



# Aviation Investigation Final Report

<b>Location:</b>	Grapeland, Texas	<b>Accident Number:</b>	FTW02LA108
<b>Date &amp; Time:</b>	March 30, 2002, 15:25 Local	<b>Registration:</b>	N9530M
<b>Aircraft:</b>	Mooney M20F	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	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

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Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY DESCENT/LANDING

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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

<b>Certificate:</b>	Private	<b>Age:</b>	46,Male
<b>Airplane Rating(s):</b>	Single-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 3 Valid Medical-w/ waivers/lim	<b>Last FAA Medical Exam:</b>	August 30, 2001
<b>Occupational Pilot:</b>	UNK	<b>Last Flight Review or Equivalent:</b>	November 3, 2001
<b>Flight Time:</b>	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

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

## Meteorological Information and Flight Plan

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

## Wreckage and Impact Information

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

## Administrative Information

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

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).