

**ANC21FA069**

**September 22, 2021**

**Dehavilland DHC-2 Beaver, N1249K**

**NTSB EXAMINATION POWERPLANT REPORT**

**Participants:**

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Examination of N1249K engine was completed on September 22, 2021, at a Temsco hangar, in Ketchikan, Alaska. The engine was in a crated box when the examination began. (See figure 1.)



*Figure 1 engine in crate.*

The last engine annual inspection was performed on July 22, 2021. The engine total time was 9,811 hours and the time since overhaul was 1,058 hours. (See figure 2.)

YEAR	RECORDING TACH TIME	FLIGHT'S FLIGHT	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations	YEAR OR DATE	RECORDING TACH TIME	TOTAL TIME IN SERVICE	Description of Inspections, Tests, Repairs and Alterations
2021	1829			I Certify That This Engine Has Been Inspected IAW Air/A Inspection and found Airworthy. Name: [Redacted]				
2020	901			I Certify That This Engine Has Been Inspected IAW Air/A Inspection and found Airworthy. Name: [Redacted]				
2019	9654			I Certify That This Engine Has Been Inspected IAW Air/A Inspection and found Airworthy. Name: [Redacted]				
2018	1871			I Certify That This Engine Has Been Inspected IAW Air/A Inspection and found Airworthy. Name: Anthony Criscola AF [Redacted]				
2017	976							
2016	1896			I Certify That This Engine Has Been Inspected IAW Air/A Inspection and found Airworthy. Name: [Redacted]				
2015	1089							
2014	984							

Figure 2 engine logbook

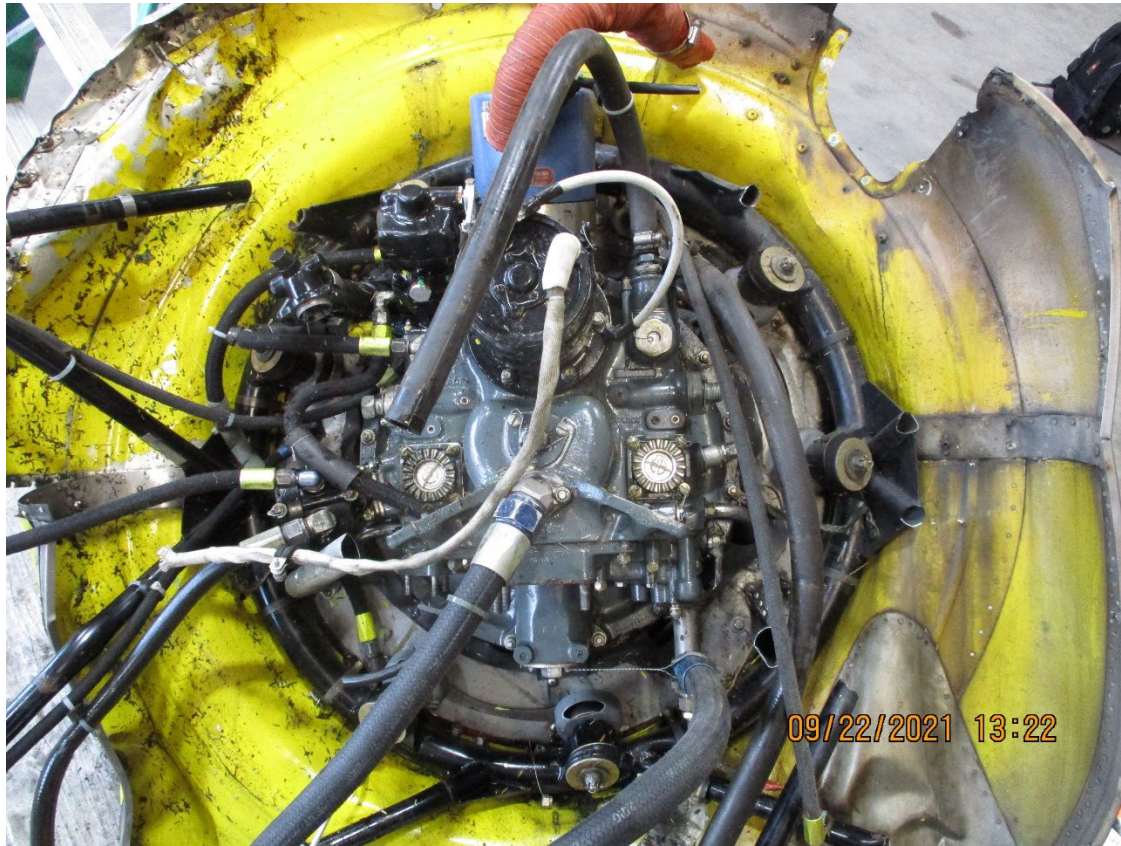
### Engine Initial Exam:

During initial examination, it was noted that the No. 6 cylinder head was fractured off by impact forces. The spark plugs were missing, and the rocker arms and housing were attached by the oil return lines. The No. 7 exhaust rocker arm and housing was fractured off the cylinder head. All cylinder fins were intact, however, tree branches were jammed in between the cooling baffling and cylinder fins throughout the engine. (See figure 3.)



