



Aviation Investigation Final Report

Location:	Audubon, Iowa	Accident Number:	CEN20LA136
Date & Time:	March 31, 2020, 16:26 Local	Registration:	N107EH
Aircraft:	ROBINSON HELICOPTER COMPANY R44 II	Aircraft Damage:	Destroyed
Defining Event:	Controlled flight into terr/obj (CFIT)	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Aerial observation		

Analysis

The pilot and passenger were conducting a low-altitude raptor survey flight. Witnesses reported seeing the helicopter flying just prior to its impact with powerlines about 85 ft above the ground. The witnesses described the helicopter in a gentle turn toward the sun prior to impact. One witness noted that he did not hear any unusual noises from the helicopter prior to impact.

Automatic dependent surveillance-broadcast data from the helicopter provided information indicating the pilot flew six flights in the 24 hours prior to the accident. The accident flight was the fifth that day and occurred approximately 10 hours after the pilot had begun flying that morning. Intervals between flights that day were 17, 24, 35, and 29 minutes.

These working conditions were conducive to fatigue. Research on pilot fatigue in a noisy, vibrating helicopter simulator found considerable increases in subjective fatigue after 6 hours of short repetitive flights. At the end of this period, some helicopter pilots who participated in the study said they were so fatigued that they did not feel safe to fly a real helicopter. As subjective fatigue increased, study pilots demonstrated increasingly frequent “lapses” in performance.

While missions the day of the accident were longer than those in the study, flights were conducted at low altitude and involved repetitive observation tasks that required a high state of awareness to avoid terrain and obstacles. This heightened state of awareness would produce a mental workload similar to the shorter repetitive IFR flights in the study; therefore, it is likely that similar effects would be expected, including lapses in performance as fatigue increased. These lapses in performance were described in the study as outliers caused by moments of inattention. The accident pilot’s ability to avoid the same wire nine times earlier that day, but not avoid it during the accident flight is consistent with an attentional “lapse.” This potential

lapse combined with over 10 hours since awakening, and 8 hours flight time already accumulated the day of the accident suggests that the pilot was likely fatigued during the accident flight and that fatigue likely challenged the pilot's ability to see and avoid the power line.

Probable Cause and Findings

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

The pilot's failure to recognize and avoid the power line during the low-altitude flight. Contributing to the accident was the pilot's fatigue, which affected the pilot's ability to see and avoid the power line.

Findings

Environmental issues	Wire - Effect on operation
Personnel issues	Fatigue due to work schedule - Pilot
Personnel issues	Identification/recognition - Pilot

Factual Information

History of Flight

Maneuvering	Controlled flight into terr/obj (CFIT) (Defining event)
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On March 31, 2020, about 1626 central daylight time, a Robinson R44 helicopter, N107EH, was destroyed when it was involved in an accident near Audubon, Iowa. The pilot and passenger were fatally injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 aerial observation flight.

According to the operator, the purpose of the flight was to conduct a raptor survey of a 442 square-mile area in western Iowa under contract with another company whose biologist was the passenger on the helicopter at the time of the accident. The helicopter was flying a north-south grid pattern when two witnesses observed the helicopter flying in a southerly direction at low altitude. One witness observed the helicopter strike the bottom two wires of a power line before it impacted terrain and burst into flames. The second witness lost sight of the helicopter just before it impacted the wires but heard the impact and observed the helicopter descend with wires intertwined in the main rotor. Both witnesses thought the helicopter was in a turn to the southwest, toward the sun, prior to the hitting the wires. One witness described the helicopter in a gentle turn, not in a way that looked like the pilot was aware of the high lines.

Automatic dependent surveillance- broadcast (ADS-B) data showed that during the final moments of the accident flight, the helicopter was travelling south over Robin Avenue, approaching 240th Street, at an ADS-B-reported geometric altitude of 1,475 ft, with a ground speed of about 85 kts. The final recorded data point was about 160 ft north of the wires that were struck. There were no deviations in heading or altitude before the end of the data. The ground elevation at the accident site was about 1,460 ft. The flights within the survey area were conducted at altitudes about 100 ft above the ground. Examination of the flight track data for the previous flight showed that the helicopter had crossed the power lines on at least two occasions during the previous flight. (See Figure 1.)

Based on ADS-B flight data and the pilot's flight records, he had flown a flight the night prior to the accident that concluded in the Sioux Falls, South Dakota, area, lasted about 45 minutes, and was followed by about 9 hours of non-flight activity. It is not known what the pilot did during this time of non-flight activity. On the day of the accident the pilot flew five flights lasting 51 minutes, 18 minutes, 3 hours 29 minutes, 3 hours 11 minutes, and 22 minutes, respectively. The first flight of the day took off at 0629. Between these flights were periods of non-flight activity lasting 17 minutes, 24 minutes, 35 minutes and 29 minutes, respectively. It was reported that the biologist joined the flight after the helicopter arrived at Arthur N. Neu Airport (CIN), Carroll, Iowa, after the second flight of the day.

