



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

May 21, 2021

ENGINE EXAMINATION NOTES

WPR20FA077

A. ACCIDENT

Location: Auburn, CA
Date: January 24, 2020
Aircraft: N50249
NTSB IIC: Albert Nixon

B. EXAMINATION PARTICIPANTS:

Albert Nixon
Senior Aviation Accident Investigator
National Transportation Safety Board
Federal Way, WA

C. SUMMARY

Examination of the engine was conducted on May 14 and 21, 2021, at the facilities of Air Transport in Phoenix, Arizona. A certified airframe and powerplant mechanic under the supervision of the NTSB IIC was utilized. The examination of the engine revealed a stuck intake valve on the No. 7 cylinder, wear and fraying on the ignition harness, and a defective front spark plug on the No. 2 cylinder, and worn and frayed ignition wiring on the front Nos. 2 and 4 cylinders that caused arcing. Additionally, examination of the oil filter pleats revealed that the oil was contaminated with metal and carbon debris. No additional evidence of preimpact mechanical failure or malfunction was noted during the examination of the engine.

D. DETAILS OF THE INVESTIGATION

1.0 Engine Examination

Examination of the single row, nine-cylinder, radial engine revealed that it remained attached to the front portion of the framework but was separated from the fuselage from the recovery.

All the spark plugs were removed and examined. Examination of the spark plugs revealed normal wear to severe wear signatures in accordance with the Champion Check-A-Plug comparison chart. Several of the sparkplugs exhibited carbon deposits.

Damage was sustained to some of the rocker covers. The rocker covers were removed, and all the valves were lubricated. Rotation was obtained through manual rotation of the propeller and

proper valve movement was obtained except for the No. 7 cylinder. The intake valve on the No. 7 cylinder was stuck fully open.



Figure 1: Engine at the examination facility as viewed from the front.

The No. 8 cylinder was removed for examination of the internal portion of the engine. Examination of the internal portion of the engine revealed no mechanical anomalies however, the oil residue had metal and carbon debris present. The carburetor sustained impact damage and was removed and examined. Examination of the carburetor revealed no anomalies besides the damage sustained.

All engine accessories were attached. Removal and examination of the magnetos revealed that during manual rotation with a powered drill, spark was observed at all the ignition leads. The front sparkplug of the No. 2 cylinder was determined to be defective. The ignition harness displayed some degree of wear and fraying on the wires. Additionally, the front Nos. 2 and 4 cylinder's ignition leads wire coating were worn and cracked and observed to arc during magneto checks.



Figure 2: Ignition wire exhibiting wear and fraying as viewed from the front of the engine.

The oil filter was removed and examined. Examination of the filter element folds revealed dark and shiny debris consistent with carbon and metal contamination. The oil pump was removed and examined, and no anomalies were noted.



Figure 3: Oil filter element folds contained dark and shiny debris.

The two-bladed propeller was attached to the crankshaft flange. One blade was relatively intact. The second blade was twisted and bent aft about mid-span. The spinner was still attached and sustained impact damage.

Submitted by: Albert Nixon