



# **Aviation Investigation Final Report**

Location:	North Las Vegas, Nevada	Accident Number:	WPR11LA161
Date & Time:	March 11, 2011, 14:50 Local	Registration:	N8360T
Aircraft:	ROBINSON HELICOPTER R22 BETA II	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (partial)	Injuries:	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

### Analysis

While conducting the pre-takeoff check of the right magneto, the certified flight instructor (CFI) determined that the drop in the helicopter's engine rpm remained within operational limits during the required two-second check period, but that it continued to drop significantly for a short period thereafter. A second check sequence produced the same results. Although concerned, the CFI continued the instructional flight, whereupon he determined that maneuvering the helicopter was taking considerably more power than he was accustomed to. About 30 minutes into the flight, the CFI landed the helicopter to once again check the right magneto because of the apparent lack of performance. The results showed the same excessive post-check rpm drop. After lifting the helicopter back airborne, and returning control to the student in a low hover, the helicopter suddenly descended, contacting the surface with one skid. The CFI then took control of the helicopter, but was unable to keep it from rolling onto its side. A postaccident test and disassembly inspection of the helicopter's magnetos and ignition system did not reveal a reason for the rpm drop or the reduction in performance.

#### **Probable Cause and Findings**

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The partial loss of engine power for undetermined reasons. Contributing to the accident was the certified flight instructor's decision to continue the flight after the helicopter exhibited inadequate performance capabilities and an unresolved power production issue.

Findings	
Aircraft	(general) - Not specified
Personnel issues	Decision making/judgment - Instructor/check pilot

# **Factual Information**

History of Flight	
Maneuvering-hover	Loss of engine power (partial) (Defining event)
Maneuvering-hover	Collision with terr/obj (non-CFIT)

On March 11, 2011, about 1450 Pacific standard time, a Robinson R-22 Beta II helicopter, N8360T, rolled over onto its side after one of its skids contacted the terrain during an instructional flight at North Las Vegas Airport, North Las Vegas, Nevada. The certified flight instructor and his student were not injured, but the helicopter, which was owned by Tamiry Aviation LLC, and operated by 702 Helicopters, sustained substantial damage. The 14 Code of Federal Regulations Part 91 local instructional flight, which was initiated about 50 minutes prior to the accident, was being operated in visual meteorological conditions. No flight plan had been filed.

According to the flight instructor, the primary objective of the instructional flight was to teach his student, who prior to the flight had accumulated less than 2 hours of instructional flight time in a helicopter, how to perform a stationary hover.

While completing the startup and pre-takeoff sequence of checklist items, the instructor noticed, "... a dramatic drop in rpm when the right magneto was checked, but only a four (4) or five (5) percent rpm drop when the left was checked." He therefore checked the right magneto a second time to see if it stayed within the Robinson allowable limitation of no more than seven percent drop within two seconds. During that check the rpm dropped about six or seven percent in two seconds, but then continued to decrease to a total drop of about fifteen percent in about four or five seconds. Although the instructor was "concerned" about the fact that the rpm had continued to drop so far past seven percent, since it technically met the maximum allowable two-second drop limit, he elected to continue the flight.

As the flight continued the instructor noticed that the helicopter required, "... an unusually high power setting to maintain even a 2 or 3 foot hover." He eventually commented to his student that some of the difficulty he was having maintaining a hover might be the result of the helicopter being "very underpowered." About 30 minutes into the flight, because the helicopter did not seem to be performing at the level that the instructor was accustomed to, he decided that he should land and perform another magneto check. During that check the selection of the right magneto produced similar results as during the check that was performed prior to the initial takeoff (a drop of about six or seven percent within two seconds, followed by a continuing total drop of about 15 percent in four or five seconds). After this second magneto check, the instructor ran the engine at a lean fuel setting for about two minutes, hoping to burn off any carbon or lead deposits that may have been affecting the engine's performance. After the completion of these two actions, the instructor lifted the helicopter back into the air in

order to detect any change in performance, but he soon determined that, "...nothing had changed in the amount of power required, and it still seemed underpowered, requiring right at about maximum continuous power to hold a 3-foot hover."

