



National Transportation Safety Board Aviation Accident Final Report

Location:	Charleston, SC	Accident Number:	ERA10LA199
Date & Time:	04/01/2010, 1200 EDT	Registration:	N3181L
Aircraft:	RATCLIFFE JOHN A KOLB MARK3X	Aircraft Damage:	Substantial
Defining Event:	Aerodynamic stall/spin	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The accident flight was the airplane's first flight and the pilot's first flight in the airplane make and model. According to witnesses, after starting the engine, the pilot completed a high speed taxi before taking off; the airplane lifted off in "a couple hundred feet." The witnesses stated that at first, the airplane pitched up "steeply" then leveled off about 75 feet above ground level (agl). It then pitched up "steeply" again until it reached about 200 feet agl and then it returned to a "less steep" climb angle. The airplane was next observed to make a right turn onto the crosswind leg of the traffic pattern at 300 to 400 feet agl, and then turned onto the downwind leg of the traffic pattern at 700 to 800 feet agl. The airplane then turned to the right, pitched nose down, and continued rotating to the right until it impacted nose first in a marsh located near the end of the runway. The airplane sustained substantial damage to the wing spar and the fuselage. Postaccident examination of the airplane and engine did not reveal any evidence of a mechanical malfunction or failure that would have precluded normal operation. A review of the pilot's records revealed that he had never logged any flight time in the accident airplane make and model. He had never logged any flight time in a tailwheel-equipped airplane, nor did he possess a tailwheel endorsement to act as pilot-in-command of a tailwheel-equipped airplane.

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 adequate airspeed which resulted in an aerodynamic stall and subsequent loss of control. Contributing to the accident was the pilot's lack of experience in the make and model airplane.

Findings

Aircraft	Airspeed - Not attained/maintained (Cause)
Personnel issues	Aircraft control - Pilot (Cause) Recent experience w/ equipment - Pilot (Factor)

Factual Information

HISTORY OF FLIGHT

On April 1, 2010, at 1200 eastern daylight time, an experimental, amateur-built, Ratcliffe Kolb Mark 3X, was substantially damaged when it impacted terrain while maneuvering, at Charleston Executive Airport (JZI), Charleston, South Carolina. The certificated private pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight conducted under Title 14 Code of Federal Regulations Part 91.

The accident flight was the first flight of the airplane and the pilot's first flight in the airplane model.

According to witnesses, after starting the engine the pilot initially taxied onto runway 4 and did a high speed taxi to a point about halfway down the runway. He then turned the airplane around and back taxied down runway 4 and cleared the runway at the end. After about 1 minute the pilot reentered the runway for takeoff. The airplane then lifted off in a couple hundred feet. At first the airplane pitched up "steeply" then leveled off about 75 feet above ground level (agl). It then pitched up "steeply" again until it reached about 200 feet agl, and then it returned to a "less steep" climb angle. The airplane was next observed to make a right turn onto the crosswind leg of the traffic pattern at 300 to 400 feet agl, and then to turn onto the downwind leg of the traffic pattern at 700 to 800 feet agl. The airplane then turned to the right, pitched nose down, and continued rotating to the right until it impacted nose first in a marsh located near the end of the runway.

PERSONNEL INFORMATION

According to FAA records, the pilot held a private pilot certificate with a rating for airplane single-engine-land. His most recent application for a FAA third-class medical certificate was on March 22, 2010. He reported 138 total hours of flight experience on that date.

A review of pilot records revealed that the pilot had approximately 75 hours of pilot in command time and had never logged flight time in the accident airplane make and model. Further review also revealed that he had never logged flight time in a tailwheel equipped airplane, and he did not have a tailwheel endorsement to act as pilot in command in a tailwheel equipped airplane.

The pilot had begun flying in 1971 and had stopped flying in 1978. During that time period he had accumulated 90 hours of flight experience and had been flying Cessna 150 and Piper PA-28 airplanes. Pilot records indicated that the pilot was then inactive for the next 26 years and did not resume flying until 2004.