*Figure 3. View of Nos. 6 & 7 cylinder damage. Note tree debris in cylinder fins.*

The fuel lines were fractured off at the bulkhead. (See figure 4.)



*Figure 4. Aft view of engine and fractured fuel lines.*

The front spark plugs were removed to facilitate a boroscope examination. The spark plugs were a mix of fine wire and massive electrode style. Normal wear was exhibited on the spark plugs, however evidence of water ingestion from impact forces showed corrosion. (See figure 5-6.)



Figure 5 engine spark plugs, 1-5



Figure 6 engine spark plugs 7-9

The crankshaft was rotated by hand at the crankshaft/propeller flange with a crankshaft turning tool through 360° of motion. The engine rotated smoothly, and crankshaft and valvetrain continuity was established through the engine. Thumb compression and suction was established on all cylinders except the No.6 cylinder due to the cylinder head fracture.

The rocker arm caps were removed, and the tension was released from the springs to facilitate push rod removal and front case removal. All the push rods exhibited normal wear. (See figure 7.)



*Figure 7. View of nose cone prior to removal.*

The front case was removed, and no anomalies were noted with the lifters and rollers. Furthermore, the lifters and rollers moved without resistance. (See figure 8.)



*Figure 8. View of lifters and rollers inside of nose cone.*

The cam assembly was removed and no anomalies were noted. The cam lobes exhibited normal wear. In addition, the cam plate gears were all present and no anomalies were noted. (See figure 9.)



*Figure 9. Cam plate and interior gears.*



The cam assembly gears exhibited normal wear. (See figure 10.)



Figure 10. Cam gear

The No. 1 cylinder and piston were removed to facilitate internal inspection of the connecting rods and counterweights.

The No. 1 cylinder, piston, valves, valve guides, springs, and valve keepers were examined, and no anomalies were noted. (See figures 11-14.)



*Figure 11. No. 1 cylinder after removal.*



*Figure 12. Interior of No. 1 cylinder.*

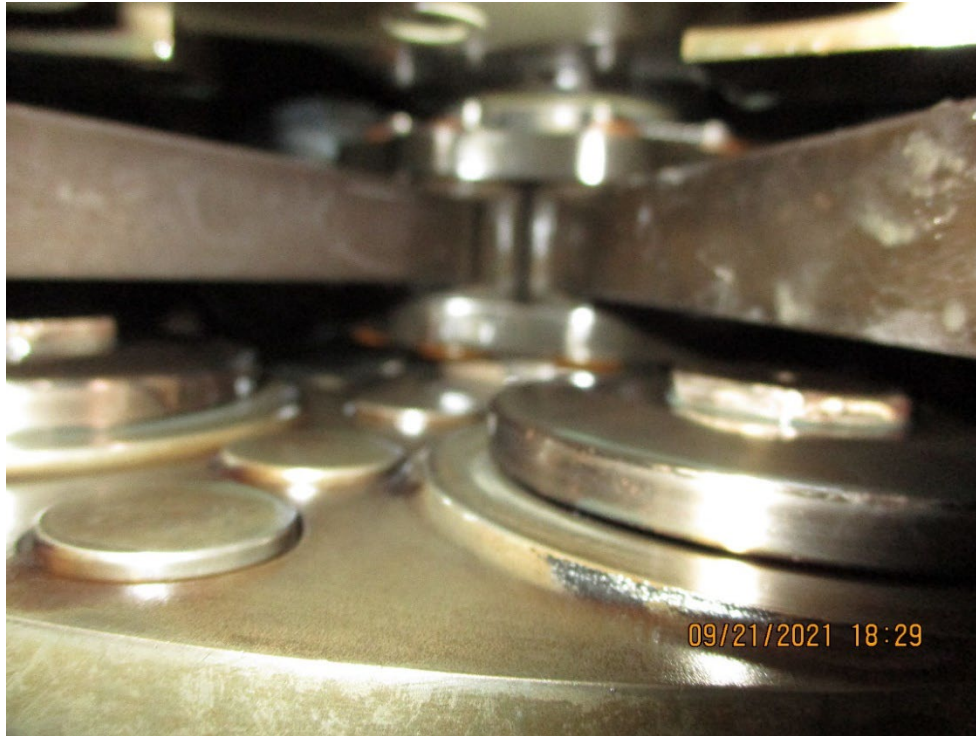


*Figure 13. No. 1 piston and piston pin.*



*Figure 14. No. 1 intake valve, exhaust valve, springs, and keepers.*

The internal examination of the crankcase revealed that the connecting rods and counterweight balance had no anomalies noted. (See figure 15, 16.)



