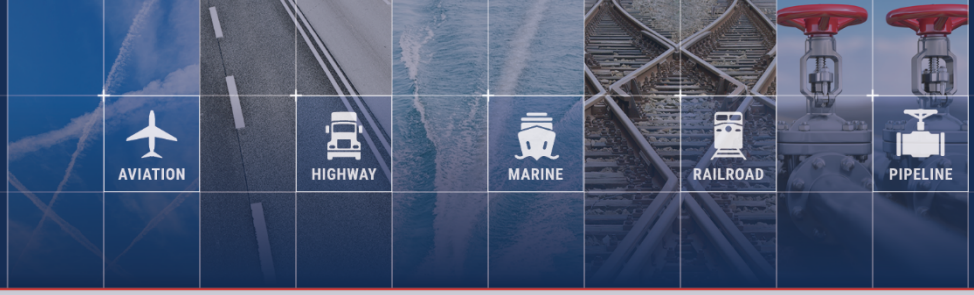

Aviation Investigation Final Report

Location:	STEVENSON, Alabama	**Accident Number:**	ATL95FA092
Date & Time:	April 27, 1995, 12:10 Local	**Registration:**	N41SW
Aircraft:	WITTMAN O&O	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

REPORTS FROM GROUND WITNESSES, NONE OF WHOM ACTUALLY SAW THE AIRPLANE, VARIED FROM HEARING A HIGH REVVING ENGINE TO AN EXPLOSION. EXAMINATION OF THE WRECKAGE REVEALED THAT THE AIRPLANE EXPERIENCED AN IN-FLIGHT BREAKUP. DAMAGE AND STRUCTURAL DEFORMATION WAS INDICATIVE OF AILERON-WING FLUTTER. WING FABRIC DOPE WAS DISTRESSED OR MISSING ON THE AFT INBOARD PORTION OF THE LEFT WING UPPER SURFACE AND ALONG THE ENTIRE LENGTH OF THE TOP OF THE MAIN SPAR. LARGE AREAS OF DOPE WERE ALSO MISSING FROM THE LEFT WING UNDERSURFACE. THE ENTIRE FABRIC COVERING ON THE UPPER AND LOWER SURFACES OF THE RIGHT WING HAD DELAMINATED FROM THE WING PLYWOOD SKIN. THE DOPED FINISH WAS SEVERELY DISTRESSED AND MOTTLED. THE FABRIC COVERING HAD NOT BEEN INSTALLED IN ACCORDANCE WITH THE POLY-FIBER COVERING AND PAINT MANUAL; THE PLYWOOD WAS NOT TREATED WITH THE POLY-BRUSH COMPOUND.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: AILERON-WING FLUTTER INDUCED BY SEPARATION AT THE TRAILING EDGE OF AN UNBONDED PORTION OF WING FABRIC AT AN AILERON WING STATION. THE DEBONDING OF THE WING FABRIC WAS A RESULT OF IMPROPER INSTALLATION.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings
1. (C) WING,SKIN - DEBONDED
2. (C) ACFT/EQUIP,INADEQUATE AIRFRAME - OWNER/BUILDER
3. (C) WING,SKIN - DELAMINATION
4. (C) WING - FLUTTER
5. WING - OVERLOAD
6. WING - SEPARATION

Factual Information

HISTORY OF FLIGHT

On April 27, 1995, about 1210 central daylight time, a Wittman O&O (Ocala and Oshkosh) experimental airplane, N41SW, registered to a private owner, operating as a 14 CFR Part 91 personal flight, experienced an in-flight breakup about 7 miles south of Stevenson, Alabama. Visual meteorological conditions prevailed and no flight plan was filed. The commercial pilot and pilot-rated passenger were fatally injured. The airplane was destroyed. The flight originated about 2 hours 40 minutes before the accident. The airplane was reported overdue on April 28, 1995, and was located on April 29, 1995.