From 2004 until the last entry in January of 2010 the pilot logged another 48.1 hours in the Cessna 150, Cessna 172, and Piper PA-28 airplanes. He did not fly again until the day of the accident flight approximately 2 months later.

AIRCRAFT INFORMATION

The accident aircraft was a two seat, high wing, strut braced, pusher configuration, tailwheel equipped airplane. The forward fuselage was of welded steel tubing mated to an aluminum tailboom. The horizontal stabilizer, tail fin, and wings were constructed of riveted aluminum tubing covered in fabric. The wings included a folding mechanism for storage and ground

transport. It was powered by a 100 horsepower, Rotax 912ULS, normally-aspirated, air and water cooled, horizontally-opposed, four-cylinder engine.

According to FAA records, the airplane's special airworthiness certificate was issued on November 6, 2009.

METEOROLOGICAL INFORMATION

A weather observation taken about 5 minutes prior to the accident, at JZI included; wind at 010 degrees at 4 knots, visibility 10 miles, temperature 26 degrees C, Dew point 05 degrees C, and an altimeter setting of 30.14 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

An on scene examination of the wreckage was initially attempted by a Federal Aviation Administration (FAA) inspector but, due to terrain conditions he was unable to do a detailed examination. His cursory examination revealed however that the airplane had come to rest inverted. The lift struts were still attached but, the wing had separated from the fuselage. The tail boom was bent to one side approximately 2 feet aft of the fuselage. The engine had separated from its mounting location, and had come to rest approximately 25 feet from the main wreckage. The propeller hub had remained attached to the crankshaft but two of its three blades were broken off at approximately mid-span.

At the request of the Safety Board, on April 5, 2010, the wreckage was removed from the marsh by an aircraft recovery company for examination by Safety Board investigators.

Examination of the wreckage by Safety Board investigators confirmed the FAA inspector's initial observations.

Examination of the airframe did not reveal any evidence of preimpact malfunction or anomalies. The airframe exhibited impact damage and multiple areas of crush and compression damage to the tubing that made up its structure. The wing folding fittings which had been modified from the original design by the pilot to reduce wear on the wing fold bolts, nuts, and cotter pins were discovered to be secured in the flight (wings locked) position. Flight control continuity was also confirmed from the rudder pedals, and control sticks to their respective flight control surfaces.

Examination of the fuel system did not reveal any evidence of preimpact failure or malfunction of the fuel system. Further examination revealed, that two of the plastic 5 gallon fuel tanks still contained a small amount of automotive gasoline. The third tank however, had been breached and was devoid of fuel. It was also discovered, that fuel lines which had separated from the tanks during the impact sequence also contained automotive gasoline, which was bright, clear, and did not exhibit evidence of any particulates or debris. When a sample of the automotive gasoline was applied to a coupon containing water finding paste, the coupon did not change color, indicating that water was not present. Examination of the electric fuel pump also revealed that it contained automotive gasoline. Its internal screen was clear of debris, and when power was applied it would pump fuel.

Examination of the engine did not reveal any evidence of preimpact malfunction or failure. Engine control continuity was confirmed from the cockpit mounted engine controls to the breaks in the cables and wires which made up the control system to the engine. Continuity of the intake system, exhaust system, valve train, and crankshaft was confirmed. The crankshaft was rotated by hand, and no binding was noted. All sparkplugs were removed for examination.

Their electrodes appeared normal and were light gray in color. Thumb compression was established on all cylinders and oil was present internally and in the rocker boxes. The carburetors were disassembled to inspect the diaphragms and the inside of the float bowls. The diaphragms were dry, and no tears or punctures were evident. The floats were functional, and the internal portions of the float bowls contained automotive gasoline and were clean and free of debris

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Medical University of South Carolina's Department of Pathology and Laboratory Medicine on behalf of the Charleston County, South Carolina, Coroner. The cause of death was full body blunt trauma.

Toxicological testing of the pilot was conducted at the FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma. The specimens were negative for carbon monoxide, cyanide, basic, acidic, and neutral drugs.

