Aviation Investigation Final Report

Location:	Grapeland, Texas	**Accident Number:**	FTW02LA108
Date & Time:	March 30, 2002, 15:25 Local	**Registration:**	N9530M
Aircraft:	Mooney M20F	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Approximately 25 minutes after departure, while in cruise flight at 1,500 feet msl a sudden vibration shook the airplane. The pilot scanned the engine instruments and everything "appeared to be normal." Subsequently, oil covered the windscreen, which severely limited forward visibility. The pilot initiated a forced landing to a grass field with the landing gear in the retracted position. During the landing, the airplane bounced, and the left wing "skimmed" across the top of a metal cattle feeder before impacting the ground, and the airplane spun around approximately 450 degrees before coming to rest upright. Examination of the engine revealed two holes on the top and bottom of the engine case between the #1 and #2 cylinders. The #2 connecting rod was found sticking out of the top hole and was not attached to the crankshaft. The #2 connecting rod cap was found separated from the connecting rod. The #2 connecting rod cap attachment bolts, nut, and both bearings were missing and not located. The other attachment bolt was found lodged inside the crankcase next to the #3 cylinder opening. The camshaft exhibited impact damage and was fractured in half at the point where the #2 connecting rod was found positioned. Review of the maintenance records revealed the engine had accumulated 997.75 hours since major overhaul at the time of the last annual inspection. Further review indicated that the last entry in the engine logbook was an oil change, with 1097.4 hours since major overhaul.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of engine power due to the #2 connecting rod cap separating from the connecting rod. A contributing factor was the limited forward visibility due to oil on the windscreen.

Findings

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

Findings
1. (C) ENGINE ASSEMBLY,CONNECTING ROD CAP - SEPARATION

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

Occurrence #3: HARD LANDING
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings
2. (F) VISUAL LOOKOUT - RESTRICTED - PILOT IN COMMAND
3. FLUID,OIL

Factual Information

On March 30, 2002, at 1525 central standard time, a Mooney M20F single-engine airplane, N9530M, was substantially damaged during a forced landing following a loss of engine power while in cruise flight near Grapeland, Texas. The airplane was registered to and operated by the pilot. The private pilot and his passenger were not injured. Visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed, but not activated for the 14 Code of Federal Regulations Part 91 personal flight. The cross-country flight originated from Livingston, Texas, at 1500, and was destined for Addison, Texas.

The pilot reported in the Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2) that approximately 25 minutes after departure, the airplane was in cruise flight at 1,500 feet msl when a "sudden heavy" vibration shook the airplane. He then scanned the engine instruments and everything "appeared to be normal." Subsequently, oil covered the windscreen, which severely limited forward visibility. He then initiated a forced landing to a grass field with the landing gear in the retracted position. During the landing, the airplane bounced, and the left wing "skimmed" across the top of a metal cattle feeder before impacting the ground, and the airplane spun around approximately 450 degrees before coming to rest upright.

Examination of the airplane by the FAA inspector, who responded to the accident site, revealed that the left wing spar was bent and there were two holes in the engine's #2 cylinder.

Further examination of the Lycoming IO-360-A1A engine, serial number L-14690-51A, on July 31, 2002 and August 1, 2002 at Textron Lycoming's facility in Williamsport, Pennsylvania, conducted under the supervision of the NTSB, revealed two holes on the top and bottom of the engine case between the #1 and #2 cylinders. The #2 connecting rod was found sticking out of the top hole and was not attached to the crankshaft. The #2 connecting rod cap was found separated from the connecting rod. The #2 connecting rod cap attachment bolt, nut, and both bearings were missing and not located. The other attachment bolt was found lodged inside the crankcase next to the #3 cylinder opening. The camshaft exhibited impact damage and was fractured in half at the point where the #2 connecting rod was found positioned.

Testing of the #2 connecting rod, bolt and nut was preformed on August 1, 2002 at the Lycoming Materials Laboratory. The bolt and nut fragments were checked for conformance to the engineering drawing criteria related to material and fabrication. There were no material nonconformities found with the connecting rod bolt or the nut. The lab concluded that "the connecting rod had been damaged secondarily. "

Review of the maintenance records revealed the last major engine overhaul was performed on May 18, 1993. On April 21, 2001, at the time of the last annual inspection, the engine had accumulated 997.75 hours since the last major overhaul. Further review indicated that the last

entry in the engine logbook was an oil change performed on July 21, 2002, with 1097.4 hours accumulated since the last major overhaul.

Pilot Information

Certificate:	Private	**Age:**	46,Male
Airplane Rating(s):	Single-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:**	August 30, 2001
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	November 3, 2001
Flight Time:	1190 hours (Total, all aircraft), 992 hours (Total, this make and model), 1096 hours (Pilot In Command, all aircraft), 14 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N9530M
Model/Series:	M20F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	670107
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 21, 2001 Annual	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:	108 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3756 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-A1A
Registered Owner:	Dale A. Simpson	**Rated Power:**	200 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 2500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Livingston, TX (00R)	**Type of Flight Plan Filed:**	IFR
Destination:	Addison, TX (ADS)	**Type of Clearance:**	VFR;VFR flight following
Departure Time:	15:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	32.936389,-97.135276

Administrative Information

Investigator In Charge (IIC):	Wigington, Doug
Additional Participating Persons:	John Loomis; FAA FSDO; Houston, TX Leah D Yeager; National Transportation Safety Board; Washington, DC
Original Publish Date:	September 30, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=54440