*Figure 15. View of connecting rods.*



*Figure 16. View of counterbalance weights.*

The oil suction screen was examined, was not obstructed, and no metallic debris was noted.



*Figure 17. Oil suction screen.*

The left (rear) and right (front) magnetos were removed and rotated by electric screwdriver. Each lead exhibited spark. No anomalies were noted. (See figure 17.)



*Figure 18. Right and Left magnetos.*

The mechanical fuel pump was removed and rotated by electric screwdriver. Suction and pressure were established in the fuel lines. (See figure 18.)



*Figure 19. Mechanical fuel pump*

The carburetor was removed for examination. The screen was clear of debris. The float was intact and no anomalies were noted. The fuel seat and accelerator pump were examined and no anomalies were noted. The butterfly valve and accelerator pump moved freely when the throttle arm was manipulated by hand. (See figure 19-21.)



*Figure 20. Carburetor*



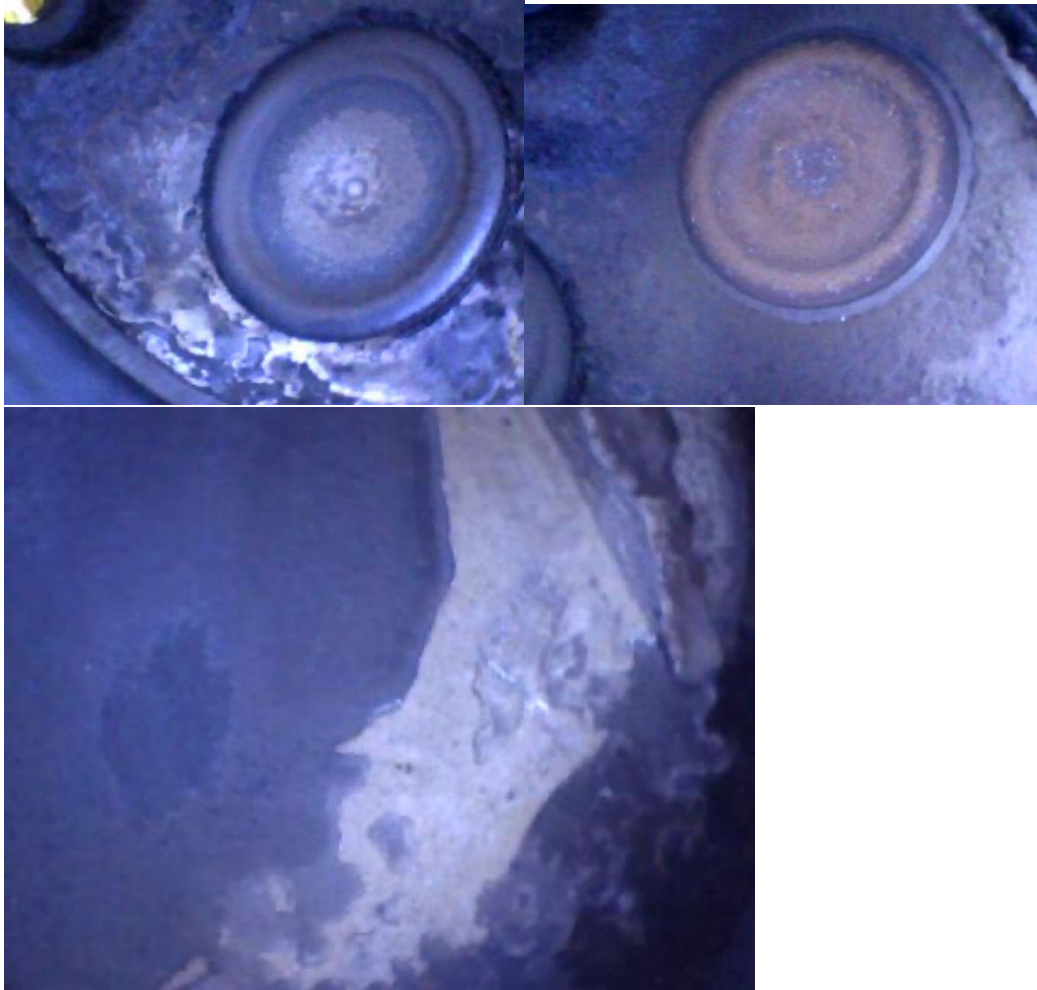


Figure 21. Fuel finger screen



Figure 22. View of carburetor float.

