National Transportation Safety Board
Aviation Accident Final Report

Location:	Linwood, KS	**Accident Number:**	DEN08FA114
Date & Time:	06/24/2008, 1020 CDT	**Registration:**	N411JT
Aircraft:	AERO COMMANDER 500S	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (total)	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

The airline's chief pilot was giving a newly-hired pilot a required competency/proficiency check. Memory data from the airplane's global positioning system showed the airplane made steep 360-degree turns to the left and right before continuing towards a practice area at gradually decreasing airspeed and altitude. A low cloud ceiling prevailed. Witnesses said they heard both engines "sputter, then quit," and saw the airplane clear a grove of trees, stall, and strike the ground. The landing gear was down and the flaps were in the approach setting. Both propellers were in the low pitch/high rpm setting, and bore little rotational signatures. Both engine fuel supply lines contained only residual fuel. Those familiar with the chief pilot's flying practices stated that he always followed a certain routine when giving a check ride. The routine consisted of the following: After performing steep 360-degree turns, he would ask the trainee to configure the airplane for landing and demonstrate minimum control maneuvers. Prior to executing steep turns, he would turn the boost pumps on. At the completion of the maneuver, the pumps would be turned off. The investigation revealed that there are unguarded fuel shutoff switches next to the boost pumps, and the circumstances of the accident are consistent with the these fuel shutoff switches being inadvertently placed in the off position, instead of the fuel boost pumps.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot-in-training inadvertently shutting off both engine fuel control valves causing a loss of power in both engines, and the pilot's failure to maintain control of the airplane resulting in a stall. Contributing to the accident was the chief pilot's inadequate supervision of the pilot-in-training.

Findings

Aircraft	Fuel controlling system - Unintentional use/operation (Cause)
Personnel issues	Incorrect action selection - Pilot (Cause) Delayed action - Instructor/check pilot (Factor) Aircraft control - Pilot (Cause)

Factual Information

HISTORY OF FLIGHT

On June 24, 2008, at 1020 central daylight time, an Aero Commander 500S, N411JT, registered to Central Airlines and operated by Central Air Southwest, Kansas City, Missouri, was destroyed when the it impacted terrain following a loss of power on both engines while maneuvering near Linwood, Kansas. Visual meteorological conditions prevailed at the time of the accident. The training flight was being conducted under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91 without a flight plan. The two commercial pilots on board the airplane, the company's chief pilot/director of operations and a pilot receiving a flight check, were fatally injured. The local flight originated at 0927 from Charles B. Wheeler Downtown Airport (MKC), Kansas City, Missouri.

The Kansas Highway Patrol and the Leavenworth County Sheriff's Office interviewed all known witnesses and collected their written statements. One witness saw "an eastbound twin engine high-wing [air]plane at low altitude that was extremely loud and flying very slowly" and "appeared to be flying level." The airplane "seemed to be throttled up, but was moving very slowly."

Three surveyors were working at Cantrell Road (County Road 1) at its intersection with 222nd Street. One of the surveyors was sitting in his truck and heard an airplane overhead. He wrote: "Engine was not running smoothly. Heard sputtering loudly, then silence...plane hit ground, what appeared to be nose first, and rest of plane crumbled to the ground until only the tail was visible in the field." He called 9-1-1. Emergency services and his cellular telephone recorded the call at 1022. Later interviewed at the accident site, the witness estimated three to four seconds elapsed from the time he heard the engines sputter to the time the airplane hit the ground.

The second surveyor saw the airplane "coming over the trees from the west. The plane's motor started cutting out and dying. While the plane was heading northeast, [it] was decreasing elevation and speed."

PERSONNEL (CREW) INFORMATION

The pilot-in-command, age 47, was employed by Central Airlines on March 20, 1987, was promoted to chief pilot on November 1, 1987, and became the director of operations on March 1, 1988. He held a commercial pilot certificate with airplane single/multiengine and instrument ratings. He also held a flight instructor certificate with airplane single/multiengine and instrument ratings. His first class airman medical certificate, dated May 1, 2008, contained the restriction, "Must wear corrective lenses for distant vision." According to Central Airlines, he had accumulated 10,500 total flight hours, of which 9,400 hours were in multiengine airplanes and 7,550 hours were in the Aero Commander. He had also logged 3,000 hours as a flight instructor, all of which were in multiengine airplanes, and 2,800 hours were in the Aero Commander. His last proficiency check was accomplished on February 13, 2008, in the Aero Commander 500S, and his last 24-month check airman observation was August 15, 2007.

The pilot-in-training, age 24, had been employed by the company for approximately two weeks.

