Aviation Investigation Final Report

Location:	Boyd, Texas	**Accident Number:**	CEN10FA277
Date & Time:	May 30, 2010, 08:45 Local	**Registration:**	N801GB
Aircraft:	AVEKO SRO VL-3 LSA	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

This report was modified on November 15, 2012. Please see the docket for this accident to view the original report with revisions shown.

The flight instructor and student pilot departed on an instructional flight in preparation for the student's check ride for a pilot certificate. A witness reported seeing the airplane "low and slow" and said that the engine was "sputtering." He added that the airplane then entered a "flat spin" before disappearing into trees. The airplane wreckage was located in a stand of trees surrounded by rolling fields. Fuel was present on site. The airplane was equipped with a ballistic parachute, and the parachute's activation handle was pulled from its stowed position, consistent with an attempted activation by the pilot; however, it had not deployed. Examination revealed that the rocket motor that should have deployed the parachute housing failed because the manufacturer used an inadequate thread sealant glue, which dried up and became inelastic when installed on an airplane and exposed to normal operating conditions (including vibration). The end cap of the rocket would unscrew. As a result, the accident airplane's parachute did not deploy. Corrective measures were developed and issued as a result of this accident. Examination also showed that, although both occupants' lap belts remained attached to the airframe their shoulder straps had separated at the adhesive joint where the shoulder strap attachment bracket fastened to the turtle deck. Postaccident examination of the airframe and engine revealed no preimpact mechanical malfunctions or failures that would have precluded normal operation. The engine was started and was run on both the left and right ignition systems.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: ***This report was modified on November 15, 2012. Please see the docket for this accident to view the original report with revisions shown.***

The pilots' failure to avoid and recover from the prohibited maneuver of aerodynamic spin during a training flight, for undetermined reasons. Contributing to the severity of the accident was the failure of the ballistic parachute rocket as a result of the manufacturer's use of an inadequate thread sealant glue on the end caps of the rocket. Contributing to the severity of the occupants' injuries was the separation of their shoulder belt attachment brackets at impact.

Findings

Not determined	(general) - Unknown/Not determined
Aircraft	(general) - Failure
Aircraft	Flight compartment equipment - Failure

Factual Information

History of Flight

Maneuvering	Aerodynamic stall/spin
Maneuvering	Unknown or undetermined
Maneuvering	Loss of control in flight (Defining event)
Uncontrolled descent	Sys/Comp malf/fail (non-power)

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HISTORY OF FLIGHT

On May 30, 2010, about 0845 central daylight time, an Aveko VL-3 LSA, special-light sport airplane, N801GB, sustained substantial damage when it collided with terrain and trees after a loss of control near Boyd, Texas. The certified flight instructor (CFI) and the student pilot were seriously injured. The airplane was registered to and operated by Denco Remodeling Group, Inc., Richland Hills, Texas. Visual meteorological conditions prevailed and no flight plan was filed or the instructional flight conducted under 14 Code of Federal Regulations Part 91.

The reported purpose of the flight was to obtain flying time, in preparation for the student pilot's check-ride for a pilot's license.
A witness reported that he saw the airplane "low and slow" and the engine was "sputtering". He added that the airplane then entered a "flat spin", before disappearing in a stand of trees.

PERSONNEL INFORMATION

The person sitting in the left seat of the airplane, held a student pilot certificate for airplane single-engine land and a third class medical certificate issued May, 2010.

The person sitting in the right seat held an airline transport pilot (ATP) certificate for airplane, single and multi-engine land, a certified flight instructor (CFI) private pilot certificate, for airplane single-engine land, a private glider rating, and an airplane-instrument rating. His third class medical certificate was issued in September, 2008; his pilot logbook was not located during the course of this investigation.

AIRCRAFT INFORMATION

The airplane was an Aveko model VL-3 LSA, serial number VL-3-012, which was a single-engine, low-wing airplane, with composite construction, fixed-tricycle landing gear, and was configured for 2 seats. The airplane received its airworthiness in the Special-Light Sport

Airplane (S-LSA) category, on January 13, 2008.

The airplane is not approved for intentional spins and stalls. The flight manual states: Warning – Aerobatics, intentional spins and stalls are prohibited! A placard on the panel states: “aerobatic maneuvers including spins prohibited, other limitations according the aeroplane flight manual.”

