

**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY
WASHINGTON, D.C. 20594**

June 22, 2021

POWERPLANT EXAMINATION REPORT

NTSB ID No.: WPR21LA121

A. ACCIDENT

Location: Lodi, California
Date: March 3, 2021
Time: 1500 Pacific daylight time
Aircraft: Cessna 150, Registration: N60290

B. POWERPLANTS GROUP

Investigator-in-Charge: Stephen Stein
National Transportation Safety Board
Federal Way, Washington

Investigator: Eleazar Nepomuceno
National Transportation Safety Board
Federal Way, Washington

C. SUMMARY

On March 3, 2021, about 1220 Pacific standard time, a Cessna 150 airplane, N60290, was substantially damaged when it was involved in an accident near Lodi, California. The instructor and pilot receiving instruction were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

According to the pilot receiving instruction, had had recently purchased the accident airplane, and this was his first flight with a new instructor. They departed the airport uneventfully and climbed to their cruise altitude, 3,000 ft mean sea level. The pilot receiving instruction donned an instrument instruction tool at 200 ft above ground level. Once they reached cruise altitude, the pilot reduced power to 2,450 rpm, applied carburetor heat, and leaned the fuel/air mixture to achieve best rpm. He followed the airplane's cruise checklist and scanned the engine instruments, but did not observe any anomalies as each instrument was reporting normal operation. Approximately 5 minutes later he heard a sound that resembled a gun shot and immediately observed the propeller stop rotating. The instructor took control of the airplane and announced "my controls" while the pilot searched for a suitable place to land and made an attempt to restart the engine that was unsuccessful. Although they were surrounded by fields, their options for suitable landing sites were limited due to trees or other obstacles. They were able to glide the airplane to the end of an almond tree field, but impacted the ground and the airplane came to rest.

Photographs of the airplane taken by local law enforcement showed substantial damage to the wings and empennage.

D. DETAILS OF INVESTIGATION

D.1 Powerplant Information

D.1.1 Engine Description

The engine was a Continental O-200-A engine, a 100 horsepower, horizontally opposed, air cooled, reciprocating engine.



Photograph 1: Engine Data Plate

D.1.2 Engine History

The accident engine received its last major overhaul in 2017 and the engine was installed on November 16, 2017. The engine's operational history was excerpted from the engine logbook.

Time Since Overhaul (TSO):	289.5
Time Since 100 hour inspection:	54.7
Time Since Annual Inspection:	Not noted

The engine did not have an electronic monitoring recorder installed.

