Aviation Investigation Final Report

Location:	Danbury, Texas	**Accident Number:**	CEN20LA051
Date & Time:	December 31, 2019, 13:30 Local	**Registration:**	N57SJ
Aircraft:	Enstrom F28	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The student pilot turned the helicopter onto the crosswind leg of the traffic pattern during a training flight when the engine suddenly began to run rough and lost partial power. The flight instructor took the controls and executed an autorotation into a clearing. The skids of the helicopter sank into the soft mud, the rotor blades contacted the ground, and the helicopter rolled onto its side.

Examination of the engine revealed that a portion of the No. 3 cylinder intake valve had broken off and migrated into the No. 1 cylinder, where it lodged between the No. 1 cylinder's intake valve and seat, holding that valve in the open position and resulting in the partial loss of engine power.

Probable Cause and Findings

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

The failure of the engine's No.3 intake valve resulting is a loss of engine power and a rollover following the autorotation to soft ground.

Findings

Aircraft	Recip engine power section - Failure
Environmental issues	Wet/muddy terrain - Contributed to outcome

Factual Information

History of Flight

Maneuvering	Loss of engine power (partial) (Defining event)
Autorotation	Off-field or emergency landing
Landing	Roll over

On December 31, 2019, about 1415 central standard time, an Enstrom F28A helicopter, N57SJ, sustained substantial damage when it nosed over during a forced landing following a partial loss of engine power. During the nose-over, the tailboom was separated and the main rotor system and fuselage were damaged. The student pilot and flight instructor were not injured. The helicopter was registered to and operated by a private individual under the provisions of Title 14 *Code of federal Regulations* Part 91 as an instructional flight. Visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The local flight originated from the Salaika Aviation Airport (07TA), Danbury, Texas, at an unconfirmed time.

The certificated flight instructor stated that he and his student had departed for a second pattern during a training mission. After the helicopter made the turn onto the crosswind leg of the traffic pattern the engine suddenly began to run rough and had lost a lot of power. He took the controls and executed an autorotation into a clearing, flared and touched down. The skids of the helicopter sunk into the soft mud, the rotor blades contacted the ground, and the helicopter rolled onto its side.

The operator reported that examination of the engine after the accident revealed that a portion of the intake valve for the No. 3 cylinder had broken off and had migrated into the No. 1 cylinder where it lodged between the No. 1 intake valve and seat, holding that valve in the open position.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	37,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	April 5, 2019
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 23, 2018
Flight Time:	4902 hours (Total, all aircraft), 4000 hours (Total, this make and model), 4700 hours (Pilot In Command, all aircraft), 122 hours (Last 90 days, all aircraft), 36 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Enstrom	**Registration:**	N57SJ
Model/Series:	F28 A	**Aircraft Category:**	Helicopter
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	278
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	September 4, 2019 Annual	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	3632 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	HIO-360-C1A
Registered Owner:	On file	**Rated Power:**	205 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LBX,25 ft msl	**Distance from Accident Site:**	
Observation Time:	19:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 7500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.2 inches Hg	**Temperature/Dew Point:**	15°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Danbury, TX (07TA)	**Type of Flight Plan Filed:**	None
Destination:	Danbury, TX (07TA)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	Salaika Aviation 07TA	**Runway Surface Type:**	Grass/turf
Airport Elevation:	30 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:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	29.243888,-95.333053

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Ronald Jacobs; FAA - Houston FSDO; Houston, TX
Original Publish Date:	May 5, 2021
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=100750