Aviation Investigation Final Report

Location:	Dixon, California	**Accident Number:**	WPR17LA137
Date & Time:	June 30, 2017, 11:05 Local	**Registration:**	N744TC
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that, after he leveled off for the personal cross-country flight, he leaned the engine for cruise flight. The pilot noticed that the manifold pressure was lower than usual although the engine instruments indicated “in the green.” About 30 minutes later, the oil pressure reading rapidly dropped; the engine subsequently lost all power and made a loud bang, then oil sprayed on the wind screen, which impeded the pilot’s visibility. The pilot deployed the Cirrus Airframe Parachute System and the airplane descended into a vineyard. A main landing gear went through and substantially damaged the wing.

Visual examination of the engine revealed a hole in the top of the engine case. A piece of connecting rod and connecting rod bolt was found on top of the left side baffling.

Disassembly of the engine revealed that the numbers 3 and 4 connecting rods were fractured and separated from their connecting rod journals. Thermal discoloration to the connecting rod journals was consistent with oil starvation. The crankcase had fractured.

Postaccident examination of the turbochargers revealed that the left turbocharger was functional. The right turbine was damaged, and its wheel head had separated from the turbine shaft and was not located. The right turbine shaft fractured circumferentially at a piston ring groove, but the type of fracture could not be determined due to the extensive damage.

Postaccident examination did not show any evidence of preimpact mechanical malfunction or abnormalities that would have precluded normal operation. However, the extent of internal damage to the engine components during impact/the accident sequence and the missing right turbine wheel head precluded a detailed examination of the engine.

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 for reasons that could not be determined due to extensive damage.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Enroute	Loss of engine power (total) (Defining event)

On June 30, 2017, about 1105 Pacific daylight time, a Cirrus Design Corporation SR-22, N744TC, was substantially damaged when it was involved in an accident near Dixon, California. The private pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that after climb-out from San Jose, California, he leveled off at 7,500 ft, leaned the engine for cruise flight, and noticed that the manifold pressure was lower than usual. The engine sounded normal and all the engine instrumentation indicated "in the green." About 30 minutes later, during the descent to land at Yolo County Airport (DWA), Davis, California, the oil pressure reading rapidly dropped. The engine subsequently lost all power and made a loud bang, then oil sprayed on the wind screen, which impeded the pilot's visibility. The pilot then deployed the Cirrus Airframe Parachute System and descended into a vineyard. One main landing gear went through and substantially damaged a wing.

Examination of the airplane on site revealed no mechanical anomalies that would have precluded normal operation of the airframe.

Visual examination of the engine revealed a hole under the engine data plate on top of the engine case. A piece of connecting rod and connecting rod bolt was found on top of the left side baffling.

Engine Examination

Postaccident examination of the engine revealed that the numbers three and four connecting rods were fractured and separated from their connecting rod journals. The number four connecting rod, rod bearing, and journal displayed thermal discoloration consistent with oil starvation.

The oil sump contained many pieces of debris, including fragments of the number three connecting rod and number four rod bearing.

The crankcase had fractured; a section containing two of the mounting bolts for the oil sump screen separated, and the screen was displaced but clean and open. The oil pump exhibited rotational scoring; the scavenge pump was unremarkable.

The governor screen was clean. The oil filter contained shiny metallic debris.

The spark plugs were removed; all center electrodes were elliptical and clean with no mechanical deformation except the number four bottom plug, which was wet and contained debris. The spark plug electrodes were gray, which corresponded to normal operation.

The magnetos were connected to a test stand, and both magnetos produced spark at all posts.

Turbocharger Examination

Left Turbocharger

The left turbocharger compressor and turbine blades rotated freely by hand. The compressor blades were not discolored. The internal lubrication passages were present with no indication of an anomaly. The center housing assembly (nose only) exhibited moderate coking. The piston rings on the turbine wheel were present and in good condition, and the journal bearings' radial holes were clear. The turbine bearing displayed signs of scoring on the outer diameter and contact damage, and the oil chamfers' hole was missing. The turbine housing displayed signs of excessive exhaust deposits. It was determined that the turbocharger was functional.

Right Turbocharger

The right turbocharger compressor vanes wobbled on the shaft and were not discolored, and the compressor housing displayed compressor wheel rub marks. The compressor blades were "smeared" due to contact with the compressor housing consistent with in the direction of rotation.

The turbocharger turbine housing was white externally and displayed evidence of exhaust residue build up internally. The turbine wheel head was not present with the unit and there was little to no rub or contact damage noted on the turbine wheel housing or heat shield. The piston ring was still in place in the center housing seal bore. The turbine wheel head separated from the turbine shaft at the outboard edge of the piston ring groove and was not located. The shaft fractured circumferentially at a piston ring grove. The fracture surface was smeared when viewed through a microscope and the type of fracture could not be determined. The turbine wheel assembly's time in service could not be determined.

The compressor impeller and impeller housing displayed damage consistent with rotational contact. Examination of the unit revealed that the bearings' oil holes contained displaced bearing material, and both the turbine and compressor bearings were worn. The bearing housing lubrication passages were clear.

The turbine wheel piston rings were present and worn

Overhaul Maintenance History

On July 21, 2016, at a total time of 651.9 hours, the right turbocharger was removed and replaced with an overhauled unit. The last maintenance entry for the engine was a 50-hour inspection on May 18, 2017, at an engine total time of 771.9 hours. The flight meter at the time of the accident was 783.8 hours. Review of a work order dated July 19, 2016, revealed that the turbine wheel assembly was marked as serviceable without documenting any type of inspection. The Turbocharger Overhaul Manual, 400600-0000 Rev B, indicated removal of the turbine wheel assembly from the center housing and

rotating assembly. The manual's requirement to penetrant-inspect the turbine wheel assembly was also not documented.

Pilot Information

Certificate:	Private	**Age:**	48,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	August 31, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1614 hours (Total, all aircraft), 967 hours (Total, this make and model), 1498 hours (Pilot In Command, all aircraft), 9 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N744TC
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:	2010	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3640
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 21, 2016 Annual	**Certified Max Gross Wt.:**	3400 lbs
Time Since Last Inspection:	12 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1008.8 Hrs at time of accident	**Engine Manufacturer:**	CONT MOTOR
ELT:		**Engine Model/Series:**	IO-550-N60B
Registered Owner:	On file	**Rated Power:**	310 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KEDU	**Distance from Accident Site:**	
Observation Time:	10:30 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.92 inches Hg	**Temperature/Dew Point:**	24°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	San Jose, CA (RHV)	**Type of Flight Plan Filed:**	Unknown
Destination:	Reno, NV (RNO)	**Type of Clearance:**	None
Departure Time:	10:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	38.525001,-121.85832(est)

Administrative Information

Investigator In Charge (IIC):	Plagens, Howard
Additional Participating Persons:	Richard Dilbeck; FAA FSDO; Sacramento, CA Les Doud; Hartzell Propeller Bradley Miller; Cirrus Aircraft; Duluth, MN Kurt Gibson; Continental Aerospace; Mobile, AL
Original Publish Date:	May 6, 2021
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=95469