



# Aviation Investigation Final Report

<b>Location:</b>	Pigeon Forge, Tennessee	<b>Accident Number:</b>	ERA16FA144
<b>Date &amp; Time:</b>	April 4, 2016, 16:10 Local	<b>Registration:</b>	N16760
<b>Aircraft:</b>	Bell 206	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	5 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Aerial observation		

## Analysis

The commercial pilot and four passengers departed in the helicopter on a local air tour flight. A witness observed the helicopter at a low altitude in a descent and noted that it sounded unusual. He then heard the engine go silent, which was followed by sounds associated with impact.

Examination of the accident site revealed that the helicopter initially impacted trees near the top of a ridge at an elevation of about 1,100 ft mean sea level and came to rest in a wooded area near the bottom of the ridge. The main wreckage was mostly consumed by a postcrash fire. The main and tail rotor blades exhibited signatures of low rotational energy consistent with unpowered ground impact damage. Disassembly of the engine fuel pump revealed anomalous and accelerated spline wear that was severe enough to prevent the fuel pump from delivering fuel to the engine, resulting in a total loss of engine power.

The wear on the splines was likely accelerated due to a lack of grease. Remnant material on the fuel pump splines was consistent with grease being present at some time on the drive gear and drive shaft splined connection, but it could not be determined if it was from the last overhaul which was performed about 8 years and 1,078 flight hours before the accident or from an earlier overhaul. Drive gear spline impressions on the drive shaft spacer were consistent with an erroneously selected spacer. The incorrectly-sized spacer could have resulted in a gap between the spacer and drive gear that provided a path for grease that was applied on the splines to escape. According to records from the most recent fuel pump overhaul and the overhaul facility, the spacer was not replaced during the last overhaul. Because overhaul records preceding the most recent fuel pump overhaul were not available, it could not be determined when the incorrectly-sized spacer was introduced into the fuel pump assembly.

Following an inflight loss of engine power, an autorotative landing can be accomplished if the pilot successfully enters the autorotation, the helicopter has adequate altitude and airspeed, and rotor rpm is managed throughout the autorotative descent. The lack of crash-resistant data and cockpit image recorders, radar data, or surveillance videos precluded determination as to why the pilot was not able to successfully complete an autorotation.

Based on the described injuries in the autopsy reports, the accident was likely survivable for the pilot and one passenger had they received immediate emergency treatment and not been subject to a postcrash fire. One of the passengers would not have survived based on their injuries. The investigation was unable to determine whether two of the passengers would have been able to survive their injuries had they not been subject to a postcrash fire.

The helicopter was not equipped, nor was it required to be equipped, with a crash resistant fuel system. Crash resistant fuel systems are intended to reduce the risk of fuel spillage and provide additional egress time for occupants. At the time of the accident, a modification to the accident make and model helicopter was available from the manufacturer (at a cost) to incorporate a fuel system with improved crash resistance. This modification was not certified to the current airworthiness standards but was tested to similar standards and would have improved the crash resistance of the helicopter's fuel system. Due to the lack of recorded data, such as a flight data recorder or videos capturing the crash, the conditions at the time of impact, such as helicopter attitude and airspeed, are unknown. Therefore, the effectiveness of a crash resistant fuel system, either one that met the current airworthiness standards or the available manufacturer modification, in preventing a postcrash fire could not be determined in this investigation.

### Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An inflight loss of engine power due to a failure of the engine fuel pump, which resulted in a collision with trees and terrain during the subsequent autorotation. The failure of the engine fuel pump resulted from the absence of adequate grease leading to accelerated spline wear within the fuel pump.

