



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

September 26, 2018

AIRFRAME AND ENGINE EXAMINATION

WPR18LA265

This document contains 14 embedded photos.

A. ACCIDENT

Location: Granada Hills, CA
Date: September 15, 2018 at 1220 PST
Aircraft: Schweitzer; N2128T
NTSB IIC: Andrew Swick

B. EXAMINATION PARTICIPANTS:

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C. SUMMARY

Examination of the recovered airframe and engine was conducted by the inspectors from the Federal Aviation Administration and the National Transportation Safety Board investigator-in-charge, on September 26, 2018 at Light Helicopter Depot, Oxnard, California. During the examination the no. 1 cylinder did not have compression during a thumb compression test. A boroscope examination of the no. 1 cylinder combustion chamber revealed the piston head and combustion chamber exhibited normal deposits. The exhaust valve head showed thermal discoloration in three areas consistent with combustion blowby. Cracking was visible on the valve head near the edge and a small amount of missing material from the outer edges of the valve head. The no. 4 cylinder did not have compression during a thumb compression test. A boroscope examination of the no. 4 cylinder combustion chamber revealed the piston head and combustion chamber revealed mechanical damage to their surface areas. The exhaust valve head was missing about 1/3 of its material.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

The airframe remained secured on the landing gear (skids). The main rotor blades were removed from the airframe during the relocation of the wreckage and were damaged. The cabin structure was damaged on the upper left door frame. The cabin controls and instrumentation were undamaged. The upper tailboom to main rotor drive shaft housing support rod separated with overload signatures, midspan.



Figure 1-Main Wreckage

The drive shaft separated about 2 feet from the engine spline shaft attachment. The separated ends were twisted. The tailboom remained attached to the fuselage and was separated near the tail rotor transmission.



Figure 2-Driveshaft Separation in the Tailboom



Figure 3-Driveshaft to Engine Section

The separated tail rotor gear box and flight control surfaces were found displayed on the hangar floor. The two separated drive shafts were about equal in length and showed twisting near the separation surfaces. One tail rotor blade separated from the gear box assembly. The tail rotor blades were undamaged.



Figure 4-Separated Tail Rotor Gear Box and Flight Control Surfaces

The fuel tank had about 1/2 tank of 100LL fuel. The fuel strainer sump valve was opened and about 1/2 an ounce of blue fuel was collected. The fuel shutoff valve was positioned from the shutoff position (out) to the full in position and fuel flowed freely from the gascolator. No water or debris was visible in the fuel.

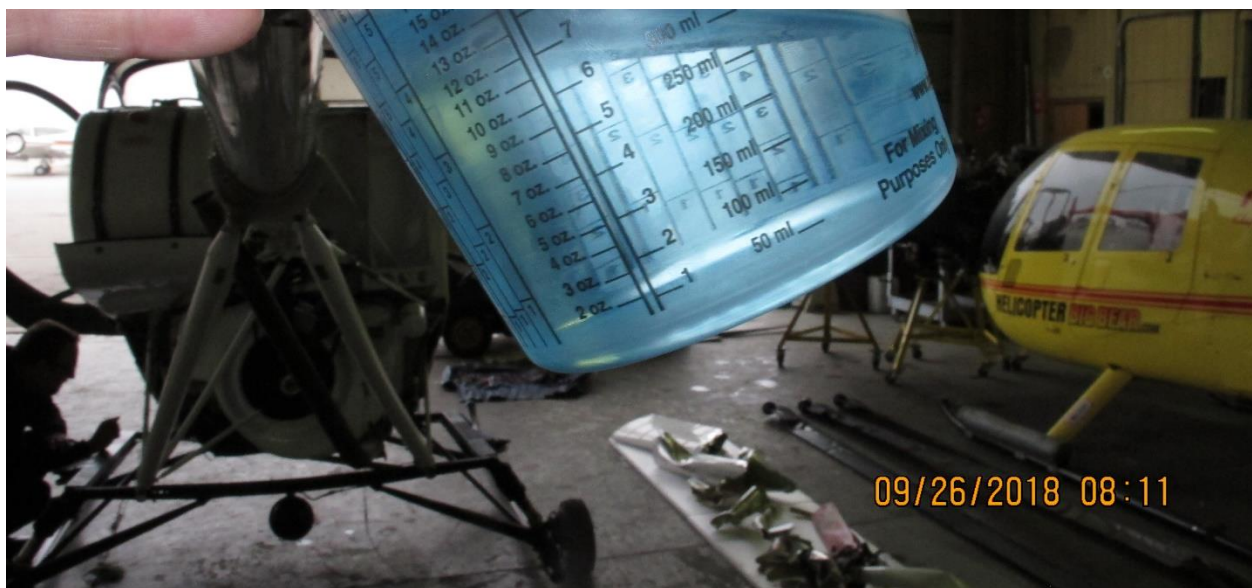


Figure 5-Fuel Collected from the Fuel Strainer

The drive belts were removed to facilitate the rotation of the crankshaft. The drive belts showed light amount of wear and were undamaged. The belt sheaves were undamaged. The drive shaft spine shaft had damage to one side of the spines.



