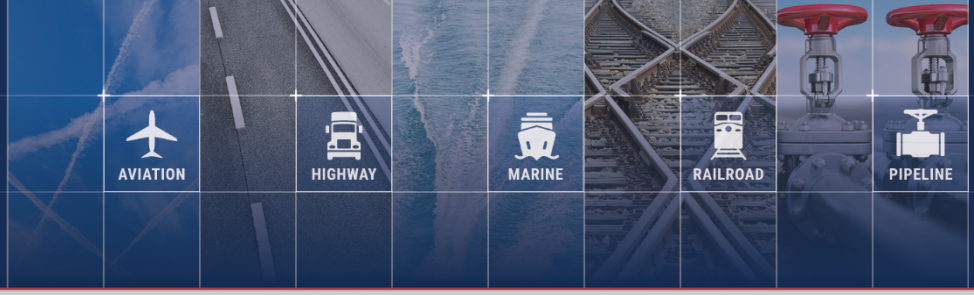

Aviation Investigation Final Report

Location:	Saylorsburg, Pennsylvania	**Accident Number:**	ERA09LA492
Date & Time:	August 30, 2009, 09:50 Local	**Registration:**	N463NB
Aircraft:	BOND NEAL O S-9	**Aircraft Damage:**	Substantial
Defining Event:	Aircraft structural failure	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The certificated sport pilot was performing slow flight and turns at 4,000 feet. A friend who assisted the pilot in building the airplane was watching the flight and communicating with the pilot using a hand-held radio. The friend observed the airplane pitch down and enter a right spiral. He told the pilot to get the nose up. The spiral ceased and the nose began to come up, but not enough, so he again told the pilot to get the nose up. As the nose came up, he observed something red and silver come off the airplane; he believed these parts were the right elevator and one of the wing struts. The nose again dropped and the airplane spiraled toward the ground. As the airplane descended, the friend saw a wing break and instructed the pilot to get out of the airplane. The autopsy report stated that the pilot bailed out of the airplane; however, the ejection was too low for the pilot's parachute to open effectively and he sustained fatal injuries. The right elevator was found a quarter mile from the main wreckage. The left wing was found 75 to 80 feet from the main wreckage. Information provided by the pilot's wife revealed that the pilot purchased the airplane partially assembled, and completed its manufacture over five years. The airplane had accumulated about 52 hours of flight time at the time of the accident. An examination of the wreckage revealed that all structural failures were consistent with static, aerodynamic overload starting in the right elevator as a result of inputs to the flight controls. No evidence of substandard structure or fatigue was found.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's excessive flight control inputs that resulted in an overload failure of the right elevator and horizontal stabilizer.

Findings

Aircraft	Elevators - Capability exceeded
Personnel issues	Aircraft control - Pilot
Personnel issues	Incorrect action performance - Pilot

Factual Information

History of Flight

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

HISTORY OF FLIGHT

On August 30, 2009, about 0950 eastern daylight time, a Bond S-9, N463NB, was substantially damaged after an in-flight structural failure near Saylorsburg, Pennsylvania. The experimental, amateur-built airplane was owned and operated by the pilot. The certificated sport pilot was killed. Visual meteorological conditions prevailed at the time, and no flight plan was filed for the local personal flight conducted under the provisions of 14 Code of Federal Regulations Part 91. The flight originated at Pegasus Air Park, Stroudsburg, Pennsylvania, at 0945.

A friend of the accident pilot, who also witnessed the accident, reported the following. He spoke with the pilot about 0920 on the morning of the accident. The pilot performed his preflight inspection and stated that he was going to fly locally for about 40 minutes to perform slow flight and turns at altitude. The friend agreed to communicate with the pilot while airborne via a hand-held radio. About 0940, the pilot reported that he was at 4,000 feet and 70 mph. The pilot made a left turn, similar to a clearing turn, and then a right turn. During the right turn, the nose dropped and the airplane completed one turn of a spiral or spin. The friend called the pilot and asked him what he was doing, and told him to get the nose of the airplane up. The friend then observed the spiral or spin cease and the nose came up, but not high enough. He again told the pilot to get the nose up. As the nose came up, the friend observed something red and silver come off the airplane. He believed the parts to be the right elevator and one of the wing struts. The nose again dropped and the airplane spiraled toward the ground. As the airplane descended, he saw the wing break and instructed the pilot to get out of the airplane.

Another witness was in her bedroom when she heard a loud noise. When she looked out of her bedroom window, she observed a small airplane flying without a wing. She then saw the airplane descend before it crashed.

A third witness was walking his dog when he observed the accident airplane. He stated that the pilot appeared to pull up when the wing came off. The airplane then spiraled to the ground.

PERSONNEL INFORMATION

The pilot held a sport pilot certificate issued on July 11, 2006. He also held an experimental aircraft builder and repairman certificate, limited to the S-9.

The pilot's wife provided a pilot logbook with entries through March 15, 2009. The total time recorded in the logbook was 315.4 hours, including 4.3 hours in the S-9. Additional information provided by a friend of the pilot indicated that the pilot flew about 52 hours in the S-9, after March 15, 2009.

AIRCRAFT INFORMATION

According to records supplied by the pilot's wife, the airplane, serial number 0493121, was originally sold in kit form on May 17, 1993. The pilot maintained a spiral notebook that chronicled the inspection and building of the accident airplane. On March 29, 2005, an "Inventory of Kit" was performed, and the following statement was noted, "Checked inventory of parts found to be OK 6.5 hours." The time frame for the building of the airplane continued from April 1, 2005 until March 5, 2009, when a condition inspection was performed by the pilot. All inspection items received a "Pass" grade with no defects noted.

