Aviation Investigation Final Report

Location:	Morristown, Arizona	**Accident Number:**	WPR09FA284
Date & Time:	June 11, 2009, 10:00 Local	**Registration:**	N149SH
Aircraft:	ROBINSON HELICOPTER R22 BETA	**Aircraft Damage:**	Substantial
Defining Event:	Collision with terr/obj (non-CFIT)	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Other work use		

Analysis

During a low-altitude flight for rounding up stray cattle on a ranch, the helicopter collided with a power line and descended uncontrolled to the ground. There were no eyewitnesses to the accident; however, two witnesses reported hearing the helicopter working in the area and then hearing a loud bang or boom. One of the witnesses reported that at the same time he heard the loud noise the power went out at his house. First responders reported finding a downed power transmission wire near the wreckage. Wire strike marks were found on the helicopter's lower fuselage that continued to its left skid. The marks appeared to go down the skid strut, and then forward on the skid, consistent with the helicopter pivoting nose down around the wire. Examination of the airframe and engine revealed no evidence of any pre-existing discrepancies that would have prevented normal operation of the helicopter. Toxicology testing revealed that the pilot was using two medications, an antidepressant and a stimulant, that are not typically approved for use by the FAA. He had previously noted the use of the stimulant for mild inattentiveness and been advised by the Federal Aviation Administration that he was not permitted to operate an aircraft anytime that he required medication. He had not indicated the use of any medications on his most recent application for a medical certificate about 2 months before the accident. The role, if any, of the medications in the accident could not be definitively established.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain clearance from the power line.

Findings

Environmental issues	Wire - Awareness of condition
Environmental issues	Wire - Response/compensation
Personnel issues	Monitoring environment - Pilot

Factual Information

History of Flight

Maneuvering-low-alt flying	Low altitude operation/event
Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT) (Defining event)

HISTORY OF FLIGHT

On June 11, 2009, about 1000 mountain standard time, a Robinson R22 Beta helicopter, N149SH, collided with a power line during low altitude flight and descended uncontrolled to ground impact near Morristown, Arizona. The commercial pilot, the sole occupant, was killed. The helicopter, which was registered to a private individual and operated by the pilot as a 14 Code of Federal Regulations Part 91 flight, sustained substantial damage. The purpose of the local flight was to herd cattle for a ranch owner. Visual meteorological conditions prevailed, and no flight plan was filed.

The ranch owner stated that the pilot had worked for him before and was familiar with the area. He said that the day before the accident, the pilot made three flights between 0900 and 1700. The pilot then had dinner with the ranch owner and spent the night at his home. In the morning, the pilot refueled and inspected the helicopter before departing on the accident flight at approximately 0730. The ranch owner did not see or hear the accident.

A witness reported that the helicopter was rounding up stray cattle less than 1/4 mile from his residence. He had been listening to the helicopter for a while, and its engine sounded normal. He heard a "loud boom," and the power went out at his house. There was a hill between the house and the accident site, so he could not see the helicopter. He drove to the accident site and found the downed helicopter.

Another witness reported that she heard the helicopter working in the area and then suddenly heard a “loud bang, like a shotgun going off.” Then she heard the helicopter’s engine “sputtering a couple of times. Then it was quiet.” She drove to the scene and observed the helicopter on its side with a downed power transmission wire nearby.

PERSONNEL INFORMATION

The pilot, age 61, held a commercial pilot certificate with a rotorcraft helicopter rating. He held a second-class medical certificate dated April 22, 2009, with the limitation, must wear corrective lenses. On the application for this medical certificate, the pilot reported that he had accumulated 3,200 hours total flight time with 700 hours flown in the past 6 months. The pilot’s flight logbook was not available for examination.

AIRCRAFT INFORMATION

The 2007 model Robinson R22 Beta helicopter, S/N 4143, was leased to the pilot. Its maximum takeoff gross weight was 1,370 pounds. It was powered by a Lycoming O-360-J2A, reciprocating, belt driven, air-cooled, normally aspirated engine, which had a maximum takeoff rating of 145 horsepower at sea level. The most recent annual inspection was completed on December 17, 2008, at a total airframe time of 549.1 hours. At the time of the accident, the helicopter had accumulated a total airframe time of 620.3 hours. The helicopter's maintenance records were not available for examination.

METEOROLOGICAL INFORMATION

At 0953, the reported weather conditions at Deer Valley (elevation 1,478 feet), Arizona, located about 25 nautical miles southeast of the accident site, were winds from 140 degrees at 7 knots; visibility 10 miles, clear skies; temperature 27 degrees Celsius (C); dew point 4 degrees C; and altimeter setting 29.88 inches. The calculated density altitude at the accident site, using Deer Valley temperature and altimeter setting, was 4,304 feet.

According to a deputy with the Yavapai County Sheriff's Office, the weather was "clear and warm with some cloudiness and the temperature was in the upper seventies" when he arrived on scene about 1219.

WRECKAGE AND IMPACT INFORMATION

The helicopter was found in rugged, mountainous terrain (elevation 2,302 feet) approximately 30 nautical miles northwest of Phoenix, Arizona, near Morristown. The terrain was sparsely covered with brush 6 to 14 feet high with scattered Saguaro cactus to 50 feet high. Downed power lines, wreckage debris, and aerial photographs were consistent with the helicopter's flight path being 320-340 degrees at the time of impact. Federal Aviation Administration (FAA) inspectors responded to the accident site and reported that the helicopter came to rest on its right side. Both windshields were shattered and the right side of the fuselage was crushed. The aft portion of the tail boom was separated from the fuselage and segmented into three pieces. The tail cone and tail rotor blades were found approximately 75 feet from the fuselage.

