



National Transportation Safety Board Aviation Accident Final Report

Location:	Ridgefield, CT	Accident Number:	ERA12LA001
Date & Time:	10/01/2011, 1245 EDT	Registration:	N231EB
Aircraft:	MOONEY AIRCRAFT CORP. M20K	Aircraft Damage:	Substantial
Defining Event:	Fuel starvation	Injuries:	1 Serious
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

According to the pilot, he completed a preflight inspection, which included checking the fuel quantity and conducting an engine run-up, without any discrepancies noted. The airplane took off without incident; however, at about 1,100 feet mean sea level, when the pilot made a right crosswind turn, the engine lost total power. The pilot unsuccessfully attempted to restart the engine and subsequently completed a forced landing to a residential area. Postaccident examination of the airplane did not reveal any mechanical malfunctions that would have precluded normal operation. The fuel selector was observed positioned to the left fuel tank, which did not contain any fuel. The right fuel tank contained about 8 gallons of fuel. The fuel tanks were intact and there was no evidence of a fuel spill at the accident site.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper fuel management, which resulted in a total loss of engine power due to fuel starvation.

Findings

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

Factual Information

On October 1, 2011, about 1245 eastern daylight time, a Mooney M20K, N231EB, operated by a commercial pilot, was substantially damaged during a forced landing following a loss of engine power near Ridgefield, Connecticut. The certificated commercial pilot was seriously injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight which originated at Danbury Municipal Airport (DXR), Danbury, Connecticut, just prior to the accident. The flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

According to the pilot, he completed a preflight inspection, which included checking the fuel for contamination, and conducting an engine run-up, without any discrepancies noted. He stated that both fuel gauges indicated "about half," which corresponded with 14 to 19 gallons in each side, and he also visually confirmed the fuel quantity in each tank.

The engine started after two attempts and the pilot confirmed that all engine indications were normal prior to takeoff. The airplane took off without incident; however, at approximately 1,100 feet mean sea level, when the pilot made a right crosswind turn, the engine lost total power. The pilot switched fuel tanks, was unable to restart the engine and looked for a place to land. The pilot stated he could not recall his exact actions prior to the forced landing; however, he thought that he turned the fuel selector to the "OFF" position, leaned the mixture, and turned the master and the ignition switches off. The airplane subsequently struck trees during a forced landing to a residential area. The airplane came to rest inverted, which resulted in substantial damage to the fuselage, wings, and empennage.

First responders stated that a "small amount of fuel," approximately one quart, exited from the left fuel tank. In addition, a first responder indicated that when he arrived at the accident site, he turned the fuel selector from the left tank position to the off position.

A postaccident examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed that the left fuel tank did not contain any fuel and the right fuel tank contained about eight gallons of fuel. There was no evidence that the fuel tanks had been compromised. In addition, there were no fuel stains on the wings or fuselage and there was no smell of fuel at the site. A fuel sample was taken from the right tank with no contamination noted.

The pilot reported 502 hours of total flight time, of which, 145 hours were in the same make and model as the accident airplane. He noted that he accumulated 10 flight hours in the same make and model of the accident airplane in the past 90 days.

According to FAA records, the airplane was manufactured in 1979, and was registered to the pilot in 2007. It was a low-wing, retractable tricycle gear, monoplane, equipped with a Continental Motors TSIO-360LB, 210-horsepower engine. The most recent annual inspection was completed on February 10, 2011. At the time of the accident, the airplane accumulated 2,661 hours of total time in service. According to the pilot's operating handbook (POH), the fuel flow at maximum continuous horsepower was between 22.5 gallons per hour and 24.2 gallons per hour. The total fuel capacity was 78.6 gallons, 39.3 gallons in each tank. A total of 3 gallons of the fuel were unusable, 1.5 gallons in each tank.

