



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

ENGINE/AIRFRAME EXAMINATION

WPR23FA256

This document contains 11 embedded photos.

A. ACCIDENT

Location: Saint Maries, Idaho
Date: July 6, 2023
Aircraft: Cessna 182N, Registration N703Z, Serial #18260582
NTSB IIC: Starr Blum

B. EXAMINATION PARTICIPANTS:

Starr Blum
Aviation Safety Investigator
NTSB

Zoë Keliher
Senior Aviation Accident Investigator
NTSB

Peter Basile
Senior Air Safety Investigator
Textron Aviation

C. SUMMARY

Examination of the recovered airplane was conducted on July 8, 2023 at the facilities of Interstate Aviation at Pullman/Moscow Airport.

D. DETAILS OF THE INVESTIGATION

1.0 Engine Examination

The Lycoming O-540-S, serial number 464297. At the accident site the tachometer indicated that the airplane's total time was 9,242.43; Hobbs 3550.3. (Photo 1).



Photo 1. Engine data plate.

The carburetor heat, propellor and throttle control could not be verified which was likely because the cable was compressed in the nose compartment area because of impact.

The two bladed McCauley propeller was bent aft about 40°; neither blade exhibited rotational signatures. (Photo 2).



Photo 2. View of propellor.

The oil sump drain was removed and retained oil. There were numerous shards and pieces of aluminum and steel internal components such as the piston. (Photo 3).



Photo 3. Oil drain pan.

Investigators removed the upper spark plugs, all of which had an oily film and were dark. The No. 3 spark upper spark plug did not have a gap between the post electrodes, and damage consistent with impact was visible. (Photo 4).

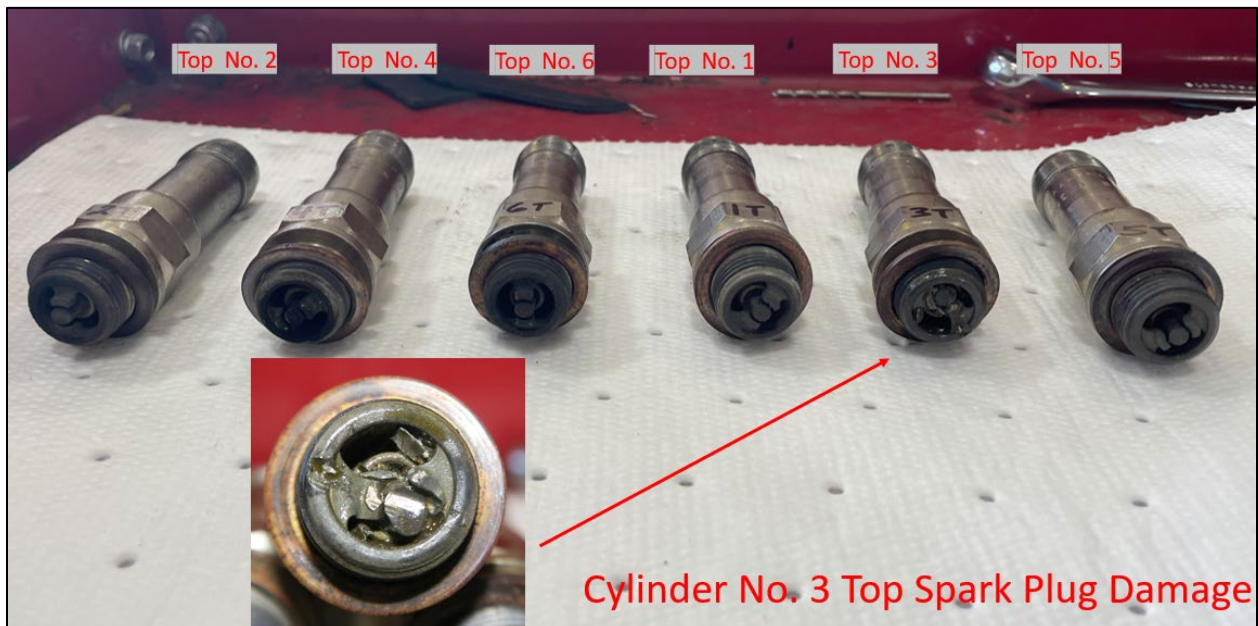


Photo 4. Top spark plugs.

A borescope was used on the No. 3 cylinder; the exhaust valve had separated, and there were numerous pieces of metal in the cylinder. The piston was not observed. The valve head was found on the cam shaft. (Photo 5).



