



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Beekmantown, New York	Accident Number:	ERA19FA035
Date & Time:	October 30, 2018, 16:11 Local	Registration:	N372CA
Aircraft:	Aerospatiale AS 355F2	Aircraft Damage:	Destroyed
Defining Event:	Dynamic rollover	Injuries:	2 Fatal, 2 Serious
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

The pilot, pilot-rated passenger, and two linemen were conducting a flight to temporarily install a block (a large pulley used for fiber-optic wire) on a utility pole that was part of a set of high-tension power lines. The pilot was seated in the front right seat, and one of the linemen was seated outside of the helicopter on a bench that was externally attached to the right side of the landing gear. The pilot-rated passenger, who was observing the flight for training purposes, was seated in the front left seat, and the other lineman was seated in the aft left seat. The power lines were aligned northwest/southeast, which required the pilot to approach the utility pole on a southeasterly heading so that the pole would be to the right of the pilot and lineman. For the lineman to install the block on the utility pole, the pilot had to hover the helicopter next to the pole. The wind conditions about the time of the accident were such that the helicopter would have encountered a tailwind. The pilot-rated passenger, the lineman seated in the aft left seat, and witnesses on the ground all stated that, while the helicopter was hovering next to the utility pole, the helicopter's right skid struck the pole a few times. The helicopter rolled over, became entangled in energized power lines, and caught fire. All four of the occupants survived the impact with the power lines and jumped to the ground to escape the burning wreckage. The pilot and the lineman seated on the bench did not survive the fall.

A postimpact fire consumed most of the helicopter while it was entangled in the power lines, and sections of the helicopter dropped from the power lines as it burned. Examination of the wreckage and both engines revealed no preimpact mechanical deficiencies that would have precluded normal operation.

The surviving lineman stated that he had flown with the pilot earlier that day and that the pilot had difficulty keeping the helicopter steady due to the strong wind, so the lineman temporarily installed a block before the helicopter returned to the base. Before the accident flight, the pilots, linemen, their foreman, the owner and a representative of the helicopter company and representatives of the linemen's employer held a safety meeting and agreed that, although the wind was too strong to fully install a block, the wind was "okay" to temporarily install another block. Given that the pilot had difficulty holding the

helicopter steady while hovering with a tailwind on the previous flight the pilot most likely also had difficulty hovering the helicopter with the tailwind that was present about the time of the accident. The helicopter's subsequent impact with the utility pole resulted in a dynamic rollover into 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 failure to keep the helicopter clear of a utility pole while hovering with a tailwind, which resulted in a dynamic rollover into active power lines.

Findings

Personnel issues	Aircraft control - Pilot
Environmental issues	Tailwind - Response/compensation
Environmental issues	Tailwind - Effect on operation
Environmental issues	Pole - Response/compensation

Factual Information

History of Flight

Maneuvering-hover	Collision with terr/obj (non-CFIT)
Maneuvering-hover	Dynamic rollover (Defining event)
Maneuvering-hover	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On October 30, 2018, about 1611 eastern daylight time, an Aerospatiale AS355F2, N372CA, was destroyed when it collided with a wooden utility pole and power lines while conducting power line construction operations near Beekmantown, New York. The airline transport pilot and a lineman were fatally injured, and the pilot-rated passenger and another lineman sustained serious injuries. The helicopter was registered to and operated by Catalyst Aviation, LLC, and was being operated as a Title 14 *Code of Federal Regulations* Part 133 external load operation. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed for the local flight that departed from a designated landing zone near Plattsburgh, New York, at 1602.

The power lines the crew was working on were supported by two 75-ft-tall wooden utility poles connected by a wooden horizontal bar and two wooden cross bars. The horizontal bar was installed about 6.5 ft below the top of the two poles. The power lines were oriented northwest/southeast.

The helicopter was equipped with a bench (platform) that was attached externally on the right side of the right landing gear. A lineman would sit on the bench while performing his duties. The pilot, who was seated in the front right seat, would position the helicopter on the left side of the utility pole so that the lineman would be able to accomplish work.

The two helicopter occupants who survived the accident, the pilot-rated passenger and one of the lineman, as well as two witnesses on the ground, provided their accounts of the circumstances surrounding the accident to the National Transportation Safety Board (NTSB) and the New York State Police. The pilot-rated passenger, who was seated in the front left seat, was observing the flight for training purposes. He stated that the pilot was the only one operating the controls at the time of the accident. The pilot-rated passenger recalled that the helicopter approached the utility pole and got caught in the power lines; the helicopter struck the utility pole twice and rolled inverted. The pilot-rated passenger stated that his next memory was that he was upside down, the helicopter was on fire, and he had to unbuckle his harness and jump to the ground.