He was in the process of receiving his FAA Part 135 standardization ride when the accident occurred. He held a commercial pilot certificate with airplane single/multiengine and instrument ratings. He also held a flight instructor certificate with airplane single and multiengine ratings. His first class airman medical certificate, dated January 16, 2008, contained the restriction, "Must wear corrective lenses." According to Central Airlines, he had accumulated 1,200 total flight hours, of which 224 hours were in multiengine airplanes and 7 hours were in the Aero Commander. He had also logged 711 hours as a flight instructor.

AIRCRAFT INFORMATION

N411JT (s.n. 3097), a model 500S, was manufactured by the Aero Commander Corporation in 1971. It was powered by two Lycoming IO-540-E1A5 engines (s.n. L-3633-48, left; L-801-48, right), each rated at 290 horsepower, driving Hartzell HC-C3YR-2UF three-blade, all-metal, full-feathering, constant speed propellers (s.n. CK5110B, left; CK5109B, right).

According to the Central Airlines, as of June 20, 2008, the airframe had accrued 12,426.6 total hours. The left engine was overhauled on June 14, 2005. It had accrued 12,671.6 total hours and 1,055.2 hours since major overhaul. The right engine was overhauled on November 5, 2007. It had accrued 11,010.1 total hours and 122.4 hours since major overhaul. New propellers were installed on the airplane on May 5, 2006. Both propellers had accrued 480.3 hours since being installed.

METEOROLOGICAL INFORMATION

The following METARs (Aviation Routine Weather Report) were recorded at Lawrence, Kansas, Municipal Airport (LWC) at 1034, 1049, and 1052, respectively:

LWS 241034: Wind, 080 degrees at 6 knots; visibility, 9 statute miles; ceiling, 2,100 feet broken; temperature, 25 degrees C.; dew point, 20 degrees C.; altimeter setting, 30.08 inches of Mercury.

LWS 241049: Wind, 100 at 7 knots; visibility, 9 statute miles; ceiling, 2,100 feet broken; temperature, 25 degrees C.; dew point, 20 degrees C.; altimeter setting, 30.08 inches or Mercury; remarks: lightning distant north, thunderstorm began 28 minutes past the hour, ended 43 minutes past the hour.

LWC 241052: Wind, 090 at 6 knots; visibility, 9 statute miles; ceiling, 2,100 feet broken, 2,800 feet overcast; temperature, 25 degrees C.; dew point, 20 degrees C.; altimeter setting, 30.08 inches of Mercury; remarks: lightning distant north and northeast, thunderstorm began 28 minutes past the hour, ended 43 minutes past the hour, sea level pressure 1017.9 millibars.

FLIGHT RECORDERS

Downloaded GPS (Global Positioning System) data indicates the airplane took off and flew to Topeka, Kansas. It made an approach to runway 31, did a procedure turn, and made another approach to runway 13. The airplane then flew to Lawrence, Kansas, where it made a touch-and-go landing. No one at the airport recalled seeing the airplane make the touch-and-go landing. Up to this point, most of the flight had been conducted between 2,000 and 4,000 feet.

The airplane flew eastbound to a practice area in Leavenworth County. It made a 360-degree (short radius) turn to the left, followed by a 360-degree (longer radius) turn to the right.

The airplane continued flying eastbound, but its altitude and airspeed began to decrease steadily (the ceiling at Lawrence was between 2,100 feet broken and 2,600 feet overcast). Between 1133:27 and 1136:58 GPS time, the airplane was flying at less than 1,000 feet. Data recording stopped shortly thereafter when the airplane entered a steep descent from a height of 742 feet.

WRECKAGE AND IMPACT INFORMATION

The on-scene investigation was conducted on June 25 and 26.

There was no lateral ground scar preceding the impact point. Impact with the ground was measured at 53 degrees nose down. There was no evidence of a rebound. The nose was aligned on a magnetic heading of 068 degrees. There was a circumferential break in the fuselage aft of the wings, and the tail was aligned on a magnetic heading of 115 degrees.

The landing gear turnbuckle was extended and the cockpit control handle was in the DOWN position. By jackscrew measurement, the flaps were in the APPROACH setting, or one-quarter DOWN. Both mixture and propeller control handles were full forward. Both throttles were mid-range. The needle on one airspeed indicator was jammed between 85 and 90 mph.

The overhead switch panel was torn away from the cockpit and was located 15 feet in front of the airplane. Examination of the overhead switch panel revealed the left fuel shutoff valve was in the CLOSED position; the right fuel shutoff valve was destroyed. Immediately adjacent to the fuel shutoff valves are the fuel boost pump and the magneto switches. The left boost pump switch was in the ON position; the right boost pump switch was destroyed (see Aero Commander 500S Maintenance Manual, p. 10-2).

