

		NTSB ID: CHI95FA191		Aircraft Registration Number: N109AC	
		Occurrence Date: 06/20/1995		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place FRANKFORT		State IL	Zip Code 60423	Local Time 1927	Time Zone CDT
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Champion		Model/Series 8KCAB		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:					
<p>HISTORY OF FLIGHT</p> <p>On June 20, 1995, at 1927 central daylight time (cdt), an American Champion 8KCAB, N109AC, registered to the Alpha Charley Flying Club, Incorporated, of Olympia Fields, Illinois, and piloted by a private pilot, was destroyed during a collision with the ground following an in-flight structural failure. Visual meteorological conditions prevailed at the time of the accident. The aerobatic 14 CFR Part 91 training flight was not operating on a flight plan. The pilot/part owner of the airplane received serious injuries. The second occupant, also a private pilot, was fatally injured. The flight departed New Lenox, Illinois, at 1912 cdt.</p> <p>The pilot/owner (pilot) of the airplane said he was teaching the second pilot how to do aileron rolls. According to the pilot the second pilot had allowed the airplane to pitch down during the inverted position of the roll maneuver. The pilot said he had the second pilot place the airplane into an inverted flight attitude. He said he did this so the second pilot could "...feel how much forward pressure [is required] to keep the plane level in inverted flight... ." The pilot said the airplane's speed at this time was about 140 miles per hour (MPH) and it was about 2,900 feet above the ground.</p> <p>After a short time of inverted flight the pilot told the second pilot to roll the airplane into an upright position. The pilot said the second pilot "...pulled back on [the] stick." The pilot said he "...chopped [the] power..." after the airplane was descending vertically toward the ground. At this point in the flight the pilot said he placed his hands on the control stick to begin recovery. He said the airspeed sounded "...very fast..." as the airplane descended. Shortly after taking control of the airplane the pilot said he heard a "...loud noise (boom) then [an] air noise. I watched the right wing depart [the] aircraft, also watched [the] door depart at same time."</p> <p>During an interview the pilot said that the second pilot had pulled the stick back hard and caused what he felt was a grey-out condition for him. He said he had the second pilot flying inverted with full power and a high RPM propeller setting. The pilot said the airspeed indicator needle was pointing at the junction of the yellow and green arc when he told the second pilot to roll out of inverted flight. He said the airplane was too fast when the split-S maneuver was entered by the second pilot. The pilot estimated the entry G-load to be 5 or 6 G's. He said the fuselage's right front corner broke away at the door's corner post.</p> <p>The pilot said he knew N109AC was close to, or beyond the airplane's never exceed speed as the airplane started its descent. The IIC asked the pilot how he knew this. He said he had flown the airplane at speeds above the never exceed speed several times in the past. When asked why he replied that he wanted to hear what it was like. Witness statements were taken by the Will County Illinois, Sheriff's Department. All four witnesses stated they heard N109AC's engine accelerate and looked up to see the airplane breaking apart. According to the Sheriff's Department report,</p>					
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Narrative (Continued)

the pilot said he only knew the second pilot by his first name. He said that they were both flying the airplane during the accident flight.

PERSONNEL INFORMATION

According to the pilot's logbook he had not flown N109AC, or any other American Champion 8KCAB, since January 4, 1995. His logbook showed 14.5 hours of flight time in N109AC between January 2 and 4, 1995. April and May 1995, entries showed 20.4 hours of flight time in a Pitts S2B. His logbook showed he had flown a Pitts S2B during June 1995, for 20.4 hours. The monthly entry stated: "Advance sequence (fair)." The accident date flight of .5 hour was in his logbook.

The pilot's logbook showed he obtained his private pilot certificate on March 31, 1988, after flying 70.7 hours. According to his logbook, the pilot began aerobatic flying on June 30, 1988. His logbook showed a total aerobatic dual instruction of 25.5 hours. His logbook showed a total time in the American Champion 8KCAB was 257.8 hours on the accident date.

The second pilot on N109AC received his private pilot certificate on May 21, 1991, after accumulating 54.9 hours of flight time. The pilot's 14 CFR Part 61.56 biennial flight review had been completed on February 18, 1994. His logbook showed 26.6 hours of single-engine tailwheel airplane experience. None of the pilot's experience had been in the American Champion 8KCAB. He had received 3.1 hours' dual instruction in a Champion 7KCAB about eight months before the accident. No instructional aerobatic flights were found in his logbook.