Photo 5. No.3 valve head.

Removal of the No. 3 cylinder revealed the cylinder had numerous gouges consistent with metal consumption in the barrel; two large pieces of aluminum were present. The intake pushrod and tube were bent. The piston connecting rod was bent aft. (Photo 6,7,8).

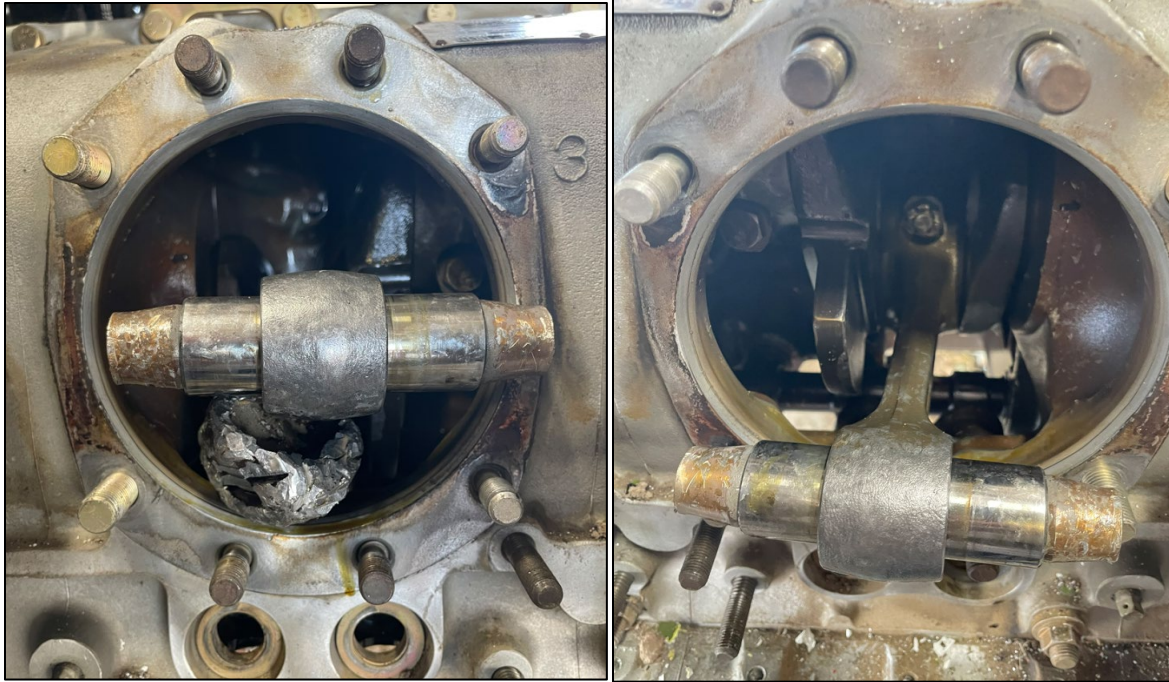


Photo 6. No. 3 piston and connecting rod.



Photo 7. No. 3 cylinder



Photo 8. No. 3 cylinder components.

The No. 1 cylinder was removed and revealed gouging to the piston skirt and metal fragments. Removal of the No. 5 cylinder revealed small metal pieces in the barrel cylinder and gouging to the piston skirt. Inside the No. 6 cylinder there were numerous pieces of metal in the piston skirt. (Photo 9, 10).

