



**NATIONAL TRANSPORTATION SAFETY BOARD**

**Office of Aviation Safety**

**Western Pacific Region**

**August 9, 2022**

**AIRFRAME AND ENGINE EXAMINATION**

**WPR21LA121**

**This document contains 6 embedded photos.**

**(9 Pages)**

## **A. ACCIDENT**

Location: Lodi, California

Date: March 3, 2021

Aircraft: Piper Cessna 150J

NTSB IIC: Stephen Stein

## **B. EXAMINATION PARTICIPANTS**

Stephen Stein

Aviation Accident Investigator (IIC)

National Transportation Safety Board

Federal Way, Washington

## **C. DETAILS OF THE INVESTIGATION**

### **C.1 Airframe Examination**



Photograph 1: Airplane at Accident Site (Courtesy of Federal Aviation Administration)

### C.1.1 Overall Inspection

The wreckage was examined at a secure facility in Rancho Cordova, California on April 15, 2021 by the NTSB IIC. The wreckage was intact and both wings had been previously removed by recovery personnel. The empennage was partially separated near the aft fuselage and both the right and left horizontal stabilizer were substantially damaged. Both wings were mostly intact except for the left wing leading edge, which exhibited a large depression about midspan.

The engine was attached to the airplane; the upper engine mounts were secured from the firewall to the engine while the lower mounts had been 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 propeller remained attached to the crankshaft flange and partial movement of the crankshaft was achieved when the propeller was rotated by hand. The camshaft did not rotate. Both blades were straight and did display any nicks, gouges, or chordwise scratches.

### C.1.2 Engine Controls

The throttle and mixture controls were continuous from the instrument panel to the carburetor. Full mixture control movement was achieved from the lean position to full rich position and the mixture control arm moved from stop to stop. Throttle control movement was confirmed to the idle position, but forward movement was restricted to about 80% of full throttle.

### C.1.3 Fuel System

The fuel gascolator sump drain had separated and the fuel gascolator bowl was empty. The gascolator filter contained a trace amount of debris. The fuel line from the gascolator to the carburetor held a trace amount of liquid that contained an odor consistent with automotive gasoline.

The fuel shutoff valve moved between the ON and OFF position with minimal resistance.

## C.2 Engine



Photograph 2: Engine Prior to Examination

The engine was a Continental Motors O-200-A, s/n 214560-72A, an air-cooled, 100 hp reciprocating engine rated for 80/87 octane fuel.

### Induction System

The airbox was crushed vertically into the carburetor, and the outside of the air filter was contaminated with oil and dirt. The inside of the air filter displayed some yellow staining, but did not contain and foreign object debris. The cylinder 4 intake hose shaft was separated while the remaining cylinder intake hoses were unremarkable.

### Oil System

The oil system was unremarkable. The oil filter was secured and did not show any indications of seepage. The oil dipstick showed 5 quarts of oil and the oil sump case did not show any indications of a breach.

### Ignition System

The magneto P leads were secured at both the left and right magnetos and the ignition coils were secured to each of the 8 spark plugs, which were also tightly secured to each cylinder. Each of the 4 top spark plugs were manufactured by Champion, model REM 37BY(e).

### Crankcase Inspection

The cylinder 3 connecting rod was fractured at the connecting rod shank and was mechanically damaged. The cylinder 4 barrel rim was bent outboard towards the crankcase. The camshaft had separated at the cylinder 4 intake lifter and at the crankshaft attachment where it displayed a slight bend. Both the cylinder 3 and 4 connecting rods remained attached to the crankshaft and they cylinder 3 connecting rod movement was smooth and unrestrictive. No evidence of a bearing failure was observed at the cylinder 3 and 4 connecting rod bearings at the crankshaft. The cylinder 1 and 2 connecting rod bearings at the crankshaft were not observed at this time.

