Aviation Investigation Final Report

Location:	Uvalde, Texas	**Accident Number:**	CEN19FA024
Date & Time:	November 3, 2018, 23:47 Local	**Registration:**	N417WT
Aircraft:	Bell 206	**Aircraft Damage:**	Destroyed
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and two passengers onboard the turboshaft-powered helicopter departed from a private ranch on a night cross-country flight in visual meteorological conditions. Video evidence from witnesses who observed the departure showed that bright flood lights were shown directly at the helicopter during the departure. The helicopter impacted terrain shortly after takeoff about 100 ft below the top of a 1,500-ft hill and about 5 miles east of the departure point.

An automated weather station, located 13 miles southeast of the departure site, at 0015 recorded, clear skies, and an altimeter setting of 29.97 inHg. A review of weather information about the time of the accident revealed a small area of cloud ceilings east of the departure point. Based upon the helicopter's recorded route of flight, it is unlikely that the helicopter encountered this area of reduced visibility/ceilings.

Examination of the helicopter revealed no evidence of any mechanical malfunctions or anomalies that would have precluded normal operation. Data from the helicopter's flight displays revealed that the helicopter's altimeter was set at 30.05 inches of mercury (inHg); The altimeter setting at the station nearest the accident site was 29.97 inHg. This difference would have resulted in the helicopter's altimeter indicating a higher altitude than the helicopter's actual altitude. The display's data also indicated the helicopter's flight path towards its destination airport. The flight display's last indicated altitude was 1,538 ft, which would have only provided marginal obstacle clearance.

Additionally, the helicopter's terrain avoidance and warning system low altitude alerts were set to "inhibit", or turned off; therefore, the pilot would not have received a terrain warning message. Flight information from the displays did not record any evasive maneuvering, and it is likely that the pilot did not see the terrain before impact.

Autopsy and toxicology testing of the pilot did not reveal evidence of incapacitation. A review of the pilot's medical information indicated that he had been diagnosed with early cataracts; the pilot first reported cataracts to the FAA in 2005, and it is possible that they could have increased in severity enough to have compromised his night vision and contributed to his difficulty avoiding the hill. Additionally, the pilot's eyesight may not have adjusted to the night conditions after being exposed to bright lights during departure. However, the severity of his cataracts at the time of the accident is unknown, and whether visual limitations from cataracts or bright lights contributed to the accident, could not be determined.

The accident is consistent with control flight into terrain during dark night conditions

Probable Cause and Findings

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

The pilot's controlled flight into terrain during night visual meteorological conditions. Contributing to the accident was the pilot improper decision to inhibit the helicopter's terrain warning systems and flight at low altitude.

Findings

Personnel issues	Lack of action - Pilot
Aircraft	Altitude - Not attained/maintained
Environmental issues	Dark - Effect on operation
Environmental issues	Mountainous/hilly terrain - Awareness of condition
Environmental issues	Mountainous/hilly terrain - Contributed to outcome
Personnel issues	Decision making/judgment - Pilot
Aircraft	Ground proximity system - Not used/operated

Factual Information

History of Flight

Enroute	Controlled flight into terr/obj (CFIT) (Defining event)

On November 3, 2018, about 2347 central standard time, a Bell 206B helicopter, N417WT, was destroyed when it was involved in an accident near Uvalde, Texas. The pilot and two passengers were fatally injured. The helicopter was operated as a Title 14 Code of Federal Regulations Part 91 personal flight. Night visual meteorological conditions prevailed at the time of the accident.

A review of data from the helicopter's primary and multifunction display units revealed that the helicopter departed a private ranch about 2341 and proceeded east toward San Antonio, Texas. The data showed that the helicopter reached an altitude of 1,900 ft before beginning a gradual descent, until the final barometric altitude of 1,538 ft (indicated altitude on the display) and 74 knots airspeed. The altimeter was set for a barometric pressure of 30.05 inHg. The data did not reveal any extreme changes in pitch, bank, or airspeed. The flight display also retained the last GPS altitude, which was 1,422 ft. Additionally, the terrain awareness warning system (TAWS) and helicopter TAWS low altitude alerts were set for 140 ft above ground level; however, terrain alerts were set to "inhibit."

Figure 1. Helicopter departure with flood lights shining on helicopter (Video screenshot from KSAT and Jason Martinez).

The Uvalde County Sherriff's Office was notified of a possible downed aircraft northwest of Uvalde, Texas. A search effort of authorities and local volunteers found the wreckage about daybreak the following morning.