According to friends of the pilot, this was his annual return flight to Oshkosh, Wisconsin. One of the friends stated that he conducted a preflight inspection of the airplane, and did not discover any problems. According to another friend, the pilot had planned his flight to avoid flying through controlled airspace, and the need to establish radio contact. The flight departed without incident. No radio communication was reported between air traffic and the flight.

At the approximate time of the accident, several local residents reported hearing an airplane in the vicinity of the accident site. These witnesses were located in a valley and on a mountain ridge; none of the witnesses actually saw the airplane in flight. Their accounts varied from hearing a high revving engine to hearing an explosion. One witness at the Stevenson Airport reported hearing a sonic boom, but did not see or hear a jet aircraft in the vicinity of the airport. According to Memphis Air Route Traffic Control Center, there were no military aircraft operating on the military training routes at the approximate time of the accident.

On April 28, 1995, friends of the pilot became concerned about the location of the airplane, since it never arrived at the planned destination. The Federal Aviation Administration (FAA) issued an alert notice, and a search for the missing airplane was initiated. On April 29, 1995, at 1830, debris from N41SW was located in the vicinity of strip mines, south of Stevenson. A massive ground and aerial search located the main wreckage early the following morning.

PERSONNEL INFORMATION

Information about the pilot is included in this report under the data field labeled "First Pilot Information". A review of the pilot's airmen records disclosed that he had acquired several pilot ratings which included certified flight instructor. The pilot had also held an airframe and powerplant (A & P) mechanic's rating. The pilot's flight logs were not recovered for examination.

Medical history on the pilot was limited, since his attending physician died several months

before this accident. A review of the pilot's FAA medical records failed to disclose a dramatic shift in the pilot's medical condition. During his last flight physical examination, the pilot had an elevated blood pressure reading. The pilot was requested to provide additional medical information to the FAA Aeromedical Division. On May 12, 1995, the FAA reviewed the additional data and declared that Mr. Wittman was medically qualified to hold a second class airmen medical certificate. According to friends of the pilot, he maintained a fit lifestyle, and they could not recall any extended medical treatment the pilot had received in recent years.

Information on the second pilot is included in this factual report as NTSB Form 6120.4, Supplement E.

AIRCRAFT INFORMATION

Information about the aircraft is included in this report under the data field labeled "Aircraft Information". According to the chairman and founder of the EAA, the Wittman O & O experimental airplane was a one-of-a-kind aircraft, and there was no design or performance information available for airplane. A review of aircraft data revealed that Mr. S.J. Wittman was issued the experimental operating limitations for the O & O experimental airplane on January 6, 1985.

METEOROLOGICAL INFORMATION

Visual meteorological conditions prevailed at the time of the accident. Weather information is contained in this report under the data field labeled "Weather Information". According to the weather study conducted by the National Transportation Safety Board, the 1200 weather plot showed southwest surface winds with wind speeds variable between 10 and 20 knots. Upper level winds between the surface and 10,000 feet in the vicinity of the accident site, were out of the southwest between 15 and 20 knots. The weather study also concluded that no significant wind shear was likely, but occasional light to moderate low level turbulence was possible in the vicinity of the accident site.

WRECKAGE AND IMPACT INFORMATION

Debris from the airplane was scattered in a ravine over an area 1.25 miles long, on Sand Mountain (see the wreckage distribution diagram). Examination of the accident site and wreckage disclosed that the airplane separated into four major components: both wings, the empennage section, and the main fuselage. They were scattered within an area .25 miles long. Other wreckage debris was scattered over an additional mile.

Examination of the accident site disclosed that wreckage debris was scattered on a southwesterly heading. The first pieces of the wreckage debris were found in the coal mining area near the location of the emergency management command post (see the wreckage diagram). A piece of aircraft skin, with the letters O and O printed on it was recovered with the debris near the coal mines. This piece of skin material was subsequently identified as part of

N41SW. Other debris located in the vicinity of the strip coal mines included plexiglass material and yellow painted fabric material. The southwest trail of debris, which included aircraft fabric, paint chips, personal items of the occupants, and flight charts, continued for about a mile where the larger pieces of the airframe were located.