D.2 Details of the Field Examination

D.2.1 General External Condition & Observations

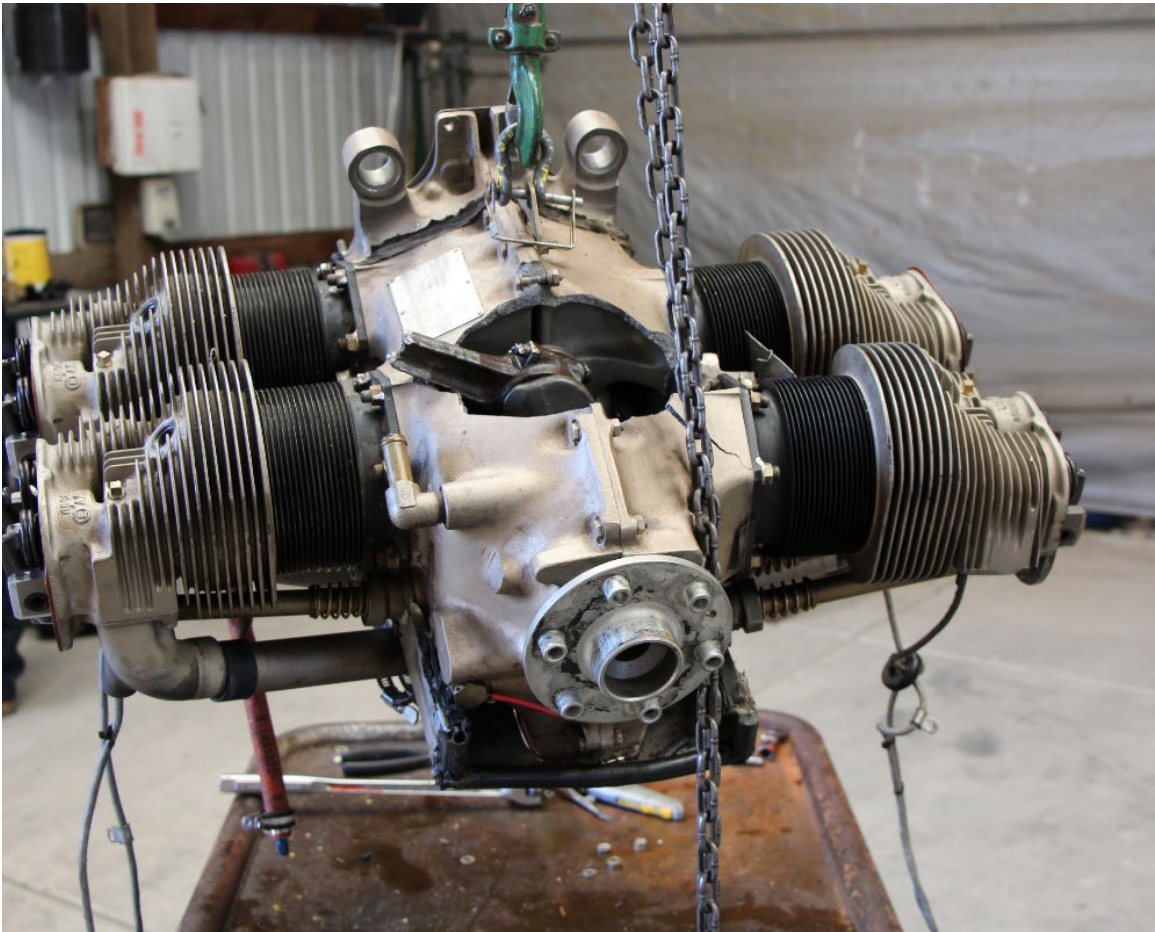
The airframe and engine were recovered from the accident site on March 3, 2021 to Faeth Aircraft in Rancho Cordova, California. An airframe and preliminary engine examination was performed on April 15, 2021 at the recovery facility. The engine was subsequently transported to Plain Parts in Pleasant Grove, California for an engine teardown (See NTSB Aircraft Examination Report).

D.2.2 Engine Observations

The engine remained attached to the airframe through its mounts; however, the lower mounts were fractured at the nose landing gear attachment truss. The top of the engine case was fractured with a hole that extended across about 7" in diameter. Additionally, the lower case had fractured around the circumference of cylinder 4. None of the other cylinders displayed were fractured.

The cylinder 4 intake tube shaft was displaced at the cylinder joint. Most of the scat tubing remained secured from the exhaust manifolds to each exhaust port with exception of the cylinder 3 and 4 exhaust tubes, which were partially crushed. Additionally, the cylinder 4 exhaust scat tube was partially crushed at the carburetor.

The oil sump case was damaged.



Photograph 2: Engine with Baffling, Rocker Covers, and Accessory Case Removed

D.2.3 Engine Teardown

The engine crate was received by Plane Parts on June 17, 2021 and subsequently opened on June 22, 2021 by the NTSB investigation team. The engine was hung on a pulley and photographed prior to the engine teardown.



