



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Fulton, MO	<b>Accident Number:</b>	CEN15LA050
<b>Date &amp; Time:</b>	11/17/2014, 1720 CST	<b>Registration:</b>	N401ME
<b>Aircraft:</b>	CESSNA 401A	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	3 Serious
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Business		

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## Analysis

The private pilot reported that, immediately after takeoff in the multi-engine airplane, the right engine experienced a total loss of power. The pilot aborted the takeoff; the airplane exited the end of the runway surface, impacted rough terrain, and came to rest upright. Examination of the right engine showed that the magneto distributor drive gears were not turning. Both damaged magnetos were removed and replaced with a slave set of magnetos. The right engine was installed in an engine test cell, and subsequently started and performed normally throughout the test cell procedure.

The damaged magnetos from the right engine were disassembled. Both nylon magneto distributor gears exhibited missing gear teeth and brown discoloration. A review of maintenance records showed that the right engine had been operated for about 8 years and an estimated 697 hours since the most recent magneto overhauls had been completed. According to maintenance instructions from the engine manufacturer, the magnetos should be inspected every 500 hours and should be overhauled or replaced at the expiration of five years since the last overhaul. Guidance also indicated that discoloration of the drive gear is an indication that the gear had been exposed to extreme heat and should be replaced.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A failure of the right engine magneto distributor drive gears, which resulted in a total loss of engine power during takeoff. Contributing to the accident was the operator's failure to inspect and maintain the magnetos in accordance with the engine manufacturer's specifications.

## Findings

Aircraft	Engine (reciprocating) - Fatigue/wear/corrosion (Cause)
Personnel issues	Lack of action - Owner/builder (Factor)

## Factual Information

On November 17, 2014, at 1720 central daylight time, a Cessna 401A, multi-engine airplane, N401ME, was substantially damaged after impacting terrain following a loss of engine power during takeoff at Elton Hensley Memorial Airport (FTT), Fulton, Missouri. The two pilots and the passenger all sustained serious injuries. The airplane was registered to and operated by Heartland Air, LLC; Mablevale, Arkansas. Evening dusk visual meteorological conditions (VMC) prevailed at the time of the accident and an instrument flight rules (IFR) flight plan had been filed for the 14 Code of Federal Regulations Part 91 business flight. The intended destination was Memorial Field Airport (HOT), Hot Springs, Arkansas.

The pilot reported that immediately after takeoff the right engine suddenly lost power and he aborted the takeoff. When the pilot saw he would not be able to stop on the runway he shut down the opposite engine. The airplane exited the end of the runway surface, impacted rough terrain, and came to rest upright. Fuel tanks were impact breached which resulted in a significant fuel spill, however there was no postimpact fire. Several witnesses called 9-1-1 emergency and ran to the wreckage location to provide aid to the three injured persons.

An on-scene examination of the wreckage revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. Both engines were removed and examined at the facilities of Continental Motors, Inc. in Mobile, Alabama. The left engine was installed in an engine test cell, and it performed normally throughout the test cell procedure.

The right engine was installed in a test cell and several attempts to start the engine were unsuccessful. Examination showed that the magneto distributor drive gears were not turning. Both magnetos were removed and replaced with a slave set of magnetos. The right engine then started and preformed normally throughout the test cell procedure.

The original magnetos from the right engine were then disassembled and both nylon magneto distributor gears had missing gear teeth and were observed to have discolored to a brown color. They were compared to a new nylon magneto distributor gear, which was white.

A review of aircraft maintenance records for the right engine showed that the At the time of the accident, the right engine had been operated for about 8-years and an estimated 697 hours since the most recent magneto overhauls had been completed.

At 1653 the automated weather observing system at Columbia Regional Airport (COU), Columbia, Missouri, located about 10 miles west from the accident location, reported wind from 290° at 19 knots gusting to 24 knots, visibility of 10 miles, scattered clouds at 5,000 feet, temperature minus 7° C, dew point minus 17° C, with an altimeter setting of 30.20 inches of Mercury. Data from the U.S. Naval Observatory showed that sundown occurred at 1653 and the end of evening civil twilight occurred at 1721.

