



National Transportation Safety Board Aviation Accident Final Report

Location:	SEBASTIAN, FL	Accident Number:	ATL01LA029
Date & Time:	02/03/2001, 1400 EST	Registration:	N658SE
Aircraft:	Robert D. Wood VELOCITY XLFG	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 Minor
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

This was the first test flight for this experimental airplane. As the airplane climbed through 2000 feet and accelerated to approximately 135 knots, the pilot reported that the left winglet began to flutter. When left rudder was applied, the flutter condition lessened, but when right rudder was applied the flutter became more severe. The pilot attempted an emergency landing in a field near the departure airport. Upon touchdown, the aircraft nosed over and came to rest inverted. Examination of the airplane disclosed errors in composite construction in the left and right wings, along with errors in bonding techniques for metal to fiber structures were revealed in the design of the aircraft.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The manufacturer's inadequate design of the winglet/rudder assembly, and inadequate bonding techniques for metal to fiber structures, which resulted in control surface flutter.

Findings

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

Findings

1. (C) MISCELLANEOUS,AIRFRAME - COMPOSITE MATERIAL

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE - NORMAL

Findings

2. (C) MISCELLANEOUS,AIRFRAME - DELAMINATION

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

Findings

3. (C) WING,WINGLET - FLUTTER
4. (C) MISCELLANEOUS - IMPROPER - KIT MANUFACTURER
5. (F) ACFT/EQUIP,INADEQUATE DESIGN - KIT MANUFACTURER

Factual Information

On February 03, 2001, at 1400 eastern standard time, a Robert Wood, Velocity XLFG, N658SE, an experimental airplane, collided with the ground during an emergency landing near Sebastian, Florida. The personal flight was operated by the pilot under the provisions of Title 14 CFR part 91 with no flight plan filed. Visual weather conditions prevailed at the time of the accident. The experimental airplane received substantial damage, and the commercial pilot received minor injuries. The flight originated from Sebastian, Florida, at about 1330.

According to the pilot, this was the first test flight of this experimental airplane. The pilot stated that after climbing to approximately 2000 feet and accelerating to approximately 135 knots, the left winglet began to flutter. The pilot reduced power to slow down, and applied left rudder pressure. The left rudder stopped fluttering, but then the right rudder began a severe flutter. The pilot applied right rudder pressure, but obtained no response. The aircraft then began an uncommanded right turn. The pilot began a descent and attempted an emergency landing in a field near the departure airport. Upon touchdown, the aircraft nosed over and came to rest inverted.

Examination of the airplane revealed that winglets, and attached rudders, had been installed. Reportedly, winglet rudders operate independent of each other and only moves outward to create drag, which yaws the airplane. The trailing edge of the left and right rudder is designed with a slight out ward bend, thus allowing the relative wind to apply pressure in the opposite direction of the normal movement of the rudder. Such pressure forces the rudder against its stop, or maintains pressure against the rudder cable during application of rudder control input, and, therefore prevents flutter. The trailing edge of the left and right rudders installed on the accident airplane were manufactured with a slightly inward bend, which allowed the relative wind to apply pressure in the direction of the normal movement of the rudder. The examination also disclosed that the right rudder cable attachment arm was ripped out of the right rudder attach point during flight due to excessive loads imposed by flutter. The examination also revealed that the composite material construction in the left and right wings, and bonding techniques for metal to fiber structures, were not completed in accordance with normal procedures.

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	28, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	01/31/2000
Occupational Pilot:		Last Flight Review or Equivalent:	03/16/2000
Flight Time:	2605 hours (Total, all aircraft), 1023 hours (Total, this make and model), 2480 hours (Pilot In Command, all aircraft), 78 hours (Last 90 days, all aircraft), 29 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Robert D. Wood	Registration:	N658SE
Model/Series:	VELOCITY XLFG	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	3FX-017
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	02/02/2001, Annual	Certified Max Gross Wt.:	2700 lbs
Time Since Last Inspection:	1 Hours	Engines:	1 Reciprocating
Airframe Total Time:	1 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	I-0540-D
Registered Owner:	ROBERT D. WOODS	Rated Power:	260 hp
Operator:	BRENDEN J. O'RIORDAN	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	VRB, 25 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	1952 EST	Direction from Accident Site:	0°
Lowest Cloud Condition:	Few / 1200 ft agl	Visibility	7 Miles
Lowest Ceiling:	Overcast / 2000 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	13 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	360°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.14 inches Hg	Temperature/Dew Point:	18° C / 16° C
Precipitation and Obscuration:			
Departure Point:	SEBASTIAN, FL (X26)	Type of Flight Plan Filed:	None
Destination:	SEBASTIAN, FL (X26)	Type of Clearance:	None
Departure Time:	1330 EST	Type of Airspace:	Class G

Airport Information

Airport:	SEBASTIAN (X26)	Runway Surface Type:	Unknown
Airport Elevation:		Runway Surface Condition:	Unknown
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	PHILLIP POWELL	Report Date:	07/30/2001
Additional Participating Persons:	Larry D Enlow; Orlando FSDO; Orlando, FL		
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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