Aviation Investigation Final Report

Location:	Campobello, South Carolina	**Accident Number:**	ATL04FA061
Date & Time:	December 28, 2003, 13:10 Local	**Registration:**	N2996L
Aircraft:	Mooney 20F	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot obtained fuel before departing on the cross country flight. Two witnesses on the ground heard and observed the airplane approaching their location. The airplane was about 100 to 200 feet above the trees. One witnesses stated the airplanes engine was heard to increase in power, decrease in power, and increase in power again. The other witnesses stated the engine was making a popping sound, while the engine was cutting in and out. The airplane was observed to make a steep right turn and the right wing was perpendicular to the ground. The nose of the airplane pitched down and the airplane disappeared from view. The Flight Manual states the airplane will stall at 98 MPH without extended flaps at a 60-degree bank angle. Examination of the crash site revealed the right main fuel cap tab was secured. The left main fuel cap tab was in the open position. Examination of the airframe and engine assembly revealed no anomalies.

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 airspeed while maneuvering for an emergency landing resulting in an inadvertent stall and a collision with trees and the ground during an uncontrolled descent. A factor in the accident was the pilot's inadequate preflight resulting in a loss of engine power due to fuel starvation.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: CRUISE - NORMAL

Findings
1. (F) FUEL SYSTEM,CAP - NOT SECURED
2. (F) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
3. (F) FLUID,FUEL - STARVATION

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - EMERGENCY

Findings
4. (C) AIRSPEED(VS) - NOT MAINTAINED - PILOT IN COMMAND
5. (C) STALL - INADVERTENT - PILOT IN COMMAND

Occurrence #4: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. OBJECT - TREE(S)

Occurrence #5: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
7. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On December 28, 2003, at 1310 Eastern Standard Time, a Mooney 20F, N2996L, registered to a private owner, operating as a 14 CFR Part 91 personal flight, collided with trees and the ground while maneuvering in the vicinity of Campobello, South Carolina. Visual meteorological conditions prevailed and no flight plan was filed. The airplane was destroyed. The commercial pilot was fatally injured. The flight originated from Petersburg, Ohio, on December 28, 2003, at 1015.

Witnesses stated they heard an airplane approaching their location. They looked up and observed an airplane flying to the north between 100 to 200 feet above the trees. The engine revved up in power, decreased in power, and revved up again. Another witness stated, "the engine was making a popping sound, and cutting in and out." The airplane was observed to make a steep right turn, and the right wing was perpendicular to the ground. The nose of the airplane went down and the airplane disappeared from view. A few seconds later both witnesses heard an impact sound as the airplane collided with the ground. They went inside and called the 911 telephone operator.

PERSONNEL INFORMATION

Review of information on file with the FAA Airman's Certification Division, Oklahoma City, Oklahoma, revealed the commercial pilot was issued a commercial pilot certificate on April 11, 1999, with ratings for airplane single engine land, and airplane multiengine land. In addition the pilot held a mechanic certificate issued on June 30, 1993, with ratings for airframe mechanic and power plant mechanic. The pilot held a second-class medical certificate issued on June 18, 2003, with the restriction must have available glasses for near vision. The pilot's logbook was not located; and the biennial flight review could not be determined. Review of information on file with the FAA Aero Medical Records Division revealed the pilot had 3,770 flight hours.

AIRCRAFT INFORMATION

The husband of the registered owner stated the airplane was not insured and the pilot-in-command had a key and performed the maintenance on the airplane. The husband stated he called the deceased pilot about two weeks before the accident and asked him to do the annual inspection, which was overdue. He further stated that he did not know the deceased pilot was going to be taking the airplane out of the state.

Review of the logbooks revealed the original logbooks were lost. The current logbooks were created from the previous owner's records and repair station information on December 5,

1988. The total tachometer time was 3170 hours. The airplane had a Lycoming remanufactured "o" time engine installed at tachometer time 2781 on June 30, 1977. The last recorded annual and 100-hour inspection was conducted on July 13, 2002, at tachometer time 3737.42 hours. The emergency locater transmitter battery (ELT) was replaced on June 13, 1992. The tachometer was damage and the time tachometer time could not be determined. The ELT battery expiration date was May 31, 2001.