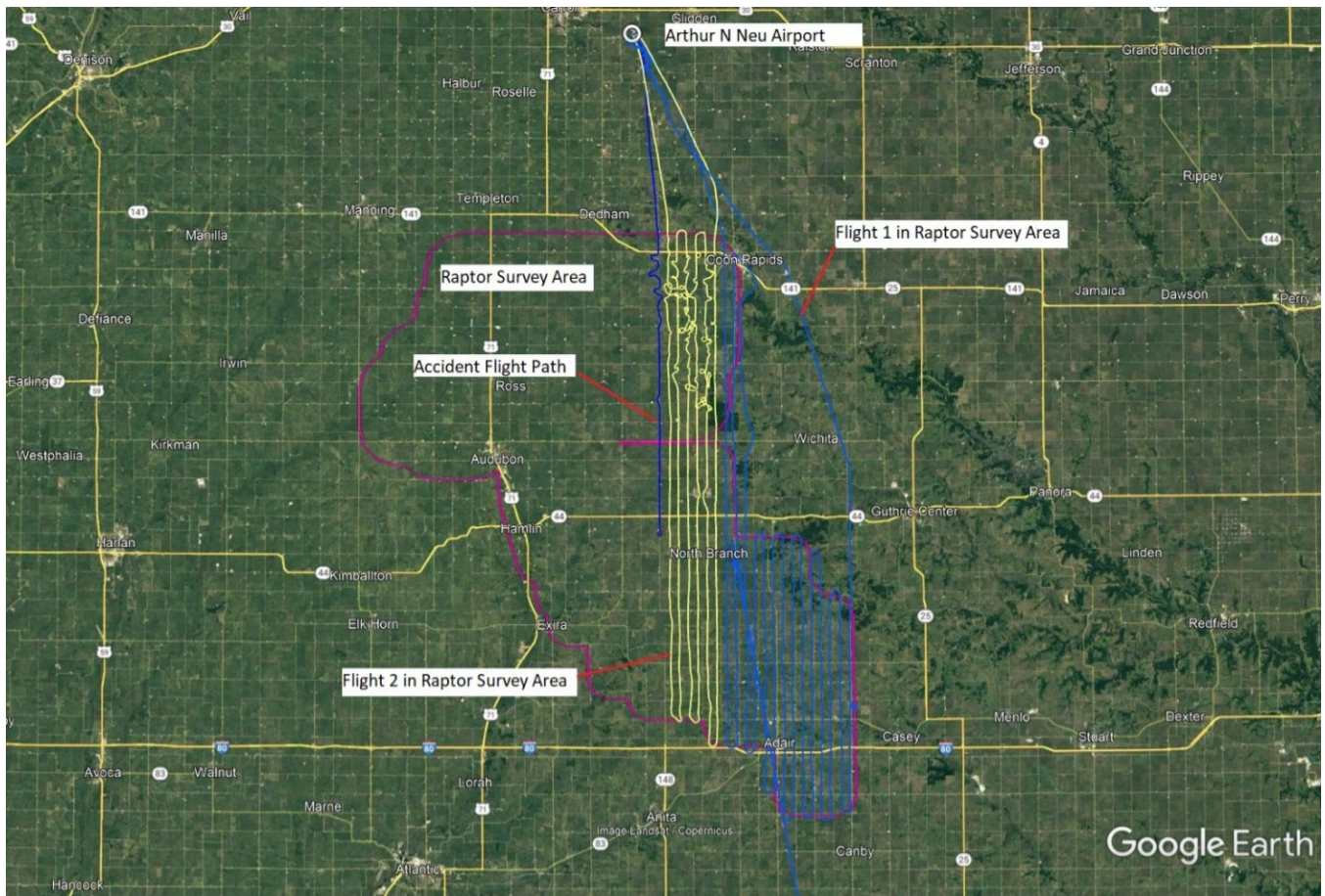


Figure 1: Plot of the survey area and the helicopter flight path on the day of the accident.

