

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA106

AIRFRAME & ENGINE EXAMINATION

April 30, 2024

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A. ACCIDENT

Location: Whitethorn, California
Date: March 8, 2024
Time: 1325 Local
Airplane: Cirrus SR22, N2824M

B. AIRFRAME & ENGINE EXAMINATION

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Party Coordinator	Benjamin Brillo Federal Aviation Administration Oakland, California

C. SUMMARY

On March 8, 2024, at 1325 Pacific standard time, a Cirrus SR22, N2824M, was substantially damaged when it was involved in an accident near Whitethorn, California. The pilot and one passenger sustained minor injuries, and one passenger was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that he departed Shelter Cove Airport (0Q5), Shelter Cove, California, with an intended destination of Santa Rosa, California. As the airplane was ascending through about 2,600 ft mean sea level, the engine lost total power. The pilot stated that he switched fuel tanks, activated the electric boost pump and manipulated the mixture and throttle controls in an effort to restore engine power.

Unable to restore engine power, he decided to deploy the Cirrus Airframe Parachute System (CAPS). The airplane descended under parachute canopy into dense tree covered terrain and became suspended within the trees. Subsequently, the airplane fell from the trees and impacted the ground inverted. The airplane sustained substantial damage to the fuselage and empennage.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

Examination of the recovered wreckage revealed that the engine, engine mount and nose landing gear had been separated from the fuselage by recovery personnel. The firewall exhibited crushing and bending aft. The left side door was fracture separated from the door hinges. The fuselage, aft of the rear seats was separated by recovery personnel to facilitate wreckage recovery.

The observed time on the quartz meter was 1,455.1.



Figure 1: View of fuselage during examination.

Flight control continuity was established from all primary flight control surfaces to the left and right cockpit controls. Separations in the control cables were consistent with cuts made by recovery personnel to facilitate wreckage recovery.

Throttle control continuity was established from the cockpit controls to the throttle body.

Mixture control continuity was established from the cockpit controls to the engine driven fuel pump.

Propeller control continuity was established from the cockpit controls to the propeller governor.

The left wing remained attached to the fuselage. Crushing was observed on the leading edge from the wing root to about mid span. An additional section on the leading edge about 6 inches in width of crushing was observed near the wing tip. The left flap and aileron remained attached via their mounts. Crushing and bending was observed to the left flap and aileron. The main fuel tank fuel cap was observed in place and secure. The left landing gear remained attached to the wing.



Figure 2: View of left wing during examination.

The right wing remained attached to the fuselage. Crushing was observed on the leading edge near the wing root. The right flap and aileron remained attached via their mounts. Crushing and bending was observed to the left flap and aileron. The main fuel tank fuel cap was observed in place and secure. The right landing gear remained attached to the wing.



Figure 3: View of right wing during examination.

The empennage, forward of the horizontal stabilizer was fracture separated from the fuselage. The vertical stabilizer, rudder, rudder trim, horizontal stabilizers, elevator, and elevator trim tabs remained attached and secure to their respective mounts. Crushing and bending was observed to the rudder.



Figure 4: View of empennage during examination.

A visual inspection was conducted of the fuel system. Continuity was established from the wing roots to the fuel injectors. The fuel selector handle was observed in a position, consistent with OFF. The fuel selector valve was observed in the near off position. The airframe fuel strainer assembly was removed and disassembled and was void of fluid and debris. The position of the auxiliary fuel pump switch was observed in the center / off position. External power was applied to the electric fuel boost pump and noise was heard emitting from the pump.

2.0 Engine Examination

Engine Manufacturer: Continental

Engine Model Number: IO-550-N

Engine Serial Number: 917979

Recent Inspection: August 15, 2023 - Annual inspection

Recent Recorded TSMOH: 1,418.9 as of last inspection

Examination of the recovered engine revealed that it was separated from the engine mount and nose gear assembly. No evidence of any external mechanical damage was observed to the engine crankcase. All six cylinders and all engine accessories remained attached. All fuel and oil lines appeared attached to their respective fittings and were tight.



Figure 5: Front view of engine during examination.

The oil sump remained attached to the crank case. Crushing and a 4 inch puncture was observed near the oil drain. About 1 quart of engine oil was drained from the oil sump. The oil sump was removed, and the oil pickup screen and oil sump were free from debris.



Figure 6: View of puncture in oil sump.

The air induction system remained attached to the engine. The air induction system was removed and visually examined, no blockages or anomalies noted.