The son of the pilot-in-command pilot stated the airplane was topped off with between 45 to 47 gallons of 100 low lead fuel at Petersburg, Ohio, on December 22, 2003. The airplane was taxied to a tie down point and remained parked over the Christmas holiday. The airplane was taxied over to the refuel point on December 28, 2003, and topped off with 1.9 gallons of 100 low lead fuel.

METEOROLOGICAL INFORMATION

The Greeneville-Spartanburg International Airport 1253 surface weather observation was wind was 210-degrees at 6 knots, visibility 10 miles, clear, temperature 59-degrees Fahrenheit, dew point temperature 41-degrees Fahrenheit, and altimeter 30.30.

WRECKAGE AND IMPACT INFORMATION

The main wreckage of the airplane was located in a wooded area on a hilltop adjacent to 915 Old Melvin Hill, Campobello, South Carolina.

Examination of the crash site revealed the right wing of the airplane collided with a tree. The outboard section of the right wing and rib were separated. Tree branches along the crash debris line exhibited 45-degree "V" cuts. The wreckage debris line continued forward 46-feet where the engine assembly was separated from the firewall. The engine assembly was buried beneath the ground 32-inches. The cabin area and empennage with the tail section was located 136 feet down the crash debris line.

The nose section of the airplane separated at the firewall. The engine assembly and engine mounts separated from the firewall. The propeller assembly separated from the propeller flange and was buried beneath the surface of the ground. The propeller spinner was destroyed. One propeller blade remained in the propeller hub. The propeller blade exhibited "s" bending and chord-wise scarring. The propeller was bent forward at mid span, and the leading edge of the propeller blade received nicks about two-inch inboard from the propeller tip. The separated propeller blade exhibited "s" bending and chord-wise scarring. The propeller blade was bent forward at mid span. The nose gear separated and was in the retracted position.

The cabin area separated from the fuselage at the windshield extending aft to the leading edge of the left and right horizontal stabilizers with accordion crushing. The instrument panel and lower cabin floor was destroyed. The fuel selector valve was not located. The flight control system from the control tube at the control column aft to the push pull tubes and rod end

bearings in the center fuselage were destroyed. The control tubes and rod end bearings extending outboard to the left and right wings, ailerons, and bell cranks were destroyed. The control tubes and rod end bearings extending aft to the rudder and left and right elevators were destroyed.

The right wing received accordion crushing along the leading edge and was fragmented from the wingtips inboard to the wing root. The upper and lower wing skin surfaces were fragmented and located down and on the debris line. The right wing main fuel cap was closed and located to the right of the engine crater. The right main fuel tank was ruptured and the filler neck had separated from the wing. No fuel, odor of fuel, or browning of vegetation was present at the crash site. The right aileron and flap separated at the attachment fittings. The right main landing gear was in the retracted position.

The aft fuselage received accordion crushing extending aft to the leading edge of the left and right horizontal stabilizers. The vertical stabilizer leading edge was damaged and the vertical stabilizer was bent to the right. The rudder assembly remained attached by the lower two hinge points. The right horizontal stabilizer was bent upward and aft. The right elevator separated at the hinge points and was located underneath the horizontal stabilizer. The left horizontal stabilizer was crushed upward and the left elevator was separated at the hinge points. The left elevator was located under the left horizontal stabilizer.

The left wing separated at the wing root. The wingtip was bent up and aft. The upper and lower wing skin separated 64-inches outboard of the wing root. The left aileron and flaps separated at their hinge points. The left main fuel tank was ruptured. The left main fuel cap was located adjacent to the left wing. The fuel cap lock was in the open position. Rust was present on the filler port neck and on the bottom of the fuel cap. The left main landing gear was retracted.

