Aviation Investigation Final Report

Location:	DAVIS, West Virginia	**Accident Number:**	IAD98LA026
Date & Time:	February 8, 1998, 16:15 Local	**Registration:**	N4120H
Aircraft:	Mooney M20J	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Serious, 1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During takeoff and approximately 100 feet AGL, the engine began to run rough and lost power. The airplane touched down on a snow covered field, nosed over and came to rest inverted. The engine was tested and the fuel flow was found to fluctuate. The fuel injector servo system was tested and the following discrepancies were found: the safety wire attached to the plug utilized to adjust the diaphragms inside the fuel servo was missing its lead seal. One of the four fuel injector nozzles was blocked. Individual injector nozzles were tested. Debris blocked the flow in one nozzle, and the remainder of the fuel nozzles had an acceptable fuel stream. A representative from Aircraft Fuel Specialists, Ltd.. who conducted the testing, stated that the adjustment to the diaphragms would not cause the loss of power as described to him. He stated that the 'blockage of the inlet screen, which was completely plugged, and the one blocked nozzle were more a factor' in the loss of power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of power due to blockage of the fuel screen and one of the four fuel injector nozzles. A contributing factor was snow covered terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) FUEL SYSTEM,SCREEN - BLOCKED(TOTAL)
2. (C) FUEL SYSTEM,NOZZLE - BLOCKED(PARTIAL)

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

Occurrence #3: NOSE OVER
Phase of Operation: LANDING - ROLL

Findings
3. (F) TERRAIN CONDITION - SNOW COVERED

Factual Information

On February 8, 1998, approximately 1615 eastern standard time, a Mooney, M20J, N4120H, sustained substantial damage during a forced landing after takeoff at the Windwood Fly-In Resort Airport (WV62), Davis, West Virginia. The certificated private pilot/owner was not injured and the passenger received serious injuries. Visual meteorological conditions prevailed and no flight plan was filed for the personal flight conducted under 14 CFR Part 91, destined for Harrisburg, Pennsylvania.

According to the pilot, the airplane was topped off with fuel prior to departing Capital City Airport (CXY), Harrisburg, Pennsylvania. The pilot reported that after departing CXY, he stopped at York Airport (THV), and then, flew to WV62, where he landed with no discrepancies to the airplane.

After 4 hours, the pilot and passenger returned to the airplane. After starting his engine, the pilot recalled that he allowed the engine to warm up prior to taxiing. He stated that the take off roll was "normal," and at approximately 100 feet AGL, the engine began to run rough and lost power. He reported that he quickly checked the fuel selector valve, engine controls, and leaned the mixture. The airplane touched down on a snow covered field, approximately 600 feet beyond the departure end of the runway, nosed over and came to rest inverted. The airplane was taken to Hagerstown Aircraft Service, Hagerstown, Maryland.

On March 2, 1998, under the supervision of a Federal Aviation Administration Inspector, the engine was placed on a test stand. The Inspector reported that the engine started up immediately, but ran for approximately 20 seconds. On subsequent attempts, the engine would only run for a few seconds. He noted that during each run, the fuel flow fluctuated. After 15 minutes of attempting to start the engine, the Inspector wrote that the engine would no longer start. The Inspector removed the fuel servo inlet screen and stated that he could not determine whether the screen was clogged. The engine driven fuel pump was removed, checked and found operational.

On March 3, 1998, the entire fuel system was bench tested at Aircraft Fuel Specialists, Ltd., a repair station specializing in aircraft fuel systems. The insurance representative's report, and data from Aircraft Fuel Specialists, Ltd stated that the injector servo was a Bendix RSA 5AD1, P/N: 2524054-7 and S/N: 68449. They observed that the safety wire was cut at the plug near the fuel inlet screen, but were advised that the FAA had pulled the inlet screen prior to engine test run. The plug for the adjustment of the diaphragms had safety wire, but it was missing the lead seal. The usual practice was to place a seal on the wire. The "idle mixture setting had three threads showing towards the mixture side and six threads showing towards the throttle side. There was a difference in the thread color." The fuel inlet screen was removed and a drop of water was observed in the screen cavity. In addition, lint was found inside the screen.

Individual injector nozzles were tested. Debris blocked the flow in one nozzle, and the remainder of the fuel nozzles had an acceptable fuel stream.

The representative from Aircraft Fuel Specialists, Ltd.. who conducted the testing, stated that the adjustment to the diaphragms would not cause the loss of power as described to him. He stated that the "blockage of the inlet screen, which was completely plugged, and the one blocked nozzle were more a factor" in the loss of power. He did not record what the contaminates consisted of, but relayed that it likely was lint and chips of paint.

In a telephone interview, the pilot stated that within the past year, four new cylinders, a new fuel flow meter gauge, and a heater were installed on the airplane. He reported that to the best of his knowledge, the installation of these units did not require adjusting the fuel injector servo unit. He stated that he flew the airplane for about 50 hours after the installation of the cylinders and the fuel flow gauge. The heater was on the airplane for 2 weeks. He stated that he did not adjust the diaphragms inside the fuel servo.

In a telephone interview, the Director of Maintenance for the shop that replaced the four cylinders stated that the cylinders were replaced because of excessive crankcase pressure with oil coming out of the breather. He stated that the 1979 vintage airplane had a total of 900 hours and the cylinders were covered with rust. When asked about the fuel injector servo, he stated that his facility did not do maintenance on that unit, and if it required servicing, it would have been sent to Mattituck Aviation.

Pilot Information

Certificate:	Private	**Age:**	51,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:**	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	May 21, 1996
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	700 hours (Total, all aircraft), 293 hours (Total, this make and model), 700 hours (Pilot In Command, all aircraft), 47 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N4120H
Model/Series:	M20J M20J	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-0635
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 4, 1997 Annual	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:	81 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	997 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-A3B6D
Registered Owner:	JAMES F. KESSLER, III	**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:	EKN ,1987 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	16:51 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:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	8°C / -7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(WV62)	**Type of Flight Plan Filed:**	None
Destination:	HARRISBURG , PA (CXY)	**Type of Clearance:**	None
Departure Time:	16:30 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	WINDWOOD FLY-IN AIRPORT WV62	**Runway Surface Type:**	Macadam
Airport Elevation:	3200 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	24	**IFR Approach:**	None
Runway Length/Width:	3000 ft / 40 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 None	**Latitude, Longitude:**	39.130405,-79.460098(est)

Administrative Information

Investigator In Charge (IIC):	Cain, Jim
Additional Participating Persons:	DAVE BURGUESS; CHARLESTON , WV NORMAN E LEE; BALTIMORE , MD
Original Publish Date:	March 30, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=28278