A lighted boroscope was used to examine all cylinder walls, pistons, and valves. No anomalies were noted. (See figure 22-29.)



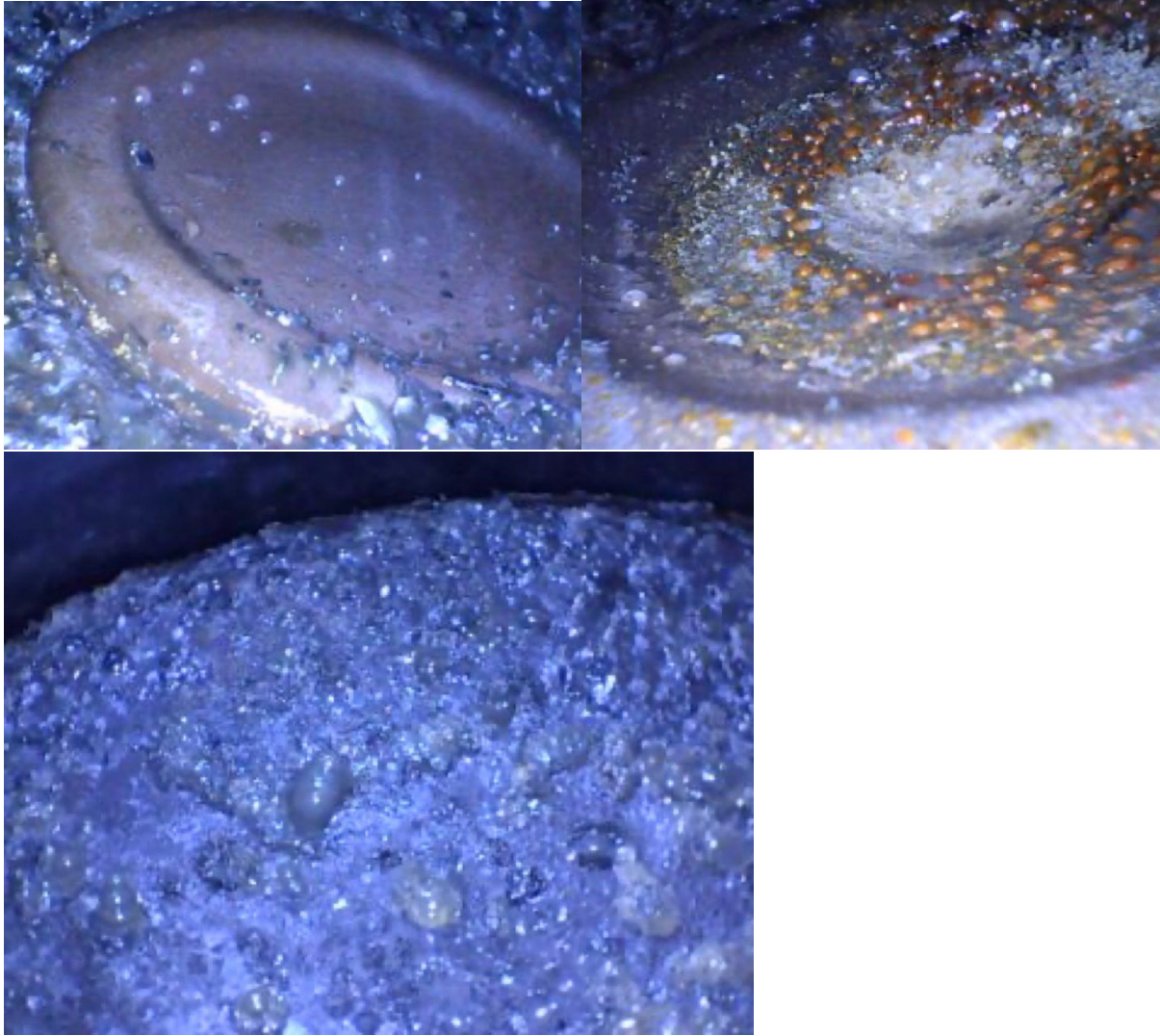
*Figure 23. Cylinder No. 2 Intake, Exhaust, and Piston Top*



*Figure 24. Cylinder No. 3 Intake Valve, Exhaust Valve, Piston Top, and Cylinder Wall*