The airplane was last fueled on August 27, 2011. According to the fuel slip, line personnel added 12 gallons of fuel to both the left and right fuel tanks, for a total of 24 gallons. The pilot

stated that he had the fuel tanks "topped-off" on that day, but the line personnel indicated to an FAA inspector that if a full "top-off" is requested, that they write that on the fuel slip. A copy of the fuel slip was obtained and "top-off" was not written on the fuel slip. In addition, according to an FAA inspector, 94 gallons of fuel had been added to the airplane since June 30, 2011, and the airplane had been operated approximately 8.1 hours since that time.

The airplane was equipped with an Electronics International Fuel Flow Instrument that retained the fuel quantity in the electronic memory. On October 4, 2011, FAA inspectors provided oversight while a mechanic applied power to the airplane. When the FAA inspector turned on the master switch, he noted that the fuel flow instrument aural warning activated, the fuel low and high/low fuel pressure warning lights were blinking, and the fuel quantity read-out was zero. He also noted that when power was applied, he could hear the fuel boost pumps operating.

On November 15, 2011, the engine was examined by two FAA inspectors. The propeller was rotated by hand and continuity was confirmed to the cylinders, camshaft, push rods, and the accessory drive section of the engine. Both magnetos were removed and disassembled with no defects noted. One sparkplug was removed from each cylinder and all were found to be in normal condition. The turbocharger was removed and rotated. The main fuel line from the fuel pump was removed and no fuel was noted in the line. The fuel lines from the fuel pump to the flow divider were removed with no fuel noted in the line. The fuel lines from the flow divider to the fuel injectors were removed and a small amount of fuel was noted. The fuel pump was removed and no defects were noted with the fuel pump drive shaft or gears.

The "Engine Power Loss – After Liftoff and During Climb" emergency procedure contained in POH, stated to:

1. Lower Nose, Establish Best Glide Speed.
2. Fuel Selector – Other Tank (Fullest Tank).
3. Throttle – Full Forward.
4. Mixture – Full Rich.
5. Magneto Switch – Both
6. Propeller – High RPM.
7. Low Boost – On.

History of Flight

Prior to flight	Preflight or dispatch event
Initial climb	Fuel starvation (Defining event) Loss of engine power (total)
Emergency descent	Off-field or emergency landing Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Commercial	Age:	47, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without Waivers/Limitations	Last Medical Exam:	08/30/2008
Occupational Pilot:	No	Last Flight Review or Equivalent:	04/16/2010
Flight Time:	502 hours (Total, all aircraft), 145 hours (Total, this make and model), 350 hours (Pilot In Command, all aircraft), 10 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	MOONEY AIRCRAFT CORP.	Registration:	N231EB
Model/Series:	M20K	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	25-0190
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	02/10/2011, Annual	Certified Max Gross Wt.:	2900 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	2661 Hours	Engine Manufacturer:	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	TSIO-360 SER
Registered Owner:	BALDWIN ROBERT A IV	Rated Power:	225 hp
Operator:	BALDWIN ROBERT A IV	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	DXR, 458 ft msl	Observation Time:	1153 EDT
Distance from Accident Site:	2 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:		Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Few / 1900 ft agl	Temperature/Dew Point:	18° C / 14° C
Lowest Ceiling:	Broken / 5500 ft agl	Visibility	10 Miles
Wind Speed/Gusts, Direction:	7 knots, Variable	Visibility (RVR):	
Altimeter Setting:	29.67 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ridgefield, CT (DXR)	Type of Flight Plan Filed:	None
Destination:	Ridgefield, CT (DXR)	Type of Clearance:	None
Departure Time:	1240 EDT	Type of Airspace:	

Airport Information

Airport:	Danbury Municipal Airport (DXR)	Runway Surface Type:	
Airport Elevation:	458 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Forced Landing

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	Luke Schiada	Adopted Date:	11/26/2012
Additional Participating Persons:	Pete Lindberg; FAA/FSDO; Windsor Locks, CT		
Publish Date:	11/27/2012		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=81957		

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