

February 18, 2021

To: Whom It May Concern

Subject: Cessna 172N N5098E [Aircraft Accident - WPR21LA069]

On 18FEB2021 @ 09:00PDT I Benjamin O'Con began inspection on aircraft N5098E 1978 Cessna 172N serial number 17271711. On 13DEC2020 @ around 12:50PDT this aircraft experienced a loss of engine power on takeoff. This aircraft with hours unknown to me is equipped with a Lycoming engine model O-320-H2AD serial number L-8346-76T.

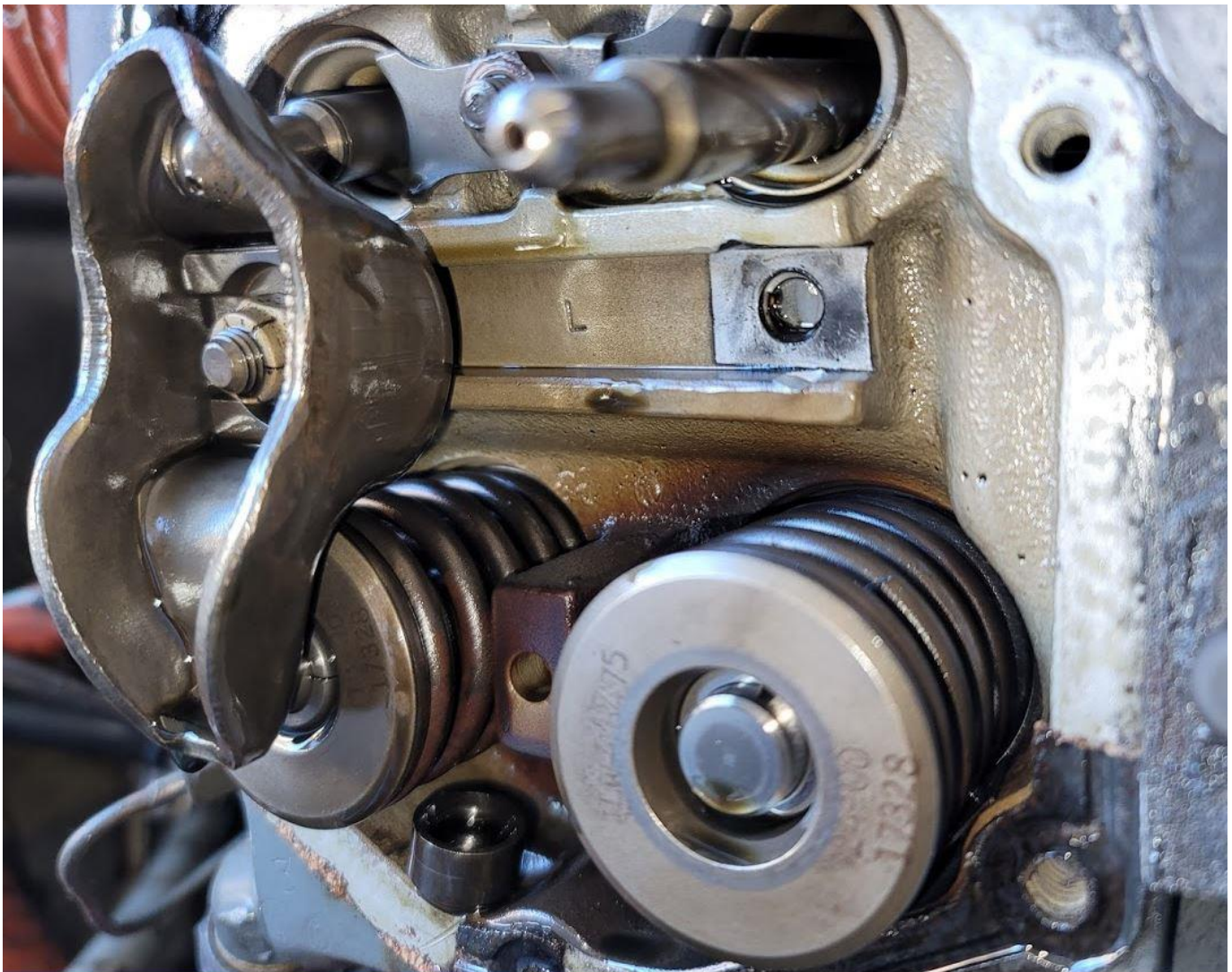
Upon initial inspection of the wreckage, it was found that the propeller appeared straight with no major damage. The engine was intact with no observed holes or damage, the propeller was turned through by hand backwards rotation and normal compression resistance was felt. The lower spark plugs were removed and cylinder numbers 1,2, and 4 plugs were dry but the number 3 was oil fouled.

