Aviation Investigation Final Report

Location:	Montgomery, New York	**Accident Number:**	ERA19LA145
Date & Time:	March 30, 2019, 12:15 Local	**Registration:**	N222ML
Aircraft:	Bell 222	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Minor, 5 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The twin-engine helicopter was about 500 ft into the initial climb after takeoff from the pilot's private property when he noticed a "split" in the #1 and #2 engine rpm needles, with the #1 engine rpm indicating below normal operating rpm, and the #2 engine rpm indicating above normal operating rpm. The pilot believed that this was believed that this was indicative of a loss of power on the #1 engine and returned to the property for a run-on landing. The helicopter touched down, encountered uneven ground, and rolled onto its left side, which resulted in substantial damage to the airframe.

Postaccident examination of the airframe found both of the throttles near the idle position, and no evidence of any preimpact mechanical malfunctions or failures of any airframe components. Both engines and their respective power turbine governors were examined and successfully test run after the accident. During the examinations, the #2 engine's P3 Ng speed sensor connector was found disconnected. According to the engine manufacturer, if the disconnection had occurred inflight, the cockpit indication of the engine speed for the #2 engine would have been zero. Given this information, and the pilot's description that the #2 engine rpm was abnormally high, it is likely that the disconnection of the connector occurred as a result of the accident sequence and not during the flight. Based on these findings, the reason for the difference between the indications of the two engines that the pilot observed during the takeoff could not be determined.

Probable Cause and Findings

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

A partial loss of engine power, as reported by the pilot, during takeoff for reasons that could not be determined based on available information.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)

On March 30, 2019, about 1215 eastern daylight time, a Bell 222 helicopter, N222ML, was substantially damaged when it was involved in an accident near Montgomery, New York. The private pilot and four passengers were not injured, and one passenger sustained minor injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated he completed the preflight inspection by the checklist, boarded passengers, and started the engines. Prior to takeoff, all gauges were in the "normal range." The pilot conducted the takeoff from a concrete pad on his property, and about 500 ft above ground level he noticed a "split" in the #1 (left) and #2 (right) engine rpm needle indications. The #1 engine rpm needle had decreased below normal operating rpm, and the #2 needle had "spiked" above the normal operating rpm.

The pilot believed there was a loss of engine power on the #1 engine, and he initiated a sharp left turn to return to his property to perform a run-on landing to a short asphalt surface in front of a utility building. According to the pilot, a strong wind pushed the helicopter left, and the left landing gear touched down in the grass that bordered a short strip of gravel, which pulled the helicopter onto uneven ground. The helicopter came to a stop, then tipped over onto its left side and the main rotor impacted the ground. After it came to rest there was a small fire underneath the helicopter. All the occupants exited the helicopter, and the fire was extinguished.

The helicopter was righted to prevent a fuel leak. A Federal Aviation Administration (FAA) inspector traveled to the site and examined the helicopter. The rotor and transmission were separated and resting next to the helicopter. There was substantial damage to the nose and transmission pylon area, and fire damage to the upper portion of the fuselage aft of the number one engine.

Postaccident examination found both of the throttles near the idle position. Continuity of the throttle was confirmed from the #2 engine twist grip to the respective fuel control. Continuity of the #1 throttle control could not be verified due to breaks in the linkages, though the twist grip and fuel control lever were both free to move.

The airframe examination revealed no pre-impact anomalies. Both engines were removed, examined, and placed in test cells, where each ran satisfactorily. No anomalies were noted on either engine that would have precluded normal operation. During the examination, the #2 engine P3 Ng speed sensor connector was found disconnected. According to the engine manufacturer, a disconnected P3 connector could have caused the cockpit indication of the

speed for the #2 engine to indicate 0 rpm. Additionally, the power turbine governors were functionally tested and exhibited no anomalies that would have precluded normal operation.

The helicopter manufacturer performed one engine inoperative performance calculations based on the environmental and loading conditions of the helicopter at the time of the accident. Based on the calculations, the helicopter did not have the capability to hover in or out of ground effect, and that the flight manual advised pilots to perform a run-on landing under those conditions.

The helicopter manufacturer also provided an explanation of how the helicopter's configuration could result in the instrument indications similar to those that the pilot reported. The explanation stated that, *"When the throttle for one engine on the twin engine Bell 222 is not in the fully governed range, then the affected engine will tend to droop at a lower Ng (N1) setting and not provide full engine power to the helicopter drive system. The helicopter will then in affect be flying in or near an OEI condition (One Engine Inoperative). Therefore, the pilot will see a split on the triple tachometer with the affected engine Np (N2) speed drooping and the unaffected engine Np (N2) speed stable at 100% Np. Depending on the conditions of flight (hover, landing, approach, maneuvering, cruise), outside temperature, and gross weight of the helicopter, the Nr (rotor rpm) might also droop. The remedy of having a drooping Nr would be to put the affected throttle back to the full on fully governed throttle position to regain N2 speed on the affected engine. If the pilot did not recognize the throttle was out of the governed region, a running landing to a suitable area should be performed. The engine run up checklist states the throttles should be rotated to FULL OPEN and verify Np at 97 to 100% during the engine runup and remain in that position until takeoff."*

Pilot Information

Certificate:	Private	**Age:**	72,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 13, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 1, 2017
Flight Time:	1000 hours (Total, all aircraft), 3 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N222ML
Model/Series:	222 A	**Aircraft Category:**	Helicopter
Year of Manufacture:	1982	**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	47081
Landing Gear Type:	N/A; Ski	**Seats:**	8
Date/Type of Last Inspection:	January 14, 2017 Annual	**Certified Max Gross Wt.:**	8400 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo shaft
Airframe Total Time:	4671 Hrs as of last inspection	**Engine Manufacturer:**	Honeywell
ELT:		**Engine Model/Series:**	LTS-101 SER
Registered Owner:	On file	**Rated Power:**	650 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MGJ,365 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	12:30 Local	**Direction from Accident Site:**	134°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	18°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Montgomery, NY	**Type of Flight Plan Filed:**	None
Destination:	Wallkill, NY (N45)	**Type of Clearance:**	None
Departure Time:	12:25 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor, 4 None	**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 5 None	**Latitude, Longitude:**	41.539443,-74.306945

Administrative Information

Investigator In Charge (IIC):	Hill, Millicent
Additional Participating Persons:	Joe Martuge; FAA/FSDO; Teterboro, NY
Original Publish Date:	August 16, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=99237

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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.