



# Aviation Investigation Final Report

<b>Location:</b>	Pellston, Michigan	<b>Accident Number:</b>	CHI07LA071
<b>Date &amp; Time:</b>	February 10, 2007, 21:15 Local	<b>Registration:</b>	N4258R
<b>Aircraft:</b>	Piper PA-32-300	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	2 Serious, 2 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The airplane was substantially damaged when it impacted trees and terrain during a forced landing at night following a mechanical failure of the engine. Examination of the engine revealed that one of the engine cylinders had failed due to fatigue. The origin of the fatigue region coincided with an area that had been thinned by corrosion. The area in question had been covered by gray paint. Checks performed at the most recent annual inspection revealed normal compression readings on all cylinders.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The fatigue failure of the engine cylinder which resulted in a complete loss of engine power, and the unsuitable terrain encountered by the pilot during the subsequent forced landing. Contributing to the accident were the night lighting condition, and trees.

## Findings

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

### Findings

1. (C) ENGINE ASSEMBLY,CYLINDER - FAILURE,TOTAL
2. (C) ENGINE ASSEMBLY,CYLINDER - FATIGUE

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Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY DESCENT/LANDING

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Occurrence #3: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

3. (F) OBJECT - TREE(S)

4. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - ENCOUNTERED - PILOT IN COMMAND

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Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

5. TERRAIN CONDITION - GROUND

## Factual Information

On February 10, 2007, about 2115 eastern standard time, a Piper PA-32-300, N4258R, piloted by a private pilot, sustained substantial damage during a forced landing following a loss of engine power during cruise flight. The 14 CFR Part 91 personal flight was operating in instrument meteorological conditions and was on an instrument flight rules (IFR) flight plan. The pilot and one passenger received serious injuries and two passengers received minor injuries. The flight originated from the Houghton County Memorial Airport, Hancock, Michigan, about 2000, and was en route to the Oakland County International Airport, Pontiac, Michigan.

During the flight, the pilot was in communication with the Minneapolis Air Route Traffic Control Center (ARTCC) for the IFR flight. The pilot informed the ARTCC controller that he had experienced a catastrophic engine failure. The pilot attempted to divert to the Pellston Regional Airport, near Pellston, Michigan. The airplane subsequently impacted trees in a wooded area near Pellston.

Initial examination of the airplane's engine revealed that the upper portion of the number 4 cylinder barrel had separated from the lower portion. The separation occurred about one inch below the cylinder head.

Examination of the separated cylinder by the National Transportation Safety Board's Materials Laboratory revealed that the fracture surface contained features consistent with fatigue. The report further indicates that the origin of these fatigue features emanated from a step in the fracture surface and progressed circumferentially from this point. The fatigue features were present approximately one-fourth of the circumference of the cylinder. Further examination revealed that the origin of the fatigue region coincided with an area near the base of one of the cooling fins that appeared to have been thinned by corrosion. This area was found to have been covered by gray paint.

Examination of the airplane's maintenance records revealed that it had accumulated a total of 5,798 hours as of its last annual inspection on November 28, 2006. The engine had accumulated 266 hours since overhaul as of the date of that inspection. The engine logbook indicates that the engine underwent a differential compression test at that time and the compression readings were 76/80 psi, 77/80 psi, 74/80 psi, 74/80 psi, 72/80 psi, and 73/80 psi for cylinders number 1 through 6 respectively. The records indicate that the most recent engine overhaul was completed on May 28, 2000, and all 6 cylinders and pistons were replaced during the overhaul.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	41, 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	<b>Last FAA Medical Exam:</b>	July 1, 2004
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	315 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N4258R
<b>Model/Series:</b>	PA-32-300	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	32-40630
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	December 1, 2006 Annual	<b>Certified Max Gross Wt.:</b>	3400 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	5798 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	IO-540-K1A5
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	300 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>	PLN,720 ft msl	<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>	20:54 Local	<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Unknown	<b>Visibility</b>	5 miles
<b>Lowest Ceiling:</b>	Overcast / 2900 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	8 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	220°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.01 inches Hg	<b>Temperature/Dew Point:</b>	-9°C / -13°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	HANCOCK, MI (CMX )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	PONTIAC, MI (PTK )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	20:00 Local	<b>Type of Airspace:</b>	

## Wreckage and Impact Information

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

## Administrative Information

**Investigator In Charge (IIC):** Brannen, John

**Additional Participating Persons:** John Golda; FAA - Grand Rapids FSDO; Grand Rapids, MI  
Mike Childers; Textron Lycoming; Elizabethtown, TN

**Original Publish Date:** June 30, 2008

**Last Revision Date:**

**Investigation Class:** [Class](#)

**Note:**

**Investigation Docket:** <https://data.nts.gov/Docket?ProjectID=65308>

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