



# Aviation Investigation Final Report

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<b>Location:</b>	Romeo, Michigan	<b>Accident Number:</b>	CEN21LA431
<b>Date &amp; Time:</b>	September 15, 2021, 10:50 Local	<b>Registration:</b>	N632SD
<b>Aircraft:</b>	Eurocopter AS350	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Hard landing	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

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## Analysis

The flight instructor reported that he intended to demonstrate to the student pilot a 180° autorotation with a power recovery near the ground. He planned to transition the helicopter into to a hover about 5 to 10 ft above ground level at the end of the maneuver. The instructor initially set the engine fuel control to the idle detent to simulate an engine failure and then entered an autorotation. As the autorotation progressed, the flight instructor repositioned the engine fuel control, but he failed to ensure that it had been placed into the flight detent. Without sufficient engine power at the end of the maneuver, the helicopter continued to descend with a low rotor speed, landed hard, and slid to a stop on the runway. Then the helicopter violently rocked side to side before the main rotor stopped rotating. During the accident sequence, the helicopter sustained substantial damage to a main rotor Starflex arm and the tail rotor driveshaft. Both the flight instructor and his student reported there were no mechanical malfunctions or failures of the helicopter that would have precluded normal operation.

## Probable Cause and Findings

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

The flight instructor’s failure to reposition the fuel control to the flight detent during a practice autorotation, which resulted in insufficient engine power to arrest the helicopter’s decent and a hard landing.

## Findings

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**Personnel issues**

Use of equip/system - Pilot

## Factual Information

### History of Flight

<b>Autorotation</b>	Hard landing (Defining event)
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### Flight instructor Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	67, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	3-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 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	October 20, 2020
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	November 19, 2020
<b>Flight Time:</b>	3760 hours (Total, all aircraft), 55 hours (Total, this make and model), 338 hours (Pilot In Command, all aircraft), 31 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

### Student pilot Information

<b>Certificate:</b>	Student	<b>Age:</b>	34, Female
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	February 19, 2021
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	28 hours (Total, all aircraft), 28 hours (Total, this make and model), 1 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Eurocopter	<b>Registration:</b>	N632SD
<b>Model/Series:</b>	AS350 B2	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	2002	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	3519
<b>Landing Gear Type:</b>	High skid	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	March 13, 2020 100 hour	<b>Certified Max Gross Wt.:</b>	4961 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Turbo shaft
<b>Airframe Total Time:</b>	6357 Hrs at time of accident	<b>Engine Manufacturer:</b>	Turbomeca
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	Arriel 1D1
<b>Registered Owner:</b>	COUNTY OF OAKLAND	<b>Rated Power:</b>	732 Horsepower
<b>Operator:</b>	COUNTY OF OAKLAND	<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>		<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>		<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Few / 3900 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 21000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	290°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.98 inches Hg	<b>Temperature/Dew Point:</b>	21°C / 15°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Lapeer, MI (D95)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Romeo, MI	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	10:30 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Romeo State Airport D98	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	738 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	18/36	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	4000 ft / 75 ft	<b>VFR Approach/Landing:</b>	Simulated forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	42.796334,-82.97426(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Fox, Andrew
<b>Additional Participating Persons:</b>	Steve Janos; Federal Aviation Administration - East Michigan FSDO; Belleville, MI
<b>Original Publish Date:</b>	May 25, 2022
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 4</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=103911">https://data.ntsb.gov/Docket?ProjectID=103911</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](#).