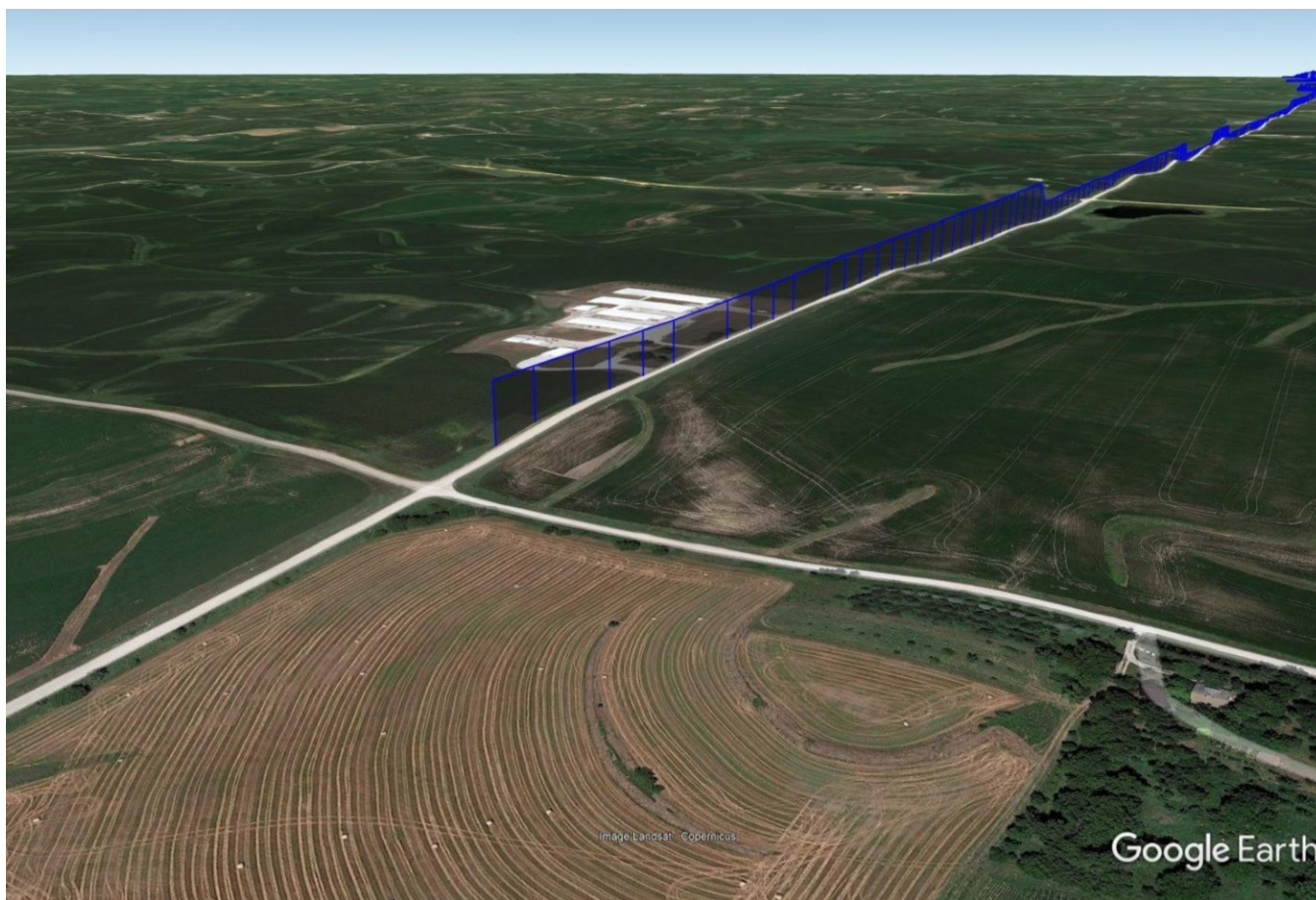


Figure 2: 3-dimensional view of the final portion of the accident flight path.

Pilot Information

Certificate:	Commercial	Age:	30, Male
Airplane Rating(s):	None	Seat Occupied:	Unknown
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Unknown
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	April 5, 2019
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	952.9 hours (Total, all aircraft), 665 hours (Total, this make and model), 897.6 hours (Pilot In Command, all aircraft), 68 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 9.5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER COMPANY	Registration:	N107EH
Model/Series:	R44 II II	Aircraft Category:	Helicopter
Year of Manufacture:	2004	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	10423
Landing Gear Type:	Skid	Seats:	4
Date/Type of Last Inspection:	March 27, 2020 Annual	Certified Max Gross Wt.:	2500 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	1906 Hrs as of last inspection	Engine Manufacturer:	Lycoming
ELT:	Installed	Engine Model/Series:	IO-540-AE1A5
Registered Owner:	MN Helicopters Inc.	Rated Power:	245 Horsepower
Operator:	Ride the Sky Helicopters	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	ADU,1288 ft msl	Distance from Accident Site:	7 Nautical Miles
Observation Time:	21:35 Local	Direction from Accident Site:	290°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	0 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	0°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.95 inches Hg	Temperature/Dew Point:	20°C / -8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Carroll, IA (CIN)	Type of Flight Plan Filed:	None
Destination:	Carroll, IA (CIN)	Type of Clearance:	None
Departure Time:	15:45 Local	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	On-ground
Total Injuries:	2 Fatal	Latitude, Longitude:	41.659911,-94.763558(est)

The helicopter came to rest in a field next to the west side of Robin Avenue and south of 240th Street. The wires that were struck ran along the north edge of 240th Street, strung between poles that were about 100 ft. tall. The estimated height of the wires struck was about 85 ft. above the ground.



Figure 3. Location of powerlines, helicopter flight path, and wreckage.

A post-impact fire consumed most of the cabin section of the helicopter. A postaccident examination of the helicopter after it was removed from the site revealed no preimpact anomalies. A large wire was found wrapped around the rotor mast just below the main rotors.



Figure 4: Powerline wires wrapped around main rotor mast.

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Michael Newhall; FAA - Des Moines FSDO; Des Moines, IA
Original Publish Date:	March 11, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=101136

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](#).