



# Aviation Investigation Final Report

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<b>Location:</b>	Blythe, California	<b>Accident Number:</b>	WPR18LA018
<b>Date &amp; Time:</b>	October 3, 2017, 15:21 Local	<b>Registration:</b>	N418CP
<b>Aircraft:</b>	CIRRUS DESIGN CORP SR22	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Powerplant sys/comp malf/fail	<b>Injuries:</b>	2 Minor
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

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## Analysis

The flight instructor reported that he and the pilot receiving instruction were conducting an instructional, cross-country flight. About 1.3 hours into the flight, the oil pressure started to decrease, and the pilots decided to divert to a nearby airport. The oil pressure continued to decrease, and the engine subsequently lost all power. The airplane was unable to reach the runway, so the pilots chose to activate the parachute system. Upon ground impact, the parachute dragged the airplane for about 20 ft. The pilots then egressed the airplane, and the parachute then dragged it another 200 ft. The nose landing gear and left main landing gear collapsed, and the fuselage and engine firewall sustained substantial damage.

During postaccident examination of the airframe, an oil streak was observed covering the airplane's belly. During engine examination, a b-nut fitting that attached the oil supply line to the turbocharger inlet check valve was found loose. A significant amount of fresh oil was observed in the area around the b-nut fitting and on the engine's right side near the turbocharger next to the b-nut. The cowling bottom's right side exhibited significantly more oil staining than the bottom's left side. The b-nut and its threads were not damaged. A small hole was found on the top of the engine crankcase, consistent with an internal engine failure.

A review of the airplane's maintenance records revealed that an annual inspection was completed earlier on the day of the accident flight and that actions were taken to comply with a turbocharger manufacturer's safety bulletin that recommended that the turbocharger oil supply inlet screen be inspected and cleaned on a regular basis. To inspect and clean the inlet screen, the oil line to the turbocharger bearing housing inlet and cap has to be removed, followed by the removal of the valve assembly from the turbocharger oil inlet fitting. The valve assembly must then be reassembled, during which the check valve should be torqued to 85-inch lbs. The valve assembly should then be reinstalled on the turbo oil adapter and torqued to 85-inch lbs. It is likely that, during the maintenance, maintenance personnel failed to properly torque the b-nut fitting that attached to the turbocharger inlet check valve oil line supply line to the turbocharger inlet check valve, which resulted in oil starvation and a subsequent engine failure.

## 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 an oil supply line fitting, which resulted in oil starvation, a subsequent engine failure, and an off-airport landing.

### Findings

<b>Aircraft</b>	Oil - Fluid level
<b>Personnel issues</b>	Scheduled/routine maintenance - Maintenance personnel
<b>Aircraft</b>	Hoses and tubes - Incorrect service/maintenance

## Factual Information

### History of Flight

<b>Prior to flight</b>	Aircraft maintenance event
<b>Enroute-cruise</b>	Powerplant sys/comp malf/fail (Defining event)
<b>Enroute-descent</b>	Loss of engine power (total)
<b>Enroute-descent</b>	Off-field or emergency landing

On October 3, 2017, about 1521 Pacific daylight time, a Cirrus Design Corp SR22 airplane, N418CP, was substantially damaged when it was involved in an accident near Blythe, California. The flight instructor and pilot sustained minor injuries. The airplane was being operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the flight instructor, the purpose of the cross-country flight was to reposition the airplane for the new owner and provide advanced transition training to the other pilot onboard. He and the pilot receiving instruction met before the flight to review the airplane's logbooks and plan the flight. The fuel tanks were filled, and neither the instructor nor the pilot saw any oil residue on the airplane's belly during the preflight inspection.

According to flight data recorder data, after an uneventful takeoff about 1347:22, the airplane climbed and then leveled off at a cruise altitude of about 11,500 ft mean sea level about 1359:38. About 1505:00, the oil pressure started to decrease. About 1.5 minutes later, the oil pressure had decreased to less than 30 pounds per square inch (psi). The instructor reported that, subsequently, they decided to divert to Blythe Airport (BLH), Blythe, California. While inbound to BLH, the oil pressure continued to decrease to less than 5 psi. Shortly thereafter, the engine lost all power. The airplane was unable to reach the runway, so the pilots chose to activate the airplane's parachute system when the airplane was about 2,000 ft above ground level. The parachute successfully deployed, and upon ground impact, the parachute dragged the airplane about 20 ft. The pilots then egressed the airplane, and the parachute dragged it another 200 ft, during which the nose landing gear and left main landing gear collapsed.

A review of maintenance records revealed that an annual inspection was completed earlier on the day of the accident flight and that actions were taken to comply with the turbocharger manufacturer's Safety Bulletin (SB) TAT SB11-04, which instructed owners "to have the turbocharger oil supply inlet screen inspected and cleaned on a regular basis to ensure that the turbo system continues to function properly." To inspect and clean the inlet screen, the oil line to the turbocharger bearing housing inlet and cap has to be removed, followed by the removal of the valve assembly from the turbocharger oil inlet fitting. The valve assembly then needs to be reassembled, during which a thread sealant should be applied on the external threads of the check valve before screwing the check valve adapter onto it, and the adapter should be torqued to 85 inch-lbs. The valve assembly should then be reinstalled on the turbo oil adapter with a thread sealant applied and torqued to 85 inch-lbs. The SB instructs maintenance personnel to conduct a postmaintenance ground run of the engine to check for any oil leaks after shutdown. The

maintenance records indicated that maintenance personnel conducted a ground run, and they did not note any oil leaks.