The left wing assembly was located in a heavily wooded area about a mile southwest of the wreckage debris at the mining area. The left wing was located on a steep ridge near a creek. An examination of the left wing assembly disclosed that the main wood spar was fractured through the lateral plane of the bolted wing-to-fuselage attachment fitting. The fracture plane extended from the inboard end of the spar about 34 inches outboard.

The front wing-to-fuselage spar attachment fitting was bent aft about 3 degrees and twisted about 5 degrees in the wing leading edge down direction. Both the front and the rear wing-to-fuselage spar attachment fittings exhibited damage, eg., twisting, bending, rear wood spar fracture, or damage to fuselage clevis tang attachment webs.

About 6 inches of the wing lift strut stub remained attached to the fuselage. The lift strut exhibited some slight column buckling (downward) about 16 inches from the spar attachment fitting.

The left wing aileron and flap were missing in their entirety. The outboard aileron hinge attachment bolt/washer had broached a clean round hole, about 1-inch in diameter, through the secondary (false) rear spar and hinge block.

The entire wing tip structure assembly (including dope/fabric) was relatively intact and remained attached to the remainder of the wing. The fabric remaining on the top and bottom surfaces of the wing was, for the most part, doped in place except in those areas adjacent to the wing skin fracture lines. The dope was distressed or missing on the aft inboard portion of the wing upper surface and along the entire length of the top of the main spar.

The right wing was located on the mountain ridge about 200 yards southwest of the left wing assembly. The main wood spar was cracked/split through the lateral plane of the bolted wing-to-fuselage attachment fitting. The primary fracture plane extended from the inboard end of the spar to about 43 inches outboard (to the wing lift strut reinforced area). The spar, outboard of this section, was cracked and twisted throughout its entire length. All wood ribs aft of the main spar were missing.

The front wing-to-fuselage spar attachment fitting was attached to the fuselage clevis rear tang. The forward clevis tang was pulled out of the fuselage.

The right aileron was missing. The outboard portion of the flap, from the center hinge outboard, was bent down about 10 degrees. The inboard area of the flap exhibited rearward bending distress/buckling. The flap inboard and middle hinge fittings were intact but pulled out of the secondary (false) rear spar; the outboard fitting was broken off.

The flap and aileron bellcrank clamps remained attached to the inboard end of the concentric flap and aileron tubes. The aileron tube was fractured at the outboard flap hinge station. The aileron upper bellcrank was broken at the clamp. The flap push-pull control rod was missing and the bellcranks had broken at the upper (clamped) and lower ends.

The entire fabric covering on the upper and lower surfaces of the wing had delaminated from the wing skin. The doped finish was severely distressed and mottled.

The empennage section was located about 200 yards further up the mountain ledge from the right wing assembly. Examination of the empennage revealed that the left horizontal stabilizer and elevator assembly was missing. The left horizontal stabilizer forward attach bolt was fractured; a threaded portion of the bolt was still in the nut plate. The right horizontal stabilizer and elevator assemblies were attached to the airframe.

The vertical fin was attached to the airframe but had been deflected 90 degrees right from its installed position. The rudder, with the fixed trim tab and rudder horn, was attached to the airframe. The tailwheel assembly was attached to the airframe at the accident site.

The fuselage examination also determined that a 33-inch section of the tubular truss fuselage had fractured, aft of the baggage compartment, and was missing. The cabin and cockpit areas sustained impact damage which reduced the livable space. The examination of the airframe revealed that the fractured tubes showed evidence of multiple bending failures in random directions.

Examination of the flight control stick assembly disclosed that the aileron torque tube near the bolted connection immediately below the middle stick was fractured. The fracture faces exhibited rotational scuffing.

MEDICAL AND PATHOLOGICAL INFORMATION

Post-mortem examination of the pilot was conducted by Dr. Joseph H. Embry, Alabama Department of Forensic Sciences, Birmingham, Alabama, on May 2, 1995. The cause of death was multiple blunt force injuries.