Using a crane, the wreckage was lifted up and the fuel valves, located in the fuel sump which is mounted in the baggage compartment, were examined. Both valves were in the OPEN position. The fuel tanks had been breached and there was no fuel in the tanks. Fuel blight was beginning to appear on the ground and surrounding vegetation. Both engines had folded underneath the wings and were inverted. Both engine fuel supply lines were opened. Only residual fuel was noted. Both engine fuel distributor manifolds were opened. Less than a tablespoon of fuel was seen. Both propellers exhibited little rotational signatures.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies on both pilots were performed at the University of Kansas Medical Center in Kansas City, Kansas. According to these reports, both pilots "died of multiple blunt force injuries." The manner of death was listed as "accident."

Toxicological screens were performed by both the University of Kansas Medical Center and FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma. No drugs or ethanol were detected in the pilot-in-training. No drugs were detected in the pilot-in-command. Ethanol (11 mg/dL, mg/hg) was detected in muscle tissue.

TESTS AND RESEARCH

The wreckage was removed to the facilities of Dodson International, a salvage recovery firm, in Rantoul, Kansas, where it was further examined on June 26 and 27. Both engines and propeller assemblies were disassembled and examined. No anomalies were noted. Both propellers were in the low pitch-high rpm setting.

The boost pumps tested satisfactorily. Both fuel shutoff valves were in the OPEN position. When battery power was applied, both fuel shutoff valves open and closed in less than one second. No anomalies were noted.

Along with several other FAA inspectors, the principal operations inspector for Central Airlines participated in the on-scene investigation. He said that in recent years, he had given the chief pilot his check rides and was familiar with his mannerisms. He said that when the chief pilot gave a competency/proficiency check to a newly-hired pilot, he always followed certain routine. According to the Aero Commander 500S Flight Manual (p. 1-3 and 2-7), the boost pumps are normally off. During certain "limited aerobatic maneuvers," including steep turns, the boost pumps are turned on by company practice. After performing steep 360-degree turns to the left and right, the boost pumps would be turned off and the chief pilot would ask the trainee to configure the airplane for landing (i.e. gear down, approach flaps). He would then ask the trainee to demonstrate minimum control airspeed maneuvers. Immediately adjacent to the fuel boost pump switches are the fuel shutoff valves (see p. 10-2, Aero Commander 500S Maintenance Manual).

The party representing Central Airlines said that the company's president experienced a similar event, but it only involved one engine. While in cruise flight, he inadvertently turned off the fuel shutoff valve instead of the boost pump. The engine lost power shortly thereafter. Realizing his mistake, he immediately switched it back on and after a short period of time, the engine resumed producing power. The principal operations inspector said that one one occasion, he purposely shut down an engine by closing the fuel shutoff valve. He said it took about 10 seconds for the engine to lose power and about 15 seconds for it to resume operation. He also said that if the airplane was inadvertently stalled, a minimum of 250 feet was required to recover.

ADDITIONAL INFORMATION

Central Airlines is an all-cargo, on-demand air carrier operating on unpublished schedules. Before the accident, its fleet consisted of 36 Aero Commanders, including 34 B models, one U model, and one S models. It also has a Rockwell International 690A Commander.

History of Flight

Maneuvering-low-alt flying	Loss of engine power (total) (Defining event) Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Commercial	**Age:**	47, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With Waivers/Limitations	**Last FAA Medical Exam:**	05/01/2008
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	02/13/2008
Flight Time:	10500 hours (Total, all aircraft), 7550 hours (Total, this make and model), 10460 hours (Pilot In Command, all aircraft), 88 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft)		

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	47, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without Waivers/Limitations	**Last FAA Medical Exam:**	11/01/2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:			

Pilot Information

Certificate:	Commercial	**Age:**	24, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With Waivers/Limitations	**Last FAA Medical Exam:**	01/16/2008
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	1200 hours (Total, all aircraft), 7 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	AERO COMMANDER	**Registration:**	N411JT
Model/Series:	500S	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	3097
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	08/01/2007, Continuous Airworthiness	**Certified Max Gross Wt.:**	6750 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	12427 Hours as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-E1B5
Registered Owner:	Central Airlines, Inc.	**Rated Power:**	290 hp
Operator:	Central Airlines, Inc.	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	Central Air Southwest	**Operator Designator Code:**	ZJWA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	LWC, 832 ft msl	**Distance from Accident Site:**	
Observation Time:	1034	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	9 Miles
Lowest Ceiling:	Broken / 2100 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.08 inches Hg	**Temperature/Dew Point:**	25°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kansas City, MO (MKC)	**Type of Flight Plan Filed:**	None
Destination:	(MKC)	**Type of Clearance:**	None
Departure Time:	0927 CDT	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	39.239722, -95.888889

Administrative Information

Investigator In Charge (IIC):	Arnold W Scott	**Adopted Date:**	05/12/2009
Additional Participating Persons:	Steven B Davis; FAA Flight Standards District Office; Kansas City, MO Darryl Frink; Central Airlines; Kansas City, MO John Butler; Textron Lycoming Engines; Arlington, TX Thomas J McCreary; Hartzell Propellers; Piqua, OH		
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Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		