



# Aviation Investigation Final Report

|                                |                                      |                         |             |
|--------------------------------|--------------------------------------|-------------------------|-------------|
| <b>Location:</b>               | WHEELING, Illinois                   | <b>Accident Number:</b> | CHI97LA142  |
| <b>Date &amp; Time:</b>        | May 20, 1997, 18:18 Local            | <b>Registration:</b>    | N6950V      |
| <b>Aircraft:</b>               | Mooney M20F                          | <b>Aircraft Damage:</b> | Substantial |
| <b>Defining Event:</b>         |                                      | <b>Injuries:</b>        | 1 None      |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Personal |                         |             |

## Analysis

On the first flight after maintenance, the pilot reported that on the initial climb, 'the engine stopped producing power and began behaving erratically.' The pilot declared an emergency to the controlling ATC personnel, and turned back to Palwaukee Municipal Airport. The pilot reported that the engine, 'was backfiring and sounded like only one cylinder was hitting.' The pilot selected a field to execute a forced landing, circled it twice, and landed on an easterly heading. The pilot reported that the plane, after touch down, 'skidded and rolled for about 250 yards before coming to rest on the bank of a small creek.' The pilot evacuated the airplane and waited for assistance. Examination of the number four cylinder revealed excessive black carbon build-up on the cylinder head and exhaust valve seat.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: binding of the number four exhaust valve, which resulted in a partial power loss. A factor was the ravine.

### Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - MECH FAILURE/MALF  
Phase of Operation: CLIMB - TO CRUISE

#### Findings

1. (C) ENGINE ASSEMBLY, VALVE, EXHAUST - BINDING(MECHANICAL)

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Occurrence #2: FORCED LANDING  
Phase of Operation: EMERGENCY DESCENT/LANDING  
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Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER  
Phase of Operation: LANDING - ROLL

Findings

2. (F) TERRAIN CONDITION - RAVINE

## Factual Information

On May 20, 1997, at 1818 central daylight time (CDT), a Mooney M20F, N6950V, sustained substantial damage during a forced landing in Wheeling, Illinois. The commercial rated pilot reported loss of engine power during initial climb. He reported no injuries. The personal 14 CFR Part 91 flight was operating in visual meteorological conditions. An IFR flight plan was on file. The flight departed Wheeling, Illinois at 1815, with a planned destination of Madison, Wisconsin.

In a written statement, the pilot reported that during an engine run-up he noticed that the engine was running rough with some backfiring. The pilot took the airplane to a local FAA Certified Repair Station for examination. A FAA Certified Mechanic examined the airplane, and found the number one cylinder intake pipe, "loose and leaking." The FAA Certified Mechanic replaced the intake gasket on the number one cylinder, ground tested the airplane, and returned it to service.

After maintenance, the pilot re-filed his flight plan and prepared for departure. The pilot reported that the engine run-up was, "acceptable," and departed Palwaukee Municipal Airport at 1815 local time. The pilot stated that, "after about five minutes the engine stopped producing power and began behaving erratically." The pilot declared an emergency to the controlling ATC personnel, and turned back to Palwaukee Municipal Airport. The pilot reported that the engine, "was backfiring and sounded like only one cylinder was hitting." He stated that, "Restart procedures were ineffective, a small response to mixture leaning, and it was quickly apparent that PWK [Palwaukee Municipal Airport] was not reachable."

The pilot selected a field to execute a forced landing, circled it twice, and landed on an easterly heading. The pilot reported that the plane, after touch down, "skidded and rolled for about 250 yards before coming to rest on the bank of a small creek." The pilot evacuated the airplane and waited for assistance.

Examination of the aircraft, showed that the left wing had a eight inch crush in the leading edge mid-wing span. The right wing was bent downwards at a 10 degree angle from the outboard production seam to the wing tip. There was a crush zone on the left lower cowling, and the bottom of the tail cone was crushed upward. When the wing fuel tanks were visually checked, the right tank was 1/2 full and left tank was 3/4 full. The fuel selector lever was set on the right tank setting.

The propeller blade tips were bent slightly aft, with no torsional bending evident.

Engine manifold, propeller, and mixture levers were set at the full aft positions. The gear selector was in the down position, with the right main and nose gears down and locked. The

left main gear was collapsed at inspection. Aileron and elevator controls were tested and showed no apparent mechanical malfunctions.

Examination of spark plugs revealed spark plugs from cylinders one and four had black carbon deposits. The engine started, and was operated at a low power settings. Cylinder number four exhibited intermittent backfiring at different mixture and power settings. Backfiring also occurred in cylinder number four during operations on right, left, and both magneto settings.

All cylinders had compression. The number four cylinder exhibited black carbon deposits. The exhaust valve and valve seat exhibited black carbon build-up as well.

Right and left magnetos were removed for testing of proper operation. Both right and left magnetos operated normally when tested.

### Pilot Information

|                                  |  |  |              |
|----------------------------------|--|--|--------------|
| <b>Certificate:</b>              | Commercial   | <b>Age:</b>                              | 32, Male     |
| <b>Airplane Rating(s):</b>       | Single-engine land; Multi-engine land  | <b>Seat Occupied:</b>                    | Left         |
| <b>Other Aircraft Rating(s):</b> | None   | <b>Restraint Used:</b>                   |              |
| <b>Instrument Rating(s):</b>     | Airplane   | <b>Second Pilot Present:</b>             | No           |
| <b>Instructor Rating(s):</b>     | None   | <b>Toxicology Performed:</b>             | No           |
| <b>Medical Certification:</b>    | Class 2 Valid Medical-w/ waivers/lim   | <b>Last FAA Medical Exam:</b>            | May 31, 1996 |
| <b>Occupational Pilot:</b>       | No   | <b>Last Flight Review or Equivalent:</b> |              |
| <b>Flight Time:</b>              | 355 hours (Total, all aircraft), 54 hours (Total, this make and model), 305 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft) |  |              |

## Aircraft and Owner/Operator Information

|                                      |                          |                                       |                 |
|--------------------------------------|--------------------------|---------------------------------------|-----------------|
| <b>Aircraft Make:</b>                | Mooney                   | <b>Registration:</b>                  | N6950V          |
| <b>Model/Series:</b>                 | M20F M20F                | <b>Aircraft Category:</b>             | Airplane        |
| <b>Year of Manufacture:</b>          |                          | <b>Amateur Built:</b>                 |                 |
| <b>Airworthiness Certificate:</b>    | Normal                   | <b>Serial Number:</b>                 | 22-1323         |
| <b>Landing Gear Type:</b>            | Retractable - Tricycle   | <b>Seats:</b>                         | 4               |
| <b>Date/Type of Last Inspection:</b> | March 14, 1997 Annual    | <b>Certified Max Gross Wt.:</b>       | 2740 lbs        |
| <b>Time Since Last Inspection:</b>   | 10 Hrs                   | <b>Engines:</b>                       | 1 Reciprocating |
| <b>Airframe Total Time:</b>          | 2739 Hrs                 | <b>Engine Manufacturer:</b>           | Lycoming        |
| <b>ELT:</b>                          | Installed, not activated | <b>Engine Model/Series:</b>           | IO-360          |
| <b>Registered Owner:</b>             | MILTON W. FUEHRER        | <b>Rated Power:</b>                   | 200 Horsepower  |
| <b>Operator:</b>                     |                          | <b>Operating Certificate(s) Held:</b> | None            |
| <b>Operator Does Business As:</b>    |                          | <b>Operator Designator Code:</b>      |                 |

## Meteorological Information and Flight Plan

|   |                                  |   |                   |
|---|----------------------------------|---|-------------------|
| <b>Conditions at Accident Site:</b>     | Visual (VMC)                     | <b>Condition of Light:</b>                  | Night/dark        |
| <b>Observation Facility, Elevation:</b> | PWK ,647 ft msl                  | <b>Distance from Accident Site:</b>         | 12 Nautical Miles |
| <b>Observation Time:</b>                | 17:53 Local                      | <b>Direction from Accident Site:</b>        | 270°              |
| <b>Lowest Cloud Condition:</b>          | Scattered / 8000 ft AGL          | <b>Visibility</b>                           | 10 miles          |
| <b>Lowest Ceiling:</b>                  | None                             | <b>Visibility (RVR):</b>                    |                   |
| <b>Wind Speed/Gusts:</b>                | 6 knots /                        | <b>Turbulence Type Forecast/Actual:</b>     | /                 |
| <b>Wind Direction:</b>                  | 80°                              | <b>Turbulence Severity Forecast/Actual:</b> | /                 |
| <b>Altimeter Setting:</b>               | 30 inches Hg                     | <b>Temperature/Dew Point:</b>               | 15°C / 2°C        |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |   |                   |
| <b>Departure Point:</b>                 | (PWK )                           | <b>Type of Flight Plan Filed:</b>           | IFR               |
| <b>Destination:</b>                     | MADISON , WI (MSN )              | <b>Type of Clearance:</b>                   | IFR               |
| <b>Departure Time:</b>                  | 18:15 Local                      | <b>Type of Airspace:</b>                    | Class D           |

## Airport Information

|                             |   |                                  |                |
|-----------------------------|---|----------------------------------|----------------|
| <b>Airport:</b>             |   | <b>Runway Surface Type:</b>      |                |
| <b>Airport Elevation:</b>   |   | <b>Runway Surface Condition:</b> |                |
| <b>Runway Used:</b>         | 0 | <b>IFR Approach:</b>             | None           |
| <b>Runway Length/Width:</b> |   | <b>VFR Approach/Landing:</b>     | Forced landing |

## Wreckage and Impact Information

|                            |        |                             |                           |
|----------------------------|--------|-----------------------------|---------------------------|
| <b>Crew Injuries:</b>      | 1 None | <b>Aircraft Damage:</b>     | Substantial               |
| <b>Passenger Injuries:</b> |        | <b>Aircraft Fire:</b>       | None                      |
| <b>Ground Injuries:</b>    | N/A    | <b>Aircraft Explosion:</b>  | None                      |
| <b>Total Injuries:</b>     | 1 None | <b>Latitude, Longitude:</b> | 42.129714,-87.920471(est) |

## Administrative Information

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|--|---|
| <b>Investigator In Charge (IIC):</b>     | Robbins, Wesley   |
| <b>Additional Participating Persons:</b> | ROBERT LUNA; WEST CHICAGO , IL  |
| <b>Original Publish Date:</b>            | June 9, 1999  |
| <b>Last Revision Date:</b>               |   |
| <b>Investigation Class:</b>              | <a href="#">Class</a>   |
| <b>Note:</b>                             |   |
| <b>Investigation Docket:</b>             | <a href="https://data.ntsb.gov/Docket?ProjectID=10574">https://data.ntsb.gov/Docket?ProjectID=10574</a> |

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