

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA159

WRECKAGE EXAMINATION

Factual Report

November 13, 2024

Table of Contents

A. ACCIDENT	3
B. WRECKAGE EXAMINATION PARTICIPANTS.....	3
C. DETAILS OF THE EXAMINATION.....	3
1.0 WRECKAGE EXAMINATION	3
1.1 ENGINE.....	3
2.0 FOLLOW-UP ENGINE EXAMINATION	5

A. ACCIDENT

Location: Peoria, Arizona
Date: May 21, 2024
Time: 1220 MST
Airplane: Nanchang CJ-6A

B. WRECKAGE EXAMINATION PARTICIPANTS

NTSB-IIC Andrew Swick
 NTSB, AS-WPR
 Phoenix, Arizona

M-14P Incorporated Jill Gernetzke (Engine Examination)
 President ~ A&P I.A.
 Kingman, Arizona

C. DETAILS OF THE EXAMINATION

1.0 Wreckage Examination

The airplane wreckage was relocated to Air Transport in Phoenix, Arizona, for further examination. The wings were removed and only the fuselage and engine were examined.



Figure 1-Main wreckage and engine.



Figure 2-Main wreckage.

1.1 Engine

The engine remained partially attached to the impact damaged engine mounting carriage. The propeller assembly remained attached to the crankshaft propeller

flange and had impact damage to the spinner. One blade separated from the hub and was not found during the recovery efforts. The engine was tilted downward and had impact damage to the air induction box and the lowest cylinder rocker valve area. Thick black colored oil continued to drip during the examination from the rocker valve area. The oil reservoir tank was empty of oil.



Figure 3-Left view of the engine.



Figure 4-Right lower view of the engine.

The right magneto separated from the engine case and had damage to its outboard mounting flange. An upper engine mount tube was damaged and positioned near the magneto.

The forward spark plugs were removed from the cylinders. The electrode areas were undamaged and showed normal operational wear. The No. 6 forward spark plug was oil soaked.



Figure 5-Fwd spark plugs.

The crankshaft was rotated by hand from the propeller assembly and light cylinder compression was obtained from all cylinders. Cylinder No. 8 and 9 rocker covers were removed, and the valve ends were lightly tapped with a mallet until cylinder compression was obtained. The ignition leads were cut near the magneto distributor during their removal. The magnetos did not produce any spark during the rotation of the drive shaft with an electric screw gun. The right magneto distributor cap was removed, and the internal components were undamaged. During rotation of the drive shaft, the points did not appear to separate. The carburetor was removed from the engine and appeared to be undamaged. The magnetos and carburetor were packaged for further examination.

The throttle, propeller and gill shutter cable continuity were established from the cockpit. All flight control continuity was also established from the cockpit control stick and rudder pedals.

The oil filter was removed and disassembled. The filter was full of black thick oil that contained metallic contaminates. Metallic fragments were identified in the folds of the filter element. The filter element material was stiff and brittle.



Figure 6-Oil filter disassembled.

The engine was removed from the fuselage and positioned on a pallet for further teardown and testing. The propeller was removed from the engine.

2.0 Follow-up Engine Examination

The engine was shipped to a facility for further examination. The engine was setup on an engine stand and the induction and exhaust assemblies were removed. The crankshaft rotated freely, and gear continuity was established to the accessory section.



Figure 7-Engine examination.

The right magneto was setup on a test bench and a light spark was produced from each terminal. The E-gap position was found to be about 31°. The coil was removed from the magneto and test results were normal.

The left magneto distributor housing was removed, and oil was present in the mag-well near the points. The magneto was setup on a test bench and spark was produced from each terminal. The magneto housing had oil residue, and the drive shaft was loose at the bearing location. The rotor and armature showed rubbing and wear marks. The E-gap position was found to be at 19°. The points contact surfaces were also found to be uneven. The coil was removed from the magneto and test results were normal.

The fuel pump and modified carburetor fuel line was tested under 4 PSI of solvent pressure and tested normal. No leaks noted. A rubber line fitting was found loose on the modified carburetor line.

The carburetor was examined and showed normal operating conditions.

The oil sump signaling filter was removed from the sump and broken metal debris was present. Some of the broken metal debris was consistent with cylinder oil scraper ring material. A small 4mm steel ball was found in the debris and had a rough and mechanically damaged surface.

Cylinders were removed from the crankcase and engine interior surfaces showed signs of mechanical damage (pock marks). The crankshaft front section was separated at the master-rod (main-connecting rod) journal and crankpin areas. The propeller gear reduction assembly was removed, and the crankcase was disassembled.

The master-rod main bearing (bushing) showed signatures of wear and scoring on its interior surface. (See figure 8) Both bushing set screws (checking pins) separated and were not found during the examination. The bushing was rotated about 90° from its original position. The forward side of the bushing edge (positioned nearest to the journal radius) had mechanical damage. The connecting rods remained attached to the main-connecting rod and had damage to the sides of the I-beam, consistent with impacting the sides of the cylinder skirts.

