Aviation Investigation Final Report

Location:	Grace, Idaho	**Accident Number:**	WPR11FA335
Date & Time:	July 18, 2011, 17:46 Local	**Registration:**	N6855N
Aircraft:	Mooney M20C	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Witnesses in the area observed the airplane make a slight right bank turn followed by a left bank turn toward the runway. The left bank increased to about 45 degrees, before the airplane "dropped" to the ground. Data extracted from the on-board GPS unit indicated that the pilot overshot the extended runway centerline while on the base leg then made a tight left turn back toward the centerline. The airplane impacted the ground, coming to rest less than 1 mile from the approach end of the runway. Given the witness statements and the GPS track, it is likely that the pilot overcorrected the airplane's course by making a steep turn at low speed, which led to a stall. A postaccident examination of the engine, airframe, and related systems revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

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 aircraft control while maneuvering in the traffic pattern, which resulted in an aerodynamic stall.

Findings

Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Approach-VFR pattern final	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On July 18, 2011, at 1746 mountain daylight time, a Mooney M20C, N6855N, impacted terrain while on approach to Simpson Airport (ID62), Grace, Idaho. The pilot/owner operated the airplane under the provisions of 14 Code of Federal Regulations Part 91 as a personal cross-country flight. The private pilot and two passengers were fatally injured; the airplane was substantially damaged. Visual meteorological conditions prevailed for the flight that departed Afton, Wyoming. No flight plan had been filed.

According to witnesses traveling south in an automobile on highway 34, the airplane flew overhead, made a slight right bank, and then banked to the left toward the runway. The witnesses reported that they were able to hear the engine as the airplane passed overhead; there were no unusual sounds coming from the engine. They also stated that the landing gear was in the UP position. The witnesses reported that the airplane appeared to be in a 45-degree left bank as it turned towards the runway. The top of the airplane's fuselage and wings were fully visible to them. The witnesses then saw the airplane drop behind the sagebrush. They saw a cloud of smoke; they called 911, and responded to the site to render aid until emergency medical services (EMS) arrived. The witnesses further reported that the weather was clear, with no wind.

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the 46-year-old pilot held a private pilot certificate with an airplane single-engine land rating. The pilot held an FAA third-class medical issued on May 16, 2011; it had no waivers or limitations. A review of the pilot's logbook revealed the last entry was recorded on April 28, 2011. He logged three flights that day for a total of 1.3 hours. The logbook indicated that as of that date, the pilot's total flight time was 563 hours, with 303 total hours in the accident airplane. According to the pilot's most recent application for his FAA medical certificate, dated May 16, 2011, he reported a total time of 600 hours with 100 hours in the last 6 months. Investigators were not able to ascertain from the pilot's logbook when his last flight review had been completed.

AIRCRAFT INFORMATION

The airplane, a 1968 Mooney M20C, serial number 68138, was equipped with a Textron

Lycoming IO-360-B1B engine, serial number L-17328-36AC. A review of the airplane's maintenance logbooks revealed that the annual inspection and engine 100-hour inspection were signed off for return to service on February 3, 2011. The logbook entry for that date recorded a total airframe time of 5,334.62 hours, and an engine time since major overhaul as 721.2 hours. A Hartzell propeller, model HC-C2YR-1BF, was installed on the airplane.

According to the airplane manufacturer, at a gross weight of 2,575 pounds, with power off, and a forward center of gravity, in a flaps and gear up condition and a 40-degree bank, the stall speed of the airplane would be 68 knots.

METEOROLOGICAL INFORMATION

The closest official weather observation station was Pocatello Regional Airport (PIH), Pocatello, Idaho, which was 42 nautical miles (nm) northwest of the accident site. The elevation of the weather observation station was 4,452 feet mean sea level (msl). An aviation routine weather report (METAR) for PIH was issued at 1653. It stated: winds from 200 degrees at 11 knots gusting to 22 knots; visibility 10 statute miles; skies 11,000 feet scattered; temperature 36 degrees Celsius; dew point 07 degrees Celsius; altimeter 29.99 inches of Mercury.

The recorded METAR for 1753 stated wind from 160 degrees at 13 knots gusting to 20 knots; visibility 10 statute miles; scattered clouds at 11,000 feet; temperature 34 degrees Celsius; dew point 10 degrees Celsius; altimeter 29.97 inches of Mercury.

Weather was also obtained from the Allen H. Tigert Airport, Soda Springs, Idaho, about 7 miles northeast of the accident airport. The density altitude for the area was calculated to be 8,976 feet.

AIRPORT INFORMATION

Simpson Airport (ID62), Grace, was not listed in the FAA's Airport/ Facility Directory. The airport was privately owned and had numerous online websites. For the purposes of this report, information about the airport was provided by the owner of the airport and shown on the website www.airnav.com/airport/ID62. The airport was located 2 miles north of the town of Grace, at GPS coordinates of 42 degrees 36.29 minutes north latitude, and 111 degrees 43.42 minutes west longitude, at an elevation of 5,598 feet. The runways are situated on headings of 16 and 34. The runway surface was comprised of gravel. There is no segmented circle or windsock present. The designated pattern traffic was left turns. The owner and airnav identified an obstacle as a 4-foot fence is located about 200 feet from the runway and 90 feet left of centerline for runway 34.

The Afton Municipal Airport (AFO), Afton, was approximately 35.2 nautical miles northeast of ID62.

WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board investigator-in-charge (NTSB IIC), a Federal Aviation Administration (FAA) airworthiness inspector, and a representative from Lycoming Engines, a party to the investigation, responded to the accident site the following day. The airframe and engine were examined, and no mechanical anomalies that would have precluded normal operation were identified.