Findings	
Aircraft	Fuel pumps - Failure
Personnel issues	Scheduled/routine maintenance - Maintenance personnel

# Factual Information

## History of Flight

<b>Prior to flight</b>	Aircraft maintenance event
<b>Maneuvering</b>	Loss of engine power (total) (Defining event)
<b>Maneuvering</b>	Collision with terr/obj (non-CFIT)
<b>Post-impact</b>	Fire/smoke (post-impact)

On April 4, 2016, about 1610 eastern daylight time, a Bell 206L, N16760, was destroyed when it impacted terrain while maneuvering following a loss of engine power in Pigeon Forge, Tennessee. The commercial pilot and four passengers were fatally injured. The helicopter was registered to a private individual and operated by Great Smoky Mountain Helicopters, Inc., doing business as Smoky Mountain Helicopters as a Title 14 *Code of Federal Regulations (CFR)* Part 91 local air tour flight. Visual meteorological conditions prevailed, and no flight plan had been filed for the flight that departed Sixty Six Heliport (6TN3), Sevierville, Tennessee, about 1600.

According to the operator, the helicopter had been purchased in 1986 for air tour/sightseeing purposes. At the time of the accident, the operator owned two helicopters, a Bell 206B that was based in Cherokee, North Carolina, and the accident helicopter, which was based at 6TN3.

A company pilot reported that he flew the helicopter on an estimated 10 local sightseeing flights on the morning of the accident. The accident pilot took over from him between 1300 and 1400 and completed 5 sightseeing flights in the helicopter before the accident flight. The company pilot reported that he checked the helicopter's fuel level before the departure of the accident flight, and the fuel level was "just below the 6-inch line," which corresponded to about 300 pounds of fuel.

The pilot of another helicopter operating in the area about the time of the accident reported that he did not hear any distress calls. He further stated that he heard the accident pilot make a normal landmark position report over "wonderworks."

A witness who lived near the accident site reported that he was outside when he observed the helicopter at a low altitude in a descent and that it "didn't sound right." He further described the sound as if "the engine was wound tight" and it "lost the rotor sound." He then heard the engine go silent, "as if the pilot cut the power," which was followed by sounds associated with impact. Another witness reported hearing the impact and seeing the accident site engulfed in fire.

## Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor; Private	<b>Age:</b>	38,Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Helicopter	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 None	<b>Last FAA Medical Exam:</b>	April 21, 2015
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	1310 hours (Total, all aircraft), 875 hours (Total, this make and model)		

According to Federal Aviation Administration (FAA) airmen records, the pilot held commercial pilot and flight instructor certificates with ratings for rotorcraft-helicopter and instrument-helicopter. He reported a total flight experience of 550 hours, with 300 hours accumulated during the preceding 6 months on the application for his most recent FAA second-class medical certificate, which was issued on April 21, 2015.

According to company records, the pilot was hired in April 2015. He satisfactorily completed a factory Bell Helicopter 206L pilot transition course on April 10, 2015 and received a logbook endorsement that noted satisfactory completion of a flight review in accordance with 14 *CFR* section 61.56 on that date. Review of the pilot's logbook revealed that, as of March 25, 2016, he had logged about 1,310 hours of total flight experience, which included about 875 hours in Bell 206-series helicopters. According to the operator's helicopter log, the pilot flew the accident helicopter on several occasions between March 25 and the accident flight; however, the flight time that was accumulated by the pilot during these flights could not be determined.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Bell	<b>Registration:</b>	N16760
<b>Model/Series:</b>	206 L	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	1977	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	45081
<b>Landing Gear Type:</b>	N/A; Skid	<b>Seats:</b>	7
<b>Date/Type of Last Inspection:</b>	March 4, 2016 Annual	<b>Certified Max Gross Wt.:</b>	4251 lbs
<b>Time Since Last Inspection:</b>	40 Hrs	<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	22522 Hrs as of last inspection	<b>Engine Manufacturer:</b>	ALLISON
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	250-C20B
<b>Registered Owner:</b>	Bobby Riggs	<b>Rated Power:</b>	420 Horsepower
<b>Operator:</b>	GREAT SMOKY MOUNTAIN HELICOPTERS INC	<b>Operating Certificate(s) Held:</b>	Certificate of authorization or waiver (COA)
<b>Operator Does Business As:</b>	Smoky Mountain Helicopters	<b>Operator Designator Code:</b>	B9RA

The seven-seat helicopter was manufactured in 1977 and issued an FAA standard airworthiness certificate in the normal category on March 1, 1977. It was equipped with a two-blade main rotor system and a two-blade tail rotor system that were powered by a 420-horsepower Rolls-Royce (formerly Allison) 250-C20B turboshaft engine.

