



National Transportation Safety Board Aviation Accident Final Report

Location:	Praire Du Sac, WI	Accident Number:	CEN11LA050
Date & Time:	11/01/2010, 1415 CDT	Registration:	N448WM
Aircraft:	MCFARLAND BILL CHALLENGER II	Aircraft Damage:	Substantial
Defining Event:	Aircraft structural failure	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airplane impacted the ground following an in-flight separation of the left wing during cruise flight. The pilot, who was the sole occupant, was fatally injured. Witnesses reported seeing the airplane traveling north, about 300-500 feet above ground level, when one wing suddenly separated from the airplane. One of the witnesses stated that the other wing separated shortly after the first one. Postaccident examination confirmed that both wings were completely separated from the airplane with the exception of the right wing aft spar and aileron. Examination of the fractures in the wing attachment fittings revealed signatures consistent with overload failure with the exception of one fitting that had no perceptible damage due to deformation or fracture. The attachment bolt for the fitting that showed no perceptible overload damage was not recovered during the investigation; however, the relative lack of damage to the strut fitting indicates that the attachment bolt either failed, or its corresponding nut had loosened and separated during the flight. A portion of wing fabric retained for testing showed that the fabric met the minimum performance requirements as set forth in regulations. No preaccident defects were found with regard to the components examined.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The separation of the fuselage-mounted wing strut attachment fitting for an undetermined reason, which resulted in the separation of the left wing of the airplane.

Findings

Aircraft	Wing attach fittings (on fus) - Failure (Cause) Wing structure - Failure (Cause)
Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

HISTORY OF FLIGHT

On November 1, 2010, about 1415 central daylight time, an amateur-built McFarland Challenger II airplane, N448WM, was substantially damaged when it impacted the ground following an in-flight separation of the left wing during cruise flight. The pilot, who was the sole occupant, was fatally injured. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not on a flight plan. The flight originated about 1400 from the Sauk Prairie Airport, Prairie Du Sac, Wisconsin, and was en route to the Merrill Municipal Airport, Merrill, Wisconsin.

Witnesses reported seeing the airplane traveling north when one wing suddenly separated from the airplane. One of the witnesses stated that the other wing separated shortly after the first one. The witnesses estimated that the airplane was 300 to 500 feet above the ground prior to the first wing separation. The airplane subsequently impacted a corn field.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with helicopter and instrument helicopter ratings. The pilot's most recent second class airman medical certificate was issued on February 17, 2010. On the pilot's application for the medical certificate, he reported 6,000 total flight hours. The pilot did not have a rating for fixed wing single engine airplanes. A friend of the pilot reported that the pilot had taken several hours of flight instruction in the accident airplane. The pilot's flight logbook was not available for review during the course of the investigation.

AIRCRAFT INFORMATION

The airplane was a high wing, tricycle gear kit aircraft with a frame structure built from aluminum alloy tubing fastened with bolts and rivets and covered with fabric. The airplane was fitted with amphibious floats and could carry 2 occupants in a tandem seat arrangement. The 65-horsepower Rotax 582 engine was mounted in pusher configuration. According to Federal Aviation Administration records, the airplane was initially certified in the experimental amateur-built category on July 14, 2004. The airplane was sold to the pilot by the widow of the original builder on August 20, 2010.

METEOROLOGICAL INFORMATION

A review of recorded data from the Baraboo Wisconsin Dells Airport automated weather observation station, elevation 979 feet, revealed that at 1415 the weather conditions were: calm wind; 10 miles visibility; scattered clouds at 3,200 feet above ground level; temperature 8 degrees Celsius; Dew Point 0 degrees Celsius; altimeter setting 30.42 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted a harvested cornfield. The components came to rest in 3 major groupings; the left wing, right wing, and fuselage. The fuselage structure was upright with the lower fuselage crushed upward. The rudder and vertical stabilizer remained attached to the aft fuselage of the airplane. The right horizontal stabilizer and elevator had separated from the airplane and were found next to the left wing. The left horizontal stabilizer and elevator were separated from the airplane but were located next to the aft fuselage at approximately their

normal installed position.

Both wings were completely separated from the airplane with the exception of the right wing aft spar and aileron. The internal structure of the right wing remained attached to the forward spar. The right wing aft spar and control surfaces remained attached to the fuselage. The forward right wing attach fitting was fractured. The left wing was separated from the fuselage and both wing attachment fittings were fractured. The fabric covering was torn and a large portion of the lower wing fabric covering was found a short distance away. The left rear spar and control surfaces exhibited uniform bending along the entire span that resulted in an upward curvature.

Components retained for further examination included 9 wing attachment fittings that exhibited deformation or fracture at the accident scene. Examination of the wing fittings by a specialist in the National Transportation Safety Board's Materials Laboratory revealed signatures consistent with overload failure on all parts exhibiting fractures. The parts that were not fractured exhibited evidence of plastic deformation, with the exception of one fitting that had no perceptible damage due to deformation or fracture. That fitting was the left-rear-lower wing strut attachment fitting that connected the wing strut to the fuselage. The attachment bolt for this fitting was not recovered.

A piece of fabric covering material from the left wing was also retained for testing. A portion of the fabric was sent to a commercial laboratory to perform the ASTM D 5035-08 Breaking Strength of Textile Fabrics (1" Cut Strip Method). The results of this test indicated an average breaking strength of 67.75 pounds.

Federal Aviation Administration minimum performance standards for new intermediate grade fabric are specified in TSO-C14B "Aircraft Fabric Intermediate Grade" and indicate a minimum of 65 pounds as the requirement when applicable.

No preaccident defects were found with regard to the components examined.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed on behalf of the Sauk County Coroner by the University of Wisconsin School of Medical and Public Health, on November 2, 2010. The pilot's death was attributed to injuries received in the accident.

Toxicology testing was performed by the FAA Civil Aerospace Medical Institute. Testing results were negative for all substances in the screening profile.

History of Flight

Enroute-cruise	Aircraft structural failure (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Commercial	Age:	51, Male
Airplane Rating(s):	None	Seat Occupied:	
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):		Toxicology Performed:	Yes
Medical Certification:	Class 2 With Waivers/Limitations	Last Medical Exam:	02/17/2010
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	6000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	MCFARLAND BILL	Registration:	N448WM
Model/Series:	CHALLENGER II	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	CH2-1002-2263
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	08/16/2010, Conditional	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	BOMBARDIER
ELT:	Installed, not activated	Engine Model/Series:	ROTAX (ALL)
Registered Owner:	MCFARLAND WILLIAM H	Rated Power:	65 hp
Operator:	On file	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	DLL, 979 ft msl	Observation Time:	1415 CDT
Distance from Accident Site:	10 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	0°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Scattered / 3200 ft agl	Temperature/Dew Point:	8°C / 0°C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	Calm	Visibility (RVR):	
Altimeter Setting:	30.42 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Prairie Du Sac, WI (91C)	Type of Flight Plan Filed:	None
Destination:	Merrill, WI (RRL)	Type of Clearance:	None
Departure Time:	1400 CDT	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal		

Administrative Information

Investigator In Charge (IIC):	John M Brannen	Adopted Date:	08/07/2012
Additional Participating Persons:	Darrell McCullion; FAA - Milwaukee FSDO; Milwaukee, WI		
Publish Date:	08/07/2012		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=77712		

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