Figure 6-Drive Belts and Belt Sheave



Figure 7-Drive Shaft and Spine Shaft

2.0 Engine Examination

Examination of the Lycoming HIO-360-G1A engine (Serial #RL-35157-51A) revealed that the engine remained attached to all four engine mounts. The engine remained secured to the airframe and was undamaged. The oil dipstick revealed just above 6 quarts. The engine control cable attachments were secure, and no anomalies noted. The drive belts remained attached to the sheaves and showed normal wear. The belts were removed to freely rotate the engine crankshaft. The cylinder rocker covers were removed, and all cylinder overheads were undamaged and lubricated.



Figure 8-Cylinder Overhead Components, No. 3 and 1



Figure 9-Cylinder Overhead Components, No. 2 and 4

The lower spark plugs were removed from the cylinders, and the electrode areas showed normal wear conditions and combustion deposits. The no. 4 spark plug revealed metal marks on the ground electrode.



Figure 10-Lower Spark Plugs

The crankshaft was rotated and thumb compression was attained on no. 2 and 3 cylinders. A rubber mallet was used to tap the rockers on cylinders no. 1 and 4. Thumb compression was still not attained. A boroscope examination of the no. 1 cylinder combustion chamber revealed the piston head and combustion chamber exhibited normal deposits. The exhaust valve head showed thermal discoloration in three areas consistent with combustion blowby. Cracking was visible on the valve head near the edge and a small amount of missing material from the outer edges of the valve head.

