



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Western Pacific Region

July 12, 2017

### **ENGINE EXAMINATION**

**WPR17LA140**

This document contains 0 embedded photos.

## **A. ACCIDENT**

Location: Bella Vista, CA  
Date: July 2, 2017  
Aircraft: Robinson R44, N488AS  
NTSB IIC: Howard Plagens

## **B. EXAMINATION PARTICIPANTS:**

Name: Hannah Warren  
Title: ASI  
Company: Robinson Helicopter Co  
Torrance, CA

Name: Dennis DeGolia  
Title: Airworthiness Inspector  
Federal Aviation Administration  
Sacramento, CA

Name: Mark Platt  
Position: ASI  
Company: Lycoming Engines

Name: Thom Webster  
Position: ASI  
Company: Robinson Helicopter Co  
Torrance, CA

## **C. SUMMARY**

Examination of the recovered engine was conducted on July 12, 2017 at the facilities of Air Shasta, Redding, CA. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered engine.

## **D. DETAILS OF THE INVESTIGATION**

### **1.0 Engine Examination**

Excerpts from the Lycoming engine examination revealed that All engine compartment fuel lines were found to be in place and secure at their respective fitting of each fuel system component.

The fuel injection servo remained securely attached at the mounting pad of the plenum. The throttle/mixture controls were found securely attached at their respective control arm of the servo and control continuity to the cockpit was established. The plug on the side of the injector body was secure with the safety wire in place. The servo fuel inlet screen was found properly installed and free of contamination. The fuel injection servo and induction system were examined and observed to be free of obstruction. The pleated paper filter element remained

securely attached within the airbox enclosure. The filter element remained intact and exhibited no evidence of pre-impact obstruction to airflow.

The fuel flow divider remained secure at the mounting bracket situated at the top of the engine. The fuel lines remained secure at each flow divider fitting and fuel injector at each cylinder.

The fuel injection nozzles remained secure at each cylinder with the respective fuel line attached. The nozzles were removed and examined. The nozzles remained free of visible contamination or obstruction to flow.

The fuel pump was attached to the engine at the mounting pad. The fuel lines remained secure at their respective fittings. The fuel pump was not removed for examination.

The spark plugs were secure at each position with their respective spark plug lead attached. The spark plug electrodes remained mechanically undamaged, and displayed varying coloration attributed to water emersion/corrosion.

The ignition harness was attached at the respective magnetos and each spark plug.

The starter was securely attached at the mounting pad, with the electrical connection secure at the post.

The alternator was securely attached at the mounting pad, with the electrical connections secure at each post

The oil filter was secure at the mounting pad and was not removed for examination. The oil suction screen was found secure and uncontaminated by any pre-mishap debris. There was no evidence observed of any pre-mishap lubrication system contamination found during the examination.

The drive belts were removed to facilitate the examination. The crankshaft was rotated by hand utilizing the cooling fan. The crankshaft was free and easy to rotate in both directions. "Thumb" compression was observed in proper order on all six cylinders. The complete valve train (except #1) was observed to operate in proper order and appeared to be free of any pre-mishap mechanical malfunction. Normal "lift action" was observed at each rocker assembly. The rocker box cover at the number one cylinder was impinged upon by the airframe and could not be removed. Clean, uncontaminated oil was observed at the exposed rocker box areas. Mechanical continuity was established throughout the rotating group, valve train and accessory section during hand rotation of the crankshaft. The top spark plugs were not removed. The combustion chamber of each cylinder was examined through the spark plug holes utilizing a lighted borescope. The combustion chambers remained mechanically undamaged, and there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged. There was no evidence of valve to piston face contact observed. The gas path and combustion signatures observed at the spark plugs, combustion chambers and exhaust system components; although contaminated with post water emersion corrosion, displayed coloration consistent with normal operation. There was no oil residue observed in the exhaust system gas path.

The left and right magnetos remained securely clamped at their respective mounting pads. The ignition harness was secure at each magneto. Magneto to engine timing could not be ascertained, due to the water-soaked magnetos internal components. The magnetos were removed for examination. The drives of each magneto remained intact and undamaged.