Review of maintenance information revealed that, at the time of the accident, the helicopter had accumulated about 22,562 total hours, and the engine had accumulated about 8,550 total hours. The helicopter had been operated for about 40 hours since its most recent 100-hour and annual inspections, which were signed-off concurrently on March 4, 2016.

According to engine records, the engine fuel pump, model number 386500-5, serial number T103542, was manufactured by the Power Accessories Division of TRW, Inc., later known as Argo-Tech Corporation and now a part of Eaton Corporation. The fuel pump was installed on the engine on June 23, 2009, at an engine total time of 7,472.0 flight hours. A maintenance record entry stated that, at the time of installation, the fuel pump had 0 flight hours since overhaul. Based on the engine total time at the time of the accident, the fuel pump had accumulated about 1,078 flight hours since its last overhaul. According to the Rolls-Royce M250-C20 series maintenance manual, the fuel pump had an overhaul interval of 4,000 hours. Before installation on the accident engine, the fuel pump was overhauled at International Governor Services (IGS) in Broomfield, Colorado. The IGS work order stated that the pump was overhauled in accordance with Argo-Tech Component Maintenance Manual (CMM) No. 73-10-10, revision 0, dated November 2000. Signed-off inspections in the work order included dimensional checks; fluorescent penetrant inspection of the filter housing, bypass filter housing, pump cover, and gear housing assembly; and magnetic particle inspection of the main drive shaft, drive gear, and driven gear. No anomalous findings were recorded in these inspections.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	GKT, 1013 ft msl	<b>Distance from Accident Site:</b>	3 Nautical Miles
<b>Observation Time:</b>	16:15 Local	<b>Direction from Accident Site:</b>	45°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	10 knots /	<b>Turbulence Type Forecast/Actual:</b>	/ Unknown
<b>Wind Direction:</b>	220°	<b>Turbulence Severity Forecast/Actual:</b>	/ Unknown
<b>Altimeter Setting:</b>	29.93 inches Hg	<b>Temperature/Dew Point:</b>	24°C / 2°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	SEVIERVILLE, TN (6TN3)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	SEVIERVILLE, TN (6TN3)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	16:05 Local	<b>Type of Airspace:</b>	Class G

The 1615 weather observation at Gatlinburg-Pigeon Forge Airport (GKT), Sevierville, Tennessee, located about 3 nautical miles northeast of the accident site, reported wind from 220°; at 10 knots, 10 statute miles visibility, clear skies, temperature 24°C, dew point 2°C, and an altimeter setting of 29.93 inches of mercury.

## Airport Information

<b>Airport:</b>	SIXTY SIX 6TN3	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	1010 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	4 Fatal	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	5 Fatal	<b>Latitude, Longitude:</b>	35.825279,-83.568336(est)

The helicopter impacted trees near the top of a ridge that was about 1,100 ft mean sea level (msl). The main wreckage was found on its left side on a heading of about 340° magnetic in a wooded area near the bottom of a ridge. An initial tree strike was identified about 405 ft south of the main wreckage on top of the ridge at an elevation of about 1,100 ft mean sea level. Pieces of Plexiglas and the front-left piece of skid tube were found in the immediate vicinity of the initial tree strike. The primary debris path began at the top of the ridge and extended down to the main wreckage at the bottom of the ridge. The main wreckage was mostly consumed by a postcrash fire, and the entire area surrounding the main wreckage was charred. All major structural components of the helicopter were located at the accident site.