The instructor then made the decision to continue the instructional flight, and turned the controls back over to his student. The student then established a hover about three feet above ground level (agl), and was, according to the instructor, hovering fairly well, when the helicopter suddenly began to descend. As the student reacted to the descent, he input right cyclic control, resulting in the right skid coming in contact with the ground with the helicopter tilting to the right. At that time the flight instructor took over the controls and tried to correct the situation by adding left cyclic and up collective, but he was unable to keep the helicopter from rolling over onto its side.

After the accident, the magnetos were bench tested and disassembled with no negative findings, and it was confirmed that the magneto-to-engine timing was correct for both magnetos. It was also noted that both magnetos had their repetitive 500-hour inspection/overhaul less than 45 days prior to the accident. The leads were examined for evidence of frayed shielding or evidence of shorting, and none was found. They themselves showed no evidence of unusual wear, contamination buildup, cracked insulators or shorting. The helicopter's air induction system was inspected, with no negative findings. At the end of the postaccident inspection process, except for some roughness of the paint applied to protect the D-spar bond line on the underside of the main rotor blade tips, a roughness noticed/inspected by the instructor prior to the flight, no component anomaly had been observed that would have contributed to a reduction in performance.

In a postaccident interview, the instructor said that he had received a text message from another certified flight instructor (CFI) the day before the flight. According to this instructor she noticed a performance reduction during that flight that lasted for only two or three minutes of the 30 minute flight. The instructor felt it may have been a magneto or fouled problem. Based upon that text message and the performance degradation that he was detecting during his flight, the instructor said that he had no good reason why he did not discontinue the flight after the second magneto check. He said that he was "uncomfortable" with how much power it took to hover, and how it seemed "very difficult" to maintain the hover height that he normally liked to use during student hover training. He then said "...but for some reason I did not take the controls and return to the south ramp and shut down." He further commented that he may have continued the flight because he supposed that he felt capable of fixing any hover problem the student was having, just like he had done "...probably a thousand times before." Later in a telephone conversation, the pilot admitted that continuing the hovering instructional flight with a low-time student, when it appeared the helicopter may not be performing up to its normal potential, was not a good decision, and that it would have been wise to return to the ramp and terminate the flight after the second magneto check.

It was further determined that the helicopter had flown 6.4 hours since the flight that resulted in the text-message from the other instructor.

# Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	29,Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
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:	February 28, 2011
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	July 3, 2009
Flight Time:	843 hours (Total, all aircraft), 706 hours (Total, this make and model), 743 hours (Pilot In Command, all aircraft), 153 hours (Last 90 days, all aircraft), 71 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

#### Information

Certificate:	None	Age:	45,Male
Airplane Rating(s):	None	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	None None	Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	2 hours (Total, all aircraft), 2 hours (Total, this make and model), 2 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

### Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER	Registration:	N8360T
Model/Series:	R22 BETA II	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	2758
Landing Gear Type:	Skid	Seats:	2
Date/Type of Last Inspection:	March 7, 2011 100 hour	Certified Max Gross Wt.:	1370 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	556 Hrs at time of accident	Engine Manufacturer:	Lycoming
ELT:	Not installed	Engine Model/Series:	0-360-J2A
Registered Owner:	TAMIRY AVIATION LLC	Rated Power:	200 Horsepower
Operator:	702 Helicopters	Operating Certificate(s) Held:	None

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
<b>Observation Facility, Elevation:</b>	KVGT	Distance from Accident Site:	5 Nautical Miles
Observation Time:	14:53 Local	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	8 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	210°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.86 inches Hg	Temperature/Dew Point:	26°C / -3°C
Precipitation and Obscuration:	No Obscuration; No Precipitat	tion	
Departure Point:	North Las Vegas, NV (KVGT)	Type of Flight Plan Filed:	None
Destination:	North Las Vegas, NV (KVGT)	Type of Clearance:	VFR
Departure Time:	14:00 Local	Type of Airspace:	

### **Airport Information**

Airport:	North Las Vegas KVGT	Runway Surface Type:	
Airport Elevation:	2205 ft msl	Runway Surface Condition:	
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

# Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 None	Latitude, Longitude:	36.210556,-115.194442(est)

#### **Administrative Information**

Investigator In Charge (IIC):	Anderson, Orrin
Additional Participating Persons:	Paul Alukonis; Las Vegas FSDO; Las Vegas, NV
Original Publish Date:	July 18, 2011
Last Revision Date:	
Investigation Class:	<u>Class</u>
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=78534

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