A supplemental training manual states: 3.2 Training flight in area - The training flight in area should contain following elements: - stalls, - turning at 60° bank, - normal flight.

The airplane was powered by a Rotax ULS-912 reciprocating engine, rated at 100 horsepower.

The engine drove a Pcszke fixed pitch, 3-blade composite propeller.
A review of the airplane's maintenance logbooks revealed the last annual inspection was completed on May 14, 2010 with a Hobbs time of 253.3 hours, and tachometer time of 230.4. At the time of the annual inspection, the airplane's engine had accumulated approximately 230.4 hours since new.

METEOROLOGICAL INFORMATION

The automated weather station at the Fort Worth Alliance Airport (KAFW), Fort Worth, Texas, about 18 miles east of the accident site, reported at 0853, winds from 160 degrees at 6 knots, temperature 28 degrees Fahrenheit, dew point 19 degrees Fahrenheit, visibility 10 miles, a clear sky, and an altimeter pressure setting of 29.82 inches of Mercury.

COMMUNICATIONS

The pilot was not in radio contact with air traffic control. There were no reported emergency or distress calls from the pilot.

WRECKAGE AND IMPACT INFORMATION

An on-scene examination was conducted on May 30 by a Federal Aviation Administration (FAA) inspector and the NTSB Investigator In-Charge (IIC). The accident site was located in a stand of trees around rolling fields, lined with trees. The airplane, impacted tree tops before colliding with the terrain, in a slightly nose down attitude. Tree and ground scars were consistent with the airplane descending through tree tops. All major components of the airplane were accounted for on-site, the airplane’s empennage was broken just forward of the vertical stabilizer, both wings, and forward section of the fuselage had heavy impact damage. The engine also received impact damage. Two of the three propeller blades were broken off near the base of the blades, and not located. Fuel was present at the scene; the fuel valve was found in the off position. First responders reported that they were concerned with fuel at site and turned the airplane’s fuel valve to the off position. There was no postcrash fire.

The airplane was equipped with a ballistic parachute; however, it was not deployed from the airplane. The ballistic parachute's red activation handle, located on the left side of the center console, was pulled aft out of its stowed position. However, a visual inspection of the handle, could not determine if this was the result of the accident, or activation by the pilot. The system's parachute remained in its compartment located behind the pilots in the airplane's turtle-deck. The door/cover panel over the parachute was missing and not located. The rocket motor used to deploy the parachute was located on the rear floor of the airplane, behind the pilot's seats. The motor was constructed of metal with two end caps threaded onto a cylinder. The bottom end cap had a nozzle, with a "brass" plug over the nozzle. The plug was bowed outward. The top end cap was not on the cylinder, and appeared to have been "partially stripped" from the motor cylinder. The system's launch structure was also bent and broken at the top part, additionally; the airplane's baggage floor had impact marks, including a circular impact crater that was consistent with the shape of the rocket housing. The airplane's parachute remained in its container, behind the occupants.

The engine/firewall/ instrument panel was pushed into the cabin area. The main and nosewheel landing gear were folded under the airplane. The left wing, about mid-span, was hung up slightly by two trees. The wing was largely severed and broken by the trees. The right wing appeared intact with a bend at the wing-to-fuselage body attachment point. The flaps were in the retracted (up) position.

The fuselage was broken in front of the vertical stabilizer, with the horizontal and vertical stabilizers hanging to the airplane's right side. Control continuity to the flight controls was established up to the front cabin area.

After the on-site inspection of the airplane, the wreckage was recovered and transported to a secure facility for further examination. A handheld GPS unit was removed from the wreckage and the flight data downloaded.

SURVIVAL ASPECTS

Both occupants received serious injuries; the ground collision compromised part of the cabin area. Both lap belts remained attached to the airframe; however, the left and right shoulder straps where found lying in the cabin seats and had separated at the adhesive joint where the shoulder strap attachment bracket fastened to the turtle deck.

There were no ballistic parachute rocket warning placards on the exterior of the airplane, particularly near or adjacent to the cabin entry point.