According to the lineman who was seated in the aft left seat, he had flown earlier that day with the pilot to install a block (a large pulley used for fiber-optic wire) on one of the utility poles. During that flight, as the helicopter approached the pole, the pilot had a hard time keeping the helicopter steady because the "...wind was too strong," so all we did was temporarily place the pulley on the wire" and then returned to the base. During the flight, the lineman sent a text message to his foreman that stated, "[the pilot] is very good. He just has horrible tailwind on the side we actually need to be on." He said that after they landed,

two more flights were conducted with different linemen taking turns practicing out on the bench. Once these flights were completed, all the linemen, their foreman, the pilot, pilot rated passenger, and "everyone" from the operator [owner of Catalyst and her husband, a helicopter test pilot, who was assisting in overseeing the operation] held a "tailboard" meeting. He said, "This was a meeting for everyone to discuss the previous flights, review the upcoming flights including a safety briefing. During this meeting, the pilot said it was too windy to fully install a block, which would require him to hover about 5-7 minutes. However, the conditions were okay to just temporarily hang the block, which would take about 30 seconds. The entire team agreed that this would be what they would do. The lineman said they departed with the pilot-rated passenger seated in the front left seat, the pilot in the front right seat, the other lineman was on the bench, and he was seated in the aft left seat. The lineman said he could see everything that occurred during the flight.

He said that, as the helicopter approached the utility pole, the other lineman on the bench was getting ready to install the block. The helicopter hovered for about 5 seconds so that the lineman could place the block on the line, and then the helicopter skid hit the pole three times. The surviving lineman indicated that the helicopter hit the pole "real hard" the third time and that the helicopter then rolled upside down into the wires and caught fire. The lineman exited the burning helicopter by jumping to the ground.

The linemen's foreman said that at the meeting prior to the accident flight he gave a sheet of all the block sizes to the husband of the owner of the helicopter company, who performed a weight and balance calculation. Once it was determined how many blocks could be taken on the accident flight, the pilot, pilot-rated passenger, and both linemen departed with the purpose to temporarily install the block. The foreman took a picture of the helicopter as it departed (time stamped at 1602) and then drove to the work site to observe the operation. The foreman said he arrived just as the helicopter was making its 45 ° approach to the power line structure.

As the helicopter got into place, the helicopter's right skid was almost even with the top of the pole. The foreman said the lineman on the bench connected the static line, opened the gate for the block, and placed the block on the power line. As the lineman was trying to close the gate of the block, the helicopter's right skid struck the pole. The helicopter pulled away and then struck the pole harder a second time. The helicopter then struck the pole a third time and immediately rolled over to the right, and the main rotor blades struck the adjacent static line and top of the other pole. The body of the helicopter became entangled in the energized (115 KVA) power lines and caught fire.

The husband of the owner of the helicopter company also witnessed the accident. He stated that the helicopter made a slow approach to the left side of the pole on a southeasterly heading (about 120°) and that the engines were operating normally. As the helicopter got into place near the pole, the lineman on the bench began to install the block. The helicopter then slid to the left and slid back to the right. The witness thought the helicopter's right skid had struck the pole because the helicopter immediately rolled over to the right. The main rotor blades then struck the top of the utility pole, and the helicopter became entangled in the power lines and caught fire. This witness saw all four helicopter occupants jump from the burning wreckage. He was not sure why the helicopter struck the pole and said it may have been the wind or just an overcorrection by the pilot.

Pilot Information

Certificate:	Airline transport; Flight instructor	Age:	56, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane single-engine; Helicopter; Instrument helicopter	Toxicology Performed:	Yes
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	August 22, 2018
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	October 16, 2018
Flight Time:	16500 hours (Total, all aircraft)		

Pilot-rated passenger Information

Certificate:	Commercial	Age:	34, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Helicopter; Instrument helicopter	Toxicology Performed:	No
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	January 19, 2018
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	January 6, 2018
Flight Time:	2000 hours (Total, all aircraft), 300 hours (Total, this make and model), 1940 hours (Pilot In Command, all aircraft), 34 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

The pilot, who was also the Director of Operations for the operator's Part 135 certificate, held an airline transport pilot certificate with ratings for airplane single-engine land, instrument airplane, rotorcraft-helicopter, and rotorcraft-helicopter instrument. A review of the pilot's Federal Aviation Administration (FAA) airman records, revealed that his most recent first-class medical certificate was issued on August 22, 2018. At that time, he reported a total of 16,500 total flight hours. The operator reported that his last flight review occurred on October 16, 2018 in the same make/model helicopter as the accident helicopter.

