



National Transportation Safety Board Aviation Accident Final Report

Location:	Gallman, MS	Accident Number:	ERA09LA316
Date & Time:	06/02/2009, 1555 CDT	Registration:	N1399X
Aircraft:	Rick Campbell Zenith-STOL CH801	Aircraft Damage:	Substantial
Defining Event:	Fuel starvation	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

After maintenance was performed that required the draining of the fuel tanks and removal and reinstallation of the right wing, the pilot-rated mechanics performed a test flight of the accident airplane in the airport traffic pattern. While turning from the base leg onto final approach for the runway, the airplane experienced a total loss of power. The pilot made a right turn in the direction of a field; the airplane then struck trees and impacted terrain in a nearly flat, inverted attitude. A postcrash fire then ensued. Examination of the wreckage revealed no evidence of any preimpact malfunctions of the engine or airplane. During examination of the fuel system it was revealed that the fuel system consisted of four fuel tanks, each with a single fuel outlet located at the lower rear corner of the fuel tank. Further examination of the fuel system and the existing burn patterns from the postcrash fire also revealed that the right main fuel tank and the left auxiliary fuel tank had contained little or no fuel in them prior to the accident. The lack of fuel in the right main fuel tank and the location of the fuel outlet, in combination with the airplane's nose-low attitude during descent to the runway and the left bank required to turn from the base to final leg of the traffic pattern, likely resulted in air entering the fuel system from the empty or nearly empty right main fuel tank.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A total loss of engine power due to fuel starvation as a result of the flightcrew's improper fuel management.

Findings

Aircraft	Fuel - Fluid management (Cause)
Personnel issues	Fuel planning - Pilot (Cause)

Factual Information

HISTORY OF FLIGHT

On June 2, 2009, at 1555 central daylight time, an experimental amateur-built Zenith Aircraft, STOL CH 801, N1399X, was substantially damaged during impact with trees, after a loss of power, during final approach at Copiah County Airport (M11), Crystal Springs, Mississippi. The certificated commercial pilot and certificated private pilot were killed. Visual meteorological conditions prevailed and no flight plan was filed for the local maintenance test flight conducted under 14 Code of Federal Regulations Part 91.

According to a witness who observed the accident flight, the accident airplane did "three crow hops" before taking off from runway 17. It then climbed up and joined the traffic pattern. When the airplane began its turn on to the final approach from the left base leg of the traffic pattern, the engine was heard to stop. The airplane was then observed to turn towards the west. It passed over the top of some pine trees and then impacted oak trees. The airplane collided with the ground and a post crash fire ensued.

PERSONNEL INFORMATION

According to FAA records, the commercial pilot who was occupying the right seat of the accident airplane, held ratings for airframe and powerplant mechanic, repairman, flight instructor airplane single engine, advanced ground instructor, commercial pilot airplane single-engine and multiengine land, and instrument airplane. His most recent FAA second-class medical certificate was issued on May 14, 2008. He reported 2,670 total hours of flight experience on that date.

According to FAA records, the private pilot who was occupying the left seat of the accident airplane, held ratings for airframe and powerplant mechanic, repairman, private pilot airplane single-engine and multiengine land. His most recent FAA third-class medical certificate was issued on October 9, 2007. He reported 240 total hours of flight experience on that date.

AIRCRAFT INFORMATION

The accident airplane was a high wing, kit built, single engine monoplane of conventional construction. It was designed for short takeoff and landing (STOL) operations from short, rough, or unimproved runways. It was equipped with fixed leading edge slats and full length flaperons which acted as both full wingspan ailerons and flaps. It was powered by a 220 horsepower, Franklin 6A-350-C1 engine.

According to FAA records, the airplane was sold to its builder as a kit on April 4, 2005. It was issued its special airworthiness certificate on February 8, 2006. On January 17, 2008 it was sold to the owner.

According to the owner, the airplane's previous conditional inspection had occurred in January of 2008 prior to the purchase of the airplane. At the time of the accident, the airplane had accrued approximately 68 total hours of operation.

METEOROLOGICAL INFORMATION

The reported weather at Hawkins Field Airport (HKS), Jackson, Mississippi, approximately 27 miles north of the accident site, at 1553, included: wind, 170 at 6 knots, visibility 10 miles, few clouds at 7,000 feet, temperature 31 degrees C, dew point 18 degrees C, altimeter setting of

29.99 inches of mercury.

AIRPORT INFORMATION

According to the Airport Facility Directory, M11 had one runway oriented in a 17/35 configuration. Runway 17 was asphalt, and was in fair condition. The total length of the runway was 3,000 feet, and its width was 75 feet.

Multiple obstructions existed on the approach end of runway 17. These included trees 66 feet in height, which were located 1,540 feet from the approach end of the runway, 100 feet left of the centerline. A 20:1 slope was required to clear the trees.

WRECKAGE AND IMPACT INFORMATION

According to an FAA inspector, the airplane first made contact with a tree, then "pancaked" into a field, and a post impact fire ensued.

Examination of the wreckage by the NTSB revealed that the airplane had come to rest inverted. The wreckage displayed crush, compression, and fire damage. However, no evidence of any preimpact failure or malfunction, of the airplane, or engine was discovered.