Postaccident examination of the airplane revealed that the fuselage and engine firewall were substantially damaged. Further, the b-nut fitting that attached the oil supply line to the turbocharger inlet check valve was found loose, and it was able to be rotated by hand. A significant amount of fresh oil was observed in the area around the b-nut fitting and on the engine's right side near the turbocharger next to the b-nut. The cowling bottom's right side exhibited significantly more oil staining than the bottom's left side. The b-nut and its threads were not damaged. No additional anomalies associated with the turbocharger were found.

The engine remained attached to all its mounts, and no external cylinder damage was observed. All engine accessories remained attached to their mounts. A small hole was found on the top of the engine crankcase, consistent with an internal engine failure.

No anomalies were noted with the ignition components, the exhaust system, or the induction system. The left and right magnetos remained attached and were intact. No evidence of oil leaks was observed around the magneto mounting flange.

All the spark plugs remained installed and were intact. The bottom spark plugs exhibited normal wear and operating signatures

Boroscopic examination of the engine's internal surfaces revealed that the Nos. 3 and 4 connecting rods had separated from the crankshaft. The journal for one of the separated connecting rods was visible, and it exhibited thermal damage consistent with lubrication distress. The No. 4 cylinder exhibited normal operating and combustion signatures. The No. 3 cylinder was only partially visible because of the piston position, and the visible portion exhibited normal operating and combustion signatures.

The fuel pump remained attached and was intact. All the fuel lines remained secured to the fuel pump, and no fuel leaks were observed. No oil leaks were observed around the area of the fuel pump mounting flange. The throttle and metering assembly remained attached and was intact, and no anomalies were noted.

The oil pump, filter, and oil sump remained attached and were intact, and no evidence of oil leaks were observed near these components. The quick oil drain valve remained secured and was in the "closed" position. The oil gauge indicated that the oil sump contained about 2 quarts of oil. A significant amount of metallic material consistent with bearing, piston, and crankcase material was found in the oil sump. The bearing pieces exhibited thermal damage, consistent with lubrication distress. The oil pick-up tube was partially visible, and no anomalies were noted. During examination of the oil filter pleats, a small amount of residual oil and several pieces of metallic material were observed. The oil cooler remained attached and was intact, and no evidence of oil leaks was found near it or its attaching lines. All the oil lines were secured, and no evidence of oil leaks were found in the lines or surrounding area.

The propeller flange remained attached to the crankshaft, and no cracks were found in the crankshaft's exterior. The crankshaft was able to be rotated by hand using the propeller with noticeable resistance, and rotational continuity was established throughout the engine and valve train.

## Flight instructor Information

<b>Certificate:</b>	Commercial; Flight instructor; Private	<b>Age:</b>	35, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane single-engine; Helicopter; Instrument airplane; Instrument helicopter	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	November 7, 2016
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	September 20, 2016
<b>Flight Time:</b>	(Estimated) 5860 hours (Total, all aircraft), 1800 hours (Total, this make and model), 5200 hours (Pilot In Command, all aircraft), 85 hours (Last 90 days, all aircraft), 22 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Pilot Information

<b>Certificate:</b>	Commercial; Private	<b>Age:</b>	22, Female
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	4-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With waivers/limitations	<b>Last FAA Medical Exam:</b>	April 20, 2017
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	August 23, 2017
<b>Flight Time:</b>	(Estimated) 320 hours (Total, all aircraft), 112 hours (Total, this make and model), 162 hours (Pilot In Command, all aircraft), 31 hours (Last 90 days, all aircraft), 14 hours (Last 30 days, all aircraft), 1 hour (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	CIRRUS DESIGN CORP	<b>Registration:</b>	N418CP
<b>Model/Series:</b>	SR22 NO SERIES	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2008	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	3262
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	October 2, 2017 Annual	<b>Certified Max Gross Wt.:</b>	3400 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	1395.3 Hrs	<b>Engine Manufacturer:</b>	CONT MOTOR
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	IO-550-N
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	315 Horsepower
<b>Operator:</b>	On file	<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>	KBLH,392 ft msl	<b>Distance from Accident Site:</b>	9 Nautical Miles
<b>Observation Time:</b>	14:52 Local	<b>Direction from Accident Site:</b>	251°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	17 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	170°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	29.7 inches Hg	<b>Temperature/Dew Point:</b>	33°C / 10°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	CAMARILLO, CA (CMA )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	SAFFORD, AZ (SAD )	<b>Type of Clearance:</b>	VFR flight following
<b>Departure Time:</b>	13:30 Local	<b>Type of Airspace:</b>	Class E

## Airport Information

<b>Airport:</b>	Blythe BLH	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	399 ft msl	<b>Runway Surface Condition:</b>	Dry;Vegetation
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Minor	<b>Latitude, Longitude:</b>	33.666942,-114.54805(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Nixon, Albert
<b>Additional Participating Persons:</b>	Robert Michaelson; Federal Aviation Administration; Riverside, CA Brad Miller; Cirrus Aircraft; Duluth, MN Kurt Gibson; Continental Motors; Mobile, AL
<b>Original Publish Date:</b>	May 5, 2021
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=96259">https://data.ntsb.gov/Docket?ProjectID=96259</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](#).