The pilot-rated passenger held a commercial pilot certificate with ratings for rotorcraft-helicopter and rotorcraft-helicopter instrument. His most recent FAA second-class medical certificate was issued on January 19, 2018, with no limitations. The operator reported that he had 2,000 hours of total flight experience, of which 300 hours were in the same make and model as the accident helicopter.

Aircraft and Owner/Operator Information

Aircraft Make:	Aerospatiale	Registration:	N372CA
Model/Series:	AS 355F2 F1	Aircraft Category:	Helicopter
Year of Manufacture:	1981	Amateur Built:	
Airworthiness Certificate:	Restricted (Special)	Serial Number:	5028
Landing Gear Type:	Skid	Seats:	6
Date/Type of Last Inspection:	October 28, 2018 100 hour	Certified Max Gross Wt.:	5600 lbs
Time Since Last Inspection:	1 Hrs	Engines:	2 Turbo shaft
Airframe Total Time:	9905.1 Hrs at time of accident	Engine Manufacturer:	Allison
ELT:	C126 installed, not activated	Engine Model/Series:	250-C20F
Registered Owner:	Catalyst Aviation LLC	Rated Power:	420 Horsepower
Operator:	Catalyst Aviation LLC	Operating Certificate(s) Held:	Rotorcraft external load (133), Commuter air carrier (135)

The Aerospatiale AS355 was a twin-engine light-utility helicopter equipped with two Rolls-Royce 250-C20F engines. The last 100-hour inspection was completed on October 28, 2018, with a total airframe time of 9,904.3 hours. The left engine had a total time of 11,611.4 hours and 1,640.9 hours since overhaul. The right engine had a total time of 8,114.9 hours and 1,684.2 hours since overhaul. According to the operator, the helicopter had flown less than 1 hour between the time of the inspection and the time of the accident.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	PBG, 234 ft msl	Distance from Accident Site:	6 Nautical Miles
Observation Time:	15:53 Local	Direction from Accident Site:	160°
Lowest Cloud Condition:		Visibility	10 miles
Lowest Ceiling:	Overcast / 3100 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	290°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.02 inches Hg	Temperature/Dew Point:	4°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Plattsburgh, NY (None)	Type of Flight Plan Filed:	None
Destination:	Beekmantown, NY	Type of Clearance:	None
Departure Time:	16:02 Local	Type of Airspace:	Unknown

Plattsburgh International Airport, Plattsburgh, New York, which was about 6 miles southeast of the

accident site, was the nearest weather reporting station. At 1553, the reported weather was wind from 290° at 7 knots, visibility 10 miles, overcast ceiling at 3,100 ft, temperature 4°C, dew point -2°C, and an altimeter setting of 30.06 inches of mercury.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal, 2 Serious	Aircraft Fire:	Both in-flight and on-ground
Ground Injuries:	N/A	Aircraft Explosion:	Both in-flight and on-ground
Total Injuries:	2 Fatal, 2 Serious	Latitude, Longitude:	44.744167,-73.439163(est)

A postimpact fire consumed most of the helicopter after it became entangled in the energized power lines, and sections of the helicopter dropped from the power lines as it burned. Found below the power lines were a portion of the cockpit, including the pilot and copilot seats; the main rotor system and all three main rotor blades; the combiner gearbox, which remained attached to the main transmission gearbox; the tailboom; and both engines.

The pilot and copilot seats were extensively fire damaged, and the aft seating area had been consumed by fire. The pilot's cyclic hand grip was mostly consumed by fire, and the electrical wires were exposed. Collective movement on both the pilot and copilot sides was consistent with corresponding movement with the partially severed control tube below the cabin floor. The left aft sliding doors and the forward windscreen exhibited fire damage.

Examination of the main rotor system revealed that the red and blue pitch change links remained attached to the pitch change horn and rotating swashplate. The yellow blade detached from the rotating swashplate and pitch change horn. A section of the blue blade had separated about three-quarters out from the blade root. The red blade exhibited full-length integrity with separation of the outer skin surface. The yellow blade was separated about five-eighths out from the blade root. The starflex arm sheared from all three rotor blades. The scissor link and collective collar remained attached to the rotating swashplate. All rotor blades were attached to the upper and lower sleeves via their respective attachment bolts.

