



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Jacksonville, OR	<b>Accident Number:</b>	WPR15LA032
<b>Date &amp; Time:</b>	11/02/2014, 1456 PST	<b>Registration:</b>	N1593M
<b>Aircraft:</b>	CESSNA T210M	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

The pilot reported that, during cruise flight, the engine began running roughly with smoke developing inside the cabin, followed by oil covering the windshield. The pilot stated that the engine continued to run and that his attempts to increase the power setting resulted in severe shaking and more smoke. The pilot initiated a forced landing in a nearby field. During the landing roll, the nosewheel landing gear dug into mud, and the airplane subsequently nosed over.

Postaccident examination of the engine revealed that the Nos. 5 and 6 connecting rods were liberated from the crankshaft. The No. 6 connecting rod was thermally discolored and fractured, which was likely caused by oil starvation to the No. 6 connecting rod journal and bearing. The No. 5 connecting rod was also fractured; however, the connecting rod and bearing did not exhibit thermal discoloration or distress; the fracture likely resulted due to damage sustained when the No. 6 connecting rod fractured. The Nos. 1 and 2 connecting rods also exhibited thermal discoloration and distress, which likely resulted from the engine's continued operation after the liberation of the No. 6 connecting rod.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power during cruise flight due to the failure of the No. 6 connecting rod, which resulted from oil starvation.

## Findings

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<b>Aircraft</b>	Recip engine power section - Failure (Cause) Oil - Fluid level (Cause)
<b>Environmental issues</b>	Wet/muddy terrain - Contributed to outcome

## Factual Information

On November 2, 2014, about 1456 Pacific standard time, a Cessna T210M, N1593M, was substantially damaged during a forced landing following a loss of engine power near Jacksonville, Oregon. The airplane was registered to and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. The private pilot, sole occupant of the airplane, sustained minor injuries. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the personal flight. The cross-country flight originated from Grants Pass, Oregon, with an intended destination of Long Beach, California.

In a written statement to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the pilot reported that during cruise flight at an altitude of about 12,900 feet mean sea level, the engine began to run rough with smoke developing inside the cabin, followed by oil covering the windshield. The pilot stated that he observed the oil pressure gauge indicating 0, however, the engine continued to run, and that any attempt to increase the power setting resulted in severe shaking and smoke. The pilot initiated a forced landing in a nearby field. During the landing roll, the nosewheel landing gear dug into the mud, and the airplane subsequently nosed over.

Examination of the airplane by local law enforcement revealed that the right wing at the flap aileron junction was bent downward about 45 degrees. Oil was observed on the windshield and surrounding the fuselage area. The wreckage was recovered to a secure location for further examination.

The engine was removed from the airframe and sent to the facilities of Continental Motors, Inc., Mobile, Alabama, for further examination. The engine was examined on March 3, 2015, by representatives from Continental Motors under the supervision of the NTSB IIC. The examination revealed a large hole on the top left side of the crankcase over the number 6 cylinder, and a smaller hole on the top right side of the crankcase over the number 5 cylinder. Visual inspection through each hole revealed that the number 5 and number 6 connecting rods were liberated from the connecting rod journals. The engine was subsequently disassembled and inspected.

The crankcase halves remained secured to each other. The main bearing saddles for the number 1 through number 3 bearings did not display any anomalies. The number 4 and number 5 bearing saddles displayed displaced material with the number 5 being the worst. In addition, the oil feed hole for the number 5 bearing was obstructed by displaced saddle material. The oil galleys on the cylinder 2, 4, and 6 side of the crankcase were free of debris, with the exception the hole at the number 5 main bearing.

The number 1 and 2 main bearings displayed normal wear and a few score marks consistent with hard-particle-passage. There was no sign of lock tab movement or lock slot elongation. The number 3 main bearing displayed wear and scoring that removed the babbitt layer and displayed the copper underlay. There was no sign of lock tab movement or lock slot elongation. The number 4 main bearing was discolored black, heavily worn, and displaced in the saddle such that the bearing split line did not match up with the case half split line. There was no evidence of lateral lock slot elongation. The oil feed to the backside of the number 4 bearing was unobstructed. The number 5 main bearing was discolored black, heavily worn, and displaced in the saddle such that the bearing split line did not match up with the case half split line. There was no evidence of lateral lock slot elongation. The oil feed to the backside of the

number 5 bearing was obstructed by displaced saddle material.

The crankshaft remained intact but displayed thermal distress at the number 1, number 2, and the number 6 connecting rod journals. The number 6 connecting rod journal was also mechanically damaged and the oil feed hole was no longer visible due to the displaced material. Additionally, the crankshaft's number 4 and number 5 main bearing journals displayed black thermal discoloration, along with material displacement at the number 5 bearing journal. All of the crankshaft oil tubes were clear of debris with the exception of the number 6 connecting rod journal, which was mechanically damaged.