A friend of the pilot reported that he assisted the accident pilot with the building of the airplane. He recalled that the accident pilot purchased the S-9 about 5 years ago and he first saw the airplane when the accident pilot showed it to him on a flatbed trailer. The airplane was partially assembled, and he believes that the 'tail feathers,' or what he calls the tail section, were assembled, skinned, and painted red. They tested the condition of the skin and found it to be in good condition.

The friend reported that there were 73.8 Hobbs hours on the airplane when the accident occurred. He had flown about 18 hours in the accident airplane and the remaining hours were flown by the accident pilot. To his knowledge, the airplane had never been flown prior to the accident pilot purchasing it. He stated that neither he nor the accident pilot performed any welding on the airplane during its manufacture. They purchased numerous pieces of hardware from a vendor to complete the project.

METEOROLOGICAL INFORMATION

The 0951 weather observation for Allentown, Pennsylvania (ABE), located 18 nautical miles south of the accident site, included the following: sky clear, surface winds calm, 10 statute miles visibility, temperature 22 degrees Celsius, dew point 17 degrees Celsius, and an altimeter setting of 29.91 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

An inspector from the Federal Aviation Administration (FAA) inspected the wreckage following the accident. The airplane crashed in a residential area. The right elevator was found approximately 0.25 miles from the fuselage. The left wing was separated at its attachment points and found about 75 to 80 feet from the fuselage.

After it was recovered to a barn, the wreckage was examined by an NTSB senior air safety investigator on October 8, 2009. The right wing remained attached to the airframe and exhibited impact damage at the outboard section. The right flap remained attached and the right aileron remained partially attached to the right wing. The left wing had separated from the airframe at the wing root and the fracture surfaces exhibited features consistent with overstress. The left flap and left aileron remained attached to the left wing. The propeller, engine, and forward section of airframe remained intact with little damage noted. The cockpit remained intact, with some deformation noted.

The upper section of empennage was crushed, but the vertical stabilizer and rudder remained attached. The left horizontal stabilizer remained partially attached to the empennage and the left elevator remained attached to the left horizontal stabilizer. The right horizontal stabilizer remained partially attached to the empennage; however, the right elevator had separated from the right horizontal stabilizer.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examination of the pilot was performed by Forensic Pathology Associates, Inc., Allentown, Pennsylvania. The cause of death was listed as, "MASSIVE TRAUMATIC INJURY DUE TO FALL FROM PLANE." The autopsy report included the following circumstances, "He self-ejected, however, the ejection was too low for the chute to open effectively. He landed on the deck of a home suffering massive trauma." The report also stated that, "He is wearing a "National 360" parachute which is open. The pull cord is still present in his left hand."

Forensic toxicology was performed on specimens of the pilot by the FAA Bioaeronautical Sciences Research Laboratory (CAMI), Oklahoma City, Oklahoma. The CAMI toxicology report was negative for carbon monoxide and drugs. Testing for carbon monoxide and cyanide was not performed.

TESTS AND RESEARCH

Two guy wires from the right horizontal stabilizer and the right elevator outboard hinge were forwarded to the NTSB Materials Laboratory, Washington, DC, for further examination. Magnified optical examinations of the fractured end of both cable sections revealed either yielding and necking or slant fractures on all of the individual wires, consistent with overstress separations. No indications of progressing cracking or corrosion were noted on either guy wire.

The elevator hinge consisted of a short steel tube welded to adjacent structure along two sides. Magnified visual examinations found fractures through the structure adjacent to the weld. The fractures displayed features and deformations consistent with overstress separations. No evidence of progressing cracking such as fatigue or corrosion was noted. However, a lack of weld fusion was visible in the portions of the welds at the ends of the barrel.

After the examination of the guy wires and right elevator outboard hinge was completed, the Chief Scientist for the NTSB examined the wreckage, assisted by a senior air safety investigator. He reported that all available evidence was consistent with a static, aerodynamic overload starting in the right elevator as a result of inputs to the flight controls. No evidence of substandard structure or fatigue was found. There was bowing of the right stabilizer and elevator, consistent with a large downward aerodynamic load on the elevator. The torque created by the bowing of both surfaces resulted in the fracture and separation of the hinge from the tube. The hinge fracture was through the tube in the area where the tube and hinge barrel were welded. The weld was adequate along both sides of the hinge barrel. The left wing and strut failed in down bending as a result of high negative air loads on the wings.

Pilot Information

Certificate:	Sport Pilot	**Age:**	46,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 28, 2008
Flight Time:	(Estimated) 367 hours (Total, all aircraft), 56 hours (Total, this make and model), 327 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BOND NEAL O	**Registration:**	N463NB
Model/Series:	S-9	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	0493121
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	March 5, 2009 Condition	**Certified Max Gross Wt.:**	710 lbs
Time Since Last Inspection:	52 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	52 Hrs at time of accident	**Engine Manufacturer:**	Rotax
ELT:	Not installed	**Engine Model/Series:**	503
Registered Owner:	BOND NEAL O	**Rated Power:**	65 Horsepower
Operator:	BOND NEAL O	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ABE,393 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	09:51 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	22°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Stroudsburg, PA (50PA)	**Type of Flight Plan Filed:**	None
Destination:	Stroudsburg, PA (50PA)	**Type of Clearance:**	None
Departure Time:	09:45 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.935554,-75.363609(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Bob Ference; FAA/FSDO; Allentown, PA Randy Schlitter; Rans Design, Inc.; Hays, KS
Original Publish Date:	March 16, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74628