



Aviation Investigation Final Report

Location:	Lexington, North Carolina	Incident Number:	ERA15IA024
Date & Time:	October 22, 2014, 06:25 Local	Registration:	N242MB
Aircraft:	CIRRUS DESIGN CORP SR22	Aircraft Damage:	Minor
Defining Event:	Loss of engine power (total)	Injuries:	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot was conducting a personal cross-country flight. The pilot reported that, while en route to his destination at a cruise altitude of about 5,000 ft mean sea level, the engine "failed." He flew the airplane toward an open field and deployed the ballistic recovery parachute. He subsequently conducted a successful landing in the field.

An examination of the engine revealed that the crankshaft had fractured between the No. 2 main journal and the No. 2 connecting rod journal. An examination of the crankshaft revealed that the fracture was due to fatigue that had initiated from multiple origins at the fillet radius between the No. 2 main journal and the cheek at the aft end of the journal. The fatigue initiated from surface damage that occurred due to the No. 2 main bearing shifting. The bearing likely shifted due to the improper tightening of the crankcase through bolt nuts and subsequent insufficient clamping force of the crankcase saddle surfaces. A review of the airplane's maintenance records revealed that the engine was last overhauled 775 total flight hours before the accident, and no records were found indicating that the through bolts had been removed since that time. It is likely that maintenance personnel improperly tightened the crankcase through bolts during the overhaul.

Probable Cause and Findings

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

Maintenance personnel's improper tightening of the crankcase through bolt nuts during reassembly of the engine at the last overhaul, which resulted in the failure of the crankshaft and the subsequent total loss of engine power.

Findings

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

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Enroute-cruise	Loss of engine power (total) (Defining event)
Enroute-cruise	Miscellaneous/other
Emergency descent	Off-field or emergency landing

On October 22, 2014, at 0625 eastern daylight time, a Cirrus SR22, N242MB, registered to and operated by a private individual, deployed the Cirrus Airframe Parachute System (CAPS) following a total loss of engine power. The commercial pilot was not injured and the airplane sustained minor damage. Visual meteorological conditions prevailed for the personal flight conducted under Title 14 Code of Federal Regulations Part 91. The flight, operating under instrument flight rules, originated from Mc Gee Field Airport (24NC), Monroe, North Carolina, at 0600 central daylight time and was destined for Piedmont Triad International Airport (GSO), Greensboro, North Carolina.

According to the pilot, while enroute to his destination, at a cruise altitude of 5,000 feet msl he contacted GSO approach and opened his flight plan. Shortly thereafter the engine "failed"; the pilot flew the airplane towards an open field and deployed the CAPS system. The airplane made a successful landing in the field.

Examination of the engine revealed that the crankshaft had fractured between the number two main journal and the number two connecting rod journal. The number two bearing displayed bearing shift signatures and had completely extruded from the bearing support. The number one, two, three, and the number four bearing supports displayed fretting near the through bolt holes. There was no evidence of an oil starvation or lack of lubrication.

Examination of the oil pump revealed that the drive gear was intact. The oil pump cavity contained light scratches. The oil pump gear teeth were intact and did not exhibit any anomalies. The oil pressure relief valve seat contained some metallic debris and the relief valve plate displayed signs of peened imprints around the seat area circumference.

The oil filter was removed from the engine and the oil filter housing was cut open and the filter element was removed from the canister for examination. The oil filter element contained flakes and slivers from the damaged internal engine components. The oil sump drain plug was removed and the oil was drained from the sump; the amount was measured to be 8 quarts. The oil was dark in color and contained metallic debris. The oil sump was removed and sections of bearing were found in the sump along with metallic slivers and shavings. The oil pickup tube was bent and the screen was intact; metallic debris was noted on the screen.

A review of maintenance records revealed that the Continental IO-550N7 engine was rebuilt by Teledyne Continental Motors on August 22, 2011. The engine accumulated 775 hours since factory

rebuild and there is no record or evidence of the cylinders being removed since rebuild. The engine accumulated 200 hours since the last annual inspection dated November 8, 2013. Further review of records revealed that a 50 hour engine oil change was performed 69 hours prior to the accident on September 29, 2014.

The crankshaft was removed sent to the NTSB materials laboratory for fracture analysis. An examination of the crankshaft revealed that the fracture was due to fatigue that initiated from multiple origins at the fillet radius between the second main journal and the cheek at the aft end of the journal.

Pilot Information

Certificate:	Private	Age:	47, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Without waivers/limitations	Last FAA Medical Exam:	February 19, 2013
Occupational Pilot:	No	Last Flight Review or Equivalent:	January 23, 2014
Flight Time:	3354 hours (Total, all aircraft), 1650 hours (Total, this make and model), 3254 hours (Pilot In Command, all aircraft), 59 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	Registration:	N242MB
Model/Series:	SR22	Aircraft Category:	Airplane
Year of Manufacture:	2004	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	0911
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	November 8, 2013 Annual	Certified Max Gross Wt.:	3600 lbs
Time Since Last Inspection:	200 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	2512 Hrs as of last inspection	Engine Manufacturer:	CONT MOTOR
ELT:	C91 installed, not activated	Engine Model/Series:	IO-550 SERIES
Registered Owner:	On file	Rated Power:	315 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Dawn
Observation Facility, Elevation:	GSO,926 ft msl	Distance from Accident Site:	30 Nautical Miles
Observation Time:	05:54 Local	Direction from Accident Site:	30°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	310°	Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	29.97 inches Hg	Temperature/Dew Point:	5°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Monroe, NC (24NC)	Type of Flight Plan Filed:	IFR
Destination:	Greensboro, NC (GSO)	Type of Clearance:	IFR
Departure Time:	06:00 Local	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Minor
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	35.816665,-80.258613(est)

Administrative Information

Investigator In Charge (IIC):	Alleyne, Eric
Additional Participating Persons:	Jack Clark; FAA; Mobile, AL Kurt Gibson; Continental Motors; Mobile, AL Brannen D Mayer; Cirrus Aircraft; Duluth, MN
Original Publish Date:	April 26, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this incident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=90288

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](#).