Aviation Investigation Final Report

Location:	Littlefield, Texas	**Accident Number:**	CEN13FA213
Date & Time:	March 30, 2013, 16:00 Local	**Registration:**	N12053
Aircraft:	Schleicher ALEXANDER	**Aircraft Damage:**	Substantial
Defining Event:	Aircraft structural failure	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Witnesses reported that, the glider, which was not approved for aerobatic maneuvers, was riding thermals about 2,000 feet above the ground when it appeared to exit a thermal and then execute a tight loop, which is considered to be an aerobatic maneuver. Witnesses then heard a loud sound, saw the glider spinning to the ground, and a portion of the right wing separate and fall to the ground. The glider continued to spin until it impacted terrain.

An examination of the wreckage revealed that the flight controls were continuous before the wing separated and the airplane impacted terrain. A review of the glider's maintenance logbooks revealed that the annual inspection was accomplished about 12 months before the accident and that the airplane was approved to be in airworthy condition. An inspection recommended by the British Gliding Association, which was intended to reveal glue joint deterioration, had not been completed. An examination of the separated wing section revealed evidence of multiple fractures due to tension and torsion. The condition of the wing's adhesive joints was mostly degraded and poor. The adhesive was very brittle, and cracks and areas of disbonding were observed. Stains and mold were observed on the wing's leading edge interior, indicative of moisture ingress, which can degrade the adhesive bonds and the wood structure. The leading edge ribs were easily pulled apart at the joints, which allowed them to separate without fracturing under minimal force. Despite the condition of the adhesive, it could not be determined whether the wing would have fractured under design load conditions, but the aerobatic maneuver placed the wing under greater load conditions. However, a thorough inspection of the wing interior, either during the last annual inspection or preflight inspection, would likely have revealed evidence of moisture and adhesive disbonding, which should have led to concerns about the airworthiness of the glider.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's improper decision to conduct aerobatic maneuvers in a glider not approved for such maneuvers. Contributing to the accident was the degradation of the adhesive holding the wing together, which should have been detected either during the last annual inspection or preflight inspection.

Findings

Personnel issues	Decision making/judgment - Pilot
Aircraft	Spar (on wing) - Damaged/degraded
Aircraft	Spar (on wing) - Not serviced/maintained
Aircraft	Spar (on wing) - Not inspected
Personnel issues	Scheduled/routine inspection - Maintenance personnel
Personnel issues	(general) - Pilot

Factual Information

History of Flight

Maneuvering-aerobatics	Aircraft structural failure (Defining event)

On March 30, 2013, about 1600 central daylight time, a Schleicher Alexander Ka7 glider, N12053, impacted terrain following an inflight wing separation near the Littlefield Municipal Airport (KLIU), Littlefield, Texas. The commercial pilot and passenger were fatally injured. The glider was destroyed. The glider was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed and no flight plan was filed. The local flight originated from KLIU about 1545.

According to witnesses of the accident, the glider was riding thermals when it appeared to come out of a thermal and execute a tight loop. They heard a loud sound and then saw the glider spinning to the ground. The glider made two rotations when a portion of the right wing separated and fell to the ground. The glider continued the spin into the ground.

The tow pilot stated that he towed the glider to an altitude of 2,800 feet above ground level (AGL) and then it released. He flew the tow plane back to the airport and landed about 5 minutes later. He went to join the other witnesses to watch the glider soar. After about 5 minutes, the glider was to the north at about 2,000 feet AGL in a nose low attitude and appeared to be in a spin. The right wing appeared to be broken but not completely separated. During the spin, about half of the right wing separated. The glider made about 4 rotations prior to impacting terrain.

Pilot Information

Certificate:	Commercial	**Age:**	79
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	Glider	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 26, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 12695 hours (Total, all aircraft)		

Passenger Information

Certificate:		**Age:**	13
Airplane Rating(s):		**Seat Occupied:**	Center
Other Aircraft Rating(s):		**Restraint Used:**	3-point
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

The pilot, age 78, held a commercial pilot certificate for airplane single engine land, airplane multiengine land, and glider, issued on March 3, 2010. He was also issued a second class medical certificate on April 26, 2012 with limitations of having glasses available for near vision. The pilot's logbook has not recovered for examination. On the pilot's April 26, 2012 application for the medical certificate, he reported 12,695 total flight hours and 120 flight hours in the past 6 months.

The passenger, age 14, was seated in the rear seat.

