Aviation Investigation Final Report

Location:	Aguila, Arizona	**Accident Number:**	WPR18LA174
Date & Time:	June 19, 2018, 12:00 Local	**Registration:**	N764CT
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Destroyed
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During a cross-country flight, the pilot observed a significant increase in the engine oil pressure followed by a sudden drop. He prepared for an emergency landing during which the engine speed increased and the engine lost power. The cabin then filled with smoke and oil covered the windshield. The pilot was able to activate the airplane's parachute and the airplane landed about 5 seconds later in a ravine. The airplane was destroyed by a postcrash fire.

A postaccident examination of the engine revealed evidence of a pre-ignition/detonation event that partially eroded the Nos. 2 and 5 pistons. The eroded pistons permitted the pressurization of the crankcase, which resulted in oil starvation of the engine. Due to the severe fire damage, the cause of the preignition/detonation could not be determined.

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 pre-ignition/detonation for reasons that could not be determined based on available information.

Findings

Not determined	(general) - Unknown/Not determined
Aircraft	Recip eng cyl section - Malfunction

Factual Information

History of Flight

Enroute-cruise	Powerplant sys/comp malf/fail (Defining event)
Enroute-cruise	Loss of engine power (total)
Emergency descent	Collision with terr/obj (non-CFIT)

On June 19, 2018, about 1200 mountain standard time, a Cirrus SR22, N764CT, was destroyed when it was involved in an accident near Aguila, Arizona. The pilot was seriously injured, and the passenger received minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, at approximately the halfway point of his cross-country flight, the oil temperature increased past the highest limit on the oil gauge. The oil pressure then dropped to between 14 and 16 pounds per square inch (psi), and the airplane began to shudder "violently."

The pilot turned the airplane toward the closest airport, about 40 miles away. While en route, the engine speed increased to over 5,000 rpm then dropped to almost 0 rpm. The pilot reported he was having a difficult time maintaining an altitude of 6,500 ft mean sea level and knew he would not be able to clear a nearby mountain range. As he looked for an area to make an emergency landing, the engine "completely seized." The pilot reported the cabin then filled with smoke and oil covered the windshield. He deployed the airplane's parachute system, and the airplane landed about 5 seconds later in a ravine. After landing, the airplane was consumed by fire.

An initial examination of the engine revealed the No. 2 connecting rod had punctured the top aft section of the crankcase. The rusted crankshaft was visible through the hole, as were the remains of the separated No. 2 connecting rod. The spark plugs were removed, and heavy erosion was observed on the electrodes; the insulators were fractured and missing significant portions. Borescope examination of the cylinders revealed signatures consistent with elevated temperatures on the pistons. The No. 5 piston was eroded around the outer circumference and there was a hole present with a portion of the top piston ring visible. Additionally, examination of the exhaust system revealed re-solidified melted metal particles, consistent with the postaccident fire.

The engine was completely disassembled for further examination. This examination revealed the Nos. 2, and 5 pistons experienced a pre-ignition/detonation event that partially eroded the pistons and resulted in oil starvation of the engine. The cause of the pre-ignition/detonation event could not be determined. Due to the severe fire damage, many of the engine components could not be tested, including the magnetos.

According to the engine maintenance records, a magneto-to-engine timing check was conducted many times, with the most recent check before the accident dated July 27, 2012; an annual inspection was performed May 9, 2018, at a total time of 1,955.4 hours with no anomalies noted. However, the required 500-hour inspection of the magnetos was not indicated in the maintenance records since their last comprehensive inspection in 2011. The magnetos had accumulated 1,284.1 hours since 2011.

Pilot Information

Certificate:	Private	**Age:**	44,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	July 1, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2018
Flight Time:	(Estimated) 0 hours (Total, all aircraft), 500 hours (Total, this make and model)		

Passenger Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	4-point
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N764CT
Model/Series:	SR22 UNDESIGNAT	**Aircraft Category:**	Airplane
Year of Manufacture:	2008	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2908
Landing Gear Type:	Tricycle	**Seats:**	
Date/Type of Last Inspection:	May 8, 2018 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	20 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1953.4 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	C126 installed, not activated	**Engine Model/Series:**	IO-550-N50B
Registered Owner:		**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PRC,1537 ft msl	**Distance from Accident Site:**	52 Nautical Miles
Observation Time:	18:53 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	290°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.11 inches Hg	**Temperature/Dew Point:**	28°C / -4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Scottsdale, AZ (SDL)	**Type of Flight Plan Filed:**	None
Destination:	Lake Havasu City, AZ (HII)	**Type of Clearance:**	VFR
Departure Time:	10:30 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Minor	**Aircraft Fire:**	On-ground
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 Minor	**Latitude, Longitude:**	34.067779,-113.2061

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye		
Additional Participating Persons:	Steven Meisner; Federal Aviation Administration; Scottsdale, AZ Brannon Mayer; Cirrus Aircraft ; Duluth , MN Phillip Grice; Continental Aerospace Technologies; Mobile, AL James Crupi; AmSafe ; Phoenix, AZ		
Original Publish Date:	April 21, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97531		