AIRCRAFT INFORMATION

N109AC's total airframe time, as of May 12, 1995, was 899.5 hours according to its airframe logbook. The airplane's airframe logbook showed its last annual inspection was on April 1, 1995. At that time, N109AC had 872.6 hours.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in Sections 13W-30S and 14W-31S of Green Garden Township of Will County, Illinois. The general wreckage trail was oriented on an East-West line about 1/4 mile east of Center Road and 3/4 mile north of Manhattan-Monee Road. A diagram appended to this report illustrates the location of N109AC's wreckage.

Elevator and rudder flight control continuity was established. The empennage's flying wires were intact but tension could not be checked due to crash and fire damage. The trim tab control handle, bellcrank and cables were attached to the elevator trim tab control horns. Examination of the separated aileron control cables revealed broomed ends that were necked.

The engine's right side and nose were buried in the ground. It was attached to the airframe and had sustained fire damage. Mechanical continuity within the engine was established. Ground collision damage prevented the engine's crankshaft from being rotated beyond a 20 degree arc.

The propeller had separated from the engine and was buried in the ground directly in front of the engine. It had separated from the engine about 4 inches aft of the crankshaft flange. One blade of the propeller was torsionally twisted. The second blade was bent aft about 80 degrees at midspan. Both blades had chordwise scratching on the face and front surfaces.

The right wing had separated from N109AC's fuselage. It was the first item on the wreckage trail. The wing's front and rear strut assembly had separated at the jury strut junction. The wing strut was still attached to the wing from the jury strut outboard. The wing's top, inboard surface, had black skid marks on part of the white colored three star pattern. The right main landing gear tire had white colored scuff marks on its tread area.

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The leading edge of the right wing's strut attach fitting was buckled outward between its spar attach point and the wing's tie down ring. The rear jury strut spar fitting had separated from the spar. Rivets holding that fitting to the spar were still in the spar assembly. The front wing strut's fuselage attach fitting had separated at the strut's fuselage end. The fitting end appeared necked with its separated end surface having a granular surface appearance.

The left wing's outboard half was observed rotated 90 degrees aft, leading edge up, to the inboard half. The junction between the outboard and inboard sections was mangled and twisted in many directions. The wing's inboard section, from the wing root outward to the midspan point was crushed aft and twisted in various directions.

The left wing strut assembly had separated from the wing and fuselage at all three attachment points. Sections of the strut's spar mounting fitting were attached to each strut assembly. The forward strut had an approximate 60 degree upward bend about 3 feet from the fuselage attachment end. The aft strut had three upward bends along its span. One bend was about 30 degrees at the jury strut location. The second bend was about 3 feet inboard of the jury strut location and was about 10 degrees up. The third bend was located about 3 feet outboard of the fuselage mount. This was about a five degree bend. The fuselage attach fittings fracture had a similar appearance to the right wing strut's attach fitting. Both jury struts were attached to this assembly.

Fracture surfaces on the fuselage's front and rear wing spar carry through structures had shear lips with their ends necked.

The separated right side fuselage frame tubing ends had a necked appearance. Shear lips were found around the circumference of the tubing ends. Illustrations of the component's location and relationship to the airframe are appended to this report.

MEDICAL AND PATHOLOGICAL INFORMATION

The autopsy on the second pilot was conducted by Dr. Shaku S. Teas, of River Forest, Illinois, on June 21, 1995. The pilot's toxicological examination was conducted by the FAA's Civil Aeromedical Institute and showed no drugs or alcohol in the specimens.

The pilot reported severe laceration of the nose and multiple cuts and bruises on his face and upper body.

TESTS AND RESEARCH

Examination of the airframe components having fracture surfaces was conducted by the NSTB's Metallurgical Laboratory in Washington, D.C. According to the metallurgist's factual report, all fracture surfaces, except for one, were typical of overstress separations. The left wing's forward wing strut to spar attach fitting's aft leg had "...a distinctive fatigue striation pattern... ." The origin area of this fracture was located along one of a series of small, sharp scratches in the forward edge of the shorter portion of the fitting leg.

Examination of the left wing strut's forward fitting was conducted. It, "...revealed the presence of fatigue striations on the shorter portion of the [forward] leg (at the leg's bottom). The fatigue striation pattern emanated from a position at or near the aft edge of the shorter portion... ." The report said that fatigue cracking from the origination point had propagated through about 25 percent of the leg's cross section. The metallurgist's report is appended to this document.

ADDITIONAL DATA/INFORMATION

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The pilot was asked to clarify what he experienced during the in-flight breakup sequence. He said there was a loud explosive sound in front of him. He said the sound came from the fuselage's right front corner near the middle of the door. He said the right wing broke away from the fuselage and that the wing's strut remained with the wing as it moved aft.

