



National Transportation Safety Board Aviation Accident Final Report

Location:	WAYNESBORO, GA	Accident Number:	ATL97LA056
Date & Time:	04/02/1997, 1735 EST	Registration:	N53212
Aircraft:	Cessna A188B	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The airplane was attempting to spray a wheat field which was 4 1/2 miles south of the departure airport. It crashed in a heavily wooded area 1 mile south of the wheat field. According to the Cessna investigator, the airplane was within the center of gravity and weight limits. The Cessna representative also reported the left horizontal stabilizer and elevator were separated from the main wreckage. He also believed the flaps were extended one notch. Further examination of the wreckage showed the right wing was fractured along the chord line from the leading edge to the rear spar. This occurred at the rib inboard of the strut attachment point on the wing. Aft of the rear spar, the wing panel exhibited 45 degree buckling on either side of the fracture. The top cap of the front spar exhibited double bending; the outboard bend was down, and the inboard bend was up. At the inboard bend, the spar was fractured. The fracture had a 45 degree bevel and no shear lips, consistent with a tensile overload failure.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the right wing after the pilot exceeded the design stress limit of the airplane, leading to a loss of control in flight.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: MANEUVERING - AERIAL APPLICATION

Findings

1. (C) WING - FAILURE, TOTAL
 2. (C) DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED - PILOT IN COMMAND
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING - AERIAL APPLICATION

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

On April 2, 1997, about 1735 eastern standard time, a Cessna A188B, N53212, collided with the ground while maneuvering near Waynesboro, Georgia. The airplane was operated by McMillan Agricultural Aviation under the provisions of Title 14 CFR Part 137, and visual flight rules. Visual meteorological conditions prevailed. A flight plan was not filed for this aerial application flight. The commercial pilot was fatally injured, and the airplane was destroyed by impact and fire. Origination of the flight was Waynesboro, Georgia about 1715 on the same day.

The field the airplane was attempting to spray, a bright green winter wheat, was approximately 4 1/2 miles south of the departure airport. The crash site was located approximately 1 mile south of the wheat field. No witnesses observed the crash.

According to a witness, he heard an airplane flying over his house at 1630. After flying for 30 minutes, the airplane presumably left the area. Twenty minutes later the airplane returned to the area, but it was only heard briefly. About 10 minutes later, the witness saw a thick, black cloud of smoke, and walked 500 feet where he located the burning airplane.

According to the operator, the pilot had flown one load of chemical to the field. After using all that chemical, he returned to the airport for more chemical. The operator stated he talked to the pilot, who reported no problems with the airplane. The operator then supervised the loading of the chemical fungicide mixture and water onto the airplane. Both the operator and the pilot agreed on the necessary chemical load, and the airplane was refueled. The operator watched the takeoff, which appeared normal. According to literature provided by the operator, the chemicals on board the airplane were not toxic to humans, and the pilot did not handle the chemicals.

The pilot was recently graduated from Ag-Flight, Inc., an agricultural flying school in Bainbridge, Georgia. He had about 860 total flight hours, with 60 completed while doing agricultural training. He had between 10 and 12 hours in the A188B, most of them while supervised. The operator had approved the pilot for flight on March 28, 1997. During the accident day, the pilot had completed 4 flight hours in the A188B.

The FAA inspector who visited the site reported that the airplane impacted in a heavily wooded area. All of the airplane, except for the left spray boom, was at the accident site. The engine was separated from the airframe, and there were smoothly cut tree limbs, about 10 inches in diameter, in the crash site. The right wing was separated from the fuselage and lay with it. Fire nearly consumed the center section of the fuselage. The FAA inspector stated that the airplane records showed the airplane was airworthy.

According to the investigator from Cessna Aircraft, the terrain at the accident site was soft and wet. The area was heavily wooded with tall trees. He also stated that there were freshly broken tree branches along a path of 160 degrees, the approximate heading of the airplane. The airframe was nosed over, with most pieces together in one area. The cockpit, inner wing sections, and tail cone had been consumed by fire. The left wing tip was found 30 feet north of the wreckage, partially in a tree. The left horizontal stabilizer and elevator were found separated from the main wreckage. According to Cessna, the left spray boom was 15 feet west of the wreckage. Control continuity was established to the elevator, rudder, and aileron systems. The right flap appeared to be extended, but the degree was not measured. The flap control lever within the cockpit appeared to be set at the first notch. An on-site examination of

the engine was not completed, but it was noted that the propeller was bent. One blade was bent aft, mid-span, 15 degrees, and the other blade was bent forward about 30 degrees at mid-span, with the outer 4 inches curling aft. The outer three inches of the second blade was broken off, according to the representative. A weight and balance was completed by the Cessna representative who concluded the airplane had a Center of Gravity (C.G.) of 41.0 inches aft of datum. The C.G. limits on this airplane were between 40.1 and 45.7 inches aft of datum. The weight of the airplane was estimated to be 3,872 pounds at takeoff and 3,860 pounds at the accident site. The restricted category allowed this airplane to takeoff at weights up to 4,200 pounds.

