Aviation Investigation Final Report

Location:	Rio Linda, California	**Accident Number:**	WPR09FA133
Date & Time:	February 28, 2009, 09:05 Local	**Registration:**	N3463X
Aircraft:	Mooney M20E	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The flight was planned to be a maintenance test flight following an annual inspection, which included the installation of a field overhauled engine by the mechanic/passenger. Witnesses reported that a "popping" sound was heard during the takeoff ground roll. After liftoff, they heard the engine surge followed by a puff of black smoke emanating from the right rear of the engine. A videotape recording obtained from a camera located on a nearby building captured the airplane on the initial climb-out before it made a left turn back to the runway. The left wing and nose dropped as the airplane entered a spin prior to descending out of view of the camera. The airplane came to rest in an open field about 300 feet from the end of the runway and was consumed by a post-crash fire. During the postaccident inspection of the airframe and engine, no mechanical failures or malfunctions were found that would have prevented normal operation. The fuel lines, hoses, and fuel pump were too badly fire damaged to be able to determine if any pre-existing malfunctions affected those components.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A partial loss of engine power for undetermined reasons and the pilot's failure to maintain an adequate airspeed while maneuvering during the initial climb, which resulted in a stall/spin.

Findings

Aircraft	(general) - Failure
Not determined	(general) - Unknown/Not determined
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Initial climb	Loss of engine power (partial)
Initial climb	Loss of control in flight (Defining event)
Initial climb	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On February 28, 2009, at 0905 Pacific standard time, a Mooney M20E, N3463X, collided with the ground shortly after takeoff from the Rio Linda airport, Rio Linda, California. The pilot/owner operated the airplane under the provisions of 14 Code of Federal Regulations Part 91, as a maintenance test flight. The certificated private pilot and mechanic/passenger were killed. The airplane was substantially damaged in the post-impact fire. Visual meteorological conditions prevailed for the local area flight, and no flight had been filed.

WITNESS INFORMATION

According to witnesses on the airport and surrounding the airport, they heard the engine sputtering and smoke emanating from the engine. Witnesses then saw the airplane enter a spin and impact the ground, and burst into flames. A witness, a part owner in the airplane, standing adjacent to the runway videotaping the flight, reported that as the airplane passed overhead he could hear popping and sputtering followed by a puff of black smoke emanating from the right rear of the engine.

The same witness reported that the airplane had recently gone through an annual inspection and the accident flight was the first flight following that maintenance. The inspection included the installation of a field major overhauled engine and tail section.

VIDEOTAPE

The witness/part owner of the airplane submitted his videotape of the accident flight. The videotape showed the engine start and run-up at the hangar, a high-speed taxi brake check, the takeoff roll and climb out, and turn back toward the runway. The videotape was reviewed by the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), no problems were observed during the start up or high-speed taxi. However, as the pilot added power, and was on the takeoff roll, a "popping" sound was heard. After liftoff, the engine was surging followed by a puff of black smoke.

Another video was obtained from Rio Linda Junior High School, which is located at the

departure end of the runway. There is no sound associated with the video. The video does show the airplane on the initial climb-out. The airplane then makes a left turn back to the runway. The airplane's nose and left wing drop and the airplane begins to spin before it drops out of view of the camera.

PERSONNEL INFORMATION

Pilot

A review of FAA airman and medical records on file in Oklahoma City, Oklahoma, revealed that the 53-year-old pilot held a private pilot certificate with ratings for airplane single-engine land and single-engine sea. The pilot also held a mechanic certificate with ratings for airframe and power plant.

The pilot held a first-class medical certificate issued on January 29, 2009. It had the limitation that the pilot shall possess glasses for near vision. The pilot reported 841 total flight hours on his most recent medical application; a pilot's logbook was not made available to the NTSB IIC for review.

Mechanic/passenger

A review of the FAA mechanic, airman, and medical records on file in Oklahoma City revealed that the 54-year-old passenger held a mechanic certificate with ratings for airframe and power plant. He also held an inspection authorization (IA) certificate. The review of his records also revealed that the mechanic held a combined student pilot and third-class medical certificate issued on June 27, 2008; at that time he reported a total of 340 flight hours. It had the limitation that he must wear corrective lenses.

AIRCRAFT INFORMATION

The airplane was a 1966 Mooney M20E, serial number 1143. The last annual inspection was dated May 5, 2007, at a total time of 3,715.52 hours.

A Lycoming IO-360-A1A, serial number L-2302-51A, was installed on the airplane on May 26, 1969 at 910 total hours. The last 100-hour inspection was dated May 5, 2007, at a total time of 664.72 hours since major overhaul. According to records made available to the NTSB IIC, the mechanic was shipped a repaired crankcase from Divco, Inc., Tulsa, Oklahoma, on September 10, 2008. Various engine parts were shipped to the mechanic in September and October 2008.

