealed that at 0653 conditions were; wind 230 degrees at 11 knots, visibility 10 statute miles, few clouds at 12,000 feet, temperature 13° Celsius, dew point minus 2° Celsius, and an altimeter setting of 30.07 inches of Mercury. Using the reported weather conditions and field elevation, the calculated density altitude was about 3,805 feet.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	Unknown
Total Injuries:	1 Fatal	**Latitude, Longitude:**	46.088611,-108.246391

Examination of the accident site revealed that the helicopter impacted a low level power line and terrain about 10 statute miles north-northeast of Shepherd, Montana. The wreckage debris was contained within an area of about 70 feet in diameter and was mostly consumed by post-impact fire. The two power lines that were severed by the helicopter had been repaired prior to the examination, and ran directly above the main wreckage. The two supporting power poles were not damaged. The left rear entry door was found near the main wreckage and had thermal damage on its lower exterior surface. A main rotor blade tip section and one tail rotor blade section was found about 100 feet from the main wreckage. The

fuselage came to rest on a heading of about 217-degrees and the tail boom was oriented on a heading of about 312-degrees magnetic. All major structural components of the helicopter were located throughout the accident site.

The engine was found in the upright position with impact damage to the left induction tube and crush damage to the exhaust pipes and freewheeling unit cover assembly. The induction inlet had impact damage to the trailing edge of all stator blades and the first stage of compressor blades.

The main rotor transmission was lying on its side with the intact main rotor mast pointing aft and downhill, and exhibited thermal damage. The transmission was located forward of the engine in the wreckage debris. Power cable was wrapped around the mast about 25 times. The swashplate assembly was manipulated by hand and appeared to be functionally operational.

The main rotor blades remained attached to the mast and were able to be manipulated by hand in the pitch axis. Both main rotor blade grips were fractured and the fractures were consistent with mechanical overload. The rotor blade laying downhill, was mostly deformed by a post-impact fire and had remnants of power line cable lying next to its mid-section. A 2-foot section of the blade tip had separated and was found about 100 feet from the main wreckage. The rotor blade lying uphill, exhibited significant impact damage about one-third of the way outboard of the blade root. The blade's afterbody was not evident.

The tailboom assembly was lying on its right side and was grossly deformed due to extreme thermal damage. The outline of the tailboom, horizontal stabilizer, and vertical fin assembly were clearly visible in the ash. The segmented tail rotor driveshaft was thermally damaged and not clearly defined; however, the Thomas couplings and related adapters were observed in their relative positions in the tailboom debris. The tail rotor gearbox and tail rotor blade assembly was located in its appropriate position in the tailboom debris. The tail rotor gearbox exhibited thermal damage, and was unable to be rotated by hand. One tail rotor blade was fractured near the tail rotor blade grip and the remainder of that blade was located within inches of the tail rotor assembly. The other tail rotor blade was fractured in a similar location; however, the remainder of that blade was located about 100 feet from the tailboom assembly.

The high-skid landing gear was fractured in multiple locations. The right-hand skid tube was fractured on both sides of the forward cross tube attach point and forward of the aft cross tube attach point. The forward cross tube was fractured outboard of the fuselage attach point. The left-hand skid tube was fractured forward of the aft cross tube attach point. The aft end of both skids remained attached to the aft cross tube; the aft end of the right-hand skid tube was bent upward about 45 degrees. Both skid tubes forward of the forward cross tube attach points were unremarkable. The remaining part of each skid tube exhibited thermal damage. The right-hand skid, right-hand step, and forward cross tube were located inverted with the skid toe and forward end of the step pointing upward at about a 45 degree angle.

Medical and Pathological Information

The NTSB's chief medical officer reviewed the pilot's autopsy, toxicology report, the FAA blue ribbon medical file, and the NTSB IIC's reports.

During the medical officer's review of the pilot's medical records on file with the FAA's airman branch, it was revealed that the pilot suffered a blood clot (deep venous thrombosis and pulmonary embolism) in 1994 and began anticoagulation therapy with Warfarin (a blood thinner). In 1997 he had thyroid surgery and in 2008 he reported paroxysmal atrial fibrillation and hypothyroidism to the FAA. Over the years, he reported multiple orthopedic surgeries and in 2008 reported cataract surgery and carotid artery surgery. After providing supplemental information, the pilot routinely received special issuance, time-limited medical certificates. He was medically certified at the time of the accident.

Forensic Medicine and Pathology, PLLC, in Billings Montana, conducted an autopsy on the pilot on May 1, 2013. The autopsy report revealed no significant traumatic injuries and determined that smoke inhalation was the cause of death, secondary to fire following a helicopter accident. Other significant conditions identified included hypertensive and atherosclerotic cardiovascular disease. During the examination of the head, 3cc of acute hemorrhage was found in the left lateral ventricle. In conclusion, the medical examiner reported, "the small area of hemorrhage in to the ventricles is in an area not usually associated with trauma, but rather could be associated with hypertensive cardiovascular disease, which may also have been a factor contributing to his death and even the crash."

The FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma, performed toxicology tests on the pilot. According to CAMI's report, 16 percent of carbon monoxide was detected in the blood, and Warfarin was detected in the blood and Urine.

A copy of the NTSB chief medical officer's factual report is included in the public docket for this accident.

Additional Information

During an in person interview with the pilot's son, he recalled that his father complained of chest pain the week prior to the accident. He further stated that his father completed a computed axial tomography (CAT scan) on April 25, 2013. The result of the CAT scan revealed no abnormalities.

Administrative Information

Investigator In Charge (IIC):	Swick, Andrew
Additional Participating Persons:	Bobby Radtke; FAA-FSDO; Helena, MT Joan Gregoire; Bell Helicopter; Dallas, TX
Original Publish Date:	May 22, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=86743