



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Greene, NY	<b>Accident Number:</b>	ERA12LA428
<b>Date &amp; Time:</b>	07/01/2012, 1530 EDT	<b>Registration:</b>	N758JQ
<b>Aircraft:</b>	CESSNA R172K	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

The pilot reported that about 25 minutes into the flight while the airplane was at an altitude of about 2,300 feet mean sea level, the engine began to run rough, followed by partial loss of power. He turned and proceeded toward an airport then he started hearing metallic grinding sounds as the engine power continued to decrease. Unable to maintain altitude, he elected to land downwind on a runway; he noted that his airspeed was about 100 knots at the threshold. The main landing gear contacted the surface about midpoint of the runway, and the pilot pushed the control yoke to force the nose landing gear onto the runway in an intentional effort to stop the airplane before running off a steep embankment. The airplane came to rest upright about three-quarters of the way down the length of the runway, with structural damage to the engine firewall.

Postaccident examination of the engine revealed the head of the No. 3 cylinder had separated from the barrel due to an undetected fatigue crack that emanated from corrosion pits on the outer surface of the barrel. Paint covering crater-shaped corrosion blisters on the barrel indicates that the paint was applied to a surface that had already corroded and suggests that the corrosion developed over an extended period of time. Although the engine had only accrued about 9 hours since the last 100-hour inspection, the location of the piston at top dead center during the compression test would have been above the location of the fracture and the loss of compression likely would not have been detected.

The engine manufacturer recommended that the engine be overhauled every 1500 hours or every 12 years. Although components of the cylinders were replaced in 1986, there was no record that the No. 3 cylinder had been replaced since the airplane was manufactured in 1979. Notably, the engine had accumulated about 1356 hours since installation and had not reached the manufacturer's recommended hour limit for overhaul. However, the 12-year time limit had been significantly exceeded and an overhaul would have involved either installing new or overhauled cylinders. Operating under 14 Code of Federal Regulations Part 91, the owner was not required to adhere to the manufacturer's overhaul recommendations. However, following both the manufacturer's recommended time and hour limitations would have likely addressed the fatigue cracking prior to the accident.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An undetected fatigue crack on the outer surface of the No. 3 cylinder barrel that could only have been detected visually and not by a differential compression test , resulting in separation of the head from the barrel and a subsequent partial loss of engine power. Contributing to the accident was the pilot's decision to land downwind on a runway that subsequently necessitated an intentional hard landing to avoid a runway overrun and his failure to follow the engine manufacturer's time between overhaul recommendation .

### Findings

<b>Aircraft</b>	Recip eng cyl section - Fatigue/wear/corrosion (Cause)
<b>Personnel issues</b>	Incorrect action performance - Pilot (Cause) Decision making/judgment - Pilot (Factor) Scheduled/routine maintenance - Owner/builder (Factor)

## Factual Information

On July 1, 2012, about 1530 eastern daylight time, a Cessna R172K, N758JQ, registered to and operated by a private individual, was landed hard during a forced landing at Greene Airport (4N7), Greene, New York. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 personal flight from Becks Grove Airport (K16), Rome, New York, to Chenango Bridge Airport (1NK8), Binghamton, New York. The airplane sustained substantial damage, and the private pilot, the sole occupant was not injured. The flight originated from K16 about 1450.

The pilot stated that part of his preflight check included checking the engine oil quantity, which indicated 8 quarts (full). After takeoff, the he climbed to 4,500 feet and proceeded towards the destination airport. About 25 minutes into the flight, after passing 4N7, the engine began to run rough followed by a loss of engine power. He turned to 4N7, and then described hearing metallic grinding sounds, and reported the engine power continued to decrease. Unable to maintain altitude due to the loss of engine power, he elected to land downwind on runway 07. He reported that the flight was about 100 knots at the threshold, and about midpoint of the runway the main landing gear contacted the surface. He then pushed on the control yoke forcing the nose landing gear onto the runway in an effort to stop the airplane before running off the end down a steep embankment. The airplane came to rest upright about  $\frac{3}{4}$  down the runway.