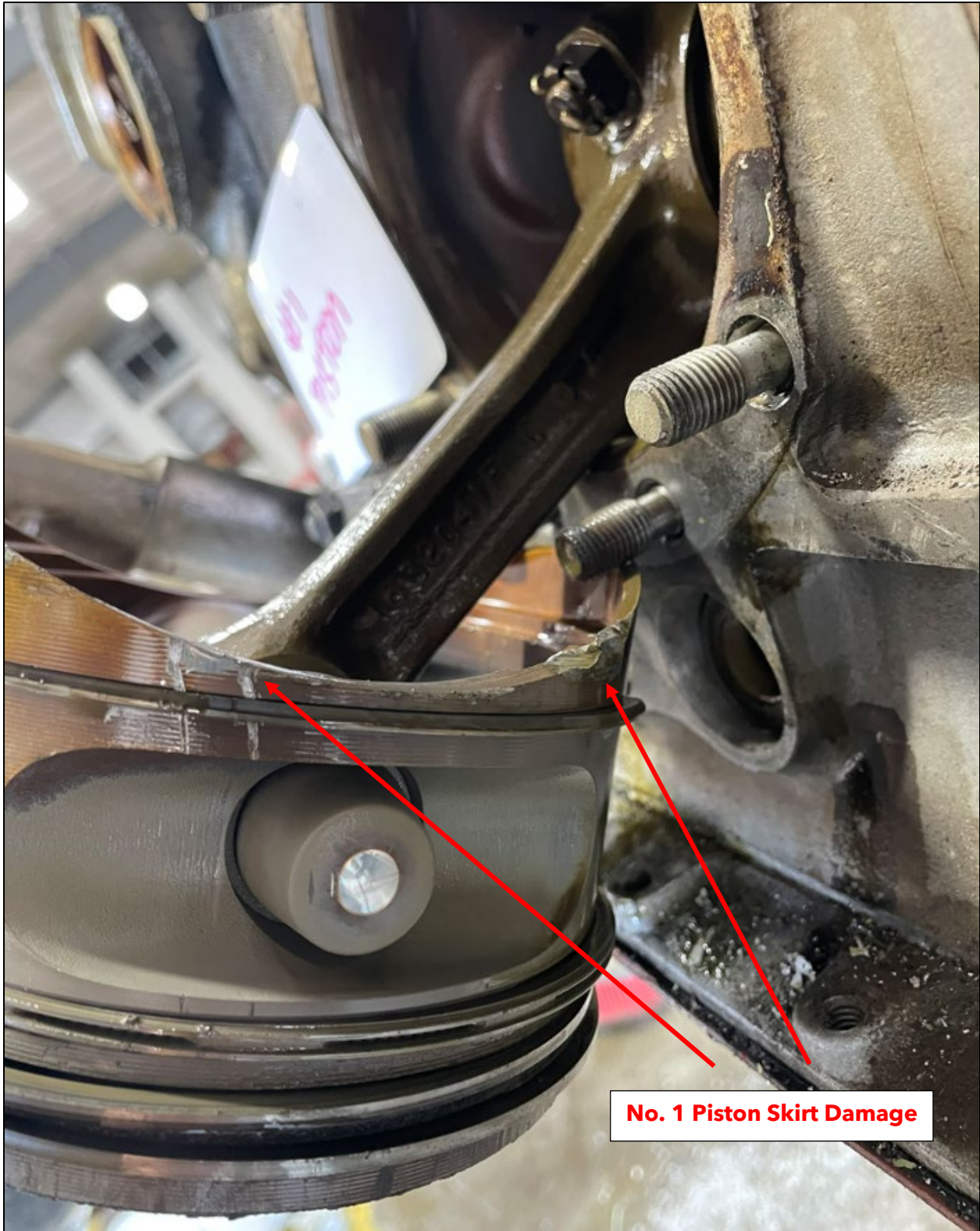


Photo 9. No. 1 piston



Photo 10. View of metal from cylinder No. 6 piston skirt.

Inside the crankcase, the camshaft and lifter (tappet) heads did not reveal damage. The camshaft lobes and heels appeared to have normal wear with no spalling noted. The drive train could be rotated, and all connecting rods were moving freely. (Photo 11).

