



Aviation Investigation Final Report

Location:	Elgin, Minnesota	Accident Number:	CEN21FA330
Date & Time:	July 19, 2021, 16:00 Local	Registration:	N44BJ
Aircraft:	Robinson R44	Aircraft Damage:	Destroyed
Defining Event:	Low altitude operation/event	Injuries:	1 Fatal
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The pilot was conducting an aerial application flight in the helicopter. Just before the accident, a witness saw the helicopter completing east and west spray passes over a cornfield. The helicopter flew two consecutive spray passes over power transmission lines that crossed the field, but, on the third spray pass, the helicopter flew underneath the powerlines while heading west. The witness then entered a nearby barn and, shortly thereafter, heard a loud “boom,” and the barn shook momentarily. The witness exited the barn and saw smoke rising from the cornfield. The witness and another person subsequently found the helicopter engulfed in flames.

According to the wreckage debris path through the cornfield, the helicopter was flying to the east when a main rotor blade impacted a powerline that crossed over the field. The powerline at the point of damage was about 28 ft above the ground. The corn crop under the transmission lines was 8 to 10 ft tall. The operator stated that, during aerial application flights, the helicopter was typically flown 10 ft above the crop to ensure optimal spray disbursement. If the 10.75 ft tall helicopter flew 10 ft above the 8 ft high corn crop, then the main rotor system would be at the same elevation as the transmission line. The position of the sun relative to the helicopter at the time of the accident would likely not have impaired the pilot’s ability to see the powerlines as the helicopter flew to the east.

Postaccident examination revealed no evidence of a pre-existing mechanical malfunction or failure that would have prevented normal operation of the helicopter. Thus, it is likely that the pilot decided to intentionally fly the helicopter under the powerlines.

Probable Cause and Findings

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

The pilot’s decision to operate the helicopter under powerlines, which resulted in a main rotor blade striking a powerline, causing the helicopter to descend from a low altitude and impact terrain.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Monitoring environment - Pilot
Environmental issues	Wire - Decision related to condition
Environmental issues	Wire - Effect on operation
Aircraft	Main rotor blade system - Damaged/degraded

Factual Information

History of Flight

Maneuvering-low-alt flying	Low altitude operation/event (Defining event)
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On July 19, 2021, about 1600 central daylight time, a Robinson R44 II helicopter, N44BJ, was destroyed when it was involved in an accident near Elgin, Minnesota. The pilot was fatally injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 137 aerial application flight.

A witness saw the helicopter completing east and west spray passes over a cornfield, with each additional spray pass progressively closer to the north end of the field. The witness saw the helicopter make two consecutive spray passes over powerlines that crossed the field, but, during the third spray pass, the helicopter flew underneath the powerlines while heading west. The witness then entered a nearby pole barn and, shortly thereafter, heard a loud “boom,” and the pole barn shook momentarily. He exited the pole barn and saw smoke rising from the cornfield. The witness and another person subsequently responded to the accident site where they found the helicopter engulfed in flames.

Pilot Information

Certificate:	Commercial	Age:	40,Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Unknown
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 Unknown	Last FAA Medical Exam:	
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 4000 hours (Total, all aircraft)		

The Federal Aviation Administration (FAA) revoked the pilot’s second-class medical certificate in a letter dated February 22, 2021. The pilot had been seriously injured in a forced landing accident that occurred about 11 months before this accident. The FAA sent a letter to the pilot,

dated August 10, 2020, requesting a medical examination to determine if he remained qualified to hold a second-class medical certificate, but the pilot did not undergo the requested evaluation.

On May 17, 2021, the pilot completed an application for a new medical certificate. On his last medical certificate application, the pilot reported 4,000 hours of total flight experience, 1,100 hours of which were flown during the previous 6 months. In addition, the pilot answered "no" when asked if his medical certificate had ever been revoked. The aviation medical examiner requested that the pilot provide information about the previous helicopter accident, but the pilot had not provided the requested records before this accident occurred.

The pilot's logbook contained only a single logbook endorsement for the required training, which was required by *Special Federal Aviation Regulation 73* to act as pilot-in-command of a Robinson R44 helicopter. The date of the endorsement was not provided.

