Aviation Investigation Final Report

Location:	Prairie du Chien, Wisconsin	**Accident Number:**	CEN17LA344
Date & Time:	September 9, 2017, 15:45 Local	**Registration:**	N299CA
Aircraft:	AVIAT AIRCRAFT INC A 1B	**Aircraft Damage:**	Substantial
Defining Event:	Flight control sys malf/fail	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

Following the aerial photography portion of the flight, the commercial pilot climbed the airplane to 3,500 ft mean sea level and proceeded toward the destination. About 5 minutes later, he felt "light buffeting" as the airplane rolled left. He attempted to counteract the left roll by applying right control stick pressure, but the airplane continued to roll left. He input right rudder to stop the left roll and decided to return to the airport of origin, 10 nautical miles away. He used the rudder to maneuver the airplane and landed uneventfully. After parking the airplane, he moved the control stick left and right several times and the outboard end of the left aileron fell to the ground.

Review of airplane maintenance records revealed that, about 9 years before the accident, the left wing tip was replaced due to "hangar rash," though there was no specific mention of damage to the left aileron. There were no other logbook entries that mentioned the left wing or left aileron.

Metallurgical analysis of the aileron hinge bracket revealed two fatigue fracture origins that led to two regions of final overstress fracture. The fatigue fractures occurred under low stress over an extended period of time. No anomalies were noted in the origin regions and there was no specific evidence of bending at the fracture area. Since there was no specific evidence of bending, it could not be determined if the previous damage to the wing tip resulted in unidentified stress to the fracture area. Wing tip damage as a result of hangar rash could have resulted in residual tension in the aileron tube and precipitated the low-stress fatigue fracture; however, the severity of previous damage to the wing tip and whether the aileron was affected could not be determined.

Probable Cause and Findings

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

The fatigue failure of the aileron hinge bracket tubing for reasons that could not be determined based on the available evidence.

Findings

Aircraft	Aileron control system - Fatigue/wear/corrosion

Factual Information

History of Flight

Enroute	Flight control sys malf/fail (Defining event)

On September 9, 2017, about 1545 central daylight time, an Aviat Husky A-1B airplane, N299CA, experienced a flight control failure near Prairie du Chien, Wisconsin. The commercial rated pilot was not injured and the airplane sustained substantial damage to the left aileron. The airplane was registered to and operated by Grandview Photo Inc., under the provisions of 14 *Code of Federal Regulations* Part 91 as an aerial photography flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan was filed. The flight departed Prairie du Chien Municipal Airport (PDC), Prairie du Chien, Wisconsin, about 1300, flew over northwest Iowa for the aerial photography portion of the flight, and was destined for La Crosse Regional Airport (LSE), La Crosse, Wisconsin.

The pilot reported that he concluded the aerial photography portion of the flight, climbed the airplane to 3,500 ft mean sea level and proceeded toward LSE. About 5 minutes later he felt "light buffeting" as the airplane rolled left. He attempted to counteract the left roll by inputting right control stick pressure, but the airplane continued to roll left. He input right rudder to stop the left roll and decided to return to PDC, which was about 10 nautical miles southeast of his location. He used the rudder to maneuver the airplane to PDC and landed uneventfully. After parking the airplane, he moved the control stick left and right several times and the outboard end of the left aileron fell to the ground. The pilot and his mechanic disconnected the inboard aileron connection and removed it for examination.

A review of the airplane maintenance logbooks revealed that on August 8, 2008, the left wing tip was replaced due to "hangar rash" and there was no specific mention of damage to the left aileron. There were no other logbook entries that mentioned the left wing or left aileron. The most recent airframe annual inspection was completed on January 18, 2017, at and airplane total time of 5,348 hours; the airframe had accumulated 5,177 hours since the wing tip was replaced.

The aileron hinge bracket was removed and sent to the NTSB Materials Laboratory for a detailed examination. The examination revealed that the main tube exhibited a complete circumferential fracture just aft of the mounting flange (figure 1).

