Aviation Investigation Final Report

Location:	LIBERTY, North Carolina	**Accident Number:**	MIA99LA191
Date & Time:	June 29, 1999, 12:40 Local	**Registration:**	N7114V
Aircraft:	Mooney M20F	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The flight was in cruise at 6,500 feet msl, when the engine started to run rough. Two to three minutes later the engine stopped operating, and the pilot requested vectors to the nearest airport. While setting himself up for a forced landing, the cabin filled with smoke, and the pilot cracked open the cabin door to evacuate the smoke. The airplane touched down short of the runway and sustained main landing gear damage. Postcrash examination revealed muffler and muffler shroud breaching that allowed engine exhaust to impinge on and burn components of the nose landing gear, the air induction system, and the lower fuselage. NTSB Materials Laboratory examination revealed the muffler failed due to scaling and intergranular attack occurring over a period of time that would have been evident 30 flight hours previous when the airplane underwent an annual inspection.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Improper inspection of the muffler assembly resulting in erosion going undetected and the rupture of the muffler and shroud while in cruise flight. The condition caused melting of portions of the air induction system, loss of engine power, and the pilot's attempted forced landing that resulted in collision with terrain that sheared one main landing gear and fractured the wheel of the other main landing gear. A factor in the accident was the pilot's obscured vision due to smoke in the cockpit.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE

Findings
1. EXHAUST SYSTEM,MUFFLER - RUPTURED
2. (C) MAINTENANCE,INSPECTION - INADEQUATE - OTHER MAINTENANCE PERSONNEL

Occurrence #2: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: CRUISE

Findings
3. (F) INDUCTION AIR DUCTING - BURNED

Occurrence #3: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. FUSELAGE,CREW COMPARTMENT - SMOKE

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Factual Information

On June 29, 1999, about 1240 eastern daylight time, a Mooney M20F, N7114V, registered to a private individual, operating as a Title 14 CFR Part 91 personal flight, crashed short of the runway at Causey Airport, Liberty, North Carolina. The pilot was attempting a forced landing following an in-flight engine failure and subsequent smoke in the cabin. Visual meteorological conditions prevailed and no flight plan was filed. The airplane sustained substantial damage and the private-rated pilot, the sole occupant, was not injured. The flight originated from Newport News, Virginia, about 1 hour 10 minutes before the accident.

According to the pilot, he was in cruise flight at 6,500 feet msl, when he heard the engine start to run rough. Two to 3 minutes later, the engine stopped altogether, and he steered toward the Causey Airport for a forced landing. He was in the landing pattern when the cabin filled with smoke. He touched down short of the runway into rough terrain, causing damage to the landing gear. In follow-up phone conversation, he stated he does not remember hearing any unusual engine noises during start or en route, nor does he remember any increase of level of exhaust noise. He did say, however, that he uses noise attenuating earphones that are very effective.

According to an FAA inspector, the airplane touched down 300 feet short of the runway and hit a berm, shearing the right main landing gear assembly and fracturing the left wheel at the axle. Postcrash examination revealed that in addition to the main gear damage, the nose tire was burned and deflated, and the fuselage bottom aft of the firewall was heat stressed and cracked. The muffler shroud had a 2 x 3 inch hole and the muffler had a 4 x 4 inch hole blown out of their respective side walls and welded seams. Portions of the lower plenum/air induction system were melted.

The muffler and shroud were shipped to the NTSB Materials Laboratory for failure analysis examination. The muffler walls revealed scaling and intergranular attack that eventually became cracks, and in the case of the perforated inlet pipes, disintegration. This allowed the undiffused exhaust gases to directly impinge on the muffler walls, accelerating the aging process.

The Mooney M20 Series Service and Maintenance Manual and 100-Hour Annual Inspection Guide state that the exhaust heater shroud should be removed and inspected and the muffler inspected for corrosion, fatigue and/or welding cracks, and any other apparent damage during annual inspections. According to airplane maintenance records, this engine and airframe underwent an annual inspection on January 21, 1999, and had accumulated 30 hours since the inspection.

Pilot Information

Certificate:	Private	**Age:**	46,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 9, 1998
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3554 hours (Total, all aircraft), 29 hours (Total, this make and model), 3439 hours (Pilot In Command, all aircraft), 119 hours (Last 90 days, all aircraft), 52 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N7114V
Model/Series:	M20F M20F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	220049
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 21, 1999 Annual	**Certified Max Gross Wt.:**	3127 lbs
Time Since Last Inspection:	30 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2128 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO360 A1A
Registered Owner:	THOMAS S. WILSON	**Rated Power:**	200 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BUY ,617 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	12:54 Local	**Direction from Accident Site:**	40°
Lowest Cloud Condition:	Scattered / 3500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	28°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	NEWPORT NEWS , VA (PHF)	**Type of Flight Plan Filed:**	None
Destination:	MOORESVILLE , NC (14A)	**Type of Clearance:**	None
Departure Time:	12:40 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	CAUSEY AIRPORT 2A5	**Runway Surface Type:**	Asphalt
Airport Elevation:	723 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	20	**IFR Approach:**	None
Runway Length/Width:	3002 ft / 40 ft	**VFR Approach/Landing:**	Forced landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	In-flight
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	35.849601,-79.569396(est)

Administrative Information

Investigator In Charge (IIC):	Stone, Alan
Additional Participating Persons:	STEPHEN A BLANSET; WINSTON-SALEM , NC
Original Publish Date:	March 2, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=46686