Aircraft and Owner/Operator Information

Aircraft Make:	Robinson	Registration:	N44BJ
Model/Series:	R44 II	Aircraft Category:	Helicopter
Year of Manufacture:	2007	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	11795
Landing Gear Type:	None; High skid	Seats:	4
Date/Type of Last Inspection:	June 24, 2021 Annual	Certified Max Gross Wt.:	2500 lbs
Time Since Last Inspection:	50.9 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	2079.9 Hrs at time of accident	Engine Manufacturer:	Lycoming
ELT:	C91A installed, not activated	Engine Model/Series:	IO-540-AE1A5
Registered Owner:	On file	Rated Power:	260 Horsepower
Operator:	Skyhawk Aviation	Operating Certificate(s) Held:	Agricultural aircraft (137)
Operator Does Business As:	On file	Operator Designator Code:	2LVG

According to the Robinson R44 II *Pilot Operating Handbook*, the helicopter's height was 10.75 ft. The operator stated that, during aerial application flights, the helicopter was typically flown 10 ft above the crop to ensure optimal spray disbursement.

Postaccident review of available maintenance documentation revealed no unresolved maintenance tasks or issues with the helicopter.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	RST, 1304 ft msl	Distance from Accident Site:	17 Nautical Miles
Observation Time:	15:54 Local	Direction from Accident Site:	226°
Lowest Cloud Condition:	Few / 4800 ft AGL	Visibility	10 miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	5 knots /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	280°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.2 inches Hg	Temperature/Dew Point:	28°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elgin, MN	Type of Flight Plan Filed:	None
Destination:	Elgin, MN	Type of Clearance:	None
Departure Time:		Type of Airspace:	Class G

At the time of the accident, the sun's position relative to the accident site was along a west-southwest heading (249° true) and was about 48.6° above the horizon.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	Unknown
Total Injuries:	1 Fatal	Latitude, Longitude:	44.108056,-92.204167

The initial impact location was a multiphase power transmission line, as shown in figure 1. The transmission line consisted of 24 aluminum-conducting strands over 7 steel strands, and three lines were present. The western line remained intact, the center line was frayed, and the eastern line was severed. The frayed transmission line at the point of damage was about 28 ft above the ground. The corn crop under the transmission lines was 8 to 10 ft tall. Portions of

the swashplate yoke, a blade droop tusk, the pilot's headset, and plexiglass fragments were located under and immediately east of the power transmission lines.