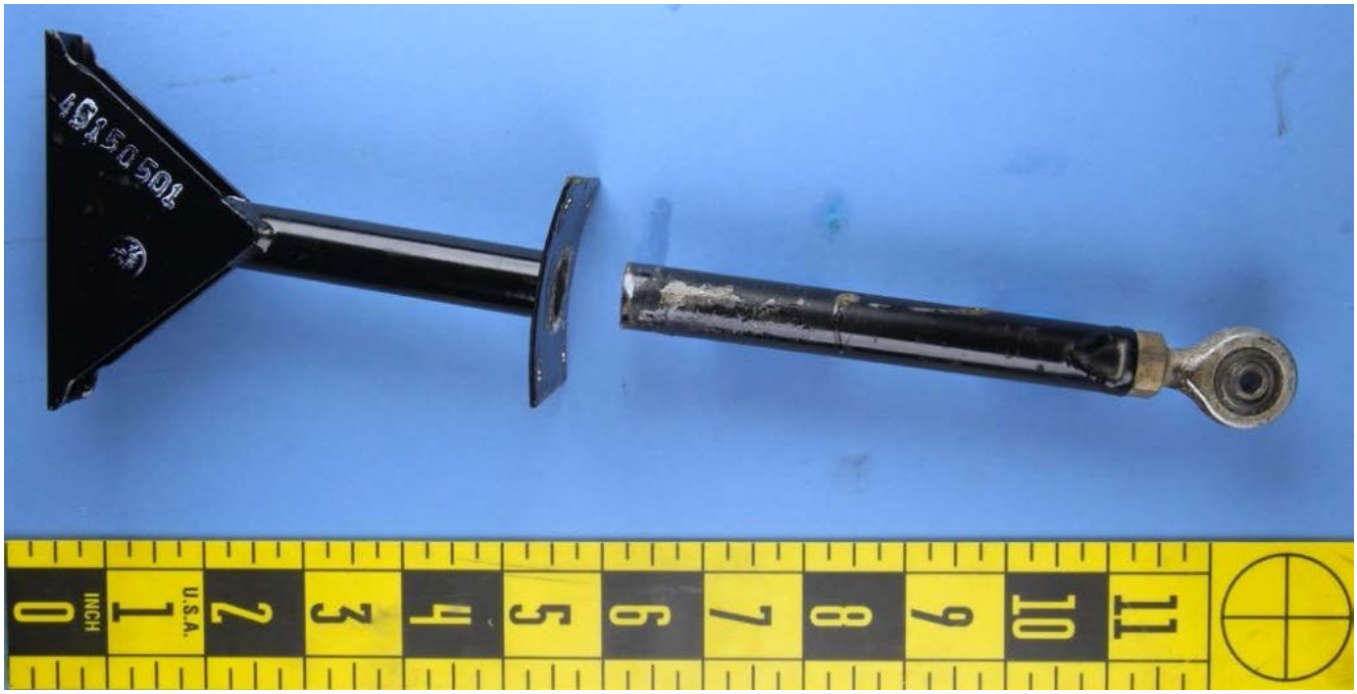

Figure 1 – Aileron Hinge Bracket

The fracture surface on the flange side was examined with a scanning electron microscope, which revealed two fatigue fracture origins that led to two regions of final overstress fracture. The fatigue fractures occurred under low stress over an extended period of time. No anomalies were noted in the origin regions. The fractures did not occur at the welds and no anomalies were noted with the welds. The examination did not find any specific evidence of bending at the fracture area.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	57,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 10, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 13, 2017
Flight Time:	19430 hours (Total, all aircraft), 16000 hours (Total, this make and model), 19330 hours (Pilot In Command, all aircraft), 353 hours (Last 90 days, all aircraft), 115 hours (Last 30 days, all aircraft), 14 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AVIAT AIRCRAFT INC	**Registration:**	N299CA
Model/Series:	A 1B	**Aircraft Category:**	Airplane
Year of Manufacture:	2005	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2294
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	January 24, 2017 Annual	**Certified Max Gross Wt.:**	2000 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	5779 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	O-360-A1P
Registered Owner:	On file	**Rated Power:**	180 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:	KPDC,661 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	15:55 Local	**Direction from Accident Site:**	174°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	25°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	PRAIRIE DU CHIEN, WI (PDC)	**Type of Flight Plan Filed:**	None
Destination:	LA CROSSE, WI (LSE)	**Type of Clearance:**	None
Departure Time:	13:00 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	PRAIRIE DU CHIEN MUNI PDC	**Runway Surface Type:**	Asphalt
Airport Elevation:	660 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	11	**IFR Approach:**	None
Runway Length/Width:	3999 ft / 75 ft	**VFR Approach/Landing:**	Precautionary landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	43.021945,-91.124443(est)

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Connie Martin; Federal Aviation Administration; Milwaukee, WI Stuart Horn; Aviat Aircraft Inc.; Afton, WY
Original Publish Date:	March 18, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=95982