TEST AND RESEARCH

The airplane's EFIS (Electronic Flight Information System) and EMS (Engine Monitoring System) displays were damaged in the accident. Both units were removed from the airplane and sent to the display's manufacturer, for potential download of NVM (non-volatile memory).

However, both units were equipped with an earlier software version that did not allow for data logging of airplane events and therefore no data was obtained from the units.

A panel mounted portable GPS unit (Garmin model 496) was located on the airplane's instrument panel. A visual inspection of the unit revealed no apparent damage from impact forces.

The data obtained from the unit, contained forty-five (45) unique tracklogs dated from February 2, 2010 to May 30, 2010. Downloaded tracklog data included the following parameters for each recorded data point: index, GPS date/time, GPS altitude, distance from previous update [leg length], time since last update [leg time], average groundspeed during the interval [leg speed], average course during the interval [leg course], and latitude/longitude position at the time of the update.

Tracklog data recovered for May 30, 2010 was stored in the tracklog designated Session 44. Data related to this tracklog began at 0812:04 CST with a latitude/longitude position fix corresponding to Hicks airfield (T67). A review of the airplane's track showed the airplane conducting several "back-n-forth" maneuvers, working away from T67 in a westerly direction, with changes in the airplane's groundspeed along the track. The GPS altitude for the airplane varied for the flight, but generally ranged between 2,700 feet to 3,600 feet. Prior to the airplane final GPS position location at 0844:38:00, the airplane completed a right-hand 360 degree turn, and headed west. As the turn was completed, the airplane's (ground) speed reduced from above 90 mph (08:43:00) to less than 45 mph. Additionally, during the last several GPS data points the airplane, rapidly lost altitude.

The engine was examined at the salvage yard. The engine sustained minor impact damage. The fuel line filter appeared clear and absent any contaminates. The top sparkplugs were removed. They exhibited normal operating signatures and appeared in new condition. A thumb compression and suction test was conducted by rotating the crankshaft by hand. Crankshaft continuity was also confirmed to the accessory section of the engine. The dual carburetor float bowls were removed and were absent any fuel. An unidentified white power like substance was found in the bottom of the bowls.

The damaged propeller unit was removed from the engine's drive gearbox. Fuel was added directly to the carburetor's float bowls. The air box, damaged in the accident was removed. The engine started; the engine's rpm responded to control input by working the carburetor's throttle input shafts. The engine ran on both the left and right ignition systems.

The engine's electric driven fuel pump operated when a current was applied to the pump. The engine driven pump was removed and tested at the engine support facility in Canada. The test revealed that the fuel pump pressures were within the minimum and maximum allowable limits per the Rotax Installation Manual.

The examination of the engine did not reveal any pre-impact mechanical anomalies.

Student pilot Information

Certificate:	Student	**Age:**	49,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	May 7, 2010
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Flight instructor Information

Certificate:	Airline transport; Commercial; Flight engineer; Flight instructor	**Age:**	63,Male
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	September 29, 2008
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	AVEKO SRO	**Registration:**	N801GB
Model/Series:	VL-3 LSA	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	VL-3-012
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	May 14, 2010 Condition	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	230 Hrs as of last inspection	**Engine Manufacturer:**	ROTAX
ELT:	Installed	**Engine Model/Series:**	912UL2
Registered Owner:	DENCO REMODELING GROUP INC	**Rated Power:**	80 Horsepower
Operator:	DENCO REMODELING GROUP INC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KAFW	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	07:53 Local	**Direction from Accident Site:**	120°
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:	29.76 inches Hg	**Temperature/Dew Point:**	26°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Hicks Airfield, TX (T67)	**Type of Flight Plan Filed:**	None
Destination:	Hicks Airfield, TX (T67)	**Type of Clearance:**	None
Departure Time:	08:17 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	33.080501,-97.560211(est)

Administrative Information

Investigator In Charge (IIC):	Hatch, Craig
Additional Participating Persons:	Gary Weeks; FAA FSDO; Fort Worth, TX Robert Seaton; Rotech Flight Safety David Graham; Gobosh (Aviation) LSA USA, Inc. Milau Babovka; Galaxy High Technology Bill Canino; SportairUSA, (Galaxy)
Original Publish Date:	March 29, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=76159