



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

December 21, 2021

ENGINE EXAMINATION SUMMARY REPORT

WPR22LA019

This document contains 11 embedded photos.

A. ACCIDENT

Location: Fall River, Oregon
Date: October 14, 2021
Aircraft: N511ZZ
NTSB IIC: Andrew Swick

Preliminary Report:

On October 14, 2021, about 1815 Pacific daylight time, a Lancair ES, experimental airplane, N511ZZ, was substantially damaged when it was involved in an accident near Fall Creek, Oregon. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that during cruise flight he descended to 4,500 ft mean sea level in preparation to land at Mahlon Sweet Field Airport (EUG), Eugene, Oregon. Soon after disconnecting the autopilot and turning to the North, he felt the engine “decelerate suddenly, and it began misfiring badly.” He realized that he was too far from the airport to land on the runway. The pilot looked at his surroundings for a place to make a forced landing but saw only forest surrounding his route of flight. He decided to focus on restarting the engine; however, his attempts were unsuccessful. The pilot reported that smoke had begun to enter the cockpit and the airplane continued to lose altitude. About 1,000 ft above ground level (agl), he checked his airspeed and pulled the ballistic recovery system handle. The parachute deployed and during the descent through the heavily wooded terrain below, the airplane collided with trees resulting in substantial damage to the left wing and the separation of the empennage. The airplane came to rest just a few feet from the ground, still supported by the parachute which remained stuck in the trees. The pilot exited the airplane and was able to walk to a nearby road.

The wreckage was relocated to a secured facility for further examination.

B. EXAMINATION PARTICIPANTS

Andrew Swick NTSB-IIC
Al Youngwerth-Owner/Pilot

C. EXAMINATION SUMMARY

Examination of the engine was conducted at Plain Parts in Pleasant Grove, California on December 22, 2021. The examination revealed the separation of gear teeth from the camshaft drive gear. No other evidence of preaccident mechanical malfunctions or anomalies were noted that would have precluded normal operation.

D. ENGINE EXAMINATION

The wings were removed from the fuselage during the recovery process and the empennage was found near the accident site. The engine cowling was partially disassembled prior to the examination and the nose landing gear had impact damage and was crushed aft. The main wreckage was supported off the ground and the engine cowling remained partially attached. The propeller spinner was removed from the propeller assembly and was not found during the examination. The propeller assembly had impact damage to three of its blades. The cabin entry door and the cockpit's instrumentation were not recovered during the investigation.



Figure 1-Main wreckage.



Figure 2-Upper right side of the engine.



Figure 3-Forward left side of the engine.

The upper and lower cowling was removed from the engine. The engine exterior was examined, and no damage was noted. About 7 quarts of oil was indicated from the oil dip stick.



Figure 4-Top left view of the engine.

The lower spark plugs were removed from the engine. The cylinders combustion chambers were examined with the use of a lighted boroscope. Each cylinder revealed a normal amount of combustion deposits and the valve heads revealed normal operation. Each the six piston heads had impact marks from each valve. The crankshaft was rotated by hand from the propeller assembly, and cylinder thumb compression was obtained to only four cylinders. The cylinder rocker covers were removed from each cylinder and the cylinder overhead components were undamaged and covered in an oil residue. The crankshaft was again rotated, and no movement was noted from each of the cylinder overhead components.