The helicopter impacted the side of a hill about 5 miles east of the departure point and about 71 miles west of San Antonio International Airport.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	76,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter; Instrument helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 26, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 23400 hours (Total, all aircraft), 400 hours (Total, this make and model)		

A review of previous aviation medical examinations noted a diagnosis of early cataracts; however, there was no additional information regarding the severity of the condition.

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N417WT
Model/Series:	206 B	**Aircraft Category:**	Helicopter
Year of Manufacture:	2005	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	4591
Landing Gear Type:	Skid	**Seats:**	
Date/Type of Last Inspection:	October 11, 2018 AAIP	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	1953 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	as of last inspection	**Engine Manufacturer:**	Rolls Royce
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	250-C20J
Registered Owner:	W T Byler Co Inc	**Rated Power:**	
Operator:	W T Byler Co Inc	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KUVA	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	05:15 Local	**Direction from Accident Site:**	316°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	30°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	17°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Private Ranch, TX	**Type of Flight Plan Filed:**	None
Destination:	San Antonio, TX (SAT)	**Type of Clearance:**	None
Departure Time:	11:45 Local	**Type of Airspace:**	

A review of weather information about the time of the accident revealed a small area of cloud ceilings east of the departure point. This area of clouds dissipated and moved eastward over time. There was no indication of low-level wind shear or clear air turbulence.

There was no record of the pilot receiving a weather briefing before departure.

Moonrise occurred at 0343 and moonset at 1642 with about 19% disk illuminated. At the time of departure and the accident, the moon would have been below the horizon.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	29.368055,-99.923889(est)

The helicopter impacted about 100 ft below the apex of a hill that measured about 1,500 ft mean sea level (see figure 2). A wreckage path about 75 to 100 yards long was distributed along the hillside leading to the main wreckage. There was no post-crash fire.