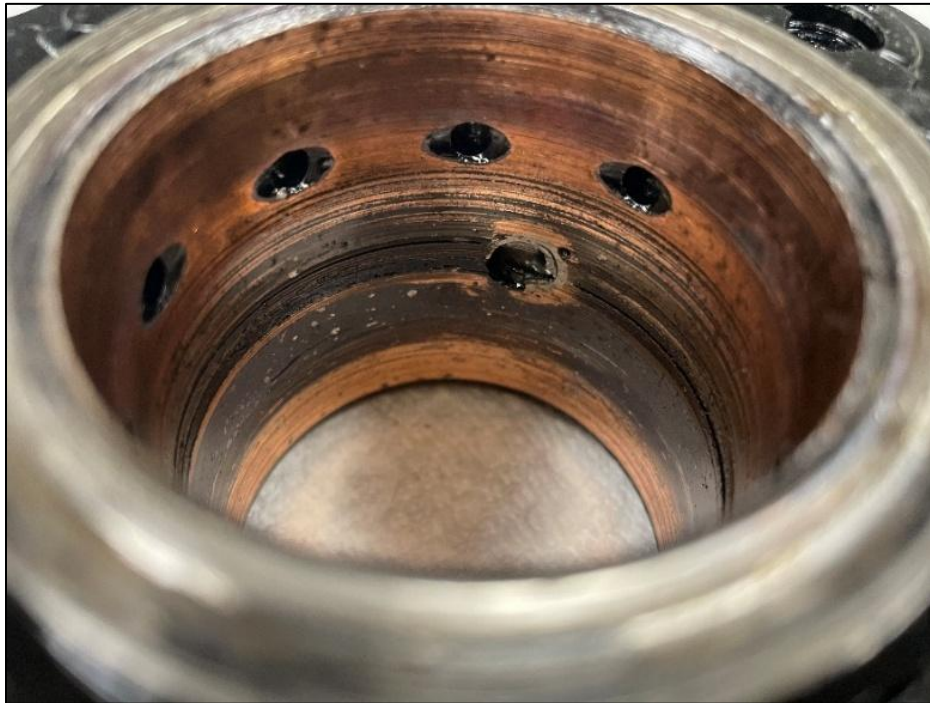


Figure 8-Master rod main bearing and set screw hole.

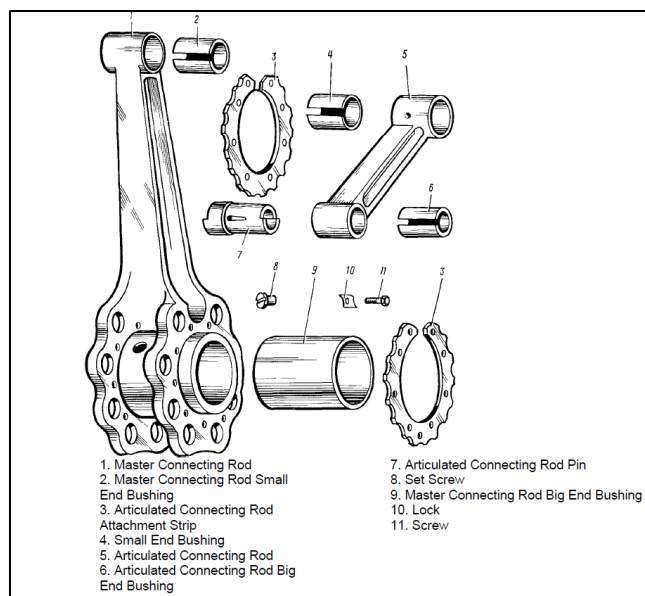


Figure 9-Master connecting rod assembly. (Courtesy of the M-14 Maintenance Manual)

Four connecting rods were removed from the main-connecting rod to gain access to the main bearing set screw areas. The connecting rod ends near the set screw areas had mechanical damage and deformation. The set screw holes were mechanically damaged and deformed and showed 3 installation chiseled strike marks. (See figures 9 and 10)



Figure 10-Master rod main bearing set screw hole and installation strike marks.



Figure 11-Master rod main bearing set screw hole and installation strike marks.

The separated journal section remained attached to the crankshaft rear section. The coupling bolt was removed, and the journal section was separated from the crankshaft rear section. The crankshaft forward section separated surfaces had a small amount of mechanical deformation and the majority of the surface area showed ratcheting and beach marks consistent with a fatigue stress fracture. The origin of the beach marks was located at the journal radius.



Figure 92-Separated journal section.



Figure 13-Separated journal section.

The crankshaft forward section separation surface had a small amount of mechanical deformation and the majority of the surface area showed ratcheting and beach marks consistent with a fatigue stress fracture. The origin of the beach marks are at the journal radius area.



Figure 13-Crankshaft forward section.



Figure 14-Crankshaft forward section separation surface.

Submitted by:

Andrew Swick
Aviation Accident Investigator