Aircraft and Owner/Operator Information

Aircraft Make:	Schleicher	**Registration:**	N12053
Model/Series:	ALEXANDER K7	**Aircraft Category:**	Glider
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	7205
Landing Gear Type:	Ski/wheel	**Seats:**	2
Date/Type of Last Inspection:	April 1, 2012 Annual	**Certified Max Gross Wt.:**	1060 lbs
Time Since Last Inspection:		**Engines:**	
Airframe Total Time:		**Engine Manufacturer:**	
ELT:	Not installed	**Engine Model/Series:**	
Registered Owner:	Eddie Hoglan	**Rated Power:**	
Operator:	Eddie Hoglan	**Operating Certificate(s) Held:**	None

The two-seat, forward swept wing glider was manufactured in 1965 by Alexander Schleicher in Germany. A standard-normal airworthiness certificate was issued for the glider on May 12, 1965. The glider was not approved for aerobatic maneuvers. A review of the maintenance records revealed that the glider received major maintenance and repairs on May 30, 1997. The most recent annual inspection was competed on April 1, 2012.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KLBB,3282 ft msl	**Distance from Accident Site:**	32 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	130°
Lowest Cloud Condition:	Few / 9000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 30000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	29°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Littlefield, TX (KLIU)	**Type of Flight Plan Filed:**	None
Destination:	Littlefield, TX (KLIU)	**Type of Clearance:**	None
Departure Time:	15:45 Local	**Type of Airspace:**	

At 1553, an automated weather reporting station located at Lubbock International Airport (KLBB), Lubbock, Texas, which was 32 miles southeast of the accident site reported: wind variable at 4 knots, visibility 10 miles, few clouds at 9,000 feet, broken cloud layer at 30,000 feet, temperature 29 degrees Celsius (C), dew point minus 4 degrees C, and the barometric pressure was 29.94 inches of mercury.

Airport Information

Airport:	Littlefield Municipal Airport KLIU	**Runway Surface Type:**	
Airport Elevation:	3616 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	33.923889,-102.386665(est)

The glider impacted terrain on the northeast side of airport. The main wreckage was located on flat terrain and situated on a southwesterly heading and was inverted. The wooden components were mostly shattered and the metal tubular components were bent and damaged. The empennage was twisted towards the cockpit and facing a southwesterly heading.

Portions of the right wing were located east and southeast of the main wreckage. The outboard section of the right wing separated near the inboard attachment point of the aileron. The separated wing section was about 15 feet in length and remained mostly intact. The spar was fractured and splintered where it separated from the inboard section of the wing. The metal aileron controls were fractured in overload and bent downward toward the underside of the wing. The control tube tore through the wing fabric laterally from the connection point to the inboard most point.

Medical and Pathological Information

An autopsy was performed on the pilot on April 1, 2013, by South Plains Forensic Pathology, P.A., Lubbock, Texas. The cause of death was determined to be blunt force injuries.

A toxicology report for the pilot was prepared by NMS Labs. The results of toxicology testing of specimens from the pilot revealed the following:

>> 23 (mg/dL, mg/hg) ETHANOL detected in muscle.
>> CAFFINE detected in muscle.

According to Federal Aviation Administration (FAA) Civil Aerospace Medical Institute, the presence of Ethanol is consistent with postmortem putrefaction.

No Tested-for-Drugs were detected in the liver.

Tests and Research

The outboard section of the right wing was sent to the National Transportation Safety Board (NTSB) Materials Laboratory in Washington, D.C., for further examination. The examination revealed the wood wing section was fractured and splintered in multiple places. Cracks were observed on many of the adhesive joints. The condition of the adhesives was degraded and poor.

The upper and lower spar caps were constructed of three and two layers of wood respectively. Both were covered in a urea formaldehyde adhesive and were constructed using scarf joints. The fracture of the scarf joint in the upper layer of the lower spar cap was relatively flat with adhesive on the tapered surface. The fracture appeared to be mainly cohesive with varying amounts of adhesive remaining on the surface and no evidence of wood or smooth adhesive interface from the mating side of the fracture. The scarf joint fractures in both spar caps were similar. Overall, the fracture features were consistent with fracture under combined tension and torsion.

The adhesive holding the ribs was brittle, and pieces continued to separate from the structure as the components were handled during the examination. Markings on the ribs noted a date of 1959.

Pieces of the spar, ribs, and skin were disassembled by hand with varying amounts of effort.

All of the wood material appeared mostly dry with no staining from moisture on most of the structure. However, mold growth and stains from moisture were observed at the leading edge of the wing on the interior of the leading edge skin and adjacent structure.

Additional Information

BGA Mandatory Aircraft Inspection 042/07/2004, Issue 3

As a result of a Ka7 glider wing failure in England in 2004, the United Kingdom Air Accidents Investigation Branch (AAIB) conducted an investigation and the British Gliding Association (BGA) issued a mandatory wing inspection for the Ka7, effective March 31, 2006, which was to be completed in five year intervals. This document defined the reason for inspection to be:

After an in-flight wing failure inspections were carried out on all BGA registered Schleicher wooden

gliders. [Urea formaldehyde] adhesive had been used on all these gliders and had sometimes suffered from failure, apparently due to a combination of age and damp conditions. Glued joint deterioration has been found in sufficient numbers of these gliders to warrant an ongoing inspection program.

There were no records of the wing inspection being completed on the accident glider.

The FAA did not issue an Airworthiness Directive related to this issue.

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	William Fitzgerald; Federal Aviation Administration; Lubbock, TX Martin Heide; Alexander Schleicher Frank Stahlkopf; German Federal Bureau of Aircraft Accidents Invest; Braunschweig
Original Publish Date:	March 24, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=86549