Aviation Investigation Final Report

Location:	Roseville, California	**Accident Number:**	LAX06LA110
Date & Time:	February 12, 2006, 11:30 Local	**Registration:**	N540FT
Aircraft:	Carpenter BJ/Carpenter SA Glasair II-S FT	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The aircraft was performing low level aerobatics over a residential area when it stalled and crashed into a single family residence. The accident site was located 2 blocks from the passenger's residence. A family member of the passenger stated that they heard the airplane pass overhead, but when they got outside the airplane had disappeared. They heard it approaching again but it crashed before it arrived over the house. Two pilots who were located at the departure airport spoke with the aircraft occupants shortly before the aircraft departed on the accident flight. The witnesses said the passenger told them that he and the other pilot were "going to show you guys what flying is about." Several of the witnesses were on a nearby golf course and other witnesses were in the residential area surrounding the accident site. All of the witnesses said the airplane was performing aerobatics at altitudes they described as between 200 and 800 feet above the ground. Several of the witnesses described specific maneuvers. They reported that on the first pass the airplane was traveling at high speed and it entered a series of "barrel rolls" before pulling up into a climb and banking steeply to reverse course. On the last pass, the airplane completed the roll series, then it pulled up and began climbing and banking. The witnesses said the airplane then stalled and entered a "nose dive" while it was "spinning or spiraling" until it crashed into the house. Examination of the wreckage found no evidence of a preimpact mechanical malfunction or failure.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain an adequate airspeed while performing low level aerobatics that led to a stall/spin.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING

Findings
1. AEROBATICS - INTENTIONAL - PILOT IN COMMAND
2. ALTITUDE - LOW - PILOT IN COMMAND
3. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
4. (C) STALL/SPIN - ENCOUNTERED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. OBJECT - RESIDENCE

Factual Information

HISTORY OF FLIGHT

On February 12, 2006, about 1130 Pacific standard time, an experimental Carpenter BJ/Carpenter SA Glasair II-S FT, N540FT, impacted a house while performing low level aerobatic maneuvers in Roseville, California. The private pilot/owner operated the airplane under the provisions of 14 CFR Part 91. The airplane was destroyed in the collision sequence and post impact fire. The pilot, a passenger, and one person inside the house were fatally injured. There were no other ground injuries. Visual meteorological conditions prevailed for the local area flight that departed Lincoln Regional Airport/Karl Harder Field (LHM), Lincoln, California, about 1115. A flight plan had not been filed.

The accident site was located two blocks from the passenger's residence. A family member of the passenger stated that they heard the airplane pass overhead, but when they got outside the airplane had disappeared. They heard it approaching again but it crashed before it arrived over the house.

Two pilots who were located at the Lincoln airport spoke with the aircraft occupants shortly before the aircraft departed on the accident flight. The witnesses said the passenger told them that he and the other pilot were "going to show you guys what flying is about."

Multiple witnesses were identified who observed portions of the aircraft's track and the maneuvers preceding the accident. Several of the witnesses were on a nearby golf course and others were in the residential area surrounding the accident site. All of the witnesses said the airplane was performing aerobatics at altitudes they described as between 200 and 800 feet above the ground.

Several of the witnesses described specific maneuvers. They reported that on the first pass the airplane was traveling at high speed and it entered a series of "barrel rolls" before pulling up into a climb and banking steeply to reverse course. On the last pass, the airplane completed the roll series, then it pulled up and began climbing. The witnesses said the airplane then stalled and entered a "nose dive" while it was "spinning or spiraling" until it crashed into the house.

Recorded radar data was obtained from the Federal Aviation Administration (FAA) and the aircraft's track was identified at the accident site location and event time. Examination of the data disclosed that the airplane approached the accident area from the northwest and then flew multiple passes in a northeast to southwest direction, with course reversals. Mode C altitude reports associated with the targets showed that the airplane approached the area between 1,900 and 2,000 feet mean sea level (msl), then descended to below 1,000 feet for the

northeast to southwest passes.

An FAA inspector responded to the site. He reported that the airplane was destroyed in the post impact fire. He also indicated that there were no obvious mechanical malfunctions noted with the engine, and that the propeller blades showed evidence of chordwise scratching and S-bending.

PERSONNEL INFORMATION

Both occupants of the aircraft held pilot certificates. According to the Placer County Coroner, the aircraft owner was positively identified as being in the left front seat and the pilot rated passenger was located in the right front seat.

According to FAA Airman Certification Records, the aircraft owner held a private pilot certificate with an airplane single engine land rating that was last issued on November 26, 2000. A third-class medical certificate was issued to the pilot on November 2, 2004, without limitations. The pilot's logbook was recovered and it recorded a total time of 287 hours, with 27 in the accident aircraft. In the last 90 days preceding the accident the logbook recorded 27 total hours, all in the accident aircraft.

The pilot rated passenger held a private pilot certificate with an airplane single engine land and instrument ratings that was last issued on October 4, 1990. The last third-class medical certificate of record was issued to the pilot on July 30, 1999, without limitations. No pilot records were recovered for the passenger.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted on the pilot by the Placer County Coroner's office, with specimens retained for toxicological analysis. The toxicological analysis was completed by the FAA Civil Aeromedical Institute with negative results for ethanol, carbon monoxide, cyanide, and all screened drug substances.

TESTS AND RESEARCH

Inspectors from the FAA Sacramento Flight Standards District Office responded to, and documented, the mishap site. The aircraft was subsequently removed from the site and transported to the facilities of Plain Parts, Sacramento, California, where a detailed examination was conducted March 15, 2006.

The aircraft was extensively fragmented and thermally destroyed by impact energy and the ensuing post impact ground fire. All of the engine's accessories were destroyed by thermal effects and could not be tested.

