



# Aviation Investigation Final Report

<b>Location:</b>	Cross Timbers, Missouri	<b>Accident Number:</b>	CEN13FA295
<b>Date &amp; Time:</b>	May 24, 2013, 18:00 Local	<b>Registration:</b>	N569BC
<b>Aircraft:</b>	ROBINSON HELICOPTER COMPANY R44 II	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	Controlled flight into terr/obj (CFIT)	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Executive/Corporate		

## Analysis

The helicopter pilot was conducting an aerial tour. After the helicopter did not return when it was expected, a search was conducted. The wreckage was located the following day in a sparsely populated and densely wooded area. Signs of impact damage were found on nearby trees. A postimpact fire had consumed the fuselage and most of the empennage. A postaccident examination of the airframe revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. A power line was found wrapped around the main rotor drive shaft, and a section of the power line was found resting on the ground leading from the power line pole toward the main wreckage. Before impact, the power line was perpendicular to the helicopter flightpath and suspended about 65 feet above the ground. It is likely that the pilot did not see and avoid the power line and that the helicopter impacted the power line and, subsequently, trees and terrain.

## Probable Cause and Findings

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

The pilot's failure to see and avoid a power line during the low-altitude flight.

## Findings

<b>Personnel issues</b>	Incorrect action sequence - Pilot
<b>Environmental issues</b>	Wire - Awareness of condition
<b>Personnel issues</b>	Monitoring environment - Pilot

## Factual Information

### History of Flight

<b>Maneuvering</b>	Controlled flight into terr/obj (CFIT) (Defining event)
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On May 24, 2013, about 1800 central daylight time, a Robinson R44 II helicopter, N569BC, collided with a powerline near Cross Timbers, Missouri. The commercial pilot and passenger were fatally injured and the helicopter was destroyed. The helicopter was registered to and operated by Lucas Oil Products, Inc. under the provisions of 14 Code of Federal Regulations Part 91 as a corporate flight. Visual meteorological conditions prevailed for the flight and no flight plan was filed. The flight originated from Lucas Oil Speedway, Wheatland, Missouri, about 1730.

According to information provided by the Federal Aviation Administration (FAA) and the pilot's landing zone marshal, the helicopter took off from the speedway to provide an aerial tour for the passenger and did not return when it was expected. A local search was conducted about 2100 to locate the helicopter. The wreckage was discovered from the air about 0130 on the following day in a densely wooded area.

According to a witness near the accident scene, he observed the helicopter flying overhead and then appeared to land in a field nearby. He stated that as the helicopter was flying overhead, the engine did not sounds normal. However, he is not familiar with helicopter engines and their sounds. Moments later, the helicopter appeared to have lifted off from the ground and then level off. He did not notice anything out of the ordinary at that time.

### Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	32
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Helicopter; Instrument helicopter	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	June 5, 2012
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	December 11, 2012
<b>Flight Time:</b>	1984 hours (Total, all aircraft), 1054 hours (Total, this make and model), 1829 hours (Pilot In Command, all aircraft), 75 hours (Last 90 days, all aircraft), 31 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

The pilot, age 32, held a commercial pilot certificate for airplane single engine land, airplane multi engine land, rotorcraft helicopter, and airplane instrument. He also held a flight instructor certificate for

helicopter and flight instructor for instrument helicopter. He was issued a second class medical certificate issued on June 5, 2012.

A review of the pilot's logbooks revealed that as of May 19, 2013, he accumulated 1,983.5 total flight hours. Of the 1,983.5 hours, 1,054.5 hours were in the make and model of the accident helicopter, 1,041.4 of which he served as pilot in command. He accumulated 918.8 flight hours in the accident helicopter.

According to the pilot's ground marshal, when asked about the pilot's flying habits, he reported the pilot liked to be at least 500 feet above any clouds and no lower than 300 feet above ground level when the clouds were not a factor. The pilot would fly at cruise speeds so the passengers could take pictures.

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	ROBINSON HELICOPTER COMPANY	<b>Registration:</b>	N569BC
<b>Model/Series:</b>	R44 II	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	2006	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	11349
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	March 13, 2013 100 hour	<b>Certified Max Gross Wt.:</b>	2500 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	1220 Hrs as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	IO-540-AE1A5
<b>Registered Owner:</b>	LUCAS OIL PRODUCTS INC	<b>Rated Power:</b>	260 Horsepower
<b>Operator:</b>	LUCAS OIL PRODUCTS INC	<b>Operating Certificate(s) Held:</b>	None

The four-seat, single main rotor, single-engine helicopter, serial number 11349, was constructed primarily of metal, and manufactured in 2006. The helicopter was powered by a 260-horsepower Lycoming IO-540-AE1A5 engine, serial number L-31379-48A, and with a maximum continuous rating of 245-horsepower.