The exhaust system remained secure to the cylinders. Crushing and bending was observed throughout, consistent with impact damage. No evidence of any exhaust leaks around the cylinder attach points were observed. The exhaust system was removed and visually examined, was free of obstructions.

The engine driven fuel pump remained attached to the engine and no external damage was observed. The mixture control lever remained attached to the fuel pump and unremarkable. The mixture control lever moved the available length. The engine driven fuel pump was removed, the drive coupling was intact and engine driven fuel pump rotated freely. Evidence of fuel staining on the pump was visible and continuing onto the engine driven oil pump.

The throttle body remained attached to the engine. The throttle lever was intact, moved freely from stop to stop.

The fuel injector nozzles remained attached to the cylinders and undamaged. The fuel injector nozzles were removed from the cylinders and found to be free of debris or restrictions.

The fuel flow manifold remained attached to its respective mount and was undamaged. The fuel manifold assembly was removed and subsequently disassembled. The internal diaphragm and spring were undamaged. The fuel manifold was clear and free of debris. The liquid in the fuel manifold was tested for water using SAR-GEL water finding paste, with positive results.

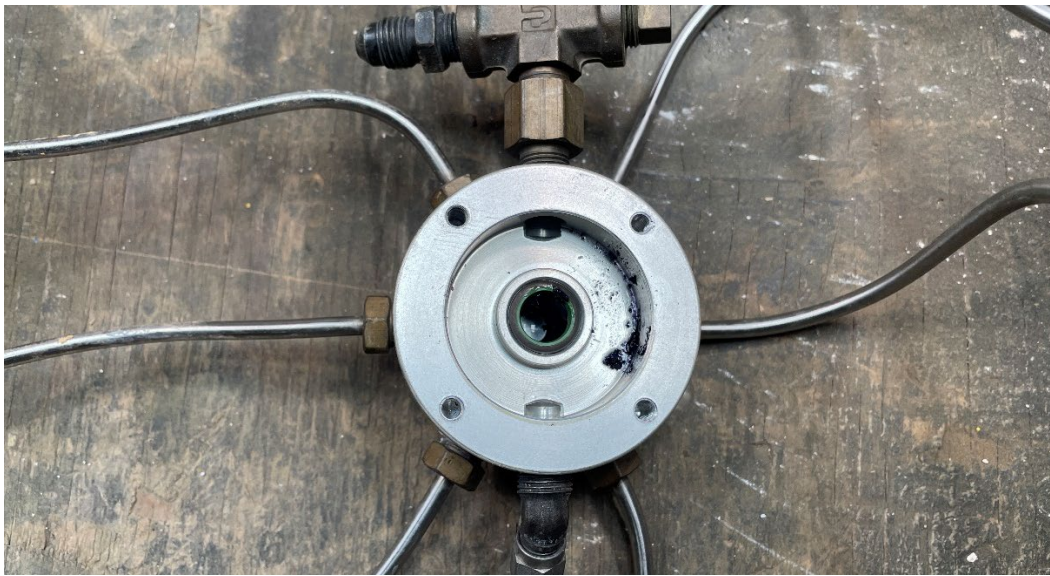


Figure 7: View of positive water test.

The rocker box covers were removed. The intake and exhaust rocker arms were intact, and oil coated on all cylinders. All intake and exhaust valve springs were in place and visually appeared to be undamaged. Both upper and lower spark plugs were removed, and all six cylinders were examined internally using a lighted borescope. A normal amount of combustion deposits was observed within the combustion dome of each cylinder and piston face. All the intake and exhaust valves were unremarkable. The crankshaft was rotated by hand using the propeller hub. Rotational continuity was established throughout the engine and valve train. Thumb compression and suction was obtained on all six cylinders.

The engine spark plugs were removed from the engine, and they were a combination of massive electrode and fine wire type. The No. 4 cylinder sparkplugs had rust deposit with the electrode area, the remaining sparkplugs exhibited gray deposits within the electrode area. All of spark plugs exhibited signatures consistent with WORN NORMAL when compared to the Champion Check-A-Plug comparison chart.



Figure 8: View of engine spark plugs.

The left and right magnetos remained attached to the engine accessory case with no external damage noted. The right engine to magneto timing was verified at 21° and the left engine to magneto timing was verified at 24°. The propeller was rotated by hand, spark was produced on all ignition leads and impulse coupling operation was heard.

