Aviation Investigation Final Report

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

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

Personnel issues	Use of equip/system - Pilot

Factual Information

History of Flight

Autorotation	Hard landing (Defining event)

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	67,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Helicopter; Instrument airplane; Instrument helicopter	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	October 20, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 19, 2020
Flight Time:	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

Certificate:	Student	**Age:**	34,Female
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	February 19, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	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

Aircraft Make:	Eurocopter	**Registration:**	N632SD
Model/Series:	AS350 B2	**Aircraft Category:**	Helicopter
Year of Manufacture:	2002	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3519
Landing Gear Type:	High skid	**Seats:**	6
Date/Type of Last Inspection:	March 13, 2020 100 hour	**Certified Max Gross Wt.:**	4961 lbs
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:	6357 Hrs at time of accident	**Engine Manufacturer:**	Turbomeca
ELT:	Installed, not activated	**Engine Model/Series:**	Arriel 1D1
Registered Owner:	COUNTY OF OAKLAND	**Rated Power:**	732 Horsepower
Operator:	COUNTY OF OAKLAND	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 3900 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 21000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	21°C / 15°C
Precipitation and Obscuration:			
Departure Point:	Lapeer, MI (D95)	**Type of Flight Plan Filed:**	None
Destination:	Romeo, MI	**Type of Clearance:**	None
Departure Time:	10:30 Local	**Type of Airspace:**	Class G

Airport Information

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

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Steve Janos; Federal Aviation Administration - East Michigan FSDO; Belleville, MI
Original Publish Date:	May 25, 2022
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=103911