Aviation Investigation Final Report

Location:	Zelienople, Pennsylvania	**Accident Number:**	ERA22LA039
Date & Time:	October 31, 2021, 16:40 Local	**Registration:**	N132BR
Aircraft:	Bell 47D1	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilot receiving instruction and the flight instructor picked up the helicopter following maintenance and performed a brief instructional flight. The instructor disembarked while the helicopter's engine continued to run, and the pilot subsequently departed for a solo flight to the home airport.

Shortly after departure, the engine "sputtered," and there was a "drop" in both the engine and main rotor rpms. The pilot performed a 180° turn back toward the departure airport, and when he leveled the helicopter, engine and rotor rpm "returned." However, soon after, the helicopter lost total engine power. The pilot entered autorotation and maneuvered the helicopter for a "flat" open area but lacked the altitude and rotor rpm to reach it. He landed on sloped terrain, which resulted in the destruction of the main rotor blades and substantial damage to the landing gear and tailboom.

Initial examination of the wreckage by Federal Aviation Administration inspectors revealed a fragmented engine accessory case. Examination of the accessory case fragments revealed that the fracture surface features were consistent with overstress due to impact. Other than the fractured accessory case, the initial wreckage examination revealed no evidence of mechanical anomalies. The helicopter's owner blocked access to the wreckage, and no further examination of the helicopter could be performed.

Weather conditions reported in the area at the time of the accident was conducive to the development of serious carburetor icing at a glide power setting. It is possible that carburetor ice may have developed during the time the helicopter was operating on the ground while the instructor disembarked; however, the pilot's use of carburetor heat was not determined, and other reasons for the loss of engine power could not be ruled out due to the lack of a more

extensive examination of the helicopter. Therefore, the reason for the loss of engine power could not be determined based on the available information.

Probable Cause and Findings

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

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

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Unknown	Unknown or undetermined (Defining event)

On October 31, 2021, about 1640 eastern daylight time, a Bell 47D1 helicopter, N132BR, was substantially damaged when it was involved in an accident in Zelienople, Pennsylvania. The pilot was not injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 solo instructional flight.

According to the pilot, an annual inspection was just completed on the helicopter at Zelienople Airport (PJC), and he met his flight instructor there to continue the training necessary to add a rotorcraft-helicopter rating to his pilot certificate. He serviced the helicopter with about 10 gallons of fuel, and they departed on the instructional flight to Butler Air Show Airport (3G9), Butler, Pennsylvania, where they landed, shut down the helicopter, and the instructor endorsed the pilot's logbook for solo flight.

The pilot and instructor then returned to PJC, where the instructor disembarked while the engine continued to run, and the pilot departed back to 3G9. About 3 to 4 miles east of PJC, the engine "sputtered," and there was a "drop" in both the engine and main rotor rpms. The pilot performed a 180° turn back toward PJC, and when he leveled the helicopter, engine and rotor rpm "returned."

The pilot continued in the direction of PJC for about 2 miles before the helicopter lost total engine power. He entered autorotation and maneuvered the helicopter for a "flat" open area but lacked the altitude and rotor rpm to reach it. The pilot landed on sloped terrain, which resulted in the destruction of the main rotor blades and substantial damage to the landing gear and tailboom. The pilot stated that there was nothing wrong with the performance and handling of the helicopter before the loss of engine power.

The pilot reported 334 total hours of flight experience, of which 54 hours were in helicopters, and 14 hours were in the accident helicopter make and model.

Examination of FAA and maintenance records revealed that the helicopter was manufactured in 1951 and was powered by a Franklin 6U-335-A, 210-horsepower, carbureted engine. Its most recent annual inspection was completed October 21, 2021, at 3,863.2 total aircraft hours.

Examination of the helicopter by FAA aviation safety inspectors revealed that the 28-gallon fuel tank contained about 5 gallons of fuel. The accessory drive case at the bottom of the vertically mounted engine was found fractured. The tachometer generator, the engine-driven oil pump, and one magneto were all separated from the engine, but remained attached to the helicopter

by associated wires and hoses. Fractured pieces of the accessory case were collected and forwarded to the National Transportation Safety Board Materials Laboratory in Washington, DC for examination.

Examination of the accessory case fragments revealed that the features displayed by the fracture surfaces were consistent with overstress fracture due to impact. Other than the fractured accessory case, the initial wreckage exam revealed no evidence of mechanical anomalies. The helicopter's subsequently owner blocked access to the wreckage and no additional examination of the helicopter was performed.

Examination of the weather reported in the area at the time of the accident revealed atmospheric conditions conducive to serious carburetor icing at glide power.

Pilot Information

Certificate:	Commercial; Student	**Age:**	36,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	January 29, 2020
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	333.8 hours (Total, all aircraft), 14.5 hours (Total, this make and model), 220.3 hours (Pilot In Command, all aircraft), 26.8 hours (Last 90 days, all aircraft), 6.8 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N132BR
Model/Series:	47D1	**Aircraft Category:**	Helicopter
Year of Manufacture:	1951	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	51-332
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	October 21, 2021 Annual	**Certified Max Gross Wt.:**	2350 lbs
Time Since Last Inspection:	1.8 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3863.2 Hrs as of last inspection	**Engine Manufacturer:**	Franklin
ELT:	Not installed	**Engine Model/Series:**	6U-335-A
Registered Owner:	STEINHEISER TERRY N	**Rated Power:**	210 Horsepower
Operator:	STEINHEISER TERRY N	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KBVI,1252 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	16:15 Local	**Direction from Accident Site:**	257°
Lowest Cloud Condition:	Scattered / 3700 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 4400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	260°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.81 inches Hg	**Temperature/Dew Point:**	15°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Zelienople, PA	**Type of Flight Plan Filed:**	None
Destination:	Butler, PA (3G9)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	ZELIENOPLE MUNI PJC	**Runway Surface Type:**	
Airport Elevation:	897 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	40.81,-80.15(est)

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	Michael McCann; FAA/FSDO; West Mifflin, PA
Original Publish Date:	October 5, 2023
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=104187