The helicopter was maintained on an annual inspection plan as well as a 100-hour inspection plan. A review of the helicopter's maintenance logbooks revealed that a 100-hour inspection was completed on the airframe and engine on March 13, 2013, at a total time of 1,219.6 hours.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KH21,1061 ft msl	<b>Distance from Accident Site:</b>	30 Nautical Miles
<b>Observation Time:</b>	17:55 Local	<b>Direction from Accident Site:</b>	90°
<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>	7 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	110°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.23 inches Hg	<b>Temperature/Dew Point:</b>	22°C / 5°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Wheatland, MO	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Wheatland, MO	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	17:30 Local	<b>Type of Airspace:</b>	

The automated weather report from Camdenton Memorial Airport (KH21), which was about 30 miles east of the accident site, reported at 1755: wind 110 degrees at 7 knots, 10 miles visibility, clear skies, temperature 72 degrees Fahrenheit (F), dewpoint 41 degrees F, and a barometric pressure of 30.24 inches of Mercury.

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	On-ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	On-ground
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	38.039165,-93.288055

A postaccident on-scene examination of the helicopter was conducted on May 26, 2013, by the National Transportation Safety Board (NTSB) Investigator-in-Charge (IIC), inspectors from the FAA, and a technical representative from the airframe manufacturer. The helicopter came to rest in a sparsely populated and densely wooded area of rolling terrain about 7 miles northeast of the Lucas Oil Speedway. A postimpact fire consumed the fuselage and most of the tail boom. The main rotor, tail rotor, and tail rotor gear box separated from the helicopter during the accident sequence.

The helicopter came to rest in an upright position on a northerly heading. There were signs of impact damage on the nearby trees and the rotor blades, windscreen, and metal fragments were scattered across

the wreckage path. The main wreckage and surrounding area received thermal damage. The forward cabin was positioned where the second tree was located; it was mostly consumed by fire and impact damage was evident. The aft cabin area was positioned just behind the tree and was mostly consumed by fire. The area from the vertical firewall to halfway through the tail boom was also consumed by fire. The second half of the tail boom, which contained the registration number decal, received impact and thermal damage.

A powerline, which exhibited impact damage, was found wrapped around the main rotor and a section of the powerline was found on the ground leading from the powerline pole to the main wreckage. The origin of the powerline was traced back to a powerline pole which would have suspended the line about 65 feet above the ground.

Flight control continuity could not be established due to impact and thermal damage, but flight control fractures were consistent with overload and thermal damage. All of the associated hardware and rod ends remained attached respectively. All flight control connections were accounted for and secure.

Rotational scoring was evident between the fixed and rotating swash plate. The main rotor blades were fractured in multiple places and were labeled A and B for identification purposes only. The spar of blade A was separated about 18" from the hub assembly. The spar from blade B was separated about 24" from the hub assembly. Beyond the initial points of separation, the remaining portion of each spar was intact and sustained impact damage. The leading edges of the blades exhibited chord-wise striations in a chatter pattern that was consistent with contacting the metal powerline.

The tail rotor blades were both separated at the root fittings and received impact damage. The tail rotor blades were labeled A and B for identification purposes only. Blade A was fractured the root fitting and blade B was fractured in multiple places. Both blades exhibited leading edge impact damage.

There was no evidence of abnormal wear or damage on either the upper or lower sheave grooves. The upper sheave exhibited rotational scoring around the entire aft face. The sprag clutch assembly in the upper sheave still operated as designed. Continuity was confirmed from the clutch shaft to the forward flex coupling assembly which was still connected to the main rotor transmission input. The main rotor gear box was fractured in overload just above the case connecting point. The mast and the upper half of the case came to rest beside the main wreckage. The remaining main rotor transmission case was melted. Continuity was confirmed from the main rotor ring gear to the main rotor drive shaft. The hub assembly remained attached and continuity was confirmed at the connection point.

The entire instrument panel was detached from the cockpit and was found near the main wreckage. The panel sustained impact damage. The ignition switch was found in the left magneto position. The flight instruments provided no useful information. The filaments for each warning light were examined and none of them exhibited stretching that would have indicated they were illuminated at the time of impact.

The engine received impact and thermal damage. The bottom of the case melted and the crankshaft was clearly visible. The accessories were melted away from the case. Cylinders 1-3-5 were separated from the case. Cylinders 2-4-6 remained attached to the case.

The helicopter was retro-fitted with main and auxiliary bladder fuel tanks. Fuel quantity stickers specific

to the bladder tanks were placed on the instrument panel. The bladder tanks received thermal damage and only the caps were recovered. Bladder material was evident around the aluminum fitting on the underside of the tank. The smell of aviation gas was evident underneath the area where the tanks were located.

## **Medical and Pathological Information**

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An autopsy was performed on the pilot on May 28, 2013, by Southwest Missouri Forensics, Springfield, Missouri. The autopsy reported the cause of death as cerebral anoxia secondary to hypoxemia due to aspiration of blood induced by blunt force trauma to the head and chest.

The FAA Civil Aerospace Medical Institute prepared a Final Forensic Toxicology Fatal Accident Report. The results were negative for all screened substances.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Lindberg, Joshua
<b>Additional Participating Persons:</b>	Chris Smith; Robinson Helicopter Company; Torrence, CA Marvin Moore; Federal Aviation Administration; Kansas City, MO Daryl Miller; Lucas Oil; Corydon, IN
<b>Original Publish Date:</b>	February 10, 2014
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=86995">https://data.nts.gov/Docket?ProjectID=86995</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.

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