



# Aviation Investigation Final Report

<b>Location:</b>	Titusville, Florida	<b>Accident Number:</b>	ERA23LA073
<b>Date &amp; Time:</b>	November 27, 2022, 11:30 Local	<b>Registration:</b>	N8006A
<b>Aircraft:</b>	CHILDS MICHAEL A ROTORWAY EXEC 162-F	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Powerplant sys/comp malf/fail	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

## Analysis

The flight instructor, who was also the owner of the experimental amateur-built helicopter, said that shortly after takeoff, while about 150 ft above ground level, the helicopter’s engine lost partial power with “severe backfiring.” He declared an emergency, turned back to the airport, and landed on a grassy area. Upon touchdown, the helicopter’s front left skid dug into the grass and the helicopter rolled over. Postaccident examination of the engine revealed the No. 4 exhaust valve spring retainer was missing. The engine maintenance manual required inspection of the valve train system, including the spring retainer, every 25 hours. A review of the engine maintenance logbook revealed that the flight instructor/owner had performed the 25-hour inspection about 8.8 hours before the accident. The reason for the separation of the valve spring retainer was not determined.

## Probable Cause and Findings

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

A failure of the No. 4 exhaust valve spring retainer, which resulted in a partial loss of engine power.

## Findings

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**Aircraft**

Recip eng cyl section - Failure

## Factual Information

### History of Flight

<b>Maneuvering-hover</b>	Powerplant sys/comp malf/fail (Defining event)
<b>Maneuvering-hover</b>	Loss of engine power (partial)
<b>Emergency descent</b>	Off-field or emergency landing
<b>Landing</b>	Dynamic rollover

On November 27, 2022, about 1130 eastern standard time, an experimental amateur-built Rotorway Exec 162-F helicopter, N8006A, was substantially damaged when it was involved in an accident near the Space Coast Regional Airport (TIX), Titusville, Florida. The flight instructor and the pilot trainee were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The flight instructor, who also owned the helicopter, stated that shortly after takeoff, while about 150 ft above ground level, the engine lost partial power with “severe backfiring.” He declared an emergency, turned back to the airport, and landed on a grassy area. Upon touchdown, with a ground speed of 5-10 mph, the helicopter’s front left skid dug into the grass. The helicopter entered a dynamic rollover and came to rest on its left side, resulting in substantial damage to the tail boom and main rotor blades.

Postaccident examination of the engine revealed the No. 4 exhaust valve spring retainer was missing. Review of the engine maintenance manual revealed the valve train system including the spring retainer, was to be inspected every 25 hours. The manual stated,

*“Note the relative depth of the keeper set in each spring retainer. You may notice a slight variance on different valves, but no keeper set should be sunk deeply into a retainer. The important thing to look for is any change in the relative position of each keeper set. If you determine that a keeper set seems to be sinking deeper into its retainer, DO NOT continue to operate the engine.”*

A review of the engine logbook revealed that the instructor/owner performed the 25-hour inspection on October 11, 2022, about 8.8 hours before the accident.

## Pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	40, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane single-engine; Helicopter; Instrument airplane; Instrument helicopter	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	June 22, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	January 5, 2022
<b>Flight Time:</b>	8450 hours (Total, all aircraft), 404 hours (Total, this make and model), 3265 hours (Pilot In Command, all aircraft), 90 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Student pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	July 19, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	August 1, 2022
<b>Flight Time:</b>	15200 hours (Total, all aircraft), 45 hours (Total, this make and model), 10000 hours (Pilot In Command, all aircraft), 100 hours (Last 90 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	CHILDS MICHAEL A	<b>Registration:</b>	N8006A
<b>Model/Series:</b>	ROTORWAY EXEC 162-F	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Experimental (Special)	<b>Serial Number:</b>	6708
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	January 11, 2022 Condition	<b>Certified Max Gross Wt.:</b>	1630 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	763 Hrs at time of accident	<b>Engine Manufacturer:</b>	Rotorway
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	A600T
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	167 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>	TIX,33 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	11:00 Local	<b>Direction from Accident Site:</b>	0°
<b>Lowest Cloud Condition:</b>	Few / 3000 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	15 knots / 20 knots	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	200°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.03 inches Hg	<b>Temperature/Dew Point:</b>	27°C / 21°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Titusville, FL	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Titusville, FL	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class D

## Airport Information

<b>Airport:</b>	Space Coast Regional TIX	<b>Runway Surface Type:</b>	Concrete
<b>Airport Elevation:</b>	20 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	9	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	5000 ft / 100 ft	<b>VFR Approach/Landing:</b>	Full stop;Precautionary landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	28.514806,-80.799222

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Read, Leah
<b>Additional Participating Persons:</b>	Ryan Sebek; FAA/FSDO; Orlando, FL
<b>Original Publish Date:</b>	January 31, 2024
<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.ntsb.gov/Docket?ProjectID=106373">https://data.ntsb.gov/Docket?ProjectID=106373</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](#).