



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

October 10, 2019

AIRFRAME AND ENGINE EXAMINATION

ERA19LA264

This document contains 12 embedded photos.

(12 Pages)

1.0 EXAMINATION PARTICIPANTS:

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2.0 ACCIDENT SUMMARY

On September 1, 2019, about 1520 central daylight time, a Cirrus Design Corporation SR22, N878SR, experienced a loss of engine power and was substantially damaged during a forced landing at Foley, Alabama. The private pilot and three passengers were not injured. The airplane was privately owned and operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident. No flight plan was filed for the flight that originated from Jack Edwards National Airport (JKA), Gulf Shores, Alabama, about 1510 and was destined for Concordia Parish Airport (0R4), Vidalia, Louisiana.

The private pilot stated that he completed the preflight inspection, engine run-up, and before-takeoff checks with no anomalies noted. About 10 minutes after departure, while climbing to cruise altitude and turning to avoid a storm cell, he felt the engine “buffet” then observed a loss in engine RPM. When he turned the airplane toward JKA, the engine stopped producing power and the propeller ceased rotating. He declared an emergency and moved the throttle to idle then full forward; however, the engine did not respond. He aimed for a field to initiate a forced landing.

The airplane owner, who was seated in the front left seat, reported no anomalies during climbout until the airplane reached about 2,500 ft agl. At that time, he said it felt like “when you take the foot off the gas in your car. It just stopped producing power.” He stated that he cycled the throttle; however, the engine did not respond. When the airplane reached 1,200 ft agl, he suggested activation of the Cirrus Airframe Parachute System (CAPS). The pilot concurred, and the owner activated the CAPS.

Initial examination of the wreckage by a Federal Aviation Administration (FAA) inspector revealed that the airplane descended via parachute and landed upright in a field. The fuselage aft of the firewall exhibited buckling and cracking, the bottom portion of the rudder exhibited a crack about 7-8 inches in length, and the nose gear was detached from its mounting location. The flap selector switch was in the 50% position, the fuel lever was in the left tank position, and the fuel pump was in the boost position.

3.0 EXAM SUMMARY

The wreckage of N878SR was recovered from the accident site in Foley, Alabama, several days after the accident. All wreckage was located at and recovered from the accident site. The wing was removed from the fuselage to facilitate recovery.

The examination of N878SR was conducted on October 8, 2019, at Florida Air Recovery, Jacksonville, FL. Examination of the airframe revealed damage confined to the nose area. The aft CAPS harness remained snubbed, indicating that the aircraft impacted the ground before tail drop occurred in the CAPS deployment sequence. The fuselage center bond line was fractured behind the firewall. Examination of the engine revealed fractured engine mounts, and the engine was displaced in a positive direction. The propeller could not be easily rotated. Examination of the wing revealed the fracture of the left main landing gear.

4.0 DETAILS OF THE EXAMINATION

4.1 Airframe Examination

Examination of the airframe revealed damage confined to the nose area. The windshield was fractured with several pieces missing. The fuselage center bond line was fractured behind the firewall. There was a crack above the left and right CAPS harness attach fittings. The aft CAPS harness remained snubbed. Examination of the wing revealed the fracture of the left main landing gear.

Airframe Examination Photos



Figure 1: Fuselage fracture at center bond line (Photo Courtesy of Cirrus)



Figure 2: Fuselage crack above right CAPS harness attach fitting (Photo Courtesy of Cirrus)



Figure 3: View of Aircraft from Right (Photo Courtesy of Cirrus)



Figure 4: View of Aircraft from Left (Photo Courtesy of Cirrus)



Figure 5: Left Portion of Wing (Photo Courtesy of Cirrus)



Figure 6: Right Portion of Wing (Photo Courtesy of Cirrus)

4.2 Engine Examination

The engine was equipped with a 3-bladed constant speed propeller, which remained attached to its mount. The exterior of the engine showed no evidence of preaccident anomalies. The spinner was crushed from the bottom. One propeller blade was loose in the propeller hub, and the propeller could be rotated with significant resistance. Examination of the engine revealed fractured engine mounts, and the engine was displaced in a positive direction. The crankshaft could not be rotated beyond a few inches.

