NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

March 29, 20012

AIRFRAME AND ENGINE EXAMINATION

WPR12LA108

This document contains 9 embedded photos.

(5 pages)

N367MR - Mooney M20J - Examination Report

Thursday, March 29, 2012
10:30 AM

Mooney M20J
N367MR
S/N: 24-1437

Participants:

• Van McKenny	NTSB
• Tom Weeks	FAA
• Shirley Roseberry	FAA

Airframe

- Engine and engine mount removed from airframe during recovery
- Battery disconnected and removed (during recovery)
- Tail section separated from the cabin along rivet line aft of rear side window (during recovery).
- Tail detached from fuselage (during recovery)
- Firewall clean, no evidence of engine oil coating
- Interior of engine cowling had a very light sheen of oil visible to the eye
- Left side belly had a thin coating of oil aft of the firewall and along the left side of the tail section.
- Belly skin panel (removed during recovery) had a light coating/sheen of oil.
- Flaps removed (during recovery).
- Salvage personnel reported that 35 gal of avgas was removed from the airplane during the recovery.

Cockpit

- Prop/Mix/Throttle - full forward
- Trim master - OFF
- Master - ON
- Avionics master - ON
- Gear handle - down
- Altimeter - 30.18
- Left Fuel Tank - 0
- Right Fuel Tank - 0
- Hobbs - 0905.7
- JPI EDM 700 removed to be examined by NTSB Recorders Lab

Engine

- IO-360-A3B6D
- S/N: L-23676-51A
- 200 HP at 2700 rpm
- JPI EDM 700 - retained by NTSB
- Overall condition; engine was removed by the recovery team. The engine was seized, so the propeller was removed from the propeller flange. The engine was in good condition and exhibited no evidence of impact damage. There was no evidence of an external oil leak, however, there were locations on external horizontal surfaces and the underside of some flanges where oil droplets were observed.

- Spark plugs were removed. Normal operating signature (NOS) except for cylinder #4 which exhibited black dust like residue residing on the top spark plug and black deposits fouling the bottom spark plug.

Spark plugs

- Fuel divider was disassembled. Gasket was pliable and intact. Petroleum odor was observed as well as liquid present on the plunger.
- Oil filter was safety wired and had the date, 1.31.2012, hand written on it. A wrench was used to loosen the filter and a filter cutter was used to cut open the case and examine the filter element. Portions of the filter element were black and other sections light brown/tan. Gold and black flakes were observed in the filter folds.

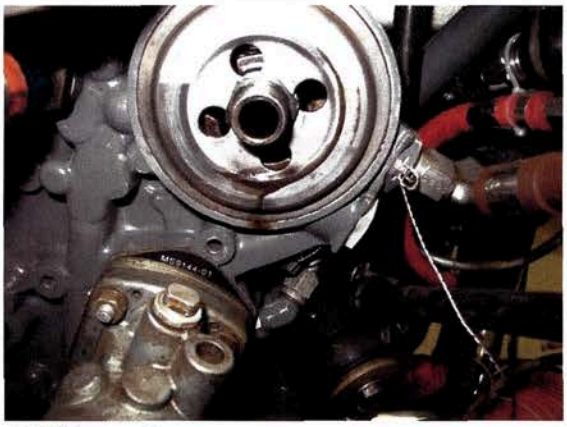
Oil filter element

- Oil lines from the accessory case to the oil cooler, and from the oil cooler to the oil filter were tight. Approximately 6 oz of oil drained from the oil cooler when it was removed from the engine.
- The oil plug finger screen was removed and examined. It has some black flakes and fibrous material on the screen but nothing that would restrict the flow of oil. The plug/screen did did release a thin drizzle of oil after the plug had been removed.
- The accessory section of the engine was removed, gasket was pliable and no evidence of oil leakage.
- Oil pump rotated freely by hand, oil pump cover was removed and oil pump gears exhibited no damage or scoring.
- The induction tubes and exhaust manifold were removed from the engine oil sump.

