



# Aviation Investigation Final Report

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<b>Location:</b>	Brunswick, Georgia	<b>Accident Number:</b>	ERA16LA071
<b>Date &amp; Time:</b>	December 15, 2015, 10:50 Local	<b>Registration:</b>	N8675N
<b>Aircraft:</b>	Piper PA-32	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (total)	<b>Injuries:</b>	2 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

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## Analysis

The private pilot was conducting a personal cross-country flight. The pilot reported that the airplane was in cruise flight at 7,500 ft mean sea level when, without any warning, there was a loud explosion from the engine and an immediate loss of engine power. The explosion caused the oil filler door to open, and oil subsequently spewed over the windshield, and smoke filled the cockpit. The pilot declared an emergency and attempted to glide to a nearby airport; however, he landed the airplane on a rooftop a few hundred yards short of the runway.

Examination of the engine revealed that the No. 4 cylinder had separated from the engine case. All of the No.4 cylinder mounting stubs and through bolts were fractured except for the bottom forward stub; the nut for this stub was not located. The piston and corresponding connecting rod for the No. 4 cylinder were found in the bottom of the engine cowling.

A review of the engine maintenance logbooks revealed that the engine was overhauled almost 8 years before the accident and had accrued a total time of 1,005.0 hours since overhaul. There were no subsequent maintenance entries related to the No. 4 cylinder. Based on the evidence, it is likely that maintenance personnel applied insufficient torque to the cylinder's bottom forward hold-down nut, which allowed it to loosen over time. The stress load was then transferred to the remaining nuts, which resulted in the failure of the stubs and through bolts and to the separation of the No. 4 cylinder.

## Probable Cause and Findings

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

Maintenance personnel's failure to properly torque a No. 4 cylinder hold-down nut during engine overhaul, which resulted in the loosening of the nut and the subsequent failure of the studs and through bolts and separation of the cylinder.

## Findings

<b>Aircraft</b>	Recip eng cyl section - Failure
<b>Personnel issues</b>	(general) - Maintenance personnel
<b>Aircraft</b>	Recip eng cyl section - Incorrect service/maintenance

## Factual Information

### History of Flight

<b>Enroute</b>	Loss of engine power (total) (Defining event)
<b>Emergency descent</b>	Off-field or emergency landing
<b>Emergency descent</b>	Collision with terr/obj (non-CFIT)

On December 15, 2015, at 1050 eastern standard time, a Piper PA-32-300, N8675N, made a forced landing about .1-mile north of Malcolm McKinnon Airport (SSI), Brunswick, Georgia, after a catastrophic engine failure. The pilot and the passenger sustained minor injuries. The airplane landed on the roof of a home and collided with trees which resulted in substantial damage to the fuselage and wings. The airplane was registered to a private company and operated as a 14 Code of Federal Regulations (CFR) Part 91 personal flight. Visual flight rules conditions existed near the accident site at the time of the accident. No flight plan was filed for the flight that originated from Jacksonville Executive at Craig Airport (CRG), Jacksonville, Florida, about 1020 and was destined for the Rock Hill/York County/Bryant Field (UZA), Rock Hill, South Carolina.

The pilot stated that he was in cruise flight at 7,500 ft mean sea level (msl) when, without any warning, there was a loud explosion from the engine and an immediate loss of engine power. The explosion caused the oil filler door to open and it partially pushed the Garmin 430 out of the dashboard. Oil spewed all over the windshield and smoke filled the cockpit. The pilot declared an emergency and attempted to glide to St. Simons Airport, St. Simons, Georgia; however, he landed on a rooftop a few hundred yards short of the runway. There was no post-impact fire.

An examination of the engine was conducted on January 26, 2016, by the National Transportation Safety Board (NTSB). The examination revealed the No. 4 cylinder had separated from the engine case. The cylinder skirt was split in several areas consistent with the piston making contact with the cylinder after it separated from the case. Groove marks etched on the top of the piston were consistent with it striking the cylinder skirt. All of the No.4 cylinders mounting stubs and thru-bolts were fractured except for the bottom forward stud. The piston and corresponding connecting rod for the No. 4 cylinder were found in the bottom of the engine cowling. The other engine components appeared unremarkable. The engine was completely disassembled and the No. 4 crank-journal showed no signs of bearing migration or excessive heat. However, there were numerous gouges and scratches throughout the inside of the engine from debris after the cylinder separated.

A review of the engine logbook revealed the engine was overhauled in February 2007 and installed on the airplane on March 16, 2007. The last engine inspection was completed on November 17, 2015, at total time of 1,005.0 hours since overhaul. A review of the engine's maintenance history since it was overhauled revealed no maintenance had been done to the No. 4 cylinder.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	44, 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>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	October 26, 2015
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	March 16, 2015
<b>Flight Time:</b>	143 hours (Total, all aircraft), 65 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N8675N
<b>Model/Series:</b>	PA-32 300	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1971	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	32-7240019
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	November 17, 2015 Condition	<b>Certified Max Gross Wt.:</b>	3400 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	5032.6 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	IO-550
<b>Registered Owner:</b>	KDK ASSOCIATES INC	<b>Rated Power:</b>	300 Horsepower
<b>Operator:</b>	KDK ASSOCIATES INC	<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>	SSI,20 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	10:53 Local	<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>		<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.94 inches Hg	<b>Temperature/Dew Point:</b>	21°C / 12°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Jacksonville, FL (CRG )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Rock Hill, SC (UZA )	<b>Type of Clearance:</b>	VFR flight following
<b>Departure Time:</b>	10:20 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Malcolm McKinnon SSI	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	20 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Minor	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	In-flight
<b>Total Injuries:</b>	2 Minor	<b>Latitude, Longitude:</b>	31.158889,-81.489166(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Read, Leah
<b>Additional Participating Persons:</b>	Don Brown; FAA/FSDO; Atlanta, GA
<b>Original Publish Date:</b>	August 16, 2016
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=92462">https://data.nts.gov/Docket?ProjectID=92462</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](#).