Aviation Investigation Final Report

Location:	Brazoria, Texas	**Accident Number:**	CEN18LA292
Date & Time:	July 23, 2018, 12:15 Local	**Registration:**	N74420
Aircraft:	Grumman AA5	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The student pilot and his flight instructor were conducting a local instructional flight when the airplane began to shake violently. A reduction of engine power revealed that the one of the propeller blades had separated about midspan. The flight instructor took control of the airplane and completed an uneventful forced landing in a nearby field. A postaccident examination revealed several fractured engine mounts.

A laboratory examination of the propeller revealed that about one-half of one blade had fractured. Further examination of the flat portion of the fracture surface revealed a pattern of crack arrest lines and striations that were consistent with fatigue cracking. The pattern of crack arrest lines indicated that the fatigue cracking emanated from the trailing edge tip of the blade. Damage to the fracture surface at the trailing edge tip of the blade obscured the exact initiation point of the fatigue cracking. The propeller had accumulated about 4,499 hours since its last overhaul, and about 11 hours since it was last examined during an annual inspection.

Probable Cause and Findings

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

The propeller blade separation due to a fatigue fracture.

Findings

Aircraft	Propeller blade section - Failure
Aircraft	Propeller blade section - Fatigue/wear/corrosion

Factual Information

History of Flight

Maneuvering	Sys/Comp malf/fail (non-power) (Defining event)
Landing	Off-field or emergency landing

On July 23, 2018, about 1215 central daylight time, a Grumman AA-5B, N74420, was substantially damaged while maneuvering near Brazoria, Texas. The flight instructor and student pilot were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the student pilot, the airplane began to shake violently while he practiced basic-attitude maneuvers under simulated instrument meteorological conditions. A reduction of engine power revealed that the one of the propeller blades had separated about midspan. The flight instructor took control of the airplane and completed an uneventful forced landing in a nearby field. A postaccident examination revealed several fractured engine mounts.

The two-blade propeller, a McCauley Propeller Systems model No. 1A170/FFA7563, serial No. P77410, was examined at the National Transportation Safety Board Materials Laboratory in Washington, D.C. About one-half of one blade had separated and was not located during the investigation. The fracture surface was flat from the trailing edge through roughly two-thirds of the chord length, before angling from the center outwards adjacent to the blade surface. Further examination of the flat portion of the fracture surface revealed a pattern of crack arrest lines and striations that were consistent with fatigue cracking. The pattern of crack arrest lines indicated that the fatigue cracking emanated from the trailing edge tip of the blade. Damage to the fracture surface at the trailing edge tip of the blade obscured the exact initiation point of the fatigue cracking. According to the propeller logbook, the most recent propeller inspection was completed in conjunction with an annual inspection on November 1, 2017, at which time the propeller had accumulated 4,488 hours since its last overhaul. The airplane had been flown about 11 hours since the last annual inspection.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	54,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 26, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 11, 2018
Flight Time:	968.4 hours (Total, all aircraft), 18.6 hours (Total, this make and model), 855.2 hours (Pilot In Command, all aircraft), 101 hours (Last 90 days, all aircraft), 24.8 hours (Last 30 days, all aircraft), 1.9 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	40,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 None	**Last FAA Medical Exam:**	February 2, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	24 hours (Total, all aircraft), 7.8 hours (Total, this make and model), 0 hours (Pilot In Command, all aircraft), 0.75 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Grumman	**Registration:**	N74420
Model/Series:	AA5 B	**Aircraft Category:**	Airplane
Year of Manufacture:	1975	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	AA5B-0222
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 1, 2017 Annual	**Certified Max Gross Wt.:**	2400 lbs
Time Since Last Inspection:	11 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4499 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	O-360-A4K
Registered Owner:		**Rated Power:**	180 Horsepower
Operator:		**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:**	9 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	29°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	260°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.92 inches Hg	**Temperature/Dew Point:**	33°C / 23°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Pearland, TX (LVJ)	**Type of Flight Plan Filed:**	None
Destination:	Brazoria, TX	**Type of Clearance:**	None
Departure Time:	11:30 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	28.984722,-95.539169(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew		
Additional Participating Persons:	Peter B Brandon; FAA - Houston FSDO; Houston, TX		
Original Publish Date:	May 27, 2021	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97860		