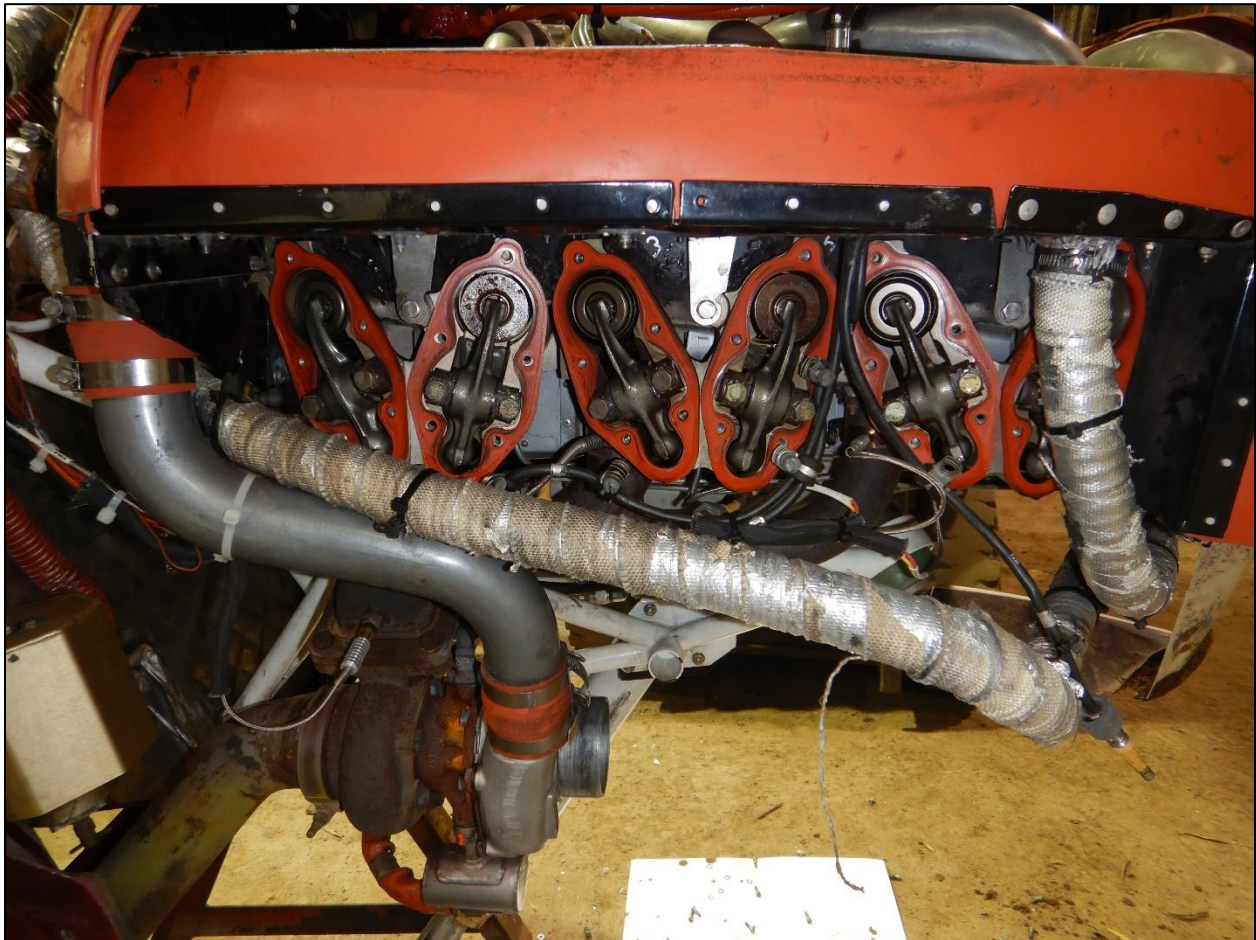


Figure 5-Cylinder overhead components, right side (No. 1, 3 and 5.)

The engine was removed from the airframe and disassembled. The oil sump contained metal fragments. The crankcase halves were separated, and the crankcase mating surfaces were undamaged. Small metal fragments were found throughout the interior of the engine. The valve lifters installed in both crankcase halves were undamaged. The camshaft drive gear had missing gear teeth and material deformation. About 2/3rds of the camshaft drive gear teeth were damaged. The camshaft lobes had normal lifter contact wear signatures and several lobes had mechanical damage on their edges. The crankshaft was removed, and the main bearings were undamaged and showed normal operating wear signatures.