Examination of the flight controls revealed that the left and right flaperons, horizontal stabilizer, elevator, and rudder control surfaces exhibited impact damage. Control continuity was established for all flight controls from the respective control surfaces, the rudder pedals, and the control stick.

Examination of the pitot-static system revealed that the pitot tube and static port were not blocked by any foreign objects or debris.

Examination of the propeller revealed that there was no evidence that the propeller had been rotating during the impact sequence.

Examination of the engine revealed that the carburetor was fire damaged. The throttle plate was full open and the throttle arm was in the full throttle position. No blockages of the intake system were discovered and examination of the exhaust manifolds revealed that the interior of the exhaust manifolds was light gray in color. Oil was present in the engine internally and in the rocker boxes. The oil pump was functional. The crankshaft was rotated by hand, and no binding was noted, the intake and exhaust valves would open and close in sequence and thumb compression was established on all cylinders. Both magnetos exhibited impact and fire damage and could not be tested. Internal examination of the magnetos revealed however, no evidence of preimpact malfunction and all of the sparkplugs electrodes were light gray in color.

Examination of the fuel system revealed that the airplane was equipped with the kit manufacturers extended range option which was composed of four 15 gallon fuel tanks. The two main fuel tanks were mounted inboard near the left and right wing roots, and the two auxiliary fuel tanks were mounted outboard of the main tanks. Each of the fuel tanks had its own fuel tank sending unit and its own fuel quantity gauge. The main fuel tanks and the auxiliary fuel tanks were each plumbed separately with their own fuel outlets located on the rear lower inboard corner of the fuel tank. Both main fuel tanks were plumbed into a floor drain and both of the auxiliary fuel tanks, were also plumbed into a floor drain. Fuel lines ran from each of these floor drains to a fuel selector valve which would allow the fuel supply to be shutoff, or allow the engine to feed off of either the main fuel tanks, or the auxiliary fuel tanks.

Further examination of the fuel system revealed that all four fuel filler caps were closed and

fastened securely.

The left main fuel tank exhibited signs of fire damage internally but the left auxiliary fuel tank did not.

The right main fuel tank did not exhibit signs of fire damage internally, and the right auxiliary fuel tank had been burned away.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed on the commercial pilot and private pilot by the Mississippi State Medical Examiners Office.

Toxicological testing of the commercial pilot and private pilot was conducted at the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma.

TESTS AND RESEARCH

According to witnesses and Federal Aviation Administration (FAA) records, the commercial pilot and the private pilot were also certificated airframe and powerplant mechanics, and were employed by a fixed base operator (FBO), which provided maintenance as well as fuel and ground handling at M11.

The airplane had been brought to the FBO for maintenance by the owner in around April 10, 2009. At that time, the commercial pilot flew the airplane with the owner for approximately 40 minutes to "learn the airplane."

The airplane would fly "right wing down," as the right wing's dihedral was incorrect and the right wing was lower than the left wing. As a result, the mechanics drained the fuel from the fuel tanks, removed the right wing, then replaced the lift struts and strut fittings and performed a conditional inspection, to "get the airplane like it should be".

History of Flight

Approach-VFR pattern base	Fuel starvation (Defining event)
Approach-VFR pattern final	Loss of engine power (total)
Emergency descent	Collision with terr/obj (non-CFIT)
Uncontrolled descent	Collision with terr/obj (non-CFIT)
Post-impact	Fire/smoke (post-impact)

Pilot Information

Certificate:	Flight Instructor; Commercial	Age:	54, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Single-engine	Toxicology Performed:	Yes
Medical Certification:	Class 2 With Waivers/Limitations	Last Medical Exam:	05/14/2008
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 2670 hours (Total, all aircraft)		

Pilot Information

Certificate:	Private	Age:	34, Male
Airplane Rating(s):	Multi-engine Land; 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 Without Waivers/Limitations	Last Medical Exam:	10/09/2007
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 240 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Rick Campbell	Registration:	N1399X
Model/Series:	Zenith-STOL CH801	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	8-4399
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	2200 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Franklin
ELT:	Not installed	Engine Model/Series:	6A-350-C1
Registered Owner:	Roger Newman	Rated Power:	220 hp
Operator:	On file	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	HKS, 341 ft msl	Observation Time:	1553 CDT
Distance from Accident Site:	27 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	360°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Few / 7000 ft agl	Temperature/Dew Point:	31° C / 18° C
Lowest Ceiling:		Visibility	10 Miles
Wind Speed/Gusts, Direction:	6 knots, 170°	Visibility (RVR):	
Altimeter Setting:	29.99 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Gallman, MS (M11)	Type of Flight Plan Filed:	Unknown
Destination:	Gallman, MS (M11)	Type of Clearance:	None
Departure Time:	1554 CDT	Type of Airspace:	

Airport Information

Airport:	Copiah County Airport (M11)	Runway Surface Type:	Asphalt
Airport Elevation:	443 ft	Runway Surface Condition:	Dry
Runway Used:	17	IFR Approach:	None
Runway Length/Width:	3000 ft / 75 ft	VFR Approach/Landing:	Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal		

Administrative Information

Investigator In Charge (IIC):	Todd G Gunther	Adopted Date:	07/18/2011
Additional Participating Persons:	Mike Jones; FAA/FSDO; Jackson, MS		
Publish Date:	07/18/2011		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=73951		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.