## ADDITIONAL INFORMATION

According to the Continental Service Bulletin SB643B (April 6, 2005)

Paragraph 3. A. "Magnetos ... must be inspected every 500 hours ..."

Paragraph 4. C. "Magnetos must be overhauled or replaced at the expiration of five years since ... the last overhaul ... without regard to accumulated operating hours"

According to the Continental S-20/S-200 Series High Tension Magneto Service Support Manual (August 31, 2011)

Page 7-3. When servicing the magneto " ... If the color of the gear has turned brown or the gear teeth are turning brown, the gear has been exposed to extreme heat, discard and replace the gear".

## History of Flight

Takeoff	Loss of engine power (partial) (Defining event)
Takeoff-rejected takeoff	Runway excursion Dragged wing/rotor/float/other Collision with terr/obj (non-CFIT)
Post-impact	Cabin safety event

## Pilot Information

Certificate:	Private	Age:	63, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	Gyroplane; Helicopter	Restraint Used:	Lap Only
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 With Waivers/Limitations	Last FAA Medical Exam:	11/29/2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	10/02/2014
Flight Time:	(Estimated) 2949 hours (Total, all aircraft), 304 hours (Total, this make and model), 41 hours (Last 90 days, all aircraft)		

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	72, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Lap Only
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	10/21/2014
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	10/03/2013
<b>Flight Time:</b>	(Estimated) 8675 hours (Total, all aircraft), 1850 hours (Total, this make and model), 150 hours (Last 90 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	CESSNA	<b>Registration:</b>	N401ME
<b>Model/Series:</b>	401A	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1969	<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	401A0085
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	8
<b>Date/Type of Last Inspection:</b>	05/01/2014, Annual	<b>Certified Max Gross Wt.:</b>	6300 lbs
<b>Time Since Last Inspection:</b>	241 Hours	<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	6434 Hours at time of accident	<b>Engine Manufacturer:</b>	CONTINENTAL
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	TSIO 520 E8
<b>Registered Owner:</b>	HEARTLAND AIR LLC	<b>Rated Power:</b>	300 hp
<b>Operator:</b>	HEARTLAND AIR LLC	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Dusk
Observation Facility, Elevation:	KCOU, 898 ft msl	Distance from Accident Site:	10 Nautical Miles
Observation Time:	1654 CST	Direction from Accident Site:	263°
Lowest Cloud Condition:	Scattered / 5000 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	19 knots / 24 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	290°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.2 inches Hg	Temperature/Dew Point:	-7° C / -17° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fulton, MO (FTT)	Type of Flight Plan Filed:	IFR
Destination:	Hot Springs, AR (HOT)	Type of Clearance:	None
Departure Time:	1720 CST	Type of Airspace:	Class G

## Airport Information

Airport:	ELTON HENSLEY MEMORIAL (FTT)	Runway Surface Type:	Asphalt
Airport Elevation:	887 ft	Runway Surface Condition:	Dry
Runway Used:	24	IFR Approach:	None
Runway Length/Width:	3203 ft / 50 ft	VFR Approach/Landing:	None

## Wreckage and Impact Information

Crew Injuries:	2 Serious	Aircraft Damage:	Substantial
Passenger Injuries:	1 Serious	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Serious	Latitude, Longitude:	38.837500, -92.008889 (est)

## Administrative Information

Investigator In Charge (IIC):	Thomas Latson	Report Date:	06/20/2017
Additional Participating Persons:	Rod McLaughlin; FAA Kansas City FSDO; Kansas City, MO James Seabolt; FAA Kansas City FSDO; Kansas City, MO Ernest C Hall; Textron Aviation; Wichita, KS Chris Lang; Continental Motors Inc; Mobile, AL		
Publish Date:	06/20/2017		
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=90400">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=90400</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. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).