Airplane wreckage was strewn along the 200-foot debris path, situated on a northwesterly heading. Red lens fragments were found at the first identified point of impact (FIPC). Approximately 75 feet from the FIPC, a round flat area was identified with a "cut" mark in the ground. Forward of the round flat area was part of the radio stack. About 120 feet from the radio stack was the right door, with the main wreckage about 5 feet from the right door. The emergency locator transmitter (ELT) was found nearby in the main wreckage in sagebrush by the sheriff's department; it was in the OFF position.

The airplane came to rest upright facing to the northeast about 1,145 feet south of the airport. Both wings remained attached to the fuselage. The bottom portion of the left wing was completely ripped open and exposed the inside of the wing. The right wing remained intact, and fuel was observed in the fuel tank. The right wing had leading- to trailing-edge crush damage from the tip inboard to about midspan of the wing. The aft portion of the fuselage, including the empennage, separated from the airplane; the rudder separated from the vertical stabilizer, but was found lying next to the tail section.

The engine separated from the engine mounts, but remained attached to the airframe via electrical wires and cables. Manual rotation of the crankshaft established mechanical and drive train continuity. Thumb compression was obtained at all cylinders.

The left magneto sustained internal damage and would only rotate about 1/4 turn. An inspection of the right magneto showed no visual damage, and when manually rotated, spark was observed at all the posts. The top spark plugs exhibited normal operation signatures when compared to the Champion Aviation check-a-plug chart AV-27. The ignition harness was damaged.

The two-bladed propeller was removed to facilitate an inspection of the engine. Both blades were bent aft with chordwise scratching; however, one blade exhibited s-bending and its tip had partially separated.

MEDICAL AND PATHOLOGICAL INFORMATION

Western Pathology Associates, LLC., performed an autopsy of the pilot on July 19, 2011. The cause of death was listed as blunt force trauma.

The FAA Forensic Toxicology Research Team CAMI, Oklahoma City, Oklahoma, performed

toxicological testing of specimens from the pilot. Analysis of the specimens contained no findings of drugs or volatiles. They did not perform test for carbon monoxide or cyanide.

TESTS AND RESEARCH

The left magneto was examined on August 8, 2011, at Air Transport, Phoenix, Arizona, by an investigator from the NTSB. Damage was noted to the mounting lug and ring, in which the lug had sustained impact damage and had become displaced about 1/8-inch from its normal position. During manual rotation of the magneto drive gear, the investigator noted binding. The five case mounting screws were loosened 2 turns, and the drive gear was manually rotated again with no binding noted, and sparks observed at all terminal posts. The magneto was disassembled; all of the internal gears were undamaged. There were no indications of thermal distress or arcing observed, the rotor was free of scoring, and all of the bearings appeared lubricated.

The Garmin GPS unit was visually examined by the Vehicle Recorder specialist, who noted that the unit had sustained major damage from impact forces. The unit was repaired, and power applied to the unit. Successful download of recorded way point, route, and tracklog data was performed. From June 20, 2011, to July 18, 2011, 10 user defined waypoints, 5 defined routes, and 9 tracklogs were downloaded. There were two tracklogs recorded for the day of the accident. The downloaded data included the following parameters: index, GPS date/time, GPS altitude, distance from previous update (leg length), time since last update (leg time), average groundspeed during the interval (leg speed), average course during the interval (leg course), and latitude/longitude position at the time of the update.

The downloaded data for the accident flight began at 1720:42, at a latitude/longitude fix that corresponded to AFO airport. The final GPS position location fix was recorded at 1746:21 that corresponded to the accident area. The calculated velocity and direction of travel was recorded as 79 knot groundspeed and a course of 002 degrees true north. A plot of the GPS data showed the airplane cross the extended runway centerline, then make a sharp turn left toward the extended centerline.

ADDITONAL INFORMATION

In March of 2013, the NTSB issued Safety Alert SA-019 titled Prevent Aerodynamic Stalls at Low Altitude. The Safety Alert can be found at http://www.ntsb.gov/doclib/safetyalerts/SA_019.pdf and contains several links for materials referencing stalls, stall training, and stall avoidance.

Pilot Information

Certificate:	Private	**Age:**	46,Male
Airplane Rating(s):	Single-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 3 Without waivers/limitations	**Last FAA Medical Exam:**	May 16, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	600 hours (Total, all aircraft), 303 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N6855N
Model/Series:	M20C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	680138
Landing Gear Type:	Retractable -	**Seats:**	4
Date/Type of Last Inspection:	February 3, 2011 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	5335 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-B1B
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	U78,5839 ft msl	**Distance from Accident Site:**	7 Nautical Miles
Observation Time:	17:51 Local	**Direction from Accident Site:**	70°
Lowest Cloud Condition:	Scattered / 10000 ft AGL	**Visibility**	20 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.18 inches Hg	**Temperature/Dew Point:**	32°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Afton, WY (AFO)	**Type of Flight Plan Filed:**	None
Destination:	Grace, ID (ID62)	**Type of Clearance:**	None
Departure Time:	17:20 Local	**Type of Airspace:**	

Airport Information

Airport:	Simpson Airport ID62	**Runway Surface Type:**	
Airport Elevation:	5598 ft msl	**Runway Surface Condition:**	
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	42.600555,-111.727775(est)

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Mark M Rushton; Federal Aviation Administration; Salt Lake City, UT Troy Helgeson; Lycoming Engines; Williamsport, PA
Original Publish Date:	April 17, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=81145