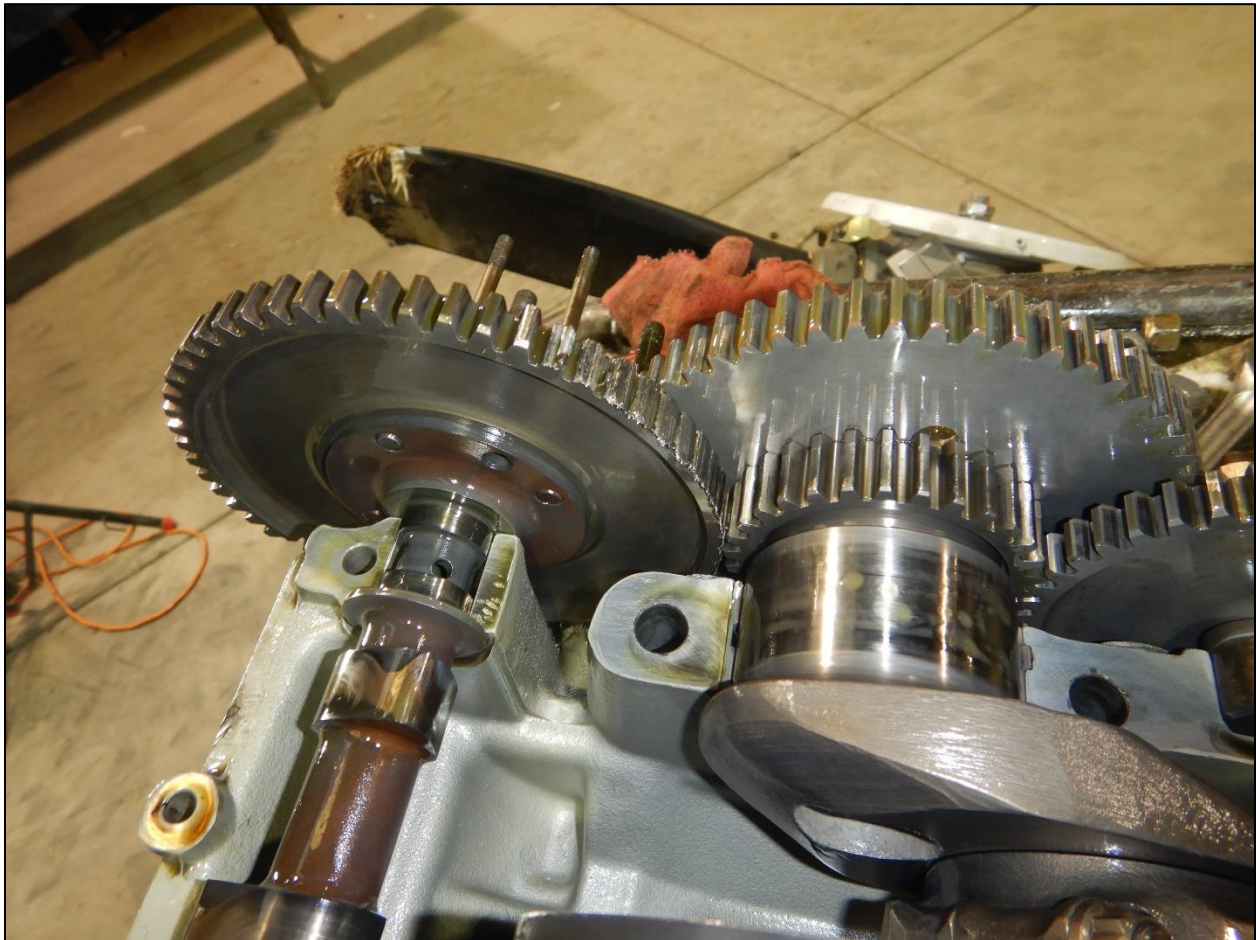


Figure 6-Engine accessory section gears-camshaft drive gear teeth separation.

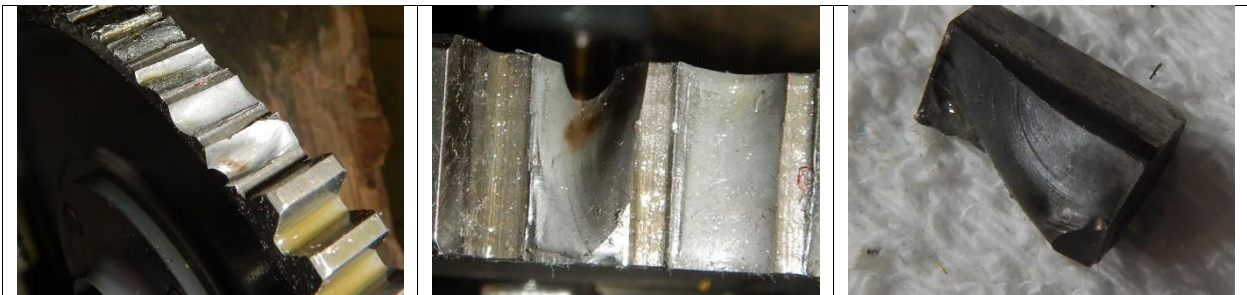


Figure 7-Camshaft drive gear-gear teeth separation.



Figure 8-Oil sump and contents.

The camshaft gear including the idler gear, crankshaft drive gear was obtained by the NTSB-IIC for further examination.



Figure 9-Camshaft assembly.

Submitted by: Andrew Swick