



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Bluemont, VA	<b>Accident Number:</b>	ERA16LA022
<b>Date &amp; Time:</b>	10/23/2015, 1530 EDT	<b>Registration:</b>	N43249
<b>Aircraft:</b>	PIPER PA-32-260	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

The commercial pilot stated that, after departure, while climbing through 4,500 ft mean sea level, engine power decreased, the engine "vibrated violently," and he noted that the oil pressure dropped to zero. Soon after, the engine experienced a total loss of power and the pilot elected to perform a forced landing to a nearby field. An examination of the engine revealed that the No. 5 connecting rod had separated from the crankshaft. While several of the cylinders and connecting rods exhibited corrosion, the root cause for the separation of the No. 5 connecting rod from the crankshaft could not be determined. The manufacturer recommended a time between overhaul of 2,000 hours of operation or 12 years, whichever occurs first. At the time of the accident, the engine had accumulated about 2,500 hours of operation in the approximate 17 years since its last overhaul.

## Probable Cause and Findings

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

A total loss of engine power as a result of the separation of the No. 5 connecting rod for reasons that could not be determined based on the available information.

## Findings

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<b>Aircraft</b>	Recip eng cyl section - Failure (Cause) Engine (reciprocating) - Not serviced/maintained
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## Factual Information

### History of Flight

Enroute-climb to cruise	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On October 23, 2015, about 1530 eastern daylight time, a Piper PA-32-260, N43249, was substantially damaged during a forced landing to a field near Bluemont, Virginia. The commercial pilot and passenger were not injured. Day visual meteorological conditions prevailed and no flight plan was filed for the personal flight, which was conducted under the provisions of 14 Code of Federal Regulations Part 91. The flight originated from Upperville Airport (2VG2), Upperville, Virginia, about 1520, and was destined for Monmouth Executive Airport (BLM), Farmingdale, New Jersey.

According to the pilot, after departure, while climbing through 4,500 feet mean sea level (msl), the engine power decreased, the engine "vibrated violently," and he noted that the oil pressure dropped to zero. He contacted air traffic control and attempted to return to the departure airport; however, he realized the airplane would not make the airport. Therefore, he elected to perform a forced landing to a nearby field.

According to the passenger, the pilot performed a preflight inspection of the airplane and added a quart of oil to the engine prior to departure. During the climb, the "engine sound became very loud with obvious serious knocking." Soon after, the engine seized and the pilot elected to land the airplane in a field. During the landing, the airplane slid across the field, struck two fences, and then came to rest upright. After the pilot and passenger egressed the airplane, the pilot checked the oil level and the passenger reported that it was "full."

### Pilot Information

Certificate:	Commercial	Age:	73, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 With Waivers/Limitations	Last FAA Medical Exam:	10/26/2013
Occupational Pilot:	No	Last Flight Review or Equivalent:	10/24/2014
Flight Time:	3195 hours (Total, all aircraft), 2500 hours (Total, this make and model), 3180 hours (Pilot In Command, all aircraft)		

According to the pilot, he held a commercial pilot certificate with a rating for airplane single-engine land and instrument airplane. He reported 3,195 total hours of flight experience, 2,500 hours of which were in the accident airplane make and model. His most recent Federal Aviation Administration (FAA) second-class medical certificate was issued on October 26, 2013.

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	PIPER	<b>Registration:</b>	N43249
<b>Model/Series:</b>	PA-32-260	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1974	<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	32-7400042
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	
<b>Date/Type of Last Inspection:</b>	06/02/2015, 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>	4610 Hours as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>		<b>Engine Model/Series:</b>	O-540 SERIES
<b>Registered Owner:</b>	BEC INDUSTRIES LTD	<b>Rated Power:</b>	250 hp
<b>Operator:</b>	BEC INDUSTRIES LTD	<b>Operating Certificate(s) Held:</b>	None

According to the FAA, the airplane was manufactured in 1974 and was registered to a corporation in 1991. According to the maintenance records, the most recent annual inspection was performed on June 2, 2015, at which time the airplane had a total time of 4,610 hours and a tachometer time of 2,414.2 hours. At that time, the oil and oil filter were changed, and the oil filter was inspected for contaminants, with none noted. Then two other oil changes were noted in the engine logbook, which corresponded to 2,462 hours and 2,512.5 hours. There was no indication in the engine logbook that the oil filters were examined for contaminants at the time they were changed. The oil filter installed on the airplane at the time of the accident indicated it was installed on September 9, 2015, at a tachometer time of 100 hours, and there was no corresponding entry in the engine logbook.

The tachometer in the airplane at the accident location indicated 117.5 hours; however, no maintenance log entry was found that corresponded to a tachometer replacement.