Examination of the airplane by a Federal Aviation Administration (FAA) airworthiness inspector revealed damage to the lower portion of the firewall and a compression wrinkle on the left lower fuselage skin aft of the firewall. Examination of the engine revealed the head of the No. 3 cylinder assembly was separated from the barrel, which remained secured to the engine crankcase. The No. 3 cylinder and piston were retained for further examination.

Examination of the No. 3 cylinder and piston was by personnel of the NTSB Materials Laboratory located Washington, D.C. The examination of the cylinder revealed the barrel was fractured at the location where it intersected the cylinder head; however, the threaded end of the barrel remained within the cylinder head. Corrosion was observed on and between the cooling fins of the cylinder head, and protruding and crater shaped blisters were noted. Paint was noted to cover the protruding blisters and many of the crater shaped blisters. The fracture surface was cleaned and examination revealed two areas of relatively flat surfaces with curving crack arrest lines consistent with fatigue; both of which originated from corrosion pits on the outer surface.

There was no record that the No. 3 cylinder had been replaced since the airplane was manufactured in 1979, although in 1986, the engine was repaired which resulted in removal of the cylinders and replacement of components of the cylinders. Additionally, in 1987, the engine horsepower was increased from 195 to 210; no modifications to the engine powertrain were necessary. The engine was last inspected in accordance with a 100-Hour inspection on November 23, 2011, and during the inspection, differential compression testing of the cylinders was performed using 80 psi (standard). The entry in the engine logbook reflects that during testing of the No. 3 cylinder, it held 76 psi. The engine had accrued about 9 hours since the inspection at the time of the accident, and the airframe total time at the time of the accident was reported to be 1,358. The engine manufacturer recommends that the engine be overhauled every 1500 hours or every 12 years; the owner reported that the engine had not been

overhauled since installation. Operating under 14 CFR Part 91, the owner was not required to adhere to the manufacturer's recommendation.

## History of Flight

Enroute-cruise	Loss of engine power (partial) (Defining event)
Emergency descent	Miscellaneous/other Off-field or emergency landing
Landing-flare/touchdown	Hard landing

## Pilot Information

Certificate:	Private	Age:	55
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	09/13/2010
Occupational Pilot:	No	Last Flight Review or Equivalent:	10/18/2011
Flight Time:	710 hours (Total, all aircraft), 250 hours (Total, this make and model), 651 hours (Pilot In Command, all aircraft), 6 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CESSNA	Registration:	N758JQ
Model/Series:	R172K	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal; Utility	Serial Number:	R1723136
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	11/23/2011, Annual	Certified Max Gross Wt.:	2550 lbs
Time Since Last Inspection:	9 Hours	Engines:	1 Reciprocating
Airframe Total Time:	1349 Hours	Engine Manufacturer:	CONT MOTOR
ELT:	Installed, not activated	Engine Model/Series:	IO-360-KB
Registered Owner:	PECHA JAMES C	Rated Power:	210 hp
Operator:	PECHA JAMES C	Air Carrier Operating Certificate:	None

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	BGM, 1636 ft msl	Observation Time:	1553 EDT
Distance from Accident Site:	10 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	248°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	29° C / 8° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	15 knots/ 20 knots, 300°	Visibility (RVR):	
Altimeter Setting:	29.92 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Rome, NY (K16)	Type of Flight Plan Filed:	None
Destination:	Binghamton, NY	Type of Clearance:	None
Departure Time:	1450 EDT	Type of Airspace:	

## Airport Information

Airport:	Greene Airport (4N7)	Runway Surface Type:	Grass/turf
Airport Elevation:	935 ft	Runway Surface Condition:	Dry
Runway Used:	07	IFR Approach:	None
Runway Length/Width:	2665 ft / 200 ft	VFR Approach/Landing:	Forced Landing

## Wreckage and Impact Information

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

## Administrative Information

Investigator In Charge (IIC):	Timothy W Monville	Adopted Date:	02/03/2014
Additional Participating Persons:	James E Welch; FAA/FSDO; Latham, NY		
Publish Date:	02/03/2014		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=84177">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=84177</a>		

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