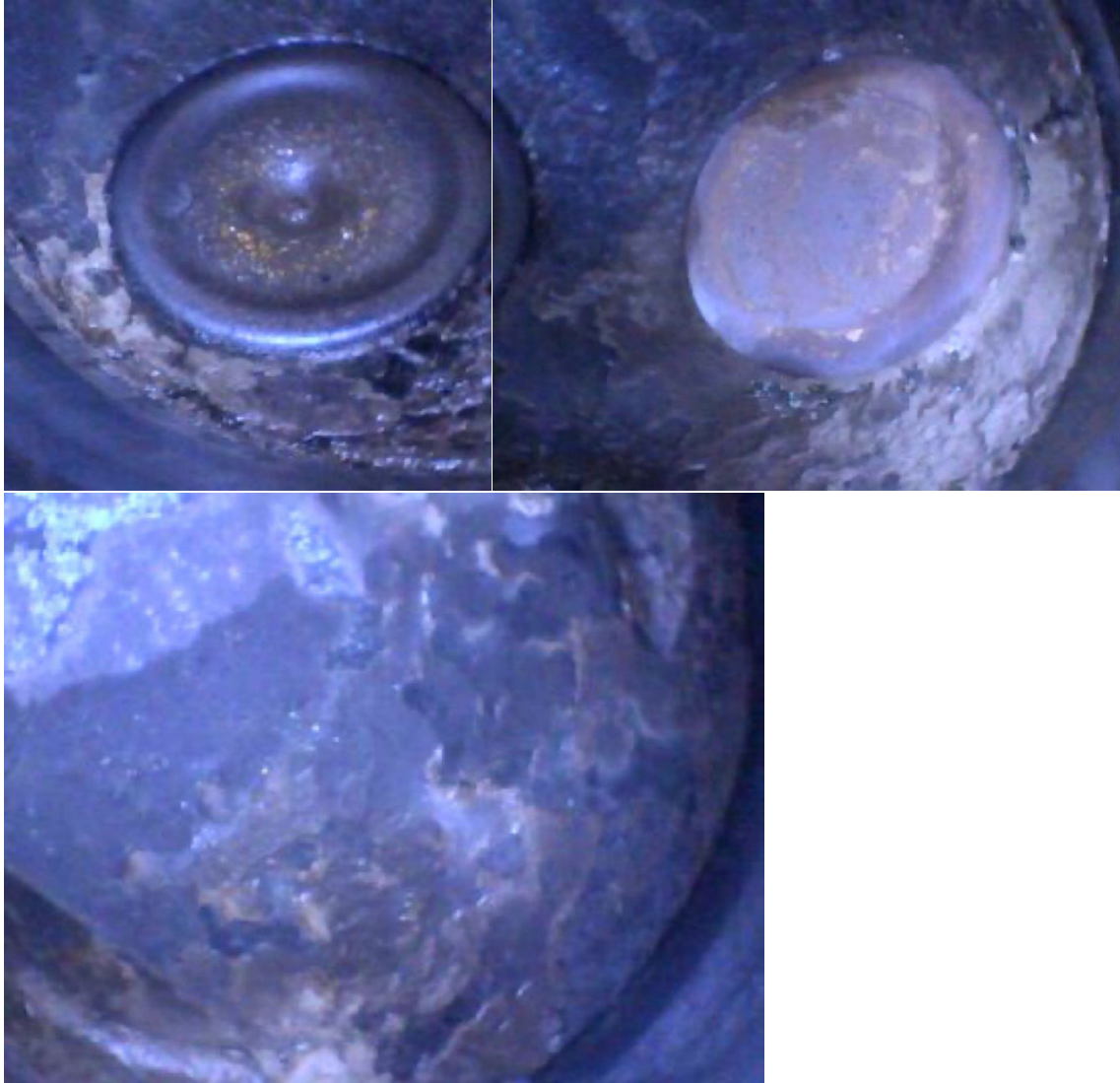
*Figure 25. Cylinder No. 4 Spark plug, Piston, Top, Intake Valve, and Exhaust Valve.*



*Figure 26. Cylinder No. 5 Intake valve, Exhaust Valve, and Piston Top. Note water droplets on the piston top.*



*Figure 27. Cylinder No. 6 Exhaust Valve, Intake Valve, and Piston Top*



*Figure 28. Cylinder No. 7 Intake Valve, Exhaust Valve, and Piston Top.*



*Figure 29. Cylinder No. 8 Exhaust Valve, Intake Valve, and Piston Top. Note oil in the cylinder.*





*Figure 30. Cylinder No. 9 Intake Valve, Exhaust Valve, Piston Top, and Cylinder Wall.*

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Dan Boggs

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