The main transmission and the combiner gearbox had separated from the airframe and appeared to be undamaged. The bilateral suspension remained attached, and the left-side combiner gearbox input had sheared. The other end of the sheared section remained attached to the No.1 engine. Two hydraulic reservoirs were found crushed and without fluid, but fluid was observed at the base of the transmission. The hydraulic pumps were attached to the combiner gearbox, and the hydraulic actuators remained attached to the stationary swashplate.

The tailboom separated from the main body of the helicopter and exhibited impact and fire damage. Examination of the tail rotor revealed that both blades were attached to their respective pitch change links, rotor drive shaft, and 90° gearbox. One blade was embedded about 2 inches into the ground, and

the other blade appeared undamaged. The vertical fin remained attached and exhibited impact damage. The right horizontal stabilizer was partially embedded in the ground and exhibited impact damage. No fluid was observed in the sight gauge. The magnetic plug was removed and was absent of debris/obstructions. The top portion of the tail rotor drive shaft cover exhibited scuff marks about 4 ft from the aft handling bars.

The helicopter's landing gear remained caught in the power lines and was later removed by the New York Power Authority. The landing gear exhibited fire damage, but the forward and rear airframe mounting sleeves were intact.

Examination of the No. 1 engine revealed that the entire engine bay had been consumed by the postcrash fire, which also melted sections of the auxiliary gearbox and several other smaller components. The engine combustor showed significant impact damage. The power turbine governor was heat damaged and was contaminated with melted aluminum. The fuel control unit was intact, but the control arm could not be manually manipulated. The bleed valve was manually operated, and the valve poppet moved smoothly along its normal stroke with no lateral play.

The compressor was heat damaged, and the composite liner had melted and left ashen debris throughout the compressor. No evidence of significant foreign object debris (FOD) was observed on the compressor blades, but the blade tips exhibited some minor bending. Neither the N1 nor the N2 rotor system could be manually rotated.

The No. 2 engine was partially buried in mud and was covered by the burned fuselage debris. The engine was damaged by the postcrash fire. The power turbine governor was partially consumed by fire, and the fuel control unit was impact and fire damaged. The bleed valve was mostly consumed by fire and was liberated from the compressor module. The compressor was heat damaged, and the composite liner had melted and left ashen debris throughout the compressor. The compressor exhibited extensive FOD damage and rotational scoring. Neither the N1 nor the N2 rotor system could be manually rotated. For the turbine module of each engine, visual examination of the fourth stage (power turbine) revealed no evidence of FOD, operational damage, or thermal degradation. Each engine's fuel spray nozzle was removed to permit a borescope examination of the first stage (gas generator turbine). The examination revealed no evidence of FOD or thermal degradation of the first stage nozzle or turbine blades. A small amount of fuel was found in each fuel spray nozzle, which was absent of debris and water. On the No. 2 engine turbine module, shiny metal splatter adhered to the turbine nozzle shield, which was consistent with FOD damage to the compressor (specifically, debris that was melted and deposited within the turbine module). The spray face of the fuel spray nozzle was intact and covered with soot.

Examination of both turbine engines revealed no mechanical deficiencies that would have precluded normal operation at the time of the accident.

Medical and Pathological Information

An autopsy of the pilot was conducted by the Champlain Valley Physician Hospital Department of Pathology, Plattsburgh, New York. The pilot's cause of death was determined to be multiple organ

trauma due to a fall.

Toxicological testing performed at the FAA Forensic Sciences Laboratory was negative for carbon monoxide, ethanol, and all tested drugs.

Additional Information

The FAA *Helicopter Flying Handbook*, FAA-H-8083-21B, states the following on pages 11-11 and -12:

A helicopter is susceptible to a lateral rolling tendency, called dynamic rollover.... For dynamic rollover to occur, some factor must cause the helicopter to roll or pivot around a skid or landing gear wheel until its critical rollover angle is reached.... Then, beyond this point, main rotor thrust continues the roll and recovery is impossible.... If the critical rollover angle is exceeded, the helicopter rolls on its side regardless of the cyclic corrections made.

Dynamic rollover begins when the helicopter starts to pivot laterally around its skid or wheel.... This can occur for a variety of reasons, including the failure to remove a tie-down or skid securing device, or if the skid or wheel contacts a fixed object while hovering sideward, or if the gear is stuck in ice, soft asphalt, or mud.... Once started, dynamic rollover cannot be stopped by application of opposite cyclic control alone.

Administrative Information

Investigator In Charge (IIC):	Read, Leah
Additional Participating Persons:	Ronald Randassao; FAA/FSDO; Albany, NY Manny Figlia; Airbus; Grand Prairie, TX Jack Johnson; Rolls Royce; Indianapolis, IN
Original Publish Date:	April 20, 2020
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=98576

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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](#).