Borescope examination of the cylinders revealed valve strikes on all of the piston faces. The propeller governor screen revealed no metal and the engine accessory drive gear for the governor would not rotate during crankshaft rotation. Upon removal of the alternator, there was no evidence of camshaft rotation upon propeller's manual rotation. The oil filter was removed and cut open. The filter pleats were visually examined and there was noticeable metallic material within the filter pleats.

Engine Examination Photos



Figure 7: Uncowled Engine (Photo Courtesy of Cirrus)

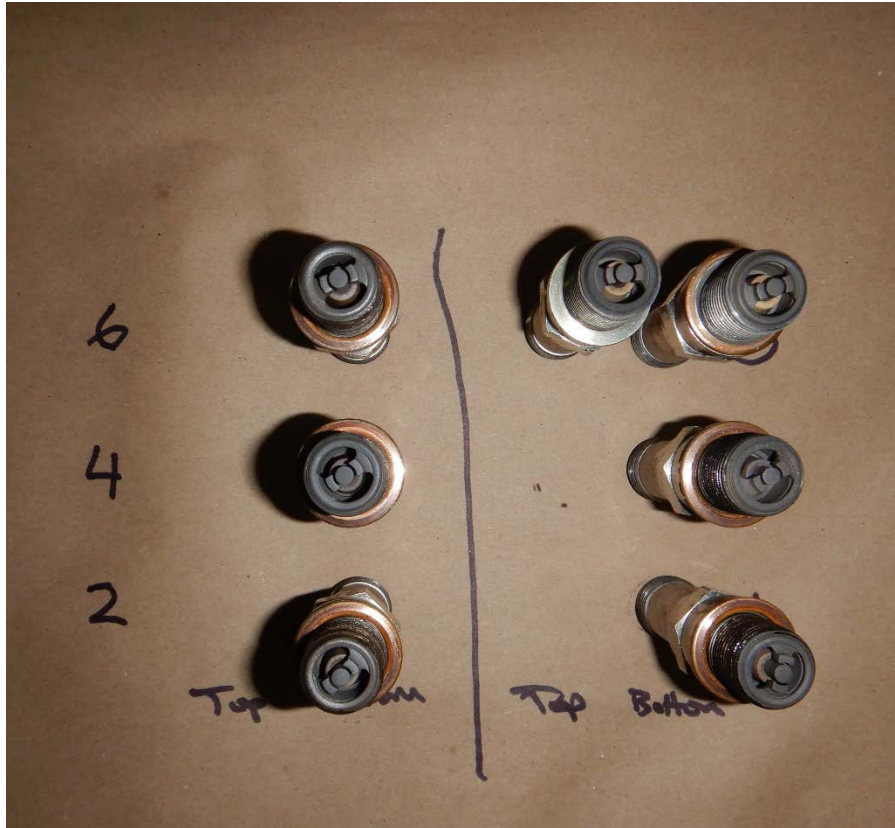


Figure 8: Removed Spark Plugs



Figure 9: Propeller Governor Screen

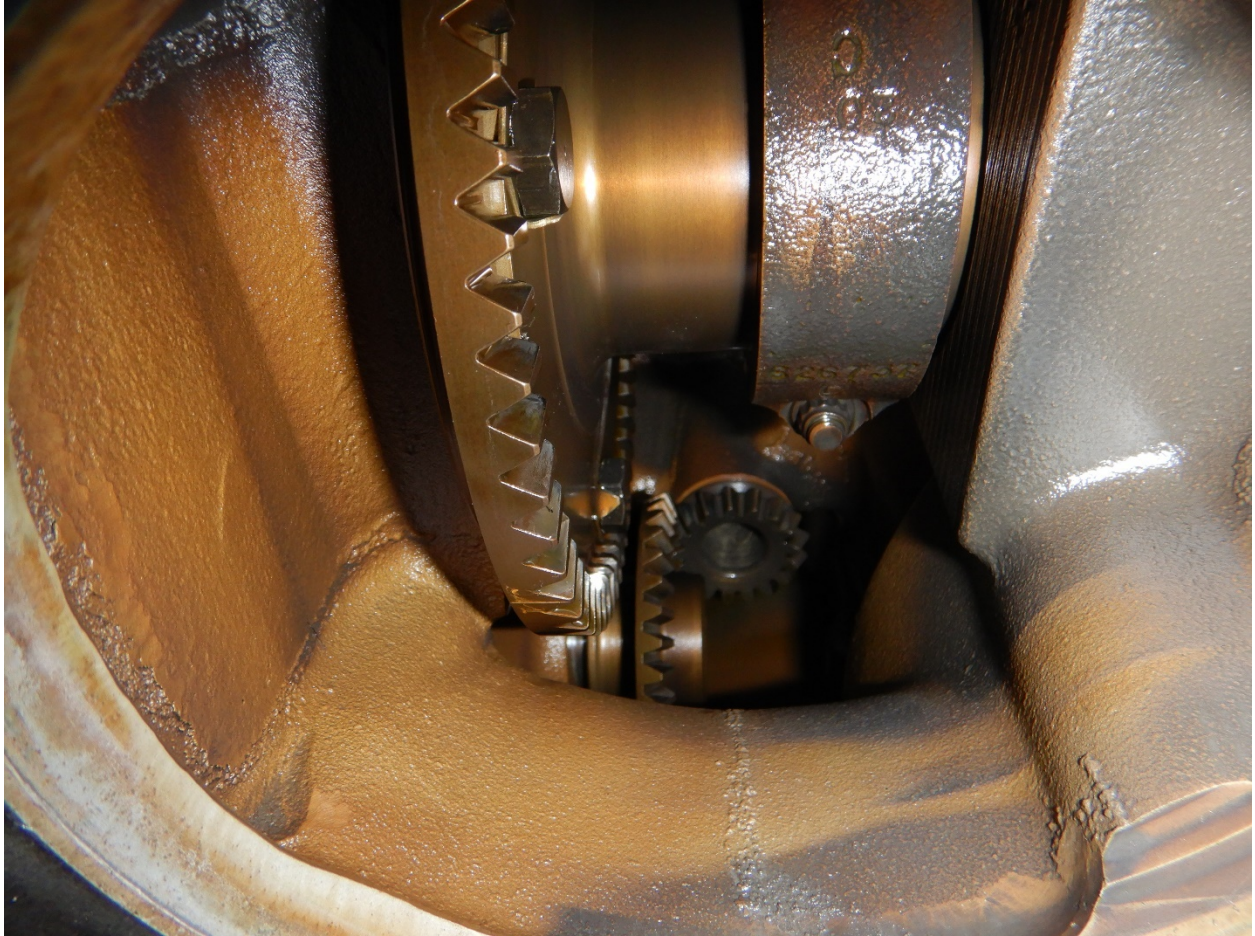


Figure 10: Camshaft View with Primary Alternator Removed



Figure 11: Metal Shavings on Oil Filter

4.3 Propeller Examination

Examination of the propeller revealed that it was attached to the engine. The spinner was crushed from the bottom. There was no indication of rotational deformation. There was no remarkable blade twisting or leading edge damage. One blade was loose.

Propeller Examination Photos



Figure 12: Spinner

Submitted by: Lynn Spencer



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ENGINE TEAR-DOWN EXAMINATION

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Initial examination of the wreckage by a Federal Aviation Administration (FAA) inspector revealed that the airplane descended via parachute and landed upright in a field. The fuselage aft of the firewall exhibited buckling and cracking, the bottom portion of the rudder exhibited a crack about 7-8 inches in length, and the nose gear was detached from its mounting location. The flap selector switch was in the 50% position, the fuel lever was in the left tank position, and the fuel pump was in the boost position.

3.0 EXAM SUMMARY

The wreckage of N878SR was recovered from the accident site in Foley, Alabama, several days after the accident. All wreckage was located at and recovered from the accident site. The initial examination of N878SR was conducted on October 8, 2019, at Florida Air Recovery, Jacksonville, FL. Follow-up examination at Continental Aerospace Technologies, Mobile, Alabama, was conducted on December 9, 2019. Examination of the camshaft drive gear revealed the absence of 10 teeth and damage to one tooth.