Photograph 3: Engine Prior to Teardown

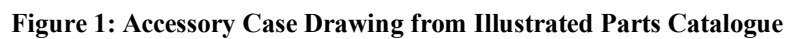
D.2.3.1 Accessories

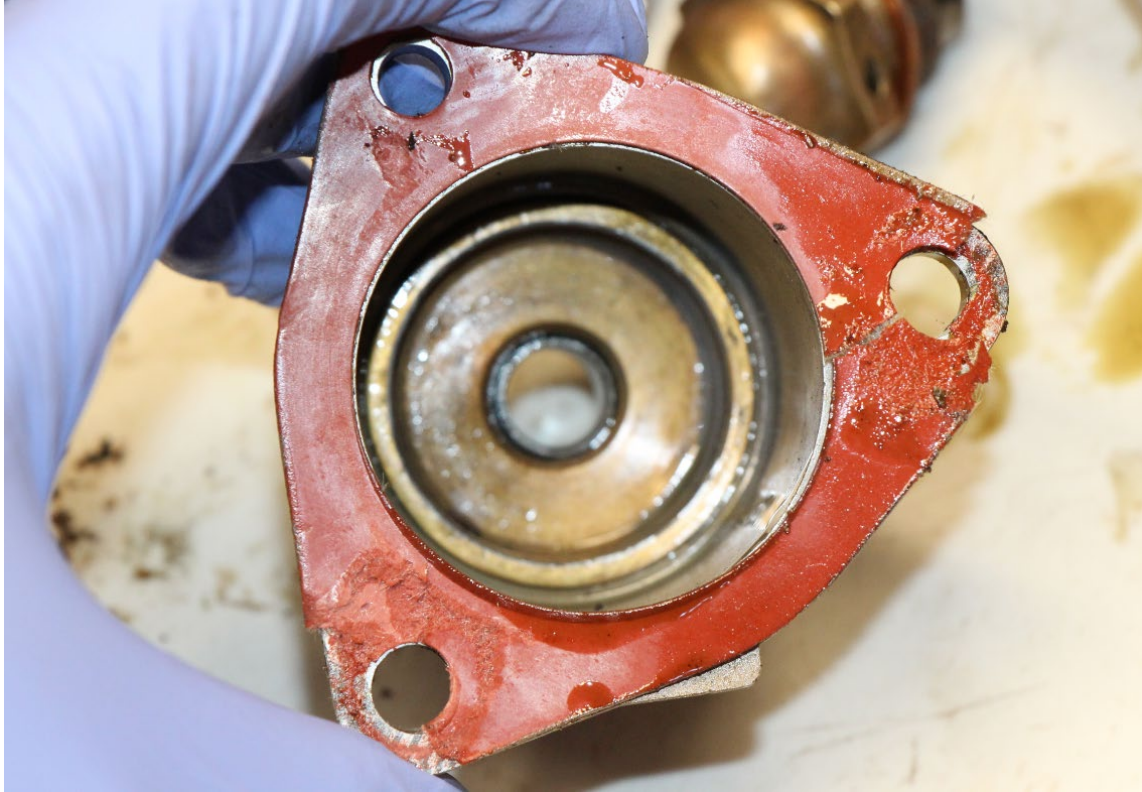
The accessories are listed in the table below.

Accessory	Manufacturer	Part No.	Serial No.
RH Magneto	Slick	4301	17060694
LH Magneto	Slick	4301	17060703
Generator	Electrosystems, Inc.	DOFF10300F	5070551S
Starter	B&C Specialty	BC320-1	1B50K7U82S
Carburetor	Marvel Schebler	10-4894-1	LY49938

Both impulse coupling driven magnetos were secured to the engine accessory case and displayed spark at each of their four ignition leads. The ignition leads were cut during the teardown to remove engine baffling. The generator and starter were also attached to the accessory case and were unremarkable.

The engine was equipped with an oil pump driven impeller shaft collocated with the tachometer drive shaft at the center of the accessory case. Both impellers were unremarkable and displayed a light film of fresh oil. An oil screen is normally contained with a housing at the lower section of the accessory case. However, the oil screen was missing from its housing, which was secured to the case and did not exhibit any damage or metallic fragments. According to the overhaul facility, the fuel screen had been removed before the engine arrived for the overhaul.