Examination of the engine assembly revealed the engine was damaged on all sides. The crankshaft would not rotate by hand. All engine accessories except for the flow divider separated from the engine. The alternator, starter, fuel injector servo, top portion of the vacuum pump including the internal rotor and vanes, turbocharger housing, including the turbine hot section separated and were not located. The turbocharger compressor impeller section was damaged. The fuel nozzles were removed and unobstructed. The flow divider was removed and opened and no fuel was present. The No. 1 cylinder head was fractured and the push rods on cylinders 1, 2, and 3 were damaged. The engine crankcase was fractured at the nose section adjacent to the No. 2 cylinder. The oil sump was destroyed; the induction system was separated and fragmented. The exhaust system was separated and not located. The propeller control arm was damaged and the control shaft was spring loaded to the high rpm position. The propeller drive end was damaged. The propeller governor oil screen was clean and free of contaminants. The governor was rotated by hand and pumping action of oil was noted. The engine fuel pump top diaphragm was damaged and the actuator arm separated from the pump shaft. The lower section of the pump was opened and the lower diaphragm and internal valve was intact.

The rear accessory case was removed and the accessory drive gears were intact. The oil pump drive spline was broken. The oil pump impeller gears were intact. The oil filter was opened and free of contaminants. All four cylinders were removed and the piston domes exhibited light gray color combustion deposits. The top sparkplugs in cylinders 2, 3, and 4 and the bottom sparkplug in cylinder 4 were recovered. The top sparkplug in cylinder 1 was not located. The bottom sparkplugs in cylinders 1, 2, and 3 were not located. All recovered sparkplugs exhibited light gray combustion deposits. The left and right magneto ignition towers produced spark at all towers.

The power section case halves were separated. All internal components were intact. The cam followers exhibited spalling, pitting, and wear.

MEDICAL AND PATHOLOGICAL INFORMATION

A Forensic Pathologist from Spartanburg Regional Medical Center conducted a postmortem examination of the commercial pilot on December 30, 2003. The cause of death was blunt force trauma. The Forensic Toxicology Research Section, Federal Aviation Administration, Oklahoma City, Oklahoma, performed postmortem toxicology of specimens from the pilot. The results were negative for ethanol, basic, acidic, and neutral drugs. Carbon monoxide and cyanide testing was not performed.

TEST AND RESEARCH

Review of the EXECUTIVE 21 OWNERS MANUAL for the Mooney Model 20F PART II FLIGHT PROCEDURES, PRE-FLIGHT states, "The following pre-flight inspection is recommended:

9. Check the left fuel tank for fuel level and drain sump.
15.Check the right fuel tank for fuel level and drain sump."

Review of PART IV PERFORMANCE DATA, FIGURE 4, STALL SPEED Vs. BANK ANGLE states at flap setting of 0-degrees flaps the airplane will stall at 98 MPH at a 60-degree bank angle. With flaps extended 33-degrees, the airplane will stall at 90 MPH at a 60-degree bank angle.

ADDITIONAL INFORMATION

The wreckage and GPS was released to Atlanta Air Recovery, Griffin, Georgia, on February 12, 2004.

Pilot Information

Certificate:	Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 18, 2003
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3770 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N2996L
Model/Series:	20F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	670355
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 13, 2002 Annual	**Certified Max Gross Wt.:**	2323 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-A1A
Registered Owner:	Josephine Melia	**Rated Power:**	200 Horsepower
Operator:	Floyd C. Redmond	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GSP,810 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	12:53 Local	**Direction from Accident Site:**	240°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	15°C / 5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Petersburg, OH (OH29)	**Type of Flight Plan Filed:**	None
Destination:	Live Oak, FL (24J)	**Type of Clearance:**	None
Departure Time:	10:15 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	35.180557,-82.063888

Administrative Information

Investigator In Charge (IIC):	Smith, Carrol
Additional Participating Persons:	Charlie Henderson; Columbia FSDO-13; West Columbia, SC Edward Rogalski; Textron Lycoming; Belleview, FL
Original Publish Date:	December 28, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=58548