According to the attached Lycoming engine data plate, the power plant is a six cylinder, air

cooled, direct drive, horizontally opposed, normally aspirated (carburetor), internal combustion engine rated at 260 hp at 2,700 rpm.

An aftermarket fuel injection system and electronic ignition system had been installed onto the engine at the time of the last field overhaul.

The engine had sustained severe thermal effect damage resulting from the post impact ground fire. Visual examination of the engine revealed no evidence of preimpact catastrophic mechanical malfunction or fire. Mechanical continuity was established during the disassembly of the engine. The cylinders' combustion chamber and barrels remained mechanically undamaged, and there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged. There was no evidence of valve to piston face contact observed. The pistons were intact. The ring assemblies at each piston were intact and free to rotate within their respective ring land. The gas path and combustion signatures observed at the spark plugs, combustion chambers, and exhaust system components displayed varying degrees of coloration consistent with the exposure to the effects of the post impact ground fire and subsequent suppression (water) operation. There was no oil residue observed in the exhaust system gas path. Mechanical continuity of the rotating group and internal mechanisms were established visually during the disassembly and examination of the engine. The accessory gears including the crankshaft gear, bolt, and dowel were intact and remained undamaged by any preimpact malfunction. There was no evidence of lubrication depravation or contamination found. The crankshaft and attached connecting rods remained free of heat distress. There were no signatures or conditions observed consistent with any premishap catastrophic mechanical malfunction. The camshaft was intact and each of the cam lobes appeared normal in their shape.

The left magneto remained secure at the mounting pad. The magneto had been subjected to thermal effects as a result of the post impact ground fire. The magneto sustained varying degrees of damage that rendered the unit inoperative and not functionally testable. Magneto to engine timing could not be ascertained.

The right magneto had been previously removed and a block-off plate had been installed on the mounting pad. An electronic ignition system by Electroair had been installed, which utilizes a trigger sensor behind the crankshaft flange. The thermal effects of the post impact ground fire destroyed the electronic ignition system.

Two pieces of unidentified material were recovered from the oil suction screen. The screen was otherwise unobstructed. The oil filter was cut open to expose the filter media, which was free of visible contaminates.

The vacuum pump was displaced from the engine at the mounting pad. The fracture surface signatures were consistent with overload. The vacuum pump was destroyed by fire and not available for examination.

The ignition harness had been subjected to post mishap ground fire and had sustained thermal damage. The harness appeared to have been attached at each spark plug lead. The fire damaged spark plugs, that were a mixture of automotive and aviation plugs, of were secure at each position. The spark plugs were removed, examined, and photographed. The spark plug electrodes remained mechanically undamaged, and displayed varying coloration consistent with being exposed to the effects of the post impact ground fire.

The spark plugs found in each cylinder were:

#1 Top = Autolite 386 automotive #1 Bottom = Champion REM-40E
#2 Top = Champion REM-40E #2 Bottom = Autolite 386 automotive
#3 Top = Autolite 386 automotive #3 Bottom = Champion REM-40E
#4 Top = Champion REM-40E #4 Bottom = Autolite 386 automotive
#5 Top = Autolite 386 automotive #5 Bottom = Champion REM-40E
#6 Top = Champion REM-40E #6 Bottom = Autolite 386 automotive

Fuel System
An aftermarket fuel injection system by Airflow Performance had been installed.

The fuel injection servo was displaced from the engine and the portion that remained attached at the mounting pad was secure. The fracture surface signatures were consistent with overload. The thermal effects of the post impact ground fire consumed the fuel injection servo and induction system. There was no data plate found.

The fuel flow divider was consumed by the post impact ground fire. All that remained were the steel components and fuel injection fuel lines. The fuel injection nozzles remained secure at each cylinder with the fuel line attached. The nozzles had been subjected to the thermal effects of the post impact ground fire, thus sustaining varying degrees of damage. The fuel pump was partially consumed and destroyed resulting from the thermal effects of the post impact ground fire. The fuel pump mounting flange remained attached at the mounting pad. The two mounting bolts remained in place and properly safety wired.

The two bladed constant speed propeller remained attached at the crankshaft flange. The propeller had been subjected to the thermal effects of the post impact ground fire. The spinner was consumed. One of the propeller blades had been consumed by the fire leaving approximately 14 inches of blade attached to the hub. The opposing blade remained intact and exhibited an 80-degree aft bend about midspan. The propeller governor was securely attached at the mounting pad with the pitch control rod securely attached at the control wheel. The governor was removed for examination. The drive was intact and free to hand rotate. The gasket screen was free of visible contamination.

Pilot Information

Certificate:	Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3	**Last FAA Medical Exam:**	November 1, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	287 hours (Total, all aircraft), 27 hours (Total, this make and model), 27 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Private	**Age:**	43,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3	**Last FAA Medical Exam:**	July 1, 1999
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Carpenter BJ/Carpenter SA	**Registration:**	N540FT
Model/Series:	Glasair II-S FT	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	2107
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-540-E4B5
Registered Owner:	Patrick A. O'Brien	**Rated Power:**	260 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MYV,62 ft msl	**Distance from Accident Site:**	
Observation Time:	10:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.36 inches Hg	**Temperature/Dew Point:**	16°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lincoln, CA (LHM)	**Type of Flight Plan Filed:**	None
Destination:	(LHM)	**Type of Clearance:**	None
Departure Time:	11:15 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	1 Fatal	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	38.769721,-121.325553

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Jim Hinson; Federal Aviation Administration; Sacramento, CA Mark Platt; Textron Lycoming; Williamsport, PA
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Last Revision Date:	
Investigation Class:	Class
Note:	
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