



# Aviation Investigation Final Report

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<b>Location:</b>	Key Biscayne, Florida	<b>Accident Number:</b>	ERA24LA166
<b>Date &amp; Time:</b>	April 6, 2024, 13:50 Local	<b>Registration:</b>	N234ZT
<b>Aircraft:</b>	ROBINSON HELICOPTER R44	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Unknown or undetermined	<b>Injuries:</b>	1 Serious
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

About 20 minutes after departure on the over-water flight, the pilot of the helicopter felt two “jerks,” although there were no caution/warning illuminations or aural warnings and the engine gauges were all “in the green.” He turned toward land and descended to 500 ft above the water. The pilot applied carburetor heat, then felt a “shake” and noted that he was having to add power as the helicopter was decelerating. While maneuvering the helicopter as close to land as possible, the low main rotor rpm horn sounded and the pilot described that the engine had lost a significant amount of power. The pilot selected an unoccupied area in the water for an autorotative landing, during which the tailboom separated. He exited the helicopter and was rescued shortly afterward.

Postaccident examination of the airframe and engine revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation of the helicopter or its engine. Additionally, the engine governor control box was tested and it passed all testing parameters. Significant saltwater and sediment contamination prevented the determination of any non-mechanical pre-impact anomalies that may have impacted normal engine operation. Although weather conditions were favorable for carburetor icing at glide power, the pilot stated that he applied carburetor heat during his descent, so carburetor ice was not a likely reason for the loss of engine power.

## Probable Cause and Findings

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

A loss of engine power for reasons that could not be determined.

## Findings

<b>Not determined</b>	(general) - Unknown/Not determined
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## Factual Information

### History of Flight

Enroute	Unknown or undetermined (Defining event)
Enroute	Ditching

On April 6, 2024, about 1350 eastern daylight time, a Robinson R-44, N234ZT, was substantially damaged when it was involved in an accident near Key Biscayne, Florida. The pilot was seriously injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he topped off the fuel tanks at Miami Executive Airport (TMB), Miami, Florida, completed a preflight inspection, and was flying on a visual-flight-rules (VFR) flight plan with VFR flight following services to North Eleuthera Airport (MYEH), North Eleuthera, Bahamas. About 20 minutes after departure, after leveling off, he felt a millisecond “jerk.” He felt something similar the week before and had attributed it to a thermal or gust. Although there were no caution/warning illuminations or aural warnings, and the engine gauges were all “in the green,” he turned back toward land as a precaution. A minute later, he felt another “jerk.” He descended to 500 ft above ground level while applying carburetor heat. The pilot then felt a longer “shake,” at which time he declared an emergency. He began hearing odd engine sounds and noted that he was having to add power as the helicopter was decelerating. While maneuvering the helicopter as close to land as possible, the pilot started to feel a vibration, the low main rotor rpm horn sounded, and the pilot described that the engine had lost a “significant” amount of power. The pilot began an autorotation, and the helicopter entered the Atlantic Ocean at about 35 kts and about 1 nm from Key Biscayne. The helicopter’s empennage was substantially damaged, and the aft portion of the tail section was impact separated.

The wreckage was recovered and examined. The tail rotor system and gearbox were not recovered from the ocean. Postaccident examination of the airframe revealed that the gascolator bowl contained a mixture liquid consistent in color and odor with aviation fuel, some clear liquid that appeared to be water, and a small amount of rust-colored liquid. About 22 gallons of fuel and 20 gallons of water were removed from the fuel tanks. A minimum fuel flow test was performed for the main tank per the maintenance manual, and the results were within the acceptable allowance. The carburetor heat was extended about 2.3 inches, and the down-latch was not engaged. The carburetor heat valve air filter housing was partially open.

Postaccident examination of the engine revealed evidence of saltwater and saltwater corrosion. The engine’s crankshaft could not be rotated when attempting to rotate the cooling

fan by hand. The crankcase contained about 2 gallons of salt water, and the oil quick drain was obstructed with sludge that had to be removed to drain the oil. The remaining oil was sufficient for engine operation. All six cylinders were removed and examined. The No. 5 cylinder was difficult to remove from the piston, and once freed, a large quantity of blackened salt-like deposits was noted between the No. 5 cylinder and the cylinder wall. All cylinders had varying amounts of salt deposits and were heavily corroded consistent with submersion in salt water. With the cylinders removed, crankshaft and camshaft continuity was confirmed.

Once the cylinder valves were released from the binding of the corrosion and deposits, all exhaust and intake valves were examined and moved freely in their respective valve guide; no scoring, material transfer, or carbon deposits were noted on the shafts of the valves. Salt deposits and corrosion were noted throughout the carburetor consistent with submersion in salt water. The fuel inlet screen was examined and found to have saltwater contamination. Both magnetos were filled with salt deposits and corroded from saltwater immersion. The magnetos were rotated by hand and no spark was noted at any of the ignition towers. The engine governor control box was functionally tested on an engineering test stand and passed all testing parameters. Examination of the airframe and engine revealed no malfunctions that would have prevented normal operation of the helicopter or its engine. Significant saltwater sediment contaminated many hoses and accessories and prevented the determination of any pre-impact anomalies that may have affected normal operation.

The 1353 weather recorded at TMB, 15 miles west of the accident site, included a temperature of 80.6°F and a dew point of 55.4°F. These conditions corresponded to the development of carburetor icing at glide power on a Carburetor Icing Probability Chart.

A review of engine maintenance records showed that during the annual inspection completed on August 5, 2023, the right magneto and the crankshaft output seal were replaced, and the No. 4 cylinder failed the minimum exhaust valve clearance and was reamed per the service bulletin (388C) instructions.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	55, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	June 1, 2022
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	June 30, 2023
<b>Flight Time:</b>	793 hours (Total, all aircraft), 725 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	ROBINSON HELICOPTER	<b>Registration:</b>	N234ZT
<b>Model/Series:</b>	R44	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	2017	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	30027
<b>Landing Gear Type:</b>	None; Skid	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	July 31, 2023 Annual	<b>Certified Max Gross Wt.:</b>	2200 lbs
<b>Time Since Last Inspection:</b>	456 Hrs	<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	550 Hrs at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	O-540-F1B5
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	210 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	TMB,10 ft msl	<b>Distance from Accident Site:</b>	16 Nautical Miles
<b>Observation Time:</b>	13:53 Local	<b>Direction from Accident Site:</b>	267°
<b>Lowest Cloud Condition:</b>	Few / 4500 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	9 knots / 17 knots	<b>Turbulence Type Forecast/Actual:</b>	Unknown / None
<b>Wind Direction:</b>	290°	<b>Turbulence Severity Forecast/Actual:</b>	Unknown / N/A
<b>Altimeter Setting:</b>	30.02 inches Hg	<b>Temperature/Dew Point:</b>	27°C / 13°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Miami, FL (TMB)	<b>Type of Flight Plan Filed:</b>	VFR
<b>Destination:</b>	North Eleuthera, OF (MYEH)	<b>Type of Clearance:</b>	VFR;VFR flight following
<b>Departure Time:</b>	13:32 Local	<b>Type of Airspace:</b>	Class E

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious	<b>Latitude, Longitude:</b>	25.66406,-80.13981

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Spencer, Lynn
<b>Additional Participating Persons:</b>	Juan Garcia; FAA/FSDO; Miramar, FL Russel Gait; Lycoming Engines; Williamsport, PA Ken Martin; Robinson Helicopter; Torrance, CA
<b>Original Publish Date:</b>	January 2, 2025
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=194041">https://data.nts.gov/Docket?ProjectID=194041</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.

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](#).