Photograph 4: Oil Screen Housing with Screen Absent

D.2.3.1.1 Spark Plugs and Ignition Harness

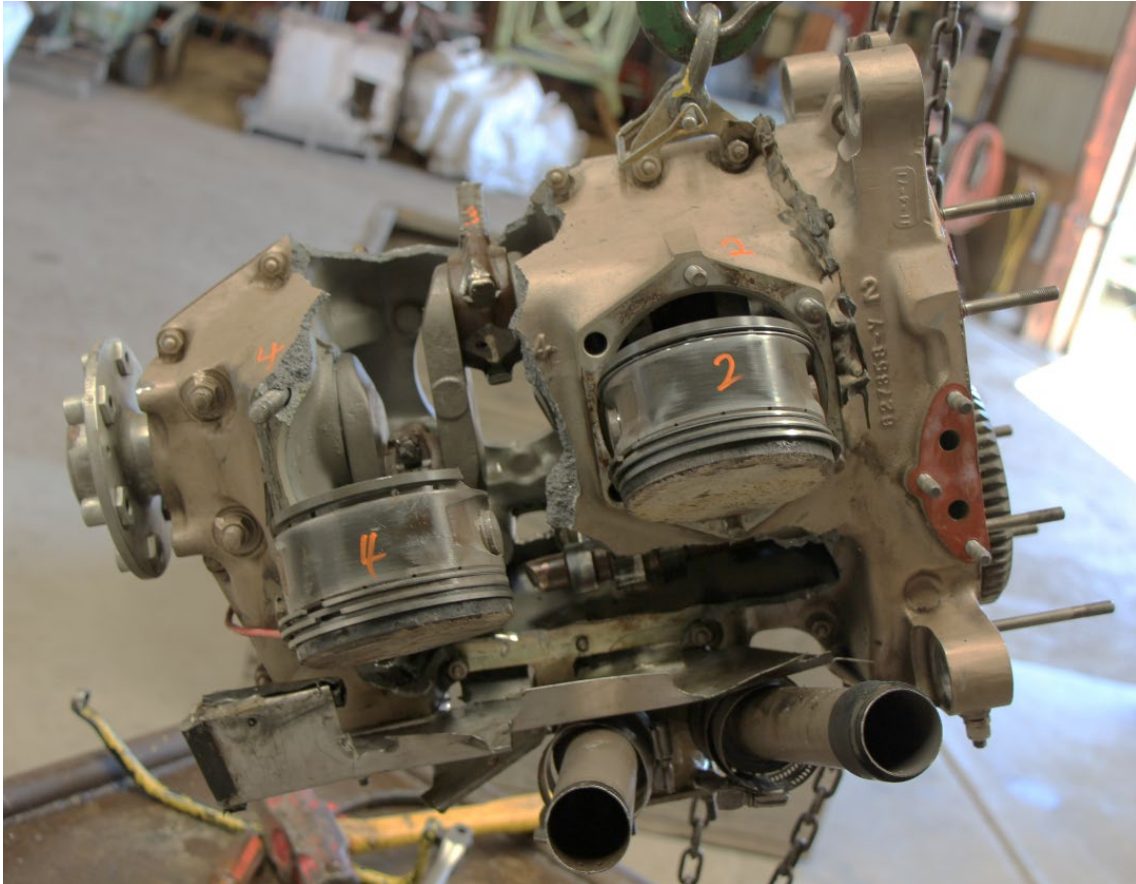
The top and bottom spark plugs were secured to each cylinder and each plug were gray in appearance consistent with normal wear. The ignition harness leads were attached to each spark plug and secured to the magnetos.

D.2.3.1.2 Oil Sump and Filter

The oil sump contained approximately 5 quarts of oil. One small metallic fragment was found at the bottom of the oil sump. The oil filter did not contain any foreign objects or metallic fragments.

D.2.3.2 Case and Cylinders

Most of the damage to the engine case was localized to Cylinder no. 4 as the case was fractured around the cylinder. Further, the case displayed was split longitudinally below cylinders 2 and 4.