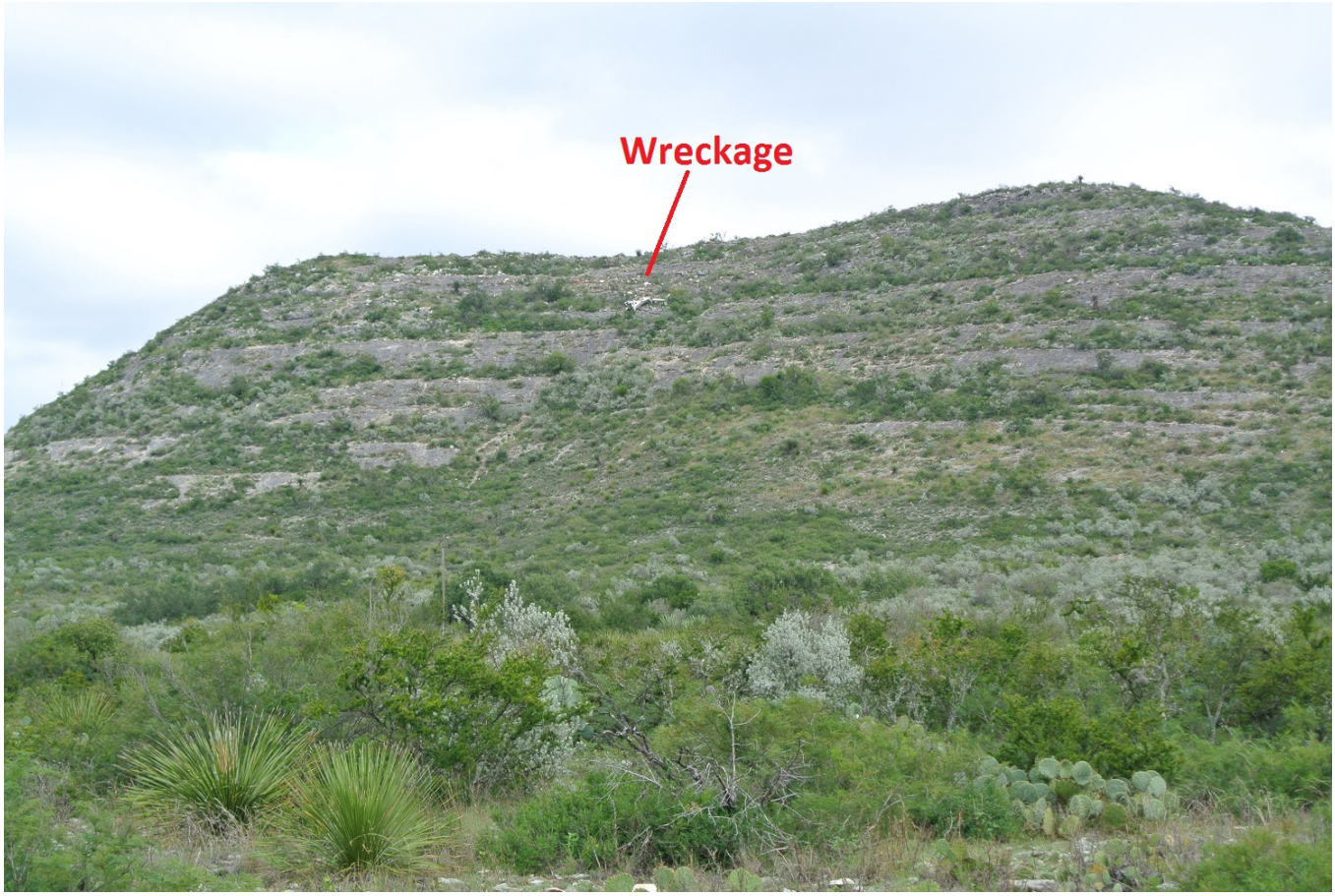

Figure 2. Wreckage at the accident site (Courtesy of FAA)

The hazardous terrain at the accident site precluded an on-scene examination of the helicopter; the wreckage was recovered to a secure facility for examination.

All major components of the helicopter were located at the accident site. The forward portion of the cabin/cockpit area was largely destroyed by impact. The tail boom remained attached to the fuselage but was twisted and damaged due to the impact. The fuel bladder remained in the fuselage and contained an undetermined quantity of fuel. The tail rotor gearbox was found several feet away from the tail boom. Both tail rotor blades were bent near the doubler but remained attached. The tail rotor was rotated by hand with no binding or anomalies noted with the tail rotor gearbox. Oil was present in the tail rotor gearbox. The tail rotor gearbox's magnetic chip detector was removed and no particles were observed.

The main rotor hub and blade assembly had separated from the main rotor mast below the main rotor hub. The main rotor mast exhibited a fracture consistent with mechanical overload. The two main rotor blades were fractured outboard of the doublers and located near the wreckage path.
Main rotor drivetrain continuity was established by rotating the input drive by hand and observing the rotation of the mast. No abnormalities were noted when the transmission was rotated by hand. The transmission chip detectors were removed and no particles were observed.
The components of the hydraulic system, including the hydraulic pump, sustained various degrees of impact damage. A small amount of hydraulic fluid was present in the hydraulic oil reservoir. The three servo actuators remained attached to the roof structure, and movement was noted when manipulated by hand. No preimpact abnormalities were noted with hydraulic system. Flight control continuity could not be established due to impact damage; however, no anomalies were noted with the collective, cyclic and anti-torque pedals.

No evidence of pre-impact abnormalities were noted during the airframe examination.

The engine was removed from the airframe and transported to an overhaul facility for a detailed examination. The engine was placed on a stand and disassembled. Continuity through the accessory section was established. Foreign object damage was noted to the leading edges of the intake compressor blades; also "metal spray" was noted on the turbine compressor wheel. The engine bleed valve and fuel nozzle were bench tested. The power turbine governor and fuel control units were sent to another facility and tested. No engine abnormalities were noted that would have restricted normal operation of the engine.

Medical and Pathological Information

The Bexar County Medical Examiner's Office, San Antonio, Texas, conducted an autopsy on the pilot.

The cause of death was determined to be "multiple blunt force injuries."

The FAA Forensic Sciences Laboratory conducted toxicological testing of the pilot. The specimens were not tested for cyanide and carbon monoxide. The test was negative for ethanol; desmethylsildenafil was detected in the muscle and liver. Desmethylsildenafil is an active metabolite of sildenafil, which is not considered to be impairing.

Administrative Information

Investigator In Charge (IIC):	Hatch, Craig
Additional Participating Persons:	Jason Dunn; FAA FSDO; San Antonio, TX Mike Hemann; FAA Rotorcraft Standards; Fort Worth, TX Gary Howe; Bell Helicopters; Fort Worth, TX Jon Michael; Rolls-Royce Corporation; Indianapolis, IN
Original Publish Date:	May 19, 2020
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98592

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.