The 8KCAB's owner's manual showed the airplane has a never exceed speed is 180 miles per hour. A representative from the manufacturer said the airplane's design diving speed was 222 miles per hour. According to the owner's manual, the airspeed at the junction of the green and yellow arc on the airspeed indicator's face is 160 MPH.

The airplane manufacturer created a performance chart related to a split-S type maneuver. The manufacturer used the pilot's stated entry speed of 160 miles per hour for their calculations. The entry G-load of 5 G's was used as the lowest airframe load during the maneuver entry. According to the manufacturer's chart, the airplane's speed would range between 202 and 252 miles per hour. The chart is appended to this report.

The pilot of N109AC was not an FAA certified flight instructor. He said he had given the second pilot aerobatic dual instruction on two previous occasions. The section in the airplane's owner manual entitled "AEROBATICS IN YOUR DECATHLON" states: "Never attempt any aerobatic maneuver without first receiving dual instruction from a qualified flight instructor."

A representative from the manufacturer defines a qualified instructor as a person possessing a current FAA flight instructor certificate who knows the airplane's characteristics and maneuvers being taught. He said the instructor should be one who has competed in International Aerobatic Club (IAC) competition at the minimum of an intermediate level. The manufacturer said it would be preferable to have an instructor who has competed in IAC advanced aerobatics competition.

The wreckage was released to Mr. D.E. McConnell, President of the Alpha Charlie Flying Club, Incorporated, on June 21, 1995.

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Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used 0	Runway Length	Runway Width
Runway Surface Type:					
Runway Surface Condition:					
Type Instrument Approach:					
VFR Approach/Landing:					
Aircraft Information					
Aircraft Manufacturer Champion		Model/Series 8KCAB		Serial Number 652-91	
Airworthiness Certificate(s): Acrobatic; Utility					
Landing Gear Type: Tailwheel					
Homebuilt Aircraft? No	Number of Seats: 2	Certified Max Gross Wt. 1800 LBS	Number of Engines: 1		
Engine Type: Reciprocating	Engine Manufacturer: LYCOMING	Model/Series: AEIO-360-H1A	Rated Power: 180 HP		
- Aircraft Inspection Information					
Type of Last Inspection Annual	Date of Last Inspection 04/1995	Time Since Last Inspection Hours	Airframe Total Time Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? Yes	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner ALPHA CHARLEY FLYING CLUB, INC		Street Address 3415 PARTHENON WAY			
		City OLYMPIA FIELDS	State IL	Zip Code 60461	
Operator of Aircraft Same as Reg'd Aircraft Owner		Street Address Same as Reg'd Aircraft Owner			
		City	State	Zip Code	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Instructional					
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First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 35
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Sex: U	Seat Occupied: Right	Principal Profession: Business	Certificate Number: On File
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Certificate(s): Private

Airplane Rating(s): Single-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): None

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? No	Current Biennial Flight Review?
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Medical Cert.: Class 3	Medical Cert. Status: Valid Medical--w/ waivers/lim.	Date of Last Medical Exam: 03/1995
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	623	225	618	5	10					
Pilot In Command(PIC)										
Instructor										
Last 90 Days	60									
Last 30 Days	20									
Last 24 Hours	2									

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? No	Second Pilot? Yes
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Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point Same as Accident/Incident Location	State	Airport Identifier	Departure Time 0000	Time Zone
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Destination Local Flight	State	Airport Identifier	
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Type of Clearance: None

Type of Airspace: Class G

Weather Information

Source of Briefing:
No record of briefing

Method of Briefing:

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
MDW	1947	CDT	619 Ft. MSL	20 NM	20 Deg. Mag.
Sky/Lowest Cloud Condition: Clear			0 Ft. AGL	Condition of Light: Day	
Lowest Ceiling: None			0 Ft. AGL	Visibility: 7 SM	Altimeter: 29.00 "Hg
Temperature: 32 °C	Dew Point: 19 °C	Wind Direction: 50		Density Altitude: Ft.	
Wind Speed: 7	Gusts:	Weather Conditions at Accident Site: Visual Conditions			
Visibility (RVR): 0 Ft.	Visibility (RVV) 0 SM	Intensity of Precipitation: Unknown			
Restrictions to Visibility: None					
Type of Precipitation: None					

Accident Information

Aircraft Damage: Destroyed	Aircraft Fire: Ground	Aircraft Explosion: None
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Classification: U.S. Registered/U.S. Soil

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot		1			1
Second Pilot	1				1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -	1	1			2
Other Ground	0	0	0		0
- GRAND TOTAL -	1	1	0		2

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Administrative Information

Investigator-In-Charge (IIC)

FRANK S. GATTOLIN

Additional Persons Participating in This Accident/Incident Investigation:

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