



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Western Pacific Region  
July 14, 2015

### **AIRFRAME AND ENGINE EXAM REPORT**

WPR15FA200

This document contains 29 embedded photos.

#### **A. ACCIDENT**

Location: Corona, CA  
Date: June 28, 2015  
Aircraft: Great Lakes 2T1A-E, Registration Number: N7LM, Serial #: 1  
NTSB IIC: Howard Plagens

## **B. EXAMINATION PARTICIPANTS:**

Howard Plagens  
Senior Air Safety Investigator  
National Transportation Safety Board  
Desert Hot Springs, CA 92240

## **C. SUMMARY**

Examination of the recovered airframe and engine was conducted on July 14, 2015, at the facilities of Air Transport, Phoenix, Arizona. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

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

### **1.0 Airframe Examination**

The airplane's data plate indicated that the empty weight was 1,317 pounds, and the maximum gross weight was 1,800 pounds. The airplane's manufacture date was March 12, 1979.

The aileron and elevator flight control cables and push-pull tubes remained connected to the rear control yoke, which also had an interconnect to the front control yoke. There were multiple disconnects within the aileron control system. All identified fractures on push pull tubes were angular and jagged.



Photo 1 Rear Cockpit



Photo 2 Rear Yoke Flight Control Connections



Photo 3 Rear Instrument Panel



Photo 4 Tachometer

The wings were highly fragmented. The tips of all wings were identified, as were both ailerons.



Photo 5 Right Rear View of Wings

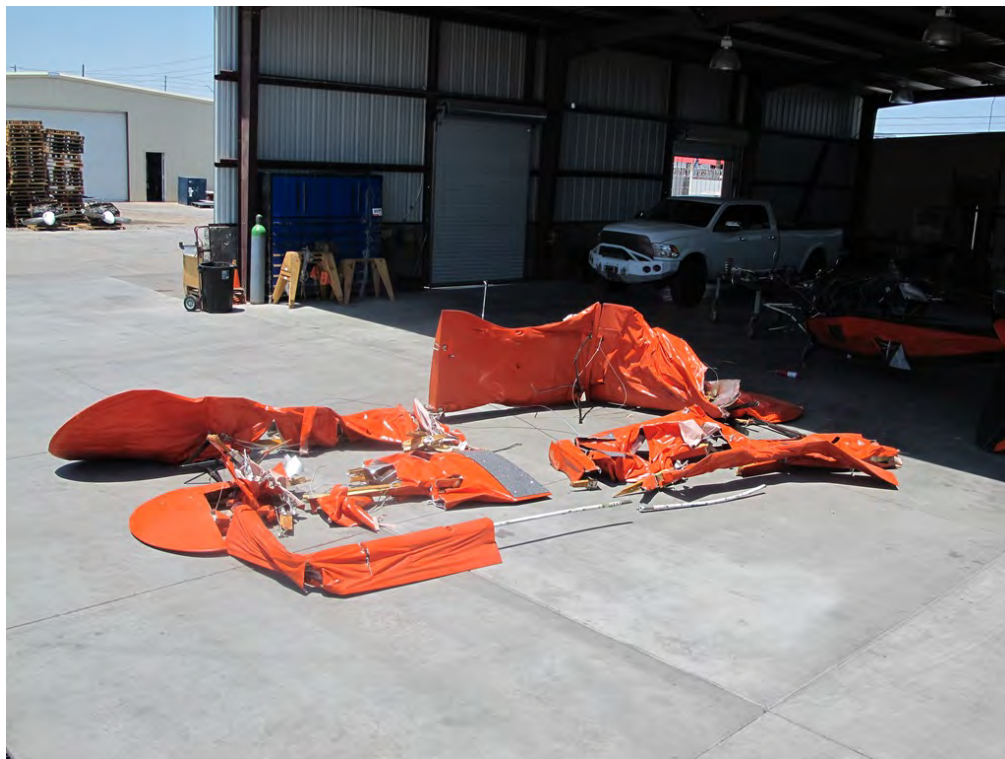


Photo 6 Left Rear View of Wings



Photo 7 Front View of Wings



Photo 8 Front Left View of Wings

The IIC established control continuity for the left and right elevators. The cables for both were connected at the control surface and were continuous to the control yoke. The left elevator is more damaged than the right, and the center section is crushed in a semicircular pattern.



Photo 9 Empennage

The IIC established control continuity for the rudder. The cables for both left and right sides were connected at the control surface, and were continuous to the front and rear pedals.

The top hinge was in an area of heavy crush damage, and was disconnected. The fracture surfaces were angular and jagged. The middle hinge was bent, but connected; the bottom hinge remained in place.



Photo 10 Rudder

## 2.0 Engine Examination

The engine was a Fairchild Range 6-440-C5 inline six-cylinder engine, manufacturer's serial number 5530, Air Corps number 42-192376; the date of manufacture was May 6, 1943. It was rated at 200 horsepower. The firing order was 1, 5, 3, 6, 2, and 4.