Toxicological samples were shipped to the Federal Aviation Administration Aeronautical Center for examination. According to the manager of the Toxicological and Accident Research Laboratory, the toxicological samples arrived in very poor condition, and the findings were possibly the result of postmortem putrefaction. The toxicological examinations detected the following levels of ethanol, 1-butanol, and acetaldehyde:

34.000 mg/dl and 37.000 mg/dl of ethanol in muscle and lung samples 4.000 mg/dl of butanol in both muscle and lung samples 3.000 mg/dl of acetaldehyde in the lung sample.

TEST AND RESEARCH

Several fractured components from the airframe were submitted to the NTSB Materials Laboratory Division for examination, (see the Metallurgist Factual Report for list of components examined). The examination of the listed components revealed no evidence of preexisting cracking, and all fracture areas were representative of overstress separations. The left horizontal forward attach bolt also failed in overstress.

A small section of the wing wood and fabric material was removed for examination. "The examination disclosed that the mahogany plywood had been coated with clear Nitrate Dope". Next, the builder covered the plywood withStits 150 pound poly-fiber. The builder next brushed a coat of nitrate dope over the layer of poly-fiber followed by a clear coat of butyrate dope. Finally, several coats of poly-spray and yellow poly-tone were sprayed over the coat butyrate dope. According to Mr. Ray Stits, President of Stits Aircraft, the above stated process does not provide the best adhesive qualities. The builder should have first applied two coats of poly-brush on the bare plywood, (see the Poly-Fiber Covering and Painting Manual).

Primary radar data from Memphis Air Route Traffic Control Center was recovered for examination. A review of this data disclosed that N41SW was flying a northerly heading at an unspecified altitude when radar contact was lost. The radar data study could only recover ground speed and magnetic heading information. During the last three minutes of the recorded data, the ground speed increased from 150 knots to 190 knots. The radar data also indicated the airplane had entered a turn. The rate and direction of turn was not determined. Turn Information was based upon the change in radar reflection of the target. The radar data also revealed that the last radar hit was north of where the aircraft wreckage was located on the ground. The wreckage distribution was 180 degrees from the original flight heading. (See the Specialist report of investigation conducted by the NTSB Office of Research and Engineering).

The aircraft wreckage was released to Mr. Paul H. Poberezny, EAA, Founder/Chairman of The Board,POB 3086, Oshkosh, Wisconsin, 54903.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	91,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	October 13, 1994
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	16995 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	WITTMAN	**Registration:**	N41SW
Model/Series:	O&O O&O	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	13
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 21, 1995 Annual	**Certified Max Gross Wt.:**	1850 lbs
Time Since Last Inspection:	3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	208 Hrs	**Engine Manufacturer:**	CONTINENTAL
ELT:	Not installed	**Engine Model/Series:**	O-470J
Registered Owner:	SYLVESTER J. WITTMAN	**Rated Power:**	205 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CHA ,682 ft msl	**Distance from Accident Site:**	31 Nautical Miles
Observation Time:	12:00 Local	**Direction from Accident Site:**	30°
Lowest Cloud Condition:	Scattered / 9500 ft AGL	**Visibility**	15 miles
Lowest Ceiling:	Overcast / 25000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots / 19 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	23°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	OCALA (FDO4)	**Type of Flight Plan Filed:**	None
Destination:	OSHKOSH (OSH)	**Type of Clearance:**	None
Departure Time:	10:30 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	34.870826,-85.82946(est)

Administrative Information

Investigator In Charge (IIC):	Powell, Phillip
Additional Participating Persons:	EDWARD BLOUNT; BIRMINGHAM , AL GARY SOLDWISCH; BIRMINGHAM , AL PAUL ALEXANDER; WASHINGTON , DC PRESTON E HICKS; ATLANTA
Original Publish Date:	December 12, 1995
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=3480