



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

March 11, 2021

AIRFRAME & ENGINE EXAMINATION

WPR20LA141

This document contains 13 embedded photos.

A. ACCIDENT

Location:	Byron, California
Date:	May 9, 2020
Aircraft:	Bellanca 8GCBC, N4116Y
NTSB Investigator-in-Charge:	Joshua Cawthra

B. Participants

Joshua Cawthra
Senior Aviation Accident Investigator
National Transportation Safety Board
Federal Way, Washington

Eric M. Gutierrez
Air Safety Investigator
National Transportation Safety Board
Federal Way, Washington

C. SUMMARY

The examination of the recovered engine revealed no evidence of any mechanical anomalies that would have precluded from normal operation.

D. AIRFRAME EXAMINATION

Examination of the recovered airplane revealed that the forward area of the fuselage significantly damaged by fire. The tow rope cutting mechanism was found the engaged position.



Figure 1: View of the airframe tow rope cutting mechanism.

E. ENGINE EXAMINATION

Engine Manufacturer: Lycoming
Engine Model Number: O-320-O2E
Engine Serial Number: L-22045-36A

Examination of the recovered engine revealed that it was recovered and stored in a synthetic material bag. The firewall and engine mount remained attached to the engine. The engine had thermal damage to the rear of the engine. No evidence of any mechanical damage was observed to the engine crankcase. The firewall and engine mount had thermal and impact damage, separating it from the airplane. All cylinders remained attached to the engine. The oil filler neck was impact separated. Additional impact damage was observed to the lower area of the number two-cylinder rocker box cover. The engine oil pump and both magnetos remained attached to the accessories case. The carburetor was separated, however, a portion of the carburetor remained attached to the engine.



Figure 2. View of the engine

The propeller, starter ring gear and crank shaft propeller flange exhibited impact damage. The crankshaft propeller flange was impact damaged. One of the propeller blades was bent aft in the opposite direction of rotation and exhibited chordwise striations along the leading edge throughout.



Figure 3. View of the propeller



Figure 4. View of starter ring gear and crankshaft propeller flange damage

The rocker box covers were removed. The intake and exhaust rocker arms were all intact and oil coated on all cylinders. All intake and exhaust valve springs were in place and visually appeared to be undamaged. The upper spark plugs were removed, and all four cylinders were examined internally using a lighted borescope. With the exception of the number two cylinder, normal amount of combustion deposits was observed within the combustion dome of each cylinder and piston face. The number two cylinder had foreign object debris and rust within the combustion dome and on the piston face. Except for the number two-cylinder, all of the intake and exhaust valves were unremarkable. The number two-cylinder intake and exhaust valves exhibited some rust like discoloration. The propeller was removed, two propeller bolts were reattached to the propeller flange, the crankshaft was rotated by hand using a hand tool. Rotational continuity was established throughout the engine and valve train. Thumb compression and suction was obtained on all four cylinders.

