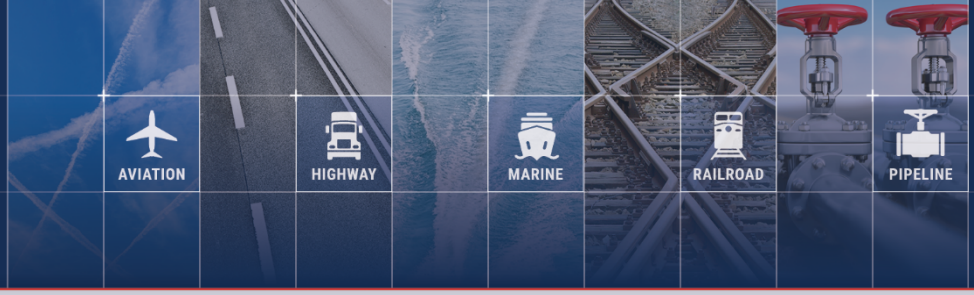

Aviation Investigation Final Report

Location:	Murrieta, California	**Accident Number:**	WPR12FA298
Date & Time:	July 9, 2012, 10:15 Local	**Registration:**	N7527Y
Aircraft:	ROBINSON HELICOPTER R22 BETA	**Aircraft Damage:**	Substantial
Defining Event:	Dynamic rollover	**Injuries:**	1 Fatal, 1 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

During an instructional flight, the student pilot reported that the instructor was demonstrating a “fast landing” approach to a hill. The instructor subsequently positioned the helicopter in a 3- to 4-foot hover above the ground and heading into the wind, then initiated a left pedal turn and started to lift off. The student stated that the helicopter suddenly rolled rapidly to the right and the main rotor blades contacted the ground, which resulted in a rollover. A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The terrain surrounding the accident site was covered with sporadic patches of sagebrush ranging from 1 to 4 feet high. It is likely that the helicopter contacted brush as the pilot performed the left hovering turn, which resulted in a dynamic rollover.

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 high vegetation while making a hovering turn, which resulted in a dynamic rollover.

Findings

Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	Lateral/bank control - Not attained/maintained
Environmental issues	(general) - Effect on operation

Factual Information

History of Flight

Maneuvering-hover	Dynamic rollover (Defining event)

HISTORY OF FLIGHT

On July 9, 2012, about 1015 Pacific daylight time, a Robinson R22 Beta helicopter, N7527Y, impacted terrain following a loss of control while hovering at an off field landing site near Murrieta, California. The flight instructor was fatally injured and his student was not injured. The helicopter was substantially damaged. The helicopter was being operated by USA Academy of Aviation, Inc., under the provisions of 14 Code of Federal Regulations Part 91. A flight plan had not been filed for the local instructional flight, which originated from French Valley Airport, Murrieta, about 0900. Visual meteorological conditions prevailed at the time of the accident.

The student reported that they were practicing off field landings. According to the student, the instructor pointed toward a hill and explained that he would demonstrate a “fast landing” approach. The instructor flew toward the hill at about 50 knots, flared to slow the helicopter, and came to a hover at the center of the hill top. The instructor hovered at 3 to 4 feet above the ground heading south into the wind, performed a left pedal turn to the east and then started to lift off. At this point, the helicopter rolled rapidly to the right, and the main rotor blades hit the ground. When the helicopter came to rest, it was lying on its left side. The student exited the helicopter and found that the instructor was trapped beneath the fuselage and was not responsive. The student reported that he was not on the flight controls when the accident occurred. He did not report any preimpact mechanical discrepancies or anomalies with the helicopter.

PERSONNEL INFORMATION

The 61-year-old flight instructor, seated in the left seat, held a commercial pilot certificate with a rotorcraft helicopter rating, and a flight instructor certificate with a rotorcraft helicopter rating. His most recent Federal Aviation Administration (FAA) second-class medical certificate was issued on September 6, 2011. At that time, he reported that he had a total flight time of 10,625 hours and had flown 251 hours in the preceding 6 months.

The student, seated in the right seat, held a private pilot certificate with an airplane single-engine land rating. His most recent FAA third-class medical certificate was issued on December 13, 2010. At that time, he reported that he had a total flight time of 80 hours and had flown 20 hours in the preceding 6 months. The student reported that he started working with the flight instructor to obtain his rotorcraft helicopter rating about 1 week before the accident,

and they had flown together about 15 hours. He further reported that he had not yet soloed in the helicopter.

AIRCRAFT INFORMATION

The single engine two person helicopter was manufactured in 2004 by the Robinson Helicopter Company. It was equipped with a two-bladed main rotor system, a two-bladed tail rotor, and skid-type landing gear. The helicopter had a maximum takeoff weight of 1,370 pounds and a useful load capacity of about 575 pounds. The helicopter was powered by a Lycoming O-360-J2A four cylinder, horizontally opposed, normally aspirated, air cooled engine. This engine was designed to produce 145 horsepower at sea level. A review of the helicopter's maintenance logbooks revealed its most recent 100-hour inspection was completed on March 11, 2012, at a recording hour meter time of 2,100 hours and a total time of 4,266.5 hours. The helicopter's recording hour meter showed 2,199.6 hours at the time of the accident.