Both main rotor blades sustained impact damage to their leading and trailing edges. Both blades were bent down 20-25 degrees near the root, and one was bent down 80 degrees approximately 4 feet in from the tip. One blade had blue transfer marks, which matched the paint on the fuselage, and the other blade had red transfer marks, which appeared to match the color of the "Danger" decal located on the tail cone.

There was a row of evenly spaced wire strike marks, 2-4 inches long with approximately 1-inch spacing, located on the left side of the nose and chin. They began at the lower windshield retainer, 6 inches left of the center bow and continued down and back to the top of the forward left landing gear strut. The leading edge of the left landing gear strut exhibited wire contact

marks, which varied in spacing from approximately 1/3-inch to constant scuffing. The left skid tube was scuffed on its upper surface, forward of the forward strut, at varying lengths and spacing.

No evidence of any preimpact mechanical discrepancies were found with the airplane's airframe or engine that would have prevented normal operation. There was no postimpact fire.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was conducted by the Yavapai County Office of the Medical Examiner, Prescott, Arizona. The cause of death was reported as multiple blunt force injuries.

Toxicology tests were conducted by the FAA's Civil Aeromedical Institute. The tests detected 2.344 ug/ml desmethylvenlafaxine, 0.984 ug/ml methylphenidate, and 0.633 venlafaxine in pleural blood. Methylphenidate is a stimulant most commonly known by the trademark name Ritalin. Venlafaxine is an antidepressant most commonly known by the trademark name Effexor; desmethylvenlafaxine is a metabolite of venlafaxine.

Review of the pilot's FAA medical records indicated that the pilot's initial application for a medical certificate, dated June 8, 2005, noted the use of methylphenidate. A letter from the pilot's psychiatrist indicated that the medication had been initiated for "mild inattentiveness," that the medication was "not a necessary medication in order for him to function normally," and that it had been discontinued on June 9, 2005. A neuropsychological evaluation performed on February 14, 2006, was noted as normal, and the pilot was issued a medical certificate by the FAA on May 17, 2006, with the notation that: "Because of your history of mild inattentiveness and possible attention deficit disorder (ADD), operation of aircraft is prohibited any time new symptoms or adverse changes occur or any time medication and/or treatment are required." The pilot's most recent application for a second-class medical certificate, dated April 22, 2009, did not note any medical conditions or the use of any medications.

TESTS AND RESEARCH

On July 2, 2009, a National Transportation Safety Board investigator, an FAA inspector, and a Robinson Helicopter company investigator convened at an aircraft salvage yard in Phoenix, Arizona, to examine the helicopter. The engine could be rotated by hand, and all four cylinders had good thumb suction and compression. The cylinder rocker covers on the right side of the fuselage were crushed; they were removed, reshaped to allow clearance for the rocker arms, and then reinstalled. The engine was started. The oil pressure was 55 psi. A magneto ground check was performed (without a tachometer) with typical drop observed on the right magneto. A more than typical drop was observed on the left magneto, which was attributed to its damaged spark plug wires.

The oil cooler had a row of evenly spaced indentations adjacent to the starter ring gear, which appeared to match the size and spacing of the teeth on the starter ring gear. There were score

marks on approximately 90 degrees of the aft face of the upper sheave, adjacent to a scuff mark on the clutch actuator. The Robinson investigator said “these two signatures are both indicators that the engine was not rotating at impact.” He further stated that this helicopter was designed to fly with low inertial energy in the main rotor blades. He said that if the main blades struck the tail boom before terrain impact, the engine’s rotation rate could be reduced to a minimum.

The auxiliary fuel tank was compromised and its fuel cap was found separated from the neck. The main fuel tank sustained only minor damage and its fuel cap was secure. Both tanks were void of fuel. The vent system was clear as were the finger screens and fuel lines. The gascolator bowl was half full of what appeared to be 100 LL Avgas (sweet smell and blue color) with no presence of water. There was a small amount of sediment in the bottom of the bowl and on the gascolator screen. The carburetor float bowl also was void of fuel and its finger screen was clear. Witnesses who first responded to the accident scene reported that a liquid, which appeared to be fuel, was trickling/dripping from the helicopter.

Pilot Information

Certificate:	Commercial	**Age:**	61,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 22, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 30, 2008
Flight Time:	3200 hours (Total, all aircraft), 3200 hours (Total, this make and model), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER	**Registration:**	N149SH
Model/Series:	R22 BETA	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	4143
Landing Gear Type:	N/A; Skid	**Seats:**	2
Date/Type of Last Inspection:	December 18, 2008 Annual	**Certified Max Gross Wt.:**	1370 lbs
Time Since Last Inspection:	71 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	620 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	O-360-J2A
Registered Owner:	On file	**Rated Power:**	145 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:	DVT,1478 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	09:53 Local	**Direction from Accident Site:**	120°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	27°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Morristown, AZ	**Type of Flight Plan Filed:**	None
Destination:	Morristown, AZ	**Type of Clearance:**	None
Departure Time:	07:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	34.01889,-112.343612

Administrative Information

Investigator In Charge (IIC):	Struhsaker, James
Additional Participating Persons:	Bill Sapp; FAA SDL FSDO; Scottsdale, AZ Thom Webster; Robinson Helicopter Company; Torrance, CA
Original Publish Date:	April 22, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74021