### Airframe and Rotor Systems

The upper portion of the main fuselage with the engine and main transmission still attached was resting on its left side and exhibited crush damage. The midsection of the tail boom, including the horizontal stabilizer, was found separated but immediately aft of the main wreckage. The left horizontal stabilizer was fractured about mid-span. The outboard portion of the left horizontal stabilizer and the vertical fin were found at the top of the ridge, about 110 ft south of the main wreckage.

The cockpit instruments were observed ahead of the main fuselage along the debris path. The instruments exhibited thermal distress. The caution and warning panel (CWP) was observed behind the main fuselage along the debris path, and it also exhibited thermal distress. Subsequent X-ray examination of the CWP was conducted at the NTSB Materials Laboratory in Washington, DC, to assess the condition of the individual light bulb filaments. The examination found that several of the bulb globes were melted due to thermal exposure; all of the lights had filaments present; and all of the filaments were visible in the X-ray. Several of the filaments were broken, but none of the bulbs demonstrated hot coil filament stretching. These findings were consistent with none of the lights being illuminated at impact.

One main rotor blade was found near the main fuselage and remained attached to the main rotor hub. The root end of the second main rotor blade remained attached to the main rotor hub and was partially embedded into the ground. The remainder of the second blade was found forward of the main fuselage in the debris path. The tips of both main rotor blades exhibited fractures. Pieces of the fractured blade tip from the second main rotor blade were found behind the ridge, about 330 ft south-southeast of the main wreckage and near the location of the initial tree strike. The leading edges of both blades did not exhibit evidence consistent with impact damage with high rotational energy.

Manual rotation of the main rotor blades in the direction opposite of normal rotation resulted in the rotation of the main rotor shaft, the engine-to-main transmission drive shaft, the engine's No. 4 turbine wheel, and the tail rotor drive output shaft. Freewheeling functionality was confirmed by manual rotation of the main rotor blades in the direction of normal rotation, which resulted in no rotation of the engine's No. 4 turbine wheel. The flexible couplings between the drive shaft flanges were intact and did not display evidence of fractures or deformation consistent with power at impact. The tail rotor gearbox remained mounted to a section of tail boom that was separated and located about 40 ft southeast of the main wreckage. Manual rotation of the tail rotor blades resulted in rotation of the gearbox input. The splines at the tail rotor gearbox did not exhibit evidence of fractures or smearing. Subsequent removal of the chip detectors from the main transmission and tail rotor gearbox revealed no evidence of large ferrous particles.

Both main rotor pitch links were fractured about mid-length, and both ends of each link remained attached to the corresponding blade pitch horn and the rotating swashplate; the fractures exhibited signatures consistent with overload. The rotating and stationary swashplates remained installed on the main rotor shaft. The idler lever assembly remained attached to the rotating swashplate and the main rotor shaft. The collective lever assembly remained attached to the swashplate sleeve assembly and the main rotor control support assembly (mounted on top of the main transmission housing). Control linkages remained attached between the control mixing unit and both the stationary swashplate and the collective lever. Control linkages from the control mixing unit to the hydraulic actuators were fractured and thermally distressed but remained connected at their clevis ends. The three hydraulic actuators (left cyclic, right cyclic, and collective) were found mounted to the airframe, but their aft mounts were fractured. The hydraulic actuators and their airframe mounts exhibited evidence of heat distress. Hydraulic lines remained connected to the three hydraulic actuators but were broken in multiple areas. The hydraulic pump remained mounted to the main transmission.

The collective control stick and the collective jackshaft were found loose within the wreckage near the main fuselage and exhibited thermal distress. The cyclic stick was not recovered at the accident site. The base of the cyclic (into which the cyclic stick is installed) was observed loose within the wreckage and exhibited thermal distress.

Due to impact damage and the extensive postcrash fire, the helicopter's seats and restraint system could not be evaluated.