3.0 Propeller Examination

The airplane was equipped with a three blade Hartzell propeller; for the purposes of this report the propeller blades were labeled A, B, and C. The propeller hub remained attached to the crankshaft. Propeller blade A & B remained attached to the propeller hub, but were cut near the propeller hub by recovery personnel. Propeller blade C remained attached to the propeller hub and exhibited aft bending about mid span.

4.0 Aircraft Information

According to the recovery personnel, the airplane came to rest inverted. Fuel was observed leaking from the airplane. No fuel was recovered from the right wing. However, about 26 gallons of fuel was recovered from the left wing.

INSPECTION RECORD F.A.R. 43.11-91.409	
AIRCRAFT TIME IN SERVICE	KIND OF INSPECTION - STATUS & DISCREPANCY LIST SIGNATURE - CERT. NO. OF PERSON APPROVING OR DISSAPPROVING AIRCRAFT FOR SERVICE
	 Sonoma JET CENTER Sonoma Jet Center Santa Rosa, Ca. 95403
	Date: 8/15/2023; Aircraft: N2824M; Type: Cirrus; S/N: 1144; Total Time: 1418.90; Engine - Type: IO-550-N, S/N: 917373; Prop - Type: PHC-J3YF-1RF, S/N: FP3199B Shop Order #: 23-8514, Closed: 8/23/2023
	Performed an Airframe Annual Inspection per Cirrus Inspection form and FAR43 appendix D. R&R all inspection panels, interior and cowlings for inspection. Drained and inspected gascolator. Serviced NLG and both left and right MLG wheel bearings. Accomplished SB 2X-32-19R3 nose gear, no discrepancies found. Serviced brake reservoir. ELT inspected I/A/W FAR 91.207(d). Battery expires 12-25. Perform cap check of battery - good. Portable fire extinguisher weight check good. Installed new #2 batteries P/N 50979-001 (x2). Replaced induction air filter P/N BA-24 with new and safetied. Performed alternator 500hr. inspection and replaced gasket. No discrepancies noted. Removed, replaced and installed TKS filter P/N 26115-101, safetied, torque striped & bled system. Resealed RH brake caliper with O-rings P/N MS28755-222. Resealed trim around wing roots. Cleaned area and applied sealant as required to re-secure RH aileron flow strip. I certify that this aircraft has been inspected I/A/W an annual inspection and owner notified of the following discrepancy: Reefing line cutters are expired and replacement parts not currently available.
	X  Ronald K Ward

Figure 9: View of airframe annual inspection.

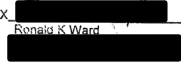
INSPECTION RECORD F.A.R. 43.11-91.409		
DATE	AIRCRAFT TIME IN SERVICE	KIND OF INSPECTION - STATUS & DISCREPANCY LIST SIGNATURE - CERT. NO. OF PERSON APPROVING OR DISSAPPROVING AIRCRAFT FOR SERVICE
		 Sonoma JET CENTER Sonoma Jet Center Santa Rosa, Ca. 95403
		Date: 8/15/2023; Aircraft: N2824M; Type: Cirrus; S/N: 1144; Hobbs: 1418.90; Total Time: 1418.90; Engine - Type: IO-550-N, S/N: 917373, Time: 1418.90, SMOH: 1418.90 Shop Order #: 23-8514, Closed: 8/23/2023
		Performed an Engine Annual Inspection per Cirrus Inspection form and FAR43 appendix D. Drained oil and removed filter. Cut open filter and inspected, no metal found. Installed AA48208-2 filter & serviced engine with 7 qts Aeroshell W100 oil and CamGuard. Performed compression test #1 62/80 #2 73/80 #3 79/80 #4 63/80 #5 73/80 #6 60/80. Serviced spark plugs, replaced 3 plugs with new P/N RH832E. Checked ignition timing. Pressure tested exhaust system. Serviced fuel injectors, removed intake pipes for cylinders 1,3 and 5. Cleaned injectors and installed with new seals and gaskets. Drained and inspected gascolator. Replaced induction air filter with new P/N BA-24 and safetied. Accomplished alternator 500hr. inspection and replaced gasket. No discrepancies found at this time. Performed dye pen inspection on #4 & #6 spark plug holes, no defects found. Removed cam-hola gasket and replaced with new P/N 653415. I certify that this engine been inspected I/A/W a 100hr inspection and this engine was determined to be in airworthy condition.
		X  Ronald K Ward

Figure 10: View of engine annual inspection.

Submitted by:

Paul Basti
Air Safety Investigator