The number 1 connecting rod remained secured to the crankshaft and the piston pin; however, it displayed thermal discoloration and evidence of heat distress associated with a lack of lubrication. The oil feed to the number 1 bearing was clear of debris. The connecting rod bearing displayed evidence of thermal discoloration and heat distress associated with a lack of lubrication.

The number 2 connecting rod remained secured to the crankshaft and the piston pin; however, it displayed thermal discoloration and evidence of heat distress associated with a lack of lubrication. The oil feed to the number 2 bearing was clear of debris. The oil feed to the number 2 bearing was clear of debris. The bearing displayed evidence of thermal discoloration and heat distress associated with a lack of lubrication.

The number 3 connecting rod remained secured to the crankshaft and piston pin. There were no signs of operational distress with the connecting rod. The oil feed to the number 3 bearing was clear of debris. The connecting rod bearing displayed some wear, but did not show the signs of thermal distress or lack of lubrication as the others.

The number 4 connecting rod remained secured to the crankshaft and piston pin. There were no signs of operational distress with the connecting rod. The oil feed to the number 4 bearing was clear of debris. The connecting rod bearing displayed some wear, but did not show the signs of thermal distress or lack of lubrication as the others.

The number 5 connecting rod was fractured into four pieces, none of which displayed thermal discoloration; however, mechanical damage was evident on all of the components. The piston end of the connecting rod remained attached to the piston pin. The oil feed to the number 5 bearing was clear of debris. The number 5 connecting rod bearing was liberated along with the fractured connecting rod; however, the two bearing halves were located (one in the sump and one found outside the engine). The bearing was mechanically damaged but there was little-to-no thermal distress noted on the bearing.

The number 6 connecting rod was fractured into five pieces, and all displayed thermal discoloration and mechanical damage. The piston end of the connecting rod remained attached to the piston pin. The oil feed to the number 6 bearing was mechanically damaged at the number 6 connecting rod journal; however, it was unobstructed at the number 4 main journal end. Remnants of the connecting rod bearing were found in the oil sump. The remnants were thermally discolored and distorted.

The internal configuration of two engine crankshaft oil tube assemblies for the number 5 and 6 connecting rods was documented using radiographic images that were collected on May 4 and 5, 2015, in Chicago, Illinois. A total of 360 computed tomography (CT) slice images were examined, processed, and analyzed by the NTSB to evaluate the component. Review of the crankshaft oil tube assembly images determined that there was no indication of low or medium

density material buildup on the interior of either the upper or lower oil tube assemblies, a medium density material buildup was noted in areas of the crankshaft outside of the oil tube assemblies, the lower oil tube assembly was deformed on one end, and the other end was completely blocked by high density material with a density similar to the density of the crankshaft material, and the upper oil tube assembly had a discontinuity in the wall area at one end of the tube assembly.

## History of Flight

<b>Enroute-cruise</b>	Loss of engine power (total) (Defining event)
<b>Landing-landing roll</b>	Collision with terr/obj (non-CFIT) Nose over/nose down

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	57
<b>Airplane Rating(s):</b>	Multi-engine Land; 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 With Waivers/Limitations	<b>Last Medical Exam:</b>	04/02/2014
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	01/13/2014
<b>Flight Time:</b>	4300 hours (Total, all aircraft), 1300 hours (Total, this make and model), 4250 hours (Pilot In Command, all aircraft), 75 hours (Last 90 days, all aircraft), 25 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Manufacturer:</b>	CESSNA	<b>Registration:</b>	N1593M
<b>Model/Series:</b>	T210M M	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	21061949
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	
<b>Date/Type of Last Inspection:</b>	04/11/2014, Annual	<b>Certified Max Gross Wt.:</b>	3803 lbs
<b>Time Since Last Inspection:</b>	111 Hours	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	5308.3 Hours	<b>Engine Manufacturer:</b>	CONT MOTOR
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	TSIO-520 SER
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	0 hp
<b>Operator:</b>	On file	<b>Air Carrier Operating Certificate:</b>	None

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	KMFR, 1329 ft msl	Observation Time:	0053 UTC
Distance from Accident Site:	13 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	42°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Scattered / 5000 ft agl	Temperature/Dew Point:	13° C / 3° C
Lowest Ceiling:		Visibility	10 Miles
Wind Speed/Gusts, Direction:	4 knots, 330°	Visibility (RVR):	
Altimeter Setting:	30.23 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Grants Pass, OR	Type of Flight Plan Filed:	IFR
Destination:	Long Beach, CA	Type of Clearance:	IFR
Departure Time:	1420 PST	Type of Airspace:	

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor		

## Administrative Information

Investigator In Charge (IIC):	Joshua Cawthra	Adopted Date:	11/05/2015
Additional Participating Persons:	Dee Rice; Federal Aviation Administration; Hillsboro, OR Nicole Channon; Continental Motors; Mobile, AL Jan Smith; Textron Aviation; Wichita, KS		
Publish Date:	11/05/2015		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=90347">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=90347</a>		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.