## Engine

The engine remained installed on the airframe. The left side of the engine casing and the left exhaust port exhibited crush damage. The first stage compressor did not exhibit evidence of hard or soft body impact damage but exhibited evidence of sooting. No evidence of scoring was observed between the first stage compressor blades and blade track. The 4th stage turbine wheel was visible through the exhaust port, and its blades did not exhibit visible impact damage. The gas producer fuel control remained installed on the engine accessory gearbox, and the indicator was observed to be in the 0° ("cut off") position. The power turbine governor and engine fuel pump remained installed on the engine accessory gearbox. Subsequent disassembly of the core engine, which was comprised of the compressor section, combustion section, turbine section, and an accessory gearbox, did not reveal any anomalous damage that would have precluded normal engine operation.

## Fuel Pump

The engine fuel pump was removed from the engine accessory gearbox and disassembled. Removal of the drive shaft revealed that its small splines, which are normally mated to the internal splines of the fuel pump drive gear, exhibited evidence of severe damage, with significant portions of the spline teeth missing material. The drive shaft spacer exhibited thermal distress and indentations consistent with contact with the internal splines of the drive gear (see Figure 1).





Figure 1. Anomalous spline damage observed on the small splines of the drive shaft (red arrows) and indentations observed on the drive shaft spacer (yellow arrows).

Remnant pieces consistent with the retaining clip, which is normally installed on the spline relief on the drive shaft small splines, were not observed during disassembly but were later identified via photographs taken during the examination (see Figure 2).



Figure 2. Remnant pieces consistent with the retaining clip (red arrow).

The internal splines of the drive gear also exhibited evidence of severe damage, with significant portions of the spline teeth missing material (see Figure 3).



Figure 3. Anomalous spline damage observed on the internal splines (red arrows).

Further examination of the disassembled fuel pump components was performed at the NTSB Materials Laboratory, Washington, DC. The hardness and material composition of the drive shaft and drive gear met required specifications. Remnant material on the drive shaft and drive gear splines were similar to mineral-oil-based/soap-thickened lubricants.

The illustrated parts list for the fuel pump found in the CMM allowed for 11 different drive shaft spacers of different sizing. According to the CMM, measurements taken during assembly of the drive shaft to the pump assembly are used to select proper drive shaft spacer thickness. The drive shaft spacer installed on the accident fuel pump drive shaft was consistent with a P/N 215981-8 spacer, about 0.240 inches thick (see Figure 4). According to the original build record from the manufacture of the fuel pump, dated September 1985, a spacer with a thickness of 0.120 inches was originally installed. Records of fuel pump overhaul preceding the last overhaul were not available, and it could not be determined whether other spacer sizes were used throughout the operational history of the accident fuel pump. In addition, it could not be determined whether the drive shaft, drive gear, and driven gear were original to the fuel pump or, if previously replaced, when the replacement occurred.



Figure 4. The drive shaft spacer installed on the drive shaft (red bracket).

[For additional details of the metallography performed on the accident fuel pump components, see NTSB Materials Lab Factual Report No. 17-016 in the docket for this investigation.]

## Flight recorders

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The helicopter was not equipped nor was it required to be equipped with any crash-resistant data or image recorders.

## Medical and Pathological Information

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The Regional Forensic Center Knox County, Knoxville, Tennessee, performed autopsies on the pilot and the four passengers. According to the autopsy reports, all five helicopter occupants suffered blunt force injuries, but three of the five died primarily from thermal injuries; one died as a result of combined thermal and blunt force injuries (pilot); and one died as a result of blunt force injuries. [For additional information pertaining to the occupants' injuries, see the NTSB Injury Factual Report in the public

docket for this investigation.]

Toxicological testing performed by the FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma, on specimens obtained from the pilot were negative for all tested drugs.

