



## National Transportation Safety Board Aviation Accident Factual Report

---

<b>Location:</b>	Bloomsburg, PA	<b>Accident Number:</b>	ERA19LA285
<b>Date &amp; Time:</b>	09/28/2019, 1930 EDT	<b>Registration:</b>	N380SH
<b>Aircraft:</b>	Enstrom F28	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of tail rotor effectiveness	<b>Injuries:</b>	1 Serious, 2 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Aerial Observation - Sightseeing		

---

On September 28, 2019, about 1930 eastern daylight time, an Enstrom F-28F helicopter, N380SH, was substantially damaged when it impacted terrain and vehicles during an approach to a helipad at the Bloomsburg Fair in Bloomsburg, Pennsylvania. The commercial pilot sustained serious injuries and the two passengers sustained minor injuries. The helicopter was operated by J&J Shop HeliAir LLC. under the provisions of Title 14 *Code of Federal Regulations (CFR)* Part 91 as a local sightseeing flight.

The pilot reported that the accident flight was the last helicopter "ride" the operator planned to fly, as this was the 10<sup>th</sup> and final day of fairgrounds flying for him. He reported that he completed a routine 3-minute flight around the fairgrounds and approached the paved helipad as he normally did. During the final approach, the helicopter "just yawed right" and he said he did "everything I could to recover, with left pedal," but the action "did not stop the yaw." He could not recall what the power settings were, or how high the helicopter was above ground when the loss of yaw control occurred. He also did not remember hearing or seeing an alarm in the cockpit. He said it was "just a standard approach" and "there was nothing unusual about it." The pilot reported there were no mechanical malfunctions or failures with the helicopter.

Surveillance videos captured the final 19 seconds of the flight. The helicopter approached the helipad over several vehicles in the fairgrounds parking lot. The approach was shallow, and about the speed of a hover-taxi. The helicopter then momentarily climbed and simultaneously its forward momentum stopped and a right yaw (spin) began. The helicopter subsequently descended and completed two and a half rotations around the main rotor mast before impacting vehicles and terrain. The helicopter appeared about 20-25 ft above the terrain when the right yaw began. A windsock that was visible in the surveillance video was consistent with a calm wind.

A post-accident examination and photographs provided by a Federal Aviation Administration (FAA) inspector revealed that the helicopter came to rest on its left side and the fuselage, tail boom, main and tail rotors sustained substantial damage. The passenger doors were not installed. Continuity for the cyclic and collective controls were confirmed. Examination of the

engine did not reveal evidence of any catastrophic internal failures and no anomalies were observed with the spark plugs or magnetos.

Weight and balance calculations based upon estimations of the pilot and passenger's weight, and 16 gallons of fuel, revealed the helicopter was likely within its center of gravity limits and about 220 lbs under its maximum allowable gross weight.

The pilot's operating handbook stated the rotor diameter was 32 ft.

Based upon nearby weather observations, the density altitude at the accident site was about 1,550 ft.

The FAA issued Advisory Circular (AC) 90-95, Unanticipated Right Yaw in Helicopters, in February 1995. The AC stated that the loss of tail rotor effectiveness (LTE) was a critical, low-speed aerodynamic flight characteristic which could result in an uncommanded rapid yaw rate which does not subside of its own accord and, if not corrected, could result in the loss of aircraft control. It also stated, "LTE is not related to a maintenance malfunction and may occur in varying degrees in all single main rotor helicopters at airspeeds less than 30 knots."

Paragraph 8 of the AC stated in part:

8. OTHER FACTORS. The following factors can significantly influence the severity of the onset of LTE.

*(a) Gross Weight and Density Altitude. An increase in either of these factors will decrease the power margin between the maximum power available and the power required to hover. The pilot should conduct low-level, low-airspeed maneuvers with minimum weight.*

*(b) Low Indicated Airspeed. At airspeeds below translational lift, the tail rotor is required to produce nearly 100 percent of the directional control. If the required amount of tail rotor thrust is not available for any reason, the aircraft will yaw to the right.*

*(c) Power Droop. A rapid power application may cause a transient power droop to occur. Any decrease in main rotor rpm will cause a corresponding decrease in tail rotor thrust. The pilot must anticipate this and apply additional left pedal to counter the main rotor torque. All power demands should be made as smoothly as possible to minimize the effect of the power droop.*

The FAA Helicopter Flying Handbook stated in part:

#### *In Ground Effect (IGE)*

*Ground effect is the increased efficiency of the rotor disk caused by interference of the airflow when near the ground. The air pressure or density is increased, which acts to decrease the downward velocity of air. Ground effect permits relative wind to be more horizontal, lift vector to be more vertical, and induced drag to be reduced. These conditions allow the rotor disk to be more efficient. Maximum ground effect is achieved when hovering over smooth hard surfaces. When hovering over surfaces as tall grass, trees, bushes, rough terrain, and*

*water, maximum ground effect is reduced. Rotor efficiency is increased by ground effect to a height of about one rotor diameter (measured from the ground to the rotor disk) for most helicopters.*

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	70, 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>	
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	03/23/2019
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	11/30/2018
<b>Flight Time:</b>	8357 hours (Total, all aircraft), 300 hours (Total, this make and model), 8264 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 50 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Enstrom	<b>Registration:</b>	N380SH
<b>Model/Series:</b>	F28 F	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	2016	<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	832
<b>Landing Gear Type:</b>	Skid	<b>Seats:</b>	3
<b>Date/Type of Last Inspection:</b>	09/05/2019, Annual	<b>Certified Max Gross Wt.:</b>	2600 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	328.7 Hours at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	HIO-360-F1AD
<b>Registered Owner:</b>	J&J Shop Heliair LLC.	<b>Rated Power:</b>	225 hp
<b>Operator:</b>	J&J Shop Heliair LLC.	<b>Operating Certificate(s) Held:</b>	Certificate of Authorization or Waiver (COA)

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night
Observation Facility, Elevation:	IPT, 525 ft msl	Distance from Accident Site:	25 Nautical Miles
Observation Time:	1954 EDT	Direction from Accident Site:	306°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	None / None
Wind Direction:		Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.04 inches Hg	Temperature/Dew Point:	22° C / 19° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	BLOOMSBURG, PA (NONE)	Type of Flight Plan Filed:	None
Destination:	BLOOMSBURG, PA (NONE)	Type of Clearance:	None
Departure Time:	1927 EDT	Type of Airspace:	Class G

## Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	2 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious, 2 Minor	Latitude, Longitude:	40.992222, -76.468333 (est)

## Administrative Information

Investigator In Charge (IIC):	Adam M Gerhardt
Additional Participating Persons:	Jeffrey Bartholomew; FAA/ FSDO; Harrisburg, PA William E Taylor; Enstrom Helicopter Corporation; Menominee, MI J. Mike Childers; Lycoming Engines; Williamsport, PA
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=100343">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=100343</a>