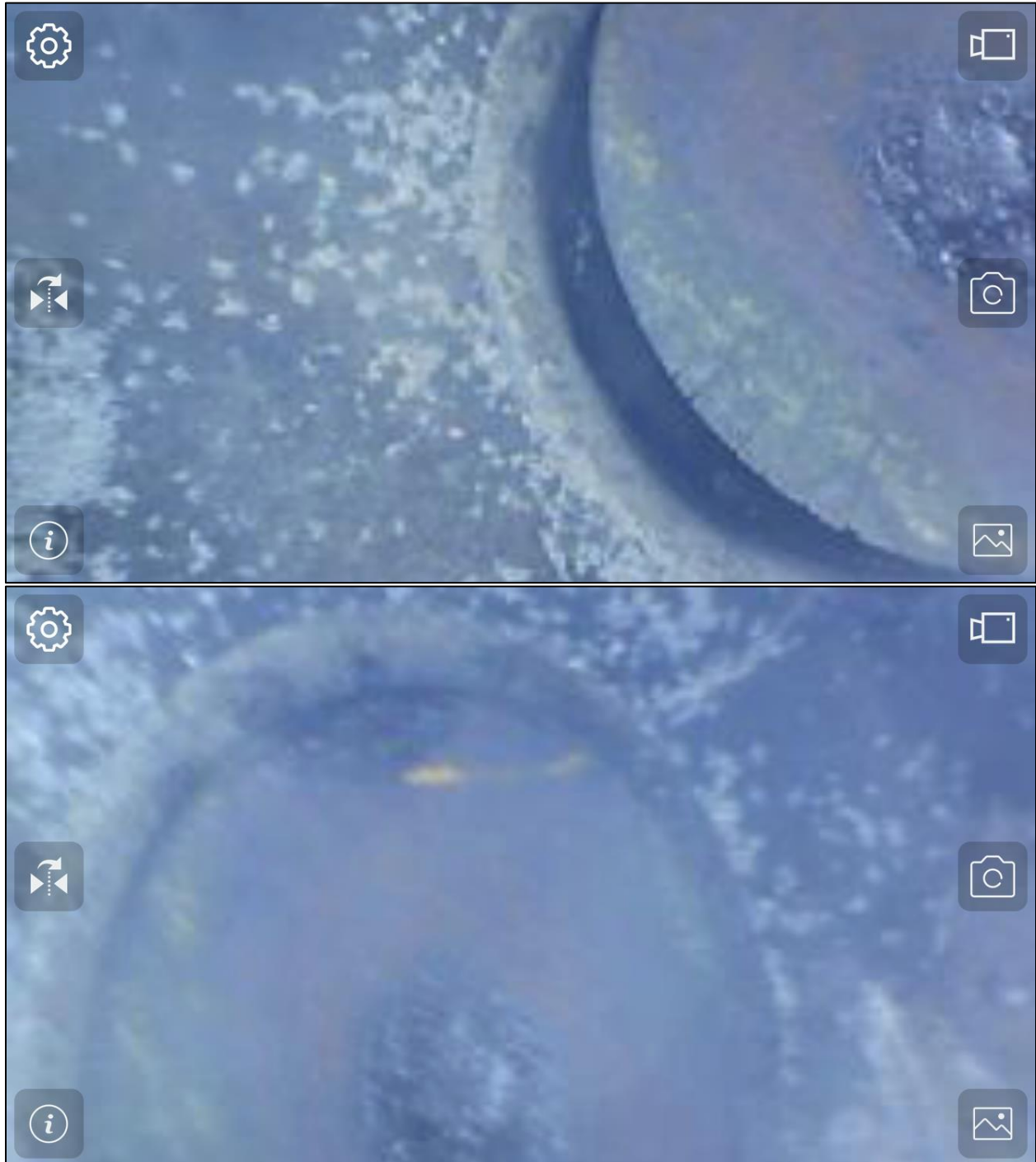


Figure 11-Boroscope Images of the No. 1 Cylinder Exhaust Valve

The no. 4 cylinder did not have any compression during a thumb compression test. A boroscope examination of the no. 4 cylinder combustion chamber revealed the piston head and combustion chamber revealed mechanical damage to their surface areas. The exhaust valve head was missing about 1/3 of its material.

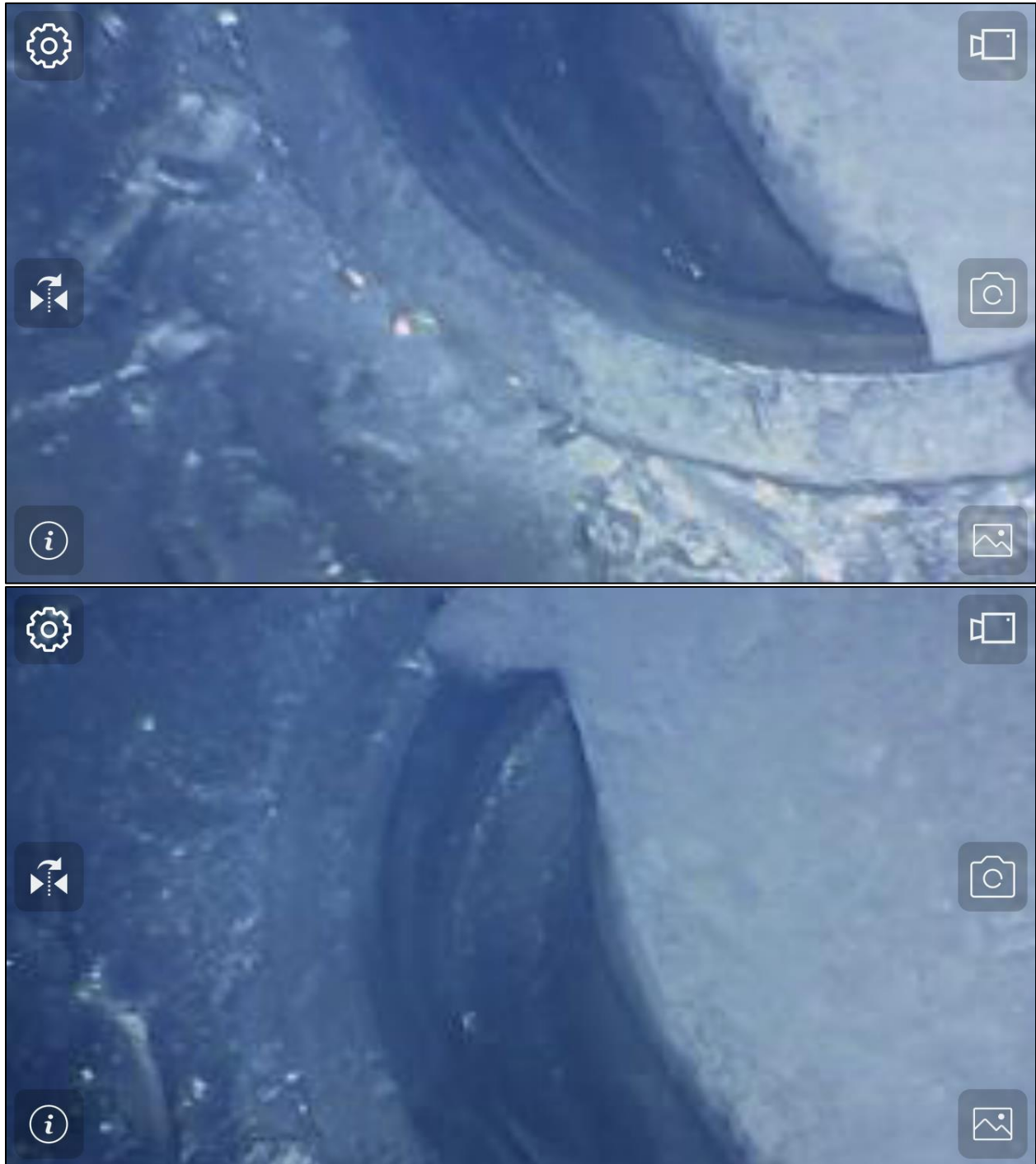


Figure 12-Boroscope Images of the No. 4 Cylinder Exhaust Valve

Submitted by: Andrew Swick