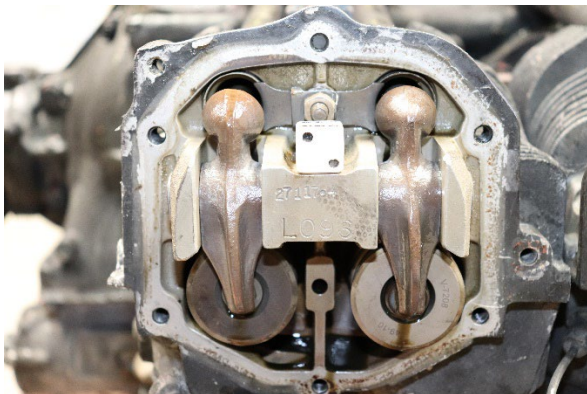


Figure 5. View of the number two-cylinder rocker arms

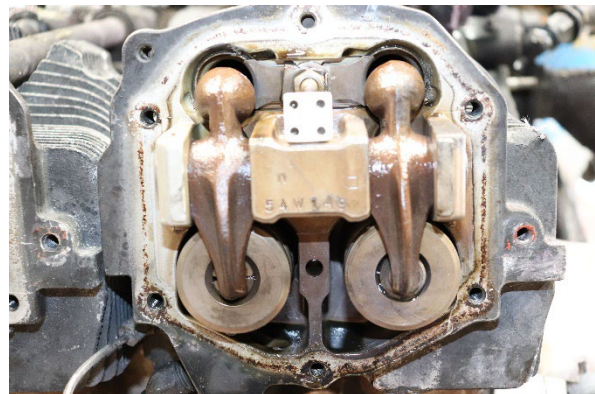


Figure 6. View of the number four-cylinder rocker arms

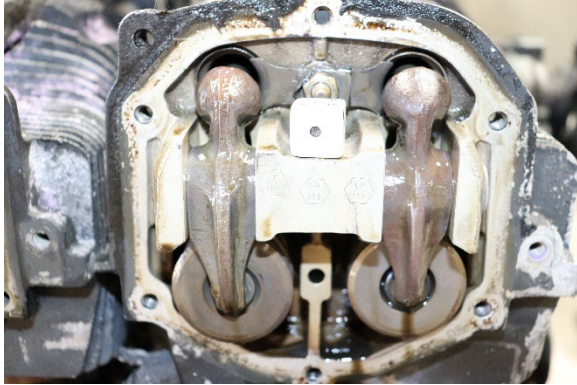


Figure 7. View of the number one-cylinder rocker arms

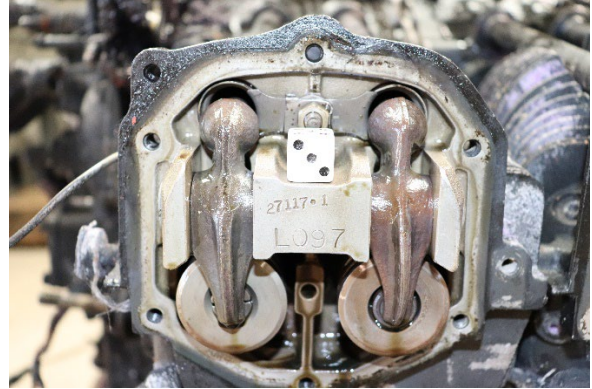


Figure 8. View of the number three-cylinder rocker arms

The top and bottom spark plugs were removed from the engine. When compared to the Champion Check-A-Plug chart, the sparkplugs had the following signatures:

<u>Cylinder Number:</u>	<u>Upper Spark Plugs</u>	<u>Lower Spark Plugs</u>
<u>1</u>	WORN OUT- NORMAL	WORN OUT-NORMAL
<u>2</u>	Filled with corrosion/debris	Filled with corrosion/debris
<u>3</u>	WORN OUT-NORMAL	WORN OUT-NORMAL
<u>4</u>	WORN OUT-NORMAL	WORN OUT-NORMAL

The number one, three and bottom four cylinder's spark plugs had black deposits within the electrode area. The number two and top four cylinder's spark plugs had debris consistent with the collection of water and debris during firefighting operations.



Figure 9. View of upper spark plugs



Figure 10. View of lower spark plugs

The left and right magnetos remained attached to the engine accessory case with no external damage noted. Both left and right were removed from the engine's accessories case. When the left magneto drive shaft was rotated by hand, spark was produced on four ignition posts and impulse coupling engagement was heard. The right magneto, which was not equipped with an impulse coupling, drive shaft was rotated by hand, spark was produced on four ignition posts.



Figure 11. View of left magneto

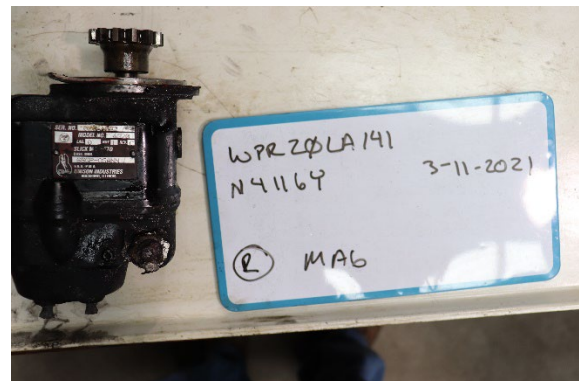


Figure 12. View of right magneto

The carburetor had impact separated and exhibited damage to the top area of the carburetor and the air intake box. The float bowl was free of debris and found unremarkable. The throttle lever was intact, undamaged and freely from stop to stop. The needle was removed and found unremarkable.



Figure 13. View of carburetor

The exhaust system remained secure to the cylinders. No evidence of any exhaust leaks around the cylinder attach points were observed.

Submitted by: Joshua Cawthra