4.0 DETAILS OF THE ENGINE EXAMINATION

Engine accessories and baffling were removed. Fuel nozzles for all cylinders were found loose in the cylinders. Torque check of through-bolt, deck studs and 7th studs torque check revealed no anomalies. The cylinders and pistons were removed. Testing of the left and right magnetos revealed no anomalies. Several gear teeth were observed in the oil pan. Examination of the fuel injectors revealed no anomalies. Examination of the camshaft drive gear revealed the absence of 10 teeth and damage to one tooth.

Engine Examination Photos



Figure 1: Crated Engine



Figure 2: Engine with baffling and accessories removed



Figure 3: Sheered Teeth in Oil Pan



Figure 4: Sparkplugs



Figure 5: Valve Strikes on Pistons Nos. 1 and 2



Figure 6: Valve Strikes on Pistons Nos. 3 and 4



Figure 7: Valve Strikes on Pistons Nos. 5 and 6

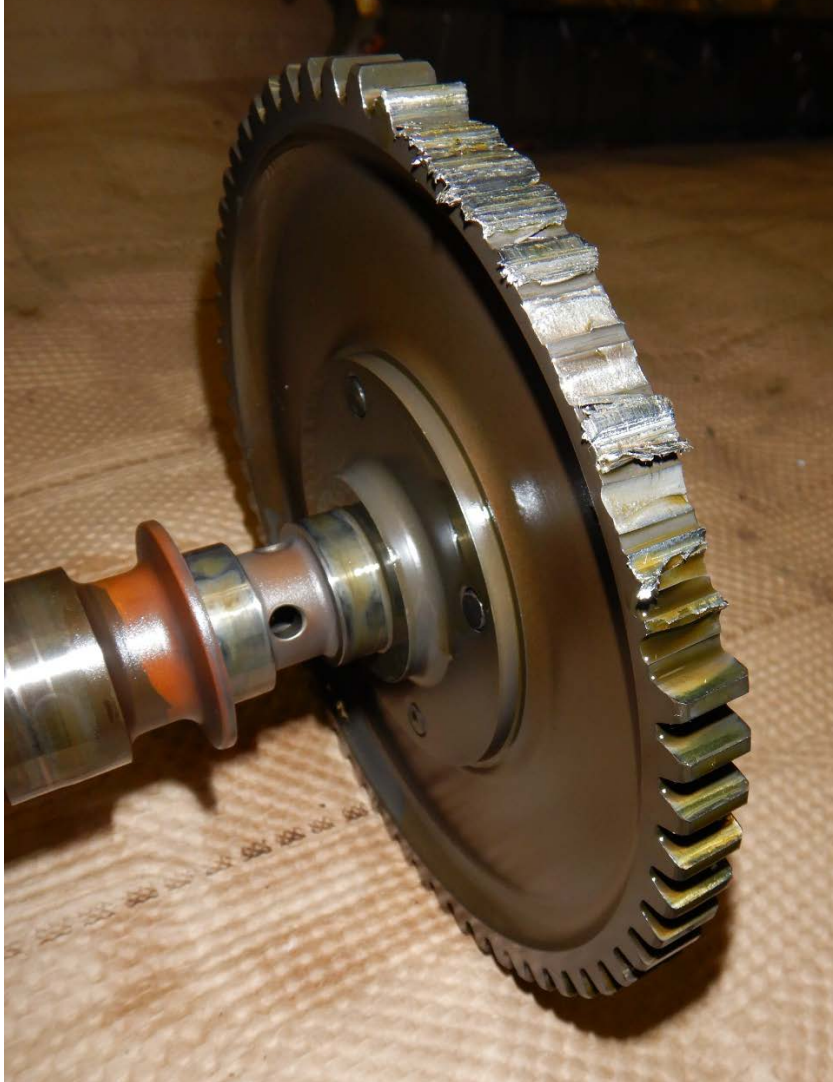


Figure 8: Camshaft Drive Gear with Sheered Teeth

Submitted by: Lynn Spencer