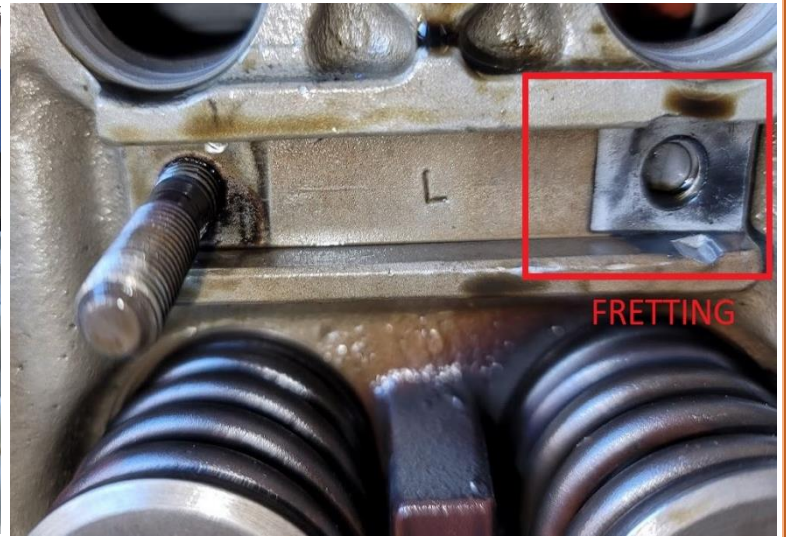
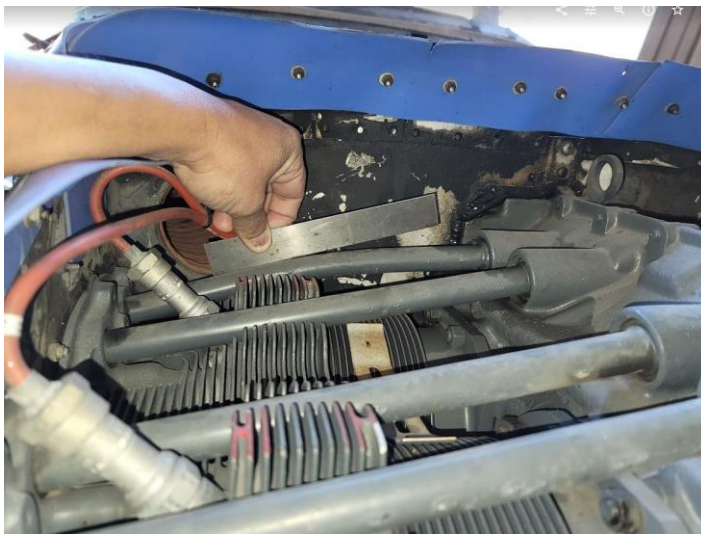


With the ignition harness loose, the magneto was function checked by verifying and observing good spark from each harness lead in the correct firing order. With a closer look of the top of the engine it was found to have the number three cylinder's intake push rod tube bent. Upon removal of the rocker covers it was found that the number three cylinder's exhaust valve rocker arm retention stud had sheared off.



The broken pieces and parts moving around in the rocker box cover could have lodged under the intake rocker arm and cause the push rod and push rod tube to bend.





Fretting was observed at the mating surface for the rocker arm seat, this damage is induced under load and in the presence of repeated relative surface motion, as induced for example by vibration from the possibility of improper torque. Rotating the engine to determine valve train operation, it was observed that all rocker arms showed excessive toe to valve stem clearances due to deterioration of camshaft and lifters. Upon further examination of the camshaft and lifters, extreme spalling wear was observed on all lifters and camshaft lobes.



Cylinder barrel scoring was noticed on the numbers one and three cylinders which were removed to view the internals of the engine. The number three cylinder has a severe crack in the lower spark plug boss. Aluminum piston pin plugs were installed and the aft pin plug of the number three cylinder and the forward pin plug from the number one cylinders were severely worn. The cylinder number three valves were removed and did not appear stuck in any way, the exhaust valve guide was found worn beyond limits and was verified using and Lycoming go no-go gauge.





In summary this engine was found to be in need of repair or overhaul and was producing substantial metal internally. It is my opinion that the amount of wear on the camshaft lobes and lifters along with the wear from the pistons and piston pin plugs that this engine has been producing metal in the last 100 plus hours. This metal should be significant enough to be found during normal oil change and maintenance upon visual inspection of the oil and filter. The amount of wear to the camshaft lobes and lifters cause excessive rocker clearances would have caused a deterioration of power over time due to valves not opening a sufficient amount. The failure of the number three exhaust valve rocker arm retention stud would have caused a sudden degradation of power additionally. The failure of the exhaust valve rocker arm retention stud in my opinion could have been caused by the fretting of the rocker arm seat to the seat boss of the cylinder head. This wear would have loosened up the mating surfaces enough to cause the stud to break under load and vibration.

This concludes my inspection of Cessna 172N N5098E [Aircraft Accident - WPR21LA069]
If you have any further questions, please do not hesitate to contact me anytime.

Thank you,

Ben O'Con
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