Photograph 5: Engine case from the left side with cylinders 2 and 4 removed

The cylinders were mostly unremarkable in appearance and did not exhibit any unusual wear with exception of cylinder no. 3, which contained a broken piston ring seal. The piston rings were attached to each piston and were unremarkable. Each of the four piston faces displayed signatures consistent with normal wear. The hydraulic valve lifters to cylinders 1 and 3 were remained within the lifters housings; however, one cylinder 3 lifter had fractured at the lifter body. The cylinder 2 and 4 lifter housings had separated

from the case, but the lifters were intact and unremarkable. None of the lifter faces exhibited any unusual wear.

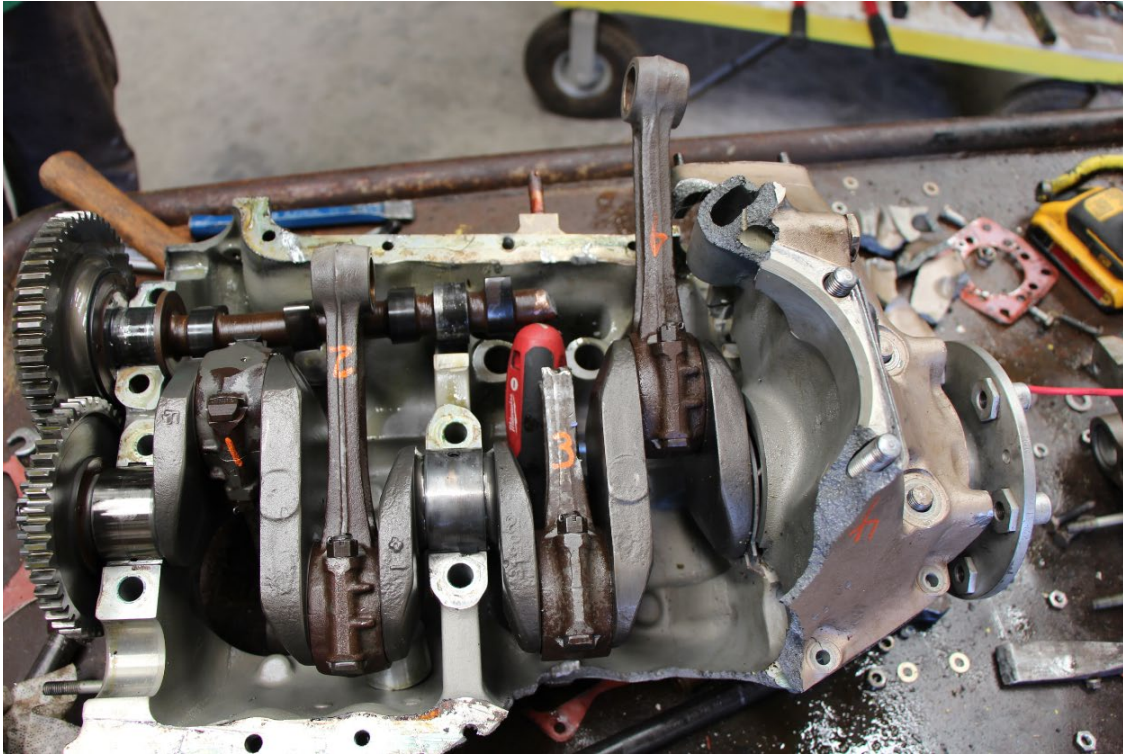


Photograph 6: Piston Face, Cylinder No. 3

D.2.3.3 Crankshaft, Connecting Rods and Camshaft

The crankshaft was secured within the engine case and each connecting rod was attached to the crankshaft and rotated normally without resistance. The cylinder 3 connecting rod was fractured at the shank about midspan. Additionally, a castellated nut was missing from the cylinder 3 connecting rod at the crankshaft; however, the safety wire was in place at the bolt bore. The crankshaft bearings and thrust washers were in place and unremarkable. The camshaft was fractured in the plane of rotation of the cylinder 3

connecting rod. The engine case, crankshaft and connecting rods did not display any evidence of thermal damage.



Photograph 7: Disassembled engine case with crankshaft and camshaft



Photograph 8: Cylinder 3 connecting rod with missing castellated nut

Stephen Stein
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