A review of the maintenance records revealed no evidence of any uncorrected maintenance discrepancies.

METEOROLOGICAL INFORMATION

At 1055, the automated weather observing system at March Air Reserve Base, Riverside, California, located about 22 miles northwest of the accident site, reported wind from 330 degrees at 7 knots; clear sky, visibility 10 miles; temperature 34 degrees Celsius; dew point minus 4 degrees Celsius; and an altimeter setting of 29.97 inches.

An automated weather station (ME2644) in Hemet, California, located about 12 miles north of the accident site, reported the following:

Time	Wind Direction	Wind Speed
0959	Northwest	1.0 mph
1004	Northwest	2.3 mph
1009	Calm	0 mph
1014	Calm	0 mph
1019	Northwest	2.0 mph

WRECKAGE AND IMPACT INFORMATION

The helicopter was examined by a FAA inspector and a representative from the Robinson Helicopter Company at the accident site on the day of the accident, and again on July 19, 2012, at the facilities of Robinson Helicopter Company in Torrance, California.

The helicopter came to rest on its left side with the nose on a heading of about 090 degrees, positioned 10 to 12 feet southeast of the top of a hill. The surface was loose dirt over rock. The area had sporadic patches of sagebrush ranging from 1 to 4 feet high. The main rotor mast was bent and disconnected about 6 inches above the gearbox, and the main rotor

system, with the exception of the outboard section of one main rotor blade, was lying next to the fuselage. There were ground scars directly under the helicopter and one about 17 feet south of the fuselage, which was consistent in appearance with a main rotor blade tip strike.

The intact main rotor blade was bent upward about 3 feet from the hub, bent upward and back (in the direction of rotation) near the tip, and displayed chordwise creases near the tip. The other main rotor blade was separated about 3 feet from the hub, and the majority of the separated section of the blade was found about 135 feet from the fuselage. This blade was bent back at the tip and displayed chordwise creases throughout its length.

Both tail rotor blades were disconnected near the hub. One had a small dent in its leading edge, and the other displayed chordwise scuff marks. The tail rotor output shaft rotated smoothly, and the tail rotor flight controls had continuity throughout.

Neither door was installed. The left side windshield was shattered, and the right side windshield was separated from the cabin. There was a large scuff mark on the chin to the left of the landing lights. The left door frame and roof section were distorted due to impact. The cowling around the main rotor mast was dented and deformed consistent with contact with the main rotor mast. The upper stabilizer was damaged near the tip and bent midway consistent with ground contact.

Examination of the cyclic and collective flight controls revealed no evidence of any preimpact malfunctions or failures. The surfaces of the separated control tubes were angular and jagged consistent with separation as a result of overload.

The engine was examined on July 19, 2012, and no visible damage was noted. The lower spark plugs were removed, the engine was rotated by hand, and good thumb suction and compression were obtained on all cylinders. The plugs were reinstalled, and the engine was started. It ran slightly rough for the first few minutes but after it warmed up, it ran smooth at idle and at 100% rpm. A magneto check was performed at 75% rpm, which resulted in an 8% rpm drop on the left magneto and a 12% rpm drop on the right magneto. Oil pressure and temperature were normal.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the flight instructor on July 10, 2012, by the Office of the Riverside County Sheriff-Coroner. The report identified the cause of death as craniocerebral trauma. The flight instructor and the student pilot were not wearing helmets, nor was this required. The helicopter was equipped with a combined seat belt/single-strap shoulder harness (similar to the type commonly installed in automobiles) for each occupant, and the student reported that both he and the instructor were using them.

Forensic toxicology testing was performed on specimens from the flight instructor at the FAA’s Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The tests

were negative for all screened substances.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	61,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	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	September 6, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	10625 hours (Total, all aircraft)		

Student pilot Information

Certificate:	Private; Sport Pilot	**Age:**	51,Male
Airplane Rating(s):	Single-engine land	**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:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	December 13, 2010
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	80 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER	**Registration:**	N7527Y
Model/Series:	R22 BETA	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3593
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	March 11, 2012 100 hour	**Certified Max Gross Wt.:**	1370 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4267 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-360 SERIES
Registered Owner:	NOVEMBER ALPHA LLC	**Rated Power:**	180 Horsepower
Operator:	USA Academy Of Aviation, Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	RIV,1536 ft msl	**Distance from Accident Site:**	
Observation Time:	10:55 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	34°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Murrieta, CA (F70)	**Type of Flight Plan Filed:**	None
Destination:	Murrieta, CA (F70)	**Type of Clearance:**	None
Departure Time:	09:00 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 None	**Latitude, Longitude:**	33.563331,-117.0625

Administrative Information

Investigator In Charge (IIC):	Struhsaker, James
Additional Participating Persons:	John Weston; FAA FSDO; Riverside, CA
Original Publish Date:	December 5, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84237