Aviation Investigation Final Report

Location:	Oshkosh, Wisconsin	**Incident Number:**	CEN12IA498
Date & Time:	July 26, 2012, 16:30 Local	**Registration:**	N60GK
Aircraft:	AMERICAN CHAMPION AIRCRAFT 8KCAB	**Aircraft Damage:**	None
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Air race/show		

Analysis

The pilot was performing at an air show and entered the aerobatic box with a 45 degree descending roll. At an airspeed of 150 mph, the pilot pulled up into a loop and then initiated a “snap-on-top-of-a-loop” maneuver. The pilot’s seat then broke, and the pilot and seatback fell backward onto the rear seat and rear control column, temporarily jamming the flight controls. The pilot was then able to recover the airplane to a “right-side-up” position with wings level. He flew away from the crowd to assess the situation and subsequently landed without further incident.

An examination revealed that the airplane’s seat bottom frame was not equipped with a required reinforcement truss stiffener. The manufacturer reviewed its production work orders and discovered that a batch of 10 seats were produced that were not constructed with the truss stiffener and, therefore, did not conform with the airplane’s production type certificate. As a result of this investigation, the manufacturer added steps to the seat production and inspection procedures to ensure proper seat assembly. Additionally, the manufacturer added to the seat welding fixture a locator (a visual cue) for the truss stiffener parts. Further, Service Letter 437 was published indicating that owners should perform a one-time inspection to ensure that the seat bottom frame contains the required reinforcement truss stiffener.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: The failure of the pilot’s seat bottom frame due to the manufacturer’s improper production,

installation, and inspection of that seat bottom, which resulted in a temporary loss of control during an air show performance.

Findings

Aircraft	Flight compartment equipment - Failure
Organizational issues	(general) - Manufacturer

Factual Information

History of Flight

Prior to flight	Miscellaneous/other
Maneuvering-aerobatics	Sys/Comp malf/fail (non-power) (Defining event)

On July 26, 2012, about 1630 central daylight time, an American Champion Aircraft model 8KCAB airplane, N60GK, had its seat tubing separate during an air show maneuver over the Wittman Regional Airport (OSH), near Oshkosh, Wisconsin. The airline transport pilot, who was the sole occupant, was uninjured and the airplane sustained no damage. The airplane's registration to the pilot was pending and the airplane was operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as an air show flight. Visual flight rules (VFR) conditions prevailed for the flight, which was not operated on a VFR flight plan. The local flight originated from OSH about 1625.

According to the pilot's incident report, he stated that he was cleared in to the air show box. He performed a roll on takeoff followed by a half Cuban eight, four point roll, hammerhead, and a one and a half roll to an inverted turn-out/climb away from the crowd. The pilot climbed the airplane to 1,300 feet above ground level and entered the aerobatic box from the south with a 45 degree descending roll. At 150 mph he pulled into a 4g loop and initiated a snap-on-top-a-loop at the 60 degree inverted climb point in the loop. At that time the seat broke, which "immediately" laid the pilot back onto the rear seat and rear control stick. The rear controls were temporarily jammed by the pilot and the broken seat back. The airplane recovered by itself after one and a half rolls to the "right-side-up" position with wings level. The pilot, in part, stated:

> I established level flight away from the crowd to assess the situation. Once I was confident I had good control I asked the air boss for landing clearance and landed on [runway] 36L without incident.

Federal Aviation Administration (FAA) inspectors examined the incident airplane and found the seat bottom frame had separated. Additionally, the seat bottom frame, serial number A02443, was not equipped with a reinforcement truss.

The manufacturer reported that the incident adjustable seat assembly part number was 7-1499, revision K. The bottom and back adjustable seat sub-assembly frame part number was 7-1513, revision D. The seat bottom sub-assembly was missing its reinforcement truss, which was a welded stiffener with part number 2-2166, revision C. The manufacturer reviewed production work orders and discovered that a batch of 10 seats were produced that were not constructed with the stiffener and were non-conforming in reference to the production type certificate. The non-conforming batch of seats were marked with serial numbers A02437

through A02446.

The manufacturer identified affected stock seats and identified which other airplanes were affected by the installation of non-conforming seats. The manufacturer made arrangements for the return of all installed non-conforming seats. According to the manufacturer, the nine remaining seats will be 'reworked' by welding on the reinforcement truss stiffener that was missing. With the stiffener in place, the seat bottom frame conforms to the type certificate design.

The manufacturer further indicated that steps were added to the paperwork for seat production as an effort to make sure the assemblers pull all the parts when they are making a batch of seat assemblies. Inspection has the same type of step added to their paperwork. Another change in manufacturing was that the seat welding fixture now has a locater for the reinforcement truss stiffener parts, which is a visual cue in addition to the paperwork. The manufacturer believes that this visual cue will reduce complacency in reference to memorized paperwork associated with an assembler's repetitive assembly operations.

Service Letter 437 was published indicating that owners should have a one-time inspection of the folding front seat bottom be conducted to ensure that the seat bottom frame contains the required 2-2166 reinforcement truss.

In follow-up communications with a manufacturer's representative in March 2013, he reported that the nine remaining seats were reworked and conformed with the type certificate. Additionally, by that time, the improved assembly and inspection paperwork and welding fixture locators had also been implemented.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	58,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	April 1, 2012
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 21, 2011
Flight Time:	23000 hours (Total, all aircraft), 5000 hours (Total, this make and model), 22700 hours (Pilot In Command, all aircraft), 120 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AMERICAN CHAMPION AIRCRAFT	**Registration:**	N60GK
Model/Series:	8KCAB	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1115-2012
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	1950 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	11.2 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C126 installed, not activated	**Engine Model/Series:**	AEIO-360-H1B
Registered Owner:	Pilot	**Rated Power:**	180 Horsepower
Operator:	Pilot	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	OSH,808 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	60°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.68 inches Hg	**Temperature/Dew Point:**	27°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Oshkosh, WI (OSH)	**Type of Flight Plan Filed:**	None
Destination:	Oshkosh, WI (OSH)	**Type of Clearance:**	VFR
Departure Time:	16:25 Local	**Type of Airspace:**	

Airport Information

Airport:	Wittman Regional Airport OSH	**Runway Surface Type:**	
Airport Elevation:	808 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Full stop

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	None
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	43.984443,-88.556945(est)

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Tim H Anderson; Federal Aviation Administration; Milwaukee, WI Jerry Mehlhaff Jr; American Champion Aircraft; Rochester, WI
Original Publish Date:	May 9, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84523