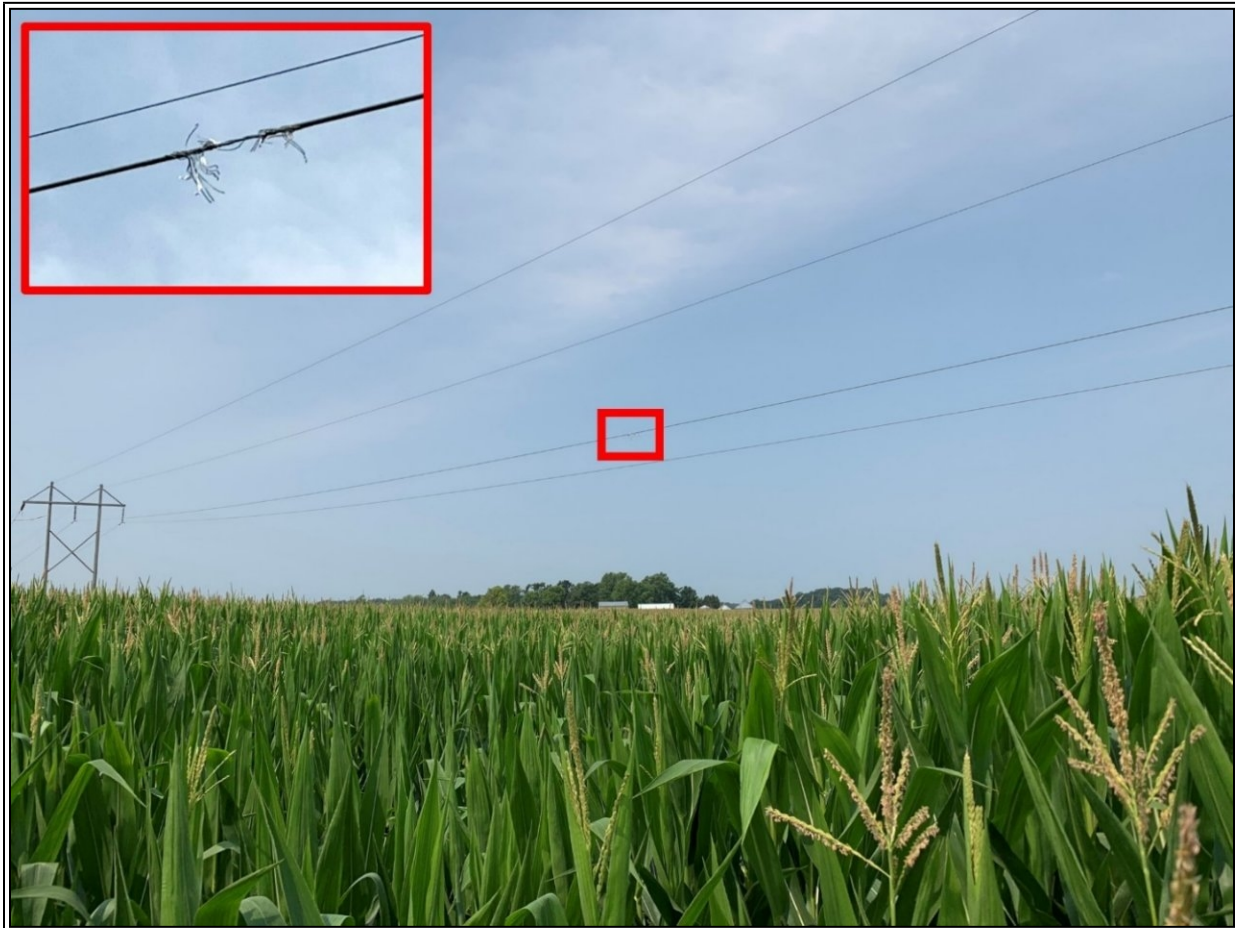


Figure 1. Powerlines above the cornfield with a red rectangle identifying the center powerline (main photograph) and an inset showing the frayed center powerline.

The wreckage debris path, as shown in figure 2, measured 292 ft between the power transmission lines and the main wreckage. The wreckage debris path through the cornfield was on a 090° heading. The helicopter impacted terrain in a 15° descent angle. Fractured portions of the spray booms, cabin door, and plexiglass were scattered along the wreckage debris path.



Figure 2. Wreckage debris path with the red circle showing the location of the wire strike.

The main wreckage, as shown in figure 3, included remnants of the cabin, landing skids, cockpit, engine, main rotor transmission, main rotor head, main rotor blades, aft fuselage, sheaves, tail rotor driveshaft, tailboom, tail rotor gear box, and tail rotor blades. The product tank was relatively intact, and its support frame was located about 15 ft north of the main wreckage. Most of the cabin and cockpit were destroyed by the postimpact fire. Flight control continuity could not be established due to the extensive damage sustained during the impact and postimpact fire.



Figure 3. Main wreckage at the accident site.

One of the two main rotor blades remained intact but folded in half during impact. The other main rotor blade fractured about 3 ft from the blade tip and exhibited damage consistent with impact with a power transmission line, as shown in figure 4. The outboard 3 ft of the main rotor blade, as shown in figure 5, was located about 465 ft south of where the helicopter impacted the power transmission line.



Figure 4. Main rotor blade fracture with damaged power transmission line.



Figure 5. Outboard 3 ft of main rotor blade (Source: Helicopter operator).

Postaccident examination revealed no evidence of a pre-existing mechanical malfunction or failure that would have prevented normal operation of the helicopter.

Medical and Pathological Information

The Mayo Clinic, Rochester, Minnesota, performed an autopsy of the pilot. His cause of death was blunt force and thermal injuries. Toxicology testing by the FAA Forensic Sciences Laboratory detected no carboxyhemoglobin, ethanol, or tested-for drugs.

Preventing Similar Accidents

Manage Risk: Good Decision-making and Risk Management Practices are Critical (SA-023)

The Problem

Although few pilots knowingly accept severe risks, accidents can also result when several risks of marginal severity are not identified or are ineffectively managed by the pilot and compound into a dangerous situation. Accidents also result when the pilot does not accurately perceive situations that involve high levels of risk. Ineffective risk management or poor aeronautical decision-making can be associated with almost any type of fatal general aviation accident.

What can you do?

- Develop good decision-making practices that will allow you to identify personal attitudes that are hazardous to safe flying, apply behavior modification techniques, recognize and cope with stress, and effectively use all resources. Understand the safety hazards associated with human fatigue and strive to eliminate fatigue contributors in your life.

- Understand that effective risk management takes practice. It is a decision-making process by which you can systematically identify hazards, assess the degree of risk, and determine the best course of action.
- Be honest with yourself and your passengers about your skill level and proficiency. Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself and the FAA about your medical condition. If you have a medical condition or are taking any medication, do not fly until your fitness for flight has been thoroughly evaluated.
- Plan ahead with flight diversion or cancellation alternatives, and brief your passengers about the alternatives before the flight.

See <https://www.nts.gov/Advocacy/safety-alerts/Documents/SA-023.pdf> for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Nikolas Halatsis; Federal Aviation Administration - Minneapolis FSDO; Minneapolis, MN Troy Helgeson; Lycoming Engines; Milliken, CO
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Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=103513

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](#).