## **Additional Information**

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### **Fuel Pump Overhaul**

A discussion with IGS personnel about their overall experiences with overhaul of the fuel pump revealed that they had seen wear similar to the accident fuel pump drive shaft spline wear but not to the severity of the wear observed on the drive shaft from the accident fuel pump. An IGS mechanic who specialized in overhauling fuel pumps similar to the one on the accident helicopter stated that he had seen drive shaft spline wear "about 4 or 5 times" since 2008, and a lack of lubricant or corrosion was associated with the spline wear. Additionally, the IGS mechanic stated he had only observed wear on the smaller splines of the drive shaft and had not observed wear on the larger splines of the drive shaft (the splines that mate to the engine accessory gearbox drive gear). According to IGS, fuel pumps that are submitted for overhaul are visually examined for evidence of spline or gear tooth wear; if wear is observed, the part is rejected.

### **Fuel System Crash Resistance**

On October 3, 1994, the FAA introduced improved fuel system crash resistance standards for normal category helicopters via Amendment 27-30 to Part 27 of the Federal Aviation Regulations. The standards for fuel system crash resistance, 14 *CFR* 27.952, are intended to minimize fuel spillage near ignition sources in order to increase the evacuation time available for crew and passengers to escape a postcrash fire. The improved crash resistance standards were not retroactively applicable to either existing helicopters or newly manufactured helicopters whose certification basis and approval predated the effectivity of Amendment 27-30.

The Bell 206L model was type certificated in September 1975 under type certificate data sheet No. H2SW. The accident helicopter was not manufactured, nor was it required to be manufactured, with a fuel system meeting the provisions of 14 *CFR* 27.952. According to Bell Helicopter, the 206L helicopter was originally equipped with a thin-wall bladder-type fuel cell. These original fuel bladders were not nor were they required to be drop-tested. Additionally, although frangible structural interfaces were used at major interfaces, such as the filler cap adapter, the vent and fuel feed lines were rigid tubes. In March 1994, Bell Helicopter released Service Instruction No. BHT-206-SI-2043 to improve the crash resistance of the original fuel system for 206L and 206L-1 helicopters via incorporation of a retrofit kit. While this retrofit kit was not certified to the provisions of 14 *CFR* 27.952, it introduced fuel bladders with a higher puncture resistance than the original fuel bladders, replacement of rigid interconnect tubes with stainless steel braided hoses, and frangible structural attachments to the fuel bladders. Additionally, the improved fuel bladders were drop-tested at 80% capacity from a height of 50 ft. According to Bell Helicopter, the

retrofit kit has been available since 1994, but they did not have a record of selling one of these retrofit kits. A review of the helicopter's maintenance history revealed no record of modifications to the original fuel system to improve its crash resistance.

#### Autorotation Information

According to the FAA Rotorcraft Flying Handbook, "...an autorotation is a descending maneuver where the engine is disengaged from the main rotor system and the rotor blades are driven solely by the upward flow of air through the rotor. In other words, the engine is no longer supplying power to the main rotor. The most common reason for an autorotation is an engine failure...At the instant of engine failure, the main rotor blades are producing lift and thrust from their angle of attack and velocity. By immediately lowering collective pitch, which must be done in case of an engine failure, lift and drag are reduced, and the helicopter begins an immediate descent, thus producing an upward flow of air through the rotor system..."

The Bell 206L rotorcraft flight manual states that in the event of an engine failure in flight, an autorotation should be performed by adjusting collective pitch control to maintain a main rotor speed of 90-107% rpm and cyclic control to obtain the desired autorotative airspeed for the condition (with a stated "normal autorotation airspeed" of 70 mph or 61 knots).

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Schiada, Luke
<b>Additional Participating Persons:</b>	Matthew Rigsby; FAA AVP-100; Fort Worth, TX John Britten; TSB Canada - Accredited Representative; Gatineau Gary P Howe; Bell Helicopter; Fort Worth , TX Jon-Adam Michael; Rolls-Royce; Indianapolis, IN Lee Fisher; Honeywell; South Bend, IN Kurt Kachler; Eaton Corporation; Euclid, OH
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<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=92950">https://data.nts.gov/Docket?ProjectID=92950</a>

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](#).