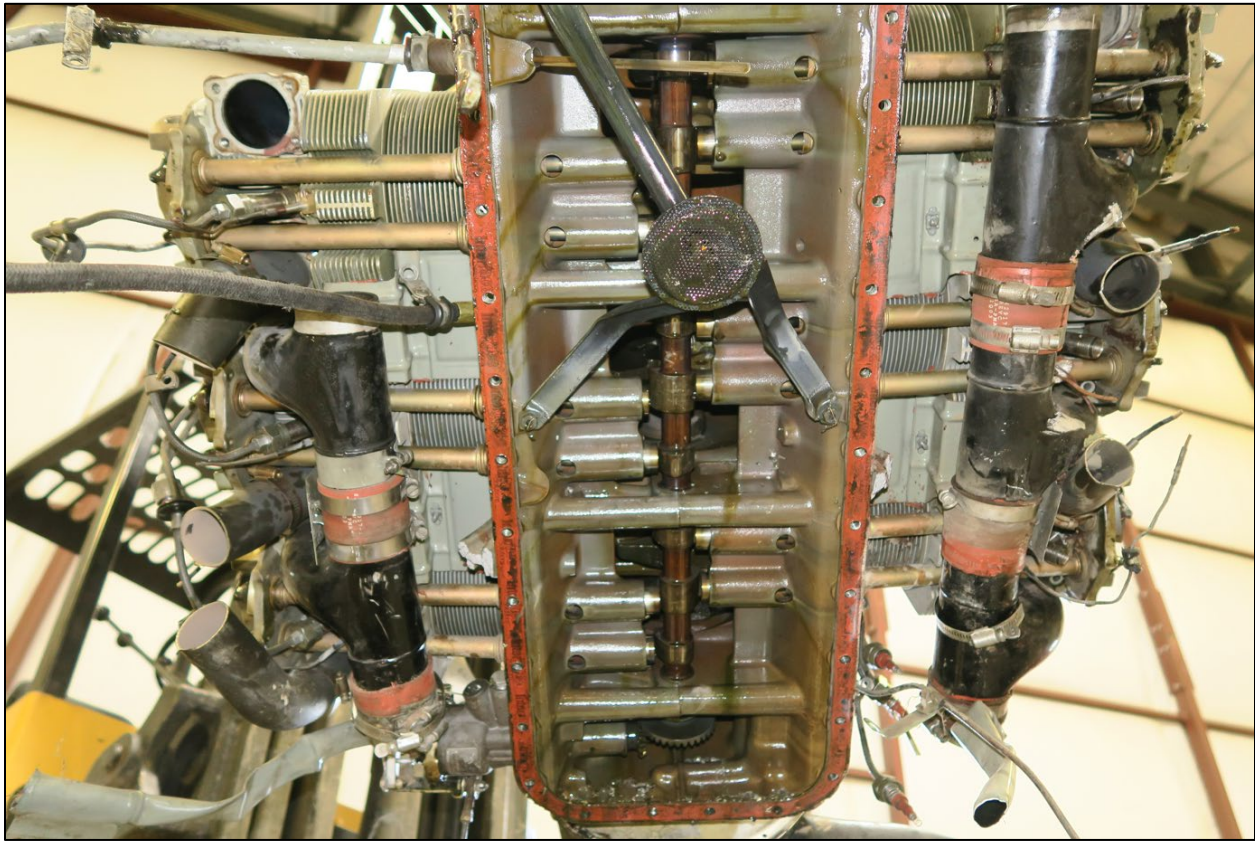


Photo 11. View of camshaft.

1.1 AIRFRAME EXAMINATION

The left and right elevator control surfaces were attached, undamaged, and could be moved freely. The elevator springs at the bell crank were intact. Cable continuity was established from the elevator arm to the elevator aft bell crank and continued to the forward elevator arm assemblies, which remained attached to the control tube located forward of the instrument panel. The right cable was impinged in the cockpit area from crush damage. The elevator trim tab remained attached to the elevator and was undamaged. The elevator trim cables remained continuous from the actuator to the control wheel. The forward and aft chains remained engaged on the sprockets. The elevator trim actuator rod was extended 0.9 inches, which according to Textron Aviation's documentation, corresponded with about 10° trailing edge down.

The rudder surface remained attached and undamaged to the vertical stabilizer. The aft portion of the rudder tip cap was separated and located about 27 ft from the main wreckage. The rudder balance weight remained attached to the rudder. Rudder cable continuity was established from the rudder horn to the rudder attachment points on the torque tubes. The rudder trim chain remained attached to the sprocket.

The left wing sustained crushing damage along the entire leading edge. The left aileron remained attached and had damage at inboard section from crushing against the flap and outboard damage consistent with impact. The aileron pushrod remained attached, and the aileron moved freely. Aileron cables remained attached to the bell crank and were continuous to the wing root where they were cut during recovery. The drive cable from the wing root to the interconnect pulley was continuous. The left flap remained attached to the wing partially extended and exhibited crush damage. The flap cables and swaged balls remained intact at the flap bell crank and were continuous to the wing root where they had been cut during recovery.

The right wing had accordioned with crush damage along the entire length of the wing. The right aileron remained attached and had crush damage consistent with impact. The aileron pushrod remained attached and moved freely. The aileron carry through cable remained attached to the bell crank and was continuous through the cabin overhead to the left-wing root. The drive cable was continuous to the right-wing root. Both cables were cut during recovery. The drive cable from the wing root to the interconnect pulley remained continuous. The flap jackscrew was extended about 2.6 inches, which according to Textron Aviation's documentation, corresponded with the flaps were about 10-15°.

The carburetor was cracked at the base near the mounting pad. There was fuel present in the bowl and the brass floats and needle valve were intact. The fuel strainer was unremarkable; the screen and bowl were clean, free of debris, and no corrosion.