The airplane was equipped with a Lycoming O-540-E4B5, 260-hp engine. The most recent engine overhaul occurred in 1998. At the most recent annual inspection, the engine had accumulated 2,285.8 hours of time since major overhaul, it was calculated that at the most recent oil change in the engine logbook, the engine had accumulated 2,384.1 hours. Since there

was no maintenance log entry that corresponded with the tachometer replacement, the engine had at least an estimated total time of 2,501.6 hours at the time of the accident.

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	JYO, 389 ft msl	Distance from Accident Site:	12 Nautical Miles
Observation Time:	1535 EDT	Direction from Accident Site:	92°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	330°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.22 inches Hg	Temperature/Dew Point:	20° C / 6° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	UPPERVILLE, VA (2VG2)	Type of Flight Plan Filed:	None
Destination:	BELMAR/FARMINGDALE, NJ (BLM)	Type of Clearance:	VFR Flight Following
Departure Time:	1520 EDT	Type of Airspace:	

## 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:	39.086667, -77.816111 (est)

An examination of the airplane revealed that the right wing was impact separated and the left wing was removed by recovery personnel. The engine remained attached to the airplane and the propeller remained attached to the engine. One propeller blade was bent aft in an approximate 45-degree angle and the other blade was bent aft in an approximate 5 degree angle.

The engine cowling was removed and no damage was noted on the exterior of the engine crankcase. The carburetor drain nut was removed and about 12 ounces of fluid similar in color

to 100LL aviation fuel was drained out of the carburetor. No debris was noted in the fluid. About 9 quarts of oil was noted in the engine, which had a capacity for 12 quarts. Crankshaft continuity was confirmed by rotating the propeller by hand without resistance, and crankshaft continuity was confirmed to the rear accessory section of the engine. The top spark plugs were removed and thumb compression was confirmed on all cylinders except cylinder No. 5.

The bottom of the crankcase was fractured near the No. 5 connecting rod. The oil pump was removed from the engine and rotated freely by hand. It was disassembled with no anomalies noted. The engine oil sump was removed from the engine and there were multiple pieces and particles of metal in the oil sump. The oil filter was removed from the engine, disassembled, and metallic debris was noted in the filter. The oil suction screen was examined and metallic debris was noted in the screen.

All cylinders except cylinder No. 5 were removed, and corrosion was noted on the Nos. 2, 3, and 4 cylinder walls. The No. 5 connecting rod was separated from the crankshaft and corrosion was noted on the connecting rod surface that interfaced with the crankshaft bearing. Cylinder No. 5 was unable to be removed due the connecting rod damage. In addition, corrosion was noted on the No. 6 connecting rod.

The No. 3 piston exhibited scoring on one side of the piston and the piston pin cap was deformed into an oval shape. The No. 3 cylinder was sent to the NTSB Materials Laboratory for further examination.

#### No. 3 Cylinder Assembly Examination

The piston exhibited a wear scar around the piston pin hole. The lines within the wear scar on the piston were consistent with reciprocating rubbing along the axis of the cylinder. The piston pin did not exhibit deformation, but it did exhibit superficial circumferential wear scars, consistent with rotation inside the piston crown. The inside walls of the cylinder exhibited deposits that were consistent with rust. Furthermore, the inner cylinder had a circular wear scar, which was consistent with the shape of the piston pin plug. There was a lack of corrosion in the circular wear region, which suggested that the corrosion of the cylinder was present before the wear or rubbing between the piston assembly and the cylinder occurred.

#### Additional Information

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According to the Lycoming Service Instruction on the required time between overhaul, it stated that the time between overhaul (TBO) takes "into account service experience, variations in operating conditions, and frequency of operation...Continuous service assumes that the aircraft will not be out of service for more than 30 consecutive days." The investigation was unable to conclusively determine if the engine was out of service for any period greater than 30 days.

"Engine deterioration in the form of corrosion (rust) and the drying out and hardening of composition materials such as gaskets, seals, flexible hoses and fuel pump diaphragms can occur if an engine is out of service for an extended period of time. Due to the loss of protective oil film after an extended period of inactivity, abnormal wear on soft metal bearing surfaces can occur during engine start. Therefore, all engines that do not accumulate the hourly period of TBO specified in this publication are recommended to be overhauled every twelfth year."

The TBO listed for an O-540-E4B5 engine was 2,000 hours.

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Heidi Moats	<b>Report Date:</b>	01/25/2018
<b>Additional Participating Persons:</b>	Clairmont Morrison; FAA/FSDO; Dulles, VA		
<b>Publish Date:</b>	01/25/2018		
<b>Note:</b>	The NTSB did not travel to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=92221">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=92221</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](#).