The pilot's forensic toxicology report indicated that "43 (mg/dL, mg/hg) ETHANOL" was detected in muscle however, putrefaction was present, and "NO ETHANOL" was detected in brain, indicating that the ethanol found in this case was most likely from sources other than ingestion.

TESTS AND RESEARCH

Review of the pilot's builders Log revealed that he had added many options and had modified portions of the design which increased the empty weight of the airplane approximately 113.5 pounds over the kit manufacturer's specified empty weight. Review of the weight and balance information contained in the builders log also revealed that the gross weight of the airplane with the pilot and fuel onboard was in excess of the kit manufacturer's recommended gross weight by 78.5 pounds at the time of the accident.

ADDITIONAL INFORMATION

According to FAA Advisory Circular AC 90-89A (Amateur Built Aircraft and Ultralight Flight Testing Handbook), the weight and balance for the aircraft to be tested should be carefully done and the gross weight and CG range should be determined prior to every flight.

The test pilot of an amateur built aircraft should be competent in an aircraft of similar configuration, size, weight, and performance as the aircraft to be tested. If the aircraft's builder is the test pilot, the costs involved in maintaining pilot competence should be budgeted with the same level of commitment and priority that is assigned to plans and materials to complete the project.

The test pilot should also be rated, current, and competent in the same category and class as the aircraft being tested, should have 100 hours solo time before flight testing a kit plane or an aircraft built from a time-proven set of plans, and have had a minimum of 50 recent takeoffs and landings in a conventional (tail wheel aircraft) if the aircraft to be tested is a tail dragger.

The test pilot must also have talked with and, if possible, fly with a pilot in the same kind of aircraft to be tested, and should have taken additional instruction in similar type certificated aircraft. For example, if the aircraft to be tested is a tail dragger, a Bellanca Citabria or Super Cub is appropriate for training, and the test pilot should be considered competent when they

have demonstrated a high level of skill in all planned flight test maneuvers in an aircraft with performance characteristics similar to the test aircraft.

Furthermore, the test pilot should also have studied the ground and in-flight emergency procedures developed for the aircraft and practice them in aircraft with similar flight characteristics, have logged a minimum of 1 hour of training in recovery from unusual attitudes within 45 days of the first test flight, and should have studied the performance characteristics of the aircraft to be tested.

History of Flight

Approach-VFR pattern downwind	Aerodynamic stall/spin (Defining event) Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Private	Age:	, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	03/22/2010
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	138 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	RATCLIFFE JOHN A	Registration:	N3181L
Model/Series:	KOLB MARK3X	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	M3X6-1-00078
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	11/06/2009, Conditional	Certified Max Gross Wt.:	1000 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	0 Hours	Engine Manufacturer:	Rotax
ELT:	Installed, not activated	Engine Model/Series:	912 ULS
Registered Owner:	On file	Rated Power:	100 hp
Operator:	On file	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	JZI, 17 ft msl	Observation Time:	1155 EDT
Distance from Accident Site:		Condition of Light:	Day
Direction from Accident Site:		Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	26 °C / 5 °C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	4 knots, 10°	Visibility (RVR):	
Altimeter Setting:	30.14 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Charleston, SC (JZI)	Type of Flight Plan Filed:	None
Destination:	Charleston, SC (JZI)	Type of Clearance:	None
Departure Time:	EDT	Type of Airspace:	

Airport Information

Airport:	Charleston Executive Airport (JZI)	Runway Surface Type:	Concrete
Airport Elevation:	17 ft	Runway Surface Condition:	
Runway Used:	04	IFR Approach:	None
Runway Length/Width:	4313 ft / 150 ft	VFR Approach/Landing:	Forced Landing; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal		

Administrative Information

Investigator In Charge (IIC):	Todd G Gunther	Adopted Date:	11/17/2011
Additional Participating Persons:	Robert Giguere; FAA/FSDO; Columbia, SC		
Publish Date:	11/17/2011		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=75619		

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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.