After the wreckage was moved to Jefferson, Georgia for storage, it was further examined. It was noted that the wreckage, excluding the tail section, was burned extensively. The engine was not present to be examined.

The front of the fuselage was crushed rearward. The rear carry-through structure was fractured in the center of the fuselage. The right side of the rear carry-through structure was bent down.

The horizontal and vertical stabilizers showed signs of fire damage on the fabric. The top of the rudder and vertical stabilizer were partially burned. The entire left horizontal stabilizer was crumpled towards its root. The left elevator was separated from the rest of the tail section. The right horizontal stabilizer and elevator were still attached to the empennage section.

Left Wing:

The left wing was mostly burned, except for part of the outboard panel which showed heat damage.

The left wing strut was attached to the wing with both the nut and bolt in place. The left strut to fuselage attachment fitting was fractured. The fracture surface had a rough, granular, and irregular appearance. The nut and bolt remained in place in the fuselage attachment clevis. The left wing strut's carry-through clevis was bent aft. The nut and bolt were removed, and the bolt appeared worn and shiny and exhibited a shear step in its centerspan.

The left wing front spar carry-through structure was bent aft at the landing gear attachment point. The lower tube of the carry-through structure was broken at the landing gear strut.

The left wing rear spar carry-through structure was not bent outboard of the fuselage.

Right Wing:

The right wing showed significant heat damage from the fuselage to the strut attachment point, with the most inboard sections of the wing completely burned away. The inboard 1/4 of the right wing strut was burned away. The right wing strut carry-through showed the clevis was bent aft and spread apart. The bolt was absent and was not recovered. The hole in the clevis was elongated. The strut remained attached to the wing, with the nut and bolt in place.

At the rib inboard of where the strut attached to the wing, there was a fracture along the chord from the leading edge of the wing to the rear spar. The wing panel aft of the rear spar exhibited 45 degree buckling on either side of the fracture. The wing rib immediately outboard

of the fracture exhibited vertical buckling of the web.

The skin on the underside of the wing at the rib, inboard of the spar fracture, was pulled toward the wing tip. All the rivet holes were pulled outboard. It was also noted that the right wing strut was bent down towards the wing at a position that corresponded to the wing fracture.

The top cap of the front spar, approximately 20 inches inboard of the wing strut attachment point, exhibited double bending; the outboard bend was down, and the inboard bend was up. At the inboard bend, the spar was separated. The fracture surface was rough, granular, and irregular. It also had a 45 degree bevel, with no shear lips, consistent with a tensile overload failure.

The rivets that attached the right wing front spar carry-through to the spar web were all pulled out of the web, and partially molten. About 18 inches inboard of the wing attachment bolt, the spar carry-through was bent forward. About 8 inches inboard of the first bend, the structure was bent aft, forming an "S" appearance.

The bolts and the fuselage attaching points were removed and sent to Cessna Aircraft for a metallurgical examination. This testing revealed that all materials met their material specifications. The upper left strut attach bolt showed bending which Cessna concluded to have been caused by overload. The left hand fitting assembly also showed bending which was also caused by overload. According to Cessna's metallurgists, the right hand fitting assembly was also bent due to overload.

A post mortem examination of the pilot was performed by the Georgia Bureau of Investigation, Department of Forensic Sciences, on April 3, 1997. A toxicology report was also completed by the FAA Toxicology and Research Laboratory on July 28, 1997. It revealed higher than normal values of carboxyhemoglobin and cyanide in the blood, and higher than normal values of nicotine and nicotine metabolite in the urine.

Pilot Information

Certificate:	Commercial	Age:	35, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Center
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	02/25/1997
Occupational Pilot:	Last Flight Review or Equivalent:		
Flight Time:	875 hours (Total, all aircraft), 15 hours (Total, this make and model), 875 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N53212
Model/Series:	A188B A188B	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Restricted	Serial Number:	18801689T
Landing Gear Type:	Tailwheel	Seats:	1
Date/Type of Last Inspection:	06/10/1996, Annual	Certified Max Gross Wt.:	4200 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	5213 Hours	Engine Manufacturer:	Continental
ELT:	Not installed	Engine Model/Series:	IO-520-D
Registered Owner:	MCMILLAN AGRICULTURAL AVIATION	Rated Power:	300 hp
Operator:	MCMILLAN AGRICULTURAL AVIATION	Operating Certificate(s) Held:	
Operator Does Business As:		Operator Designator Code:	FYKG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	AGS, 423 ft msl	Distance from Accident Site:	22 Nautical Miles
Observation Time:	1753 EST	Direction from Accident Site:	360°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	130°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	20° C / 1° C
Precipitation and Obscuration:			
Departure Point:	(NONE)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1715 EST	Type of Airspace:	Class G

Airport Information

Airport:	BURKE COUNTY (BXG)	Runway Surface Type:	Asphalt
Airport Elevation:	302 ft	Runway Surface Condition:	Dry
Runway Used:	8	IFR Approach:	
Runway Length/Width:	3200 ft / 75 ft	VFR Approach/Landing:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	PRESTON E HICKS	Report Date:	04/24/1998
Additional Participating Persons:	JAMES A MEDCALF REGAN H CAMPBELL		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).