Aviation Investigation Final Report

Location:	Mack, Colorado	**Accident Number:**	CEN13LA562
Date & Time:	September 23, 2013, 17:35 Local	**Registration:**	N426TF
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Minor, 2 None
Flight Conducted Under:	Part 91: General aviation		

Analysis

The pilot reported that, while the airplane was in cruise flight, the engine suddenly lost power and then seized. During the subsequent forced landing, the airplane sustained substantial damage. Examination of the engine revealed that the crankshaft was fractured through the cheek extending from the No. 2 main bearing journal to the No. 3 connecting rod journal. The No. 2 main bearings had extruded from their crankcase positions and exhibited mechanical damage. The No. 2 main bearing support displayed signatures consistent with bearing shift. The No. 2 main bearing saddle support and several other bearing saddle supports exhibited fretting, consistent with movement between the engine case halves due to insufficient torque on the case through bolts. Maintenance logbook records showed that the Nos. 1, 2, 3, and 4 cylinders were replaced about 1 1/2 years before the accident. When maintenance personnel replaced those cylinders, they would have had to remove the nuts on the case through bolts because they also serve as hold-down bolts for the cylinders. Based on the evidence, it is likely that maintenance personnel applied insufficient torque on the case through bolts after replacing the cylinders, which led to case movement and ultimately to the No. 2 main bearings shifting and extruding, the crankshaft fracturing, and the engine seizing.

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 due to the failure of the engine crankshaft, which resulted from maintenance personnel's application of insufficient torque on the engine case through bolts.

Findings

Aircraft	Recip engine power section - Incorrect service/maintenance
Aircraft	Recip engine power section - Failure
Personnel issues	(general) - Maintenance personnel

Factual Information

History of Flight

Enroute-cruise	Loss of engine power (total) (Defining event)
Landing	Collision with terr/obj (non-CFIT)

On September 23, 2013, about 1735 mountain daylight time, a Cirrus Design Corp SR22 airplane, N426TF, sustained substantial damage during a forced landing to runway 25 at the Mack Mesa Airport (C07), Mack, Colorado. The pilot reported that the engine seized during cruise flight. The pilot executed a forced landing to the airport but landed long, and ran off the end. The airplane became airborne again due to a drop off in the terrain. The pilot then attempted landing on a road and struck a ditch. The private pilot sustained minor injuries and his two passengers were not injured. The business flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and a Federal Aviation Administration (FAA) flight plan had been filed for the flight. The flight originated from the San Luis Valley Regional Airport, Alamosa, Colorado, about 1617, and was en route to the Ogden-Hinckley Airport, Ogden, Utah, when the accident occurred.

The pilot reported that when the airplane was about 7 to 8 miles northeast of C07, at an altitude of 12,500 feet, the engine suddenly lost power and fuel flow reduced. The pilot reached to increase fuel flow, but the engine seized. He attempted to restart the engine, but it would not rotate. The pilot diverted the airplane to C07 and attempted a landing on runway 25. During the engine out landing, the airplane overran the runway. At the departure end of the runway was a large drop off and the airplane went over the drop off, becoming airborne again. The pilot continued to fly the airplane, maneuvering to avoid power lines and attempted a landing on a road. The airplane sustained damage during the landing.

The airplane was equipped with a Heads Up Technologies Recoverable Data Module (RDM) that recorded flight and engine data at a 1 Hertz rate. Review of the recorded data confirmed the pilot's description of events. At 1723:39 (hhmm:ss), the airplane was at 12,190 feet pressure altitude and 82 percent engine power at 2,522 rpm. By 1727:29, the engine power had reduced to 49 percent at 2,524 rpm. Engine power was restored briefly and at 1727:41, was at 89 percent at 2,206 rpm, but then rapidly dropped to 0 percent power and 0 rpm at 17:30:00. The data further showed that the airplane came to rest at 1735:44.

Subsequent to the accident, the engine was removed from the airplane for a teardown examination. The examination revealed that the crankshaft was fractured through at the cheek going from the No. 2 main bearing journal to the No. 3 connecting rod journal. The No. 2 main bearings had extruded from their crankcase positions and exhibited mechanical damage. The No. 2 main bearing support displayed signatures consistent with bearing shift. The No. 2 main bearing saddle supports and several other bearing saddle supports exhibited fretting.

A review of the airplane's maintenance records showed that on April 13, 2012, the Nos. 1, 2, 3, and 4 cylinders were removed and replaced due to cracking in the injector boss area. The cylinders were

replaced with new units at that time. The through case bolts adjacent to the No. 2 main bearing journal also serve as hold down bolts for cylinders 2 and 3. In order to remove the cylinders it was necessary to remove the nuts from the through bolts.

Pilot Information

Certificate:	Private	**Age:**	50
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
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:**	April 29, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	2888 hours (Total, all aircraft), 1390 hours (Total, this make and model), 2838 hours (Pilot In Command, all aircraft), 94 hours (Last 90 days, all aircraft), 34 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N426TF
Model/Series:	SR22 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	2009	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3586
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 26, 2013 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	190 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1491 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-N60B
Registered Owner:	TRANS MED LLC	**Rated Power:**	310 Horsepower
Operator:	TRANS MED LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GJT,4858 ft msl	**Distance from Accident Site:**	19 Nautical Miles
Observation Time:	17:53 Local	**Direction from Accident Site:**	135°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	350°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	ALAMOSA, CO (ALS)	**Type of Flight Plan Filed:**	Company VFR
Destination:	OGDEN, UT (OGD)	**Type of Clearance:**	None
Departure Time:	16:17 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Mack Mesa Airport 10CO	**Runway Surface Type:**	Asphalt
Airport Elevation:	4724 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25	**IFR Approach:**	None
Runway Length/Width:	2600 ft / 60 ft	**VFR Approach/Landing:**	Forced landing;Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 2 None	**Latitude, Longitude:**	39.268054,-108.864166

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Scott Hartley; FAA - Salt Lake City FSDO; Salt Lake City, UT
Original Publish Date:	August 25, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=88133