



Aviation Investigation Final Report

Location:	Henderson, Texas	Accident Number:	CEN22LA234
Date & Time:	June 6, 2022, 09:50 Local	Registration:	N94WC
Aircraft:	ROBINSON HELICOPTER R44	Aircraft Damage:	Substantial
Defining Event:	Powerplant sys/comp malf/fail	Injuries:	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The helicopter pilot was practicing hover takeoffs and landings in a crosswind. The passenger reported that, while hovering before a landing, the helicopter shuddered, and the left skid contacted the ground. The helicopter rolled onto its left side. The helicopter sustained substantial damage to the main rotor blades, fuselage, and tail boom.

Examination of the helicopter’s flight control systems and main and tail rotor drive systems did not show any preimpact anomalies that would have precluded normal operation. Examination of the No. 2 cylinder revealed that the exhaust push rod was bent and the exhaust valve was stuck. Borescope inspection of the No. 2 cylinder showed that the exhaust valve had contacted the piston and the intake valve appeared to be recessed in the No. 2 valve seat. The loss of engine power was most likely due to the stuck exhaust valve on the No. 2 cylinder.

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 in a hover due to a stuck exhaust valve.

Findings

Aircraft	(general) - Malfunction
Aircraft	Recip eng cyl section - Damaged/degraded
Aircraft	Yaw control - Not attained/maintained

Factual Information

History of Flight

Maneuvering-hover	Powerplant sys/comp malf/fail (Defining event)
Maneuvering-hover	Loss of control in flight

On June 6, 2022, about 0950 central daylight time, a Robinson R44 helicopter, N94WC, was substantially damaged when it was involved in an accident near Henderson, Texas. The pilot sustained serious injuries and the passenger sustained minor injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The passenger reported that the pilot was practicing hover takeoffs and landings in a crosswind. She stated that, while hovering before a landing, the helicopter shuddered, and the left skid contacted the ground. The helicopter rolled onto its left side. The helicopter sustained substantial damage to the main rotor blades and tail boom.

Examination of the helicopter's flight control systems and main and tail rotor drive systems did not show any preimpact anomalies. During the engine examination the valve covers, and bottom sparkplugs were removed. The crankshaft was rotated by hand and thumb compression was obtained at all cylinders except the No. 2 cylinder. Examination of the No. 2 cylinder revealed that the exhaust push rod was bent and the exhaust valve was found stuck. Borescope inspection of the No. 2 cylinder showed that the exhaust valve had contacted the piston. The intake valve appeared to be recessed in the No. 2 valve seat.

A review of the engine logbooks showed no indication of compliance with Lycoming Engines Mandatory Service Bulletin 388C, "Procedure to Determine Exhaust Valve and Guide Condition." The service bulletin recommended compliance every 300 hours or if valve sticking is suspected and cautioned that "Failure to comply with the provisions of this publication could result in engine failure due to excessive carbon build up between the valve guide and valve stem resulting in sticking valves or broken exhaust valves..." According to Robinson, past experiences of a stuck valve in a R44 have resulted in the pilots reporting some or all the following symptoms: vibrations felt through the airframe, popping, or misfiring out of the exhaust, loss of power, low rotor RPM and/or engine RPM fluctuations.

Pilot Information

Certificate:	Airline transport; Private	Age:	49, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	September 30, 2021
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 3300 hours (Total, all aircraft), 50 hours (Total, this make and model), 20 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	ROBINSON HELICOPTER	Registration:	N94WC
Model/Series:	R44	Aircraft Category:	Helicopter
Year of Manufacture:	1999	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	0691
Landing Gear Type:	Skid	Seats:	4
Date/Type of Last Inspection:	Annual	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Lycoming
ELT:	Not installed	Engine Model/Series:	IO-540
Registered Owner:	On file	Rated Power:	280 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:	KRFI,443 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	09:59 Local	Direction from Accident Site:	10°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	Overcast / 20200 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	7 knots / 16 knots	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	190°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	29.79 inches Hg	Temperature/Dew Point:	28°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Henderson, TX	Type of Flight Plan Filed:	None
Destination:	Henderson, TX	Type of Clearance:	None
Departure Time:		Type of Airspace:	Class E

Airport Information

Airport:	Henderson County Airport RFI	Runway Surface Type:	
Airport Elevation:	443 ft msl	Runway Surface Condition:	Dry
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor	Aircraft Fire:	None
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	1 Serious, 1 Minor	Latitude, Longitude:	32.141723,-94.851728(est)

Administrative Information

Investigator In Charge (IIC):	Lemishko, Alexander
Additional Participating Persons:	Les Williams; FAA FSDO; Irving, TX Thom Webster ; Robinson; Torrence, CA Troy Helgeson; Lycoming; Williamsport , PA
Original Publish Date:	April 25, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=105203

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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](#).