WRECKAGE AND IMPACT

The NTSB IIC and a representative from Lycoming, a party to the investigation, responded to the accident site. The entire airplane came to rest adjacent to the airport property at the Roy Hayer Memorial Speedway in an open area. The airplane came to rest at global position

system (GPS) coordinates of latitude of 38 degrees 40.770 minutes north, and a longitude of 121 degrees 26.779 minutes west, at an elevation of 41 feet.

The entire airplane came to rest at the accident site; the cockpit and cabin areas, as well as the empennage were thermally destroyed in the fire. Fire damage was noted to the tail section, and both wings. Both wings were crushed from the leading to trailing edge. The left wing center section was thermally destroyed. The right wing remained intact, with sooting evident at the center section of the wing. The engine remained attached to the firewall, and the propeller assembly remained connected to the engine.

MEDICAL AND PATHOLOGICAL INFORMATION

Pilot

The Sacramento County Coroner completed an autopsy on March 1, 2009. The manner of death was listed as multiple blunt force injuries.

The FAA Forensic Toxicology Research Team, Oklahoma City, performed toxicological testing of specimens of the pilot. Analysis of the specimens contained no findings for carbon monoxide, cyanide, volatiles, or tested drugs.

Mechanic/passenger

The Sacramento County Coroner completed an autopsy on March 2, 2009. The manner of death was listed as multiple blunt force injuries. The autopsy report identified that chest blood from the mechanic was retained for toxicology testing.

TEST AND RESEARCH INFORMATION

The NTSB IIC and a participant from Lycoming Engines examined the airframe and engine at Plain Parts, Sacramento, California, on March 2, 2009.

Inspection of the airframe found no anomalies with the flight control system.

A visual examination of the engine revealed no obvious mechanical malfunctions. Mechanical and drive train continuity was established through manual rotation of the crankshaft; thumb compression was also obtained.

The fuel fitting connection between the firewall to the fuel pump line was tight. The fuel pump to servo line hose was loose in the fitting where it connected to the servo. The oil filter hose to fitting was loose, but the fitting to the oil filter connection was secure. The fuel pump was mostly consumed by fire. The accessories above the fuel pump sustained thermal damage.

Both magnetos remained attached to their respective mounting pads on the engine, but

sustained thermal damage. The right magneto was free to rotate but produced no spark, and as a result of the fire damage, the left magneto would not rotate. The spark plugs appeared normal as compared to the Champion check-a-plug chart AV-27.

All four of the cylinders were removed and inspected; investigators noted no detonation or foreign debris along the cylinder walls, no piston to cylinder damage, and no stuck valves. There was no internal damage to the connecting rods or thermal discoloration, nor were any of the push rods bent. The oil pick-up screen was free of debris, and the fuel servo inlet screen was also clear. The fuel flow divider was opened and the diaphragm was not damaged and was free of debris. The fuel injectors were clear.

According to the Lycoming representative, there were no abnormalities that would have prevented normal operation.

The propeller assembly remained attached to the engine with the spinner crushed and torn. The propeller governor was broken at the flange at the accessory housing. The propeller blades were randomly labeled Blade A and Blade B. Blade A was bent aft at the hub with diagonal scratch marks evident about 1 foot from the hub outboard. Blade B was bent aft at the hub with chordwise scratch marks evident the length of the blade.

Fuel lines, hoses, and the fuel pump were shipped to the NTSB metallurgical laboratory in Washington, D.C., for additional inspection. According to the metallurgical specialist, the fuel lines and hoses were installed as a kit. One of the fuel lines had a data plate on it identifying it as a Stratoflex 111. The hose had a rubber interior; the lines themselves were thermally damaged and a determination of pre-existing damage could not be ascertained. The fuel pump also sustained heavy fire damage. The outer aluminum case was melted with sections of the pump missing, most likely consumed during the fire. Due to the fire damage a determination of any pre-existing mechanical failures or malfunctions was not possible.

Pilot Information

Certificate:	Private	**Age:**	53,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**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 1 Without waivers/limitations	**Last FAA Medical Exam:**	January 29, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 15, 2006
Flight Time:	824 hours (Total, all aircraft), 46 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N3463X
Model/Series:	M20E	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1143
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 5, 2007 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2715 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360
Registered Owner:	David Michaud	**Rated Power:**	
Operator:	David Michaud	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SMF,27 ft msl	**Distance from Accident Site:**	7 Nautical Miles
Observation Time:	08:53 Local	**Direction from Accident Site:**	265°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.03 inches Hg	**Temperature/Dew Point:**	12°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Rio Linda, CA (L36)	**Type of Flight Plan Filed:**	None
Destination:	Rio Linda, CA (L36)	**Type of Clearance:**	None
Departure Time:	09:05 Local	**Type of Airspace:**	

Airport Information

Airport:	Rio Linda Airport L36	**Runway Surface Type:**	Asphalt
Airport Elevation:	45 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	35	**IFR Approach:**	None
Runway Length/Width:	2625 ft / 42 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	38.679443,-121.446388

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Rick Stockton; Federal Aviation Administration; Sacramento, CA Troy Hegleson; Textron Lycoming; Williamsport, PA
Original Publish Date:	April 28, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=73409