A borescope inspection was performed on each cylinder. The inspection of cylinder 3 revealed that the connecting rod bushing end was still attached to the piston pin. The piston ring seal was fractured and part of a piston ring was exposed. Additionally, there was some debris along the cylinder wall. The cylinder 4 connecting rod remained attached to the piston pin. Some oil stained fragments were observed at the cylinder wall. The connecting rods to cylinders 1 and 2 remained attached to their piston pins. The limited movement of the propeller and inspection holes precluded further inspection of these cylinders.



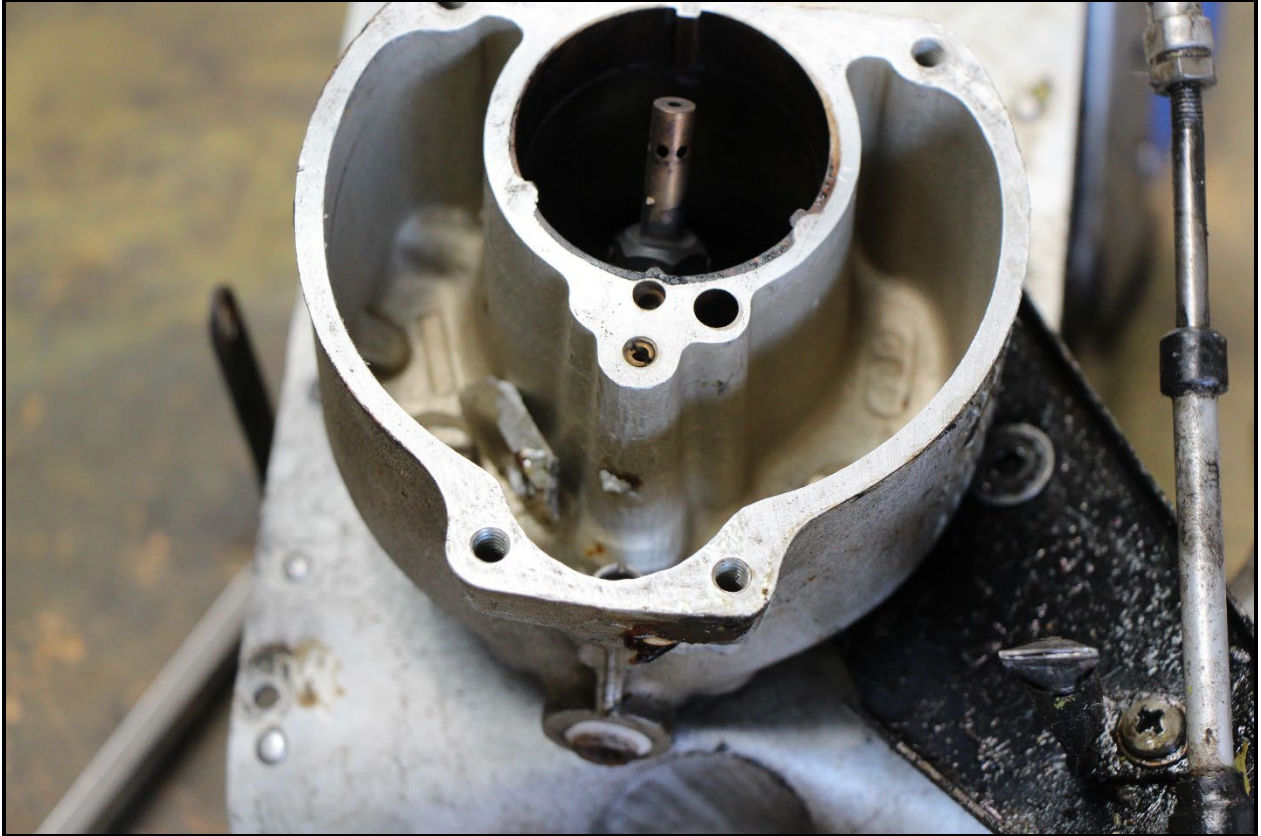
Photograph 3: Hole in Crankcase at Cylinder 3/4 and Exposed Cylinder 3 Connecting Rod Shank



Photograph 4: Cylinder 3 Piston Ring Seal and Piston Ring



Photograph 5: Fractured Camshaft Section



Photograph 6: Carburetor Fuel Bowl