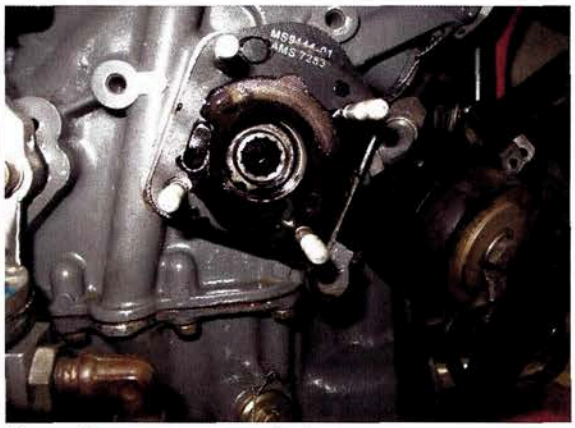
- The oil pan was removed from the bottom of the engine. A small amount of oil was observed coating the bottom of the sump. Gold colored and black colored flakes or sand like material were observed on the bottom of the sump. No evidence of an oil leak from the oil sump gasket.

Oil sump & material found in the sump

- Fuel lines leading to the throttle body were removed and drained fuel.
- Fuel pump was removed and drained fuel.
- The propeller governor was removed, rotated freely by hand, and the filter screen was clear of debris. The governor drained out approximately 2 oz of oil.
- The propeller gasket was a single black gasket, MS9144-01, AMS7283.



Oil filter pad



Propeller governor gasket

- Exhaust manifold was removed. The exhaust manifolds were dark brown/black and dull in color. The muffler was brown/black with vertical staining streaks and portions had a shiny surface.
- Valve covers were removed from all 4 cylinders. Valve rockers were coated with a light coat of oil
- The engine cylinders were removed from the engine case. All valves were seated, and no evidence of mechanical valve damage was observed. All push rods were removed and found lubricated with oil, no discoloration observed.
- The piston wrist pins were removed. Piston heads exhibited brown-white combustion deposits.
- #1 connecting rod was seized at the crankshaft bearing. Connecting rod exhibited red-brown discoloration around the base of the rod and connecting rod end cap.

- #2 connecting rod moved freely and had no discoloration.
- #3 connecting rod moved freely, and was discolored red-brown around the base and end cap.
- #4 connecting rod moved freely, and had no discoloration.

#1 connecting rod

#2 connecting rod

#3 connecting rod

#4 connecting rod

- Crankshaft balance weights were present and moved freely.
- The engine case could not be split. Either the halves were fused together or a thru bolt was still securing the halves together.
- The oil cooler was sealed, pressurized with compressed air, and submerged into a water tank. No air leak bubbles were observed. (Test was performed by Plain Parts personnel under the direction of NTSB IIC).
- Total amount of engine oil recovered from the engine was measured as 1 qt. An estimated additional 1/8-1/4 qt was observed draining from the oil suction screen plug hole (but was not captured).

Oil Cooler

- Oil cooler was pressurized with a shop air, and placed in a water bath. While in the water bath no air leakage was observed.

Test report email from Plain Parts

Thursday, April 05, 2012
1:33 PM

McKenny Van

From: Dennis James [redacted]
Sent: Thursday, April 05, 2012 1:13 PM
To: McKenny Van
Subject: Mooney M-20, N367MR
Attachments: 367MR oil recovered.JPG

Van,

As per your request, a few days ago looked at the airplane listed above and got you following results:

1) Oil collected from the oil pan, oil cooler and oil lines.
   a. Please see attached photo for total quantity collected.

2) Testing the oil cooler with a small amount of air to pressurize the cooler.
   a. We pressurized the oil cooler and then place the cooler under water to test for leaks.
   b. No leaks were found. Oil cooler in good condition and holds pressure.

3) Look at the upper and lower cowling for signs of oil leak inside engine compartment.
   a. Cowlings were dry and did not show signs of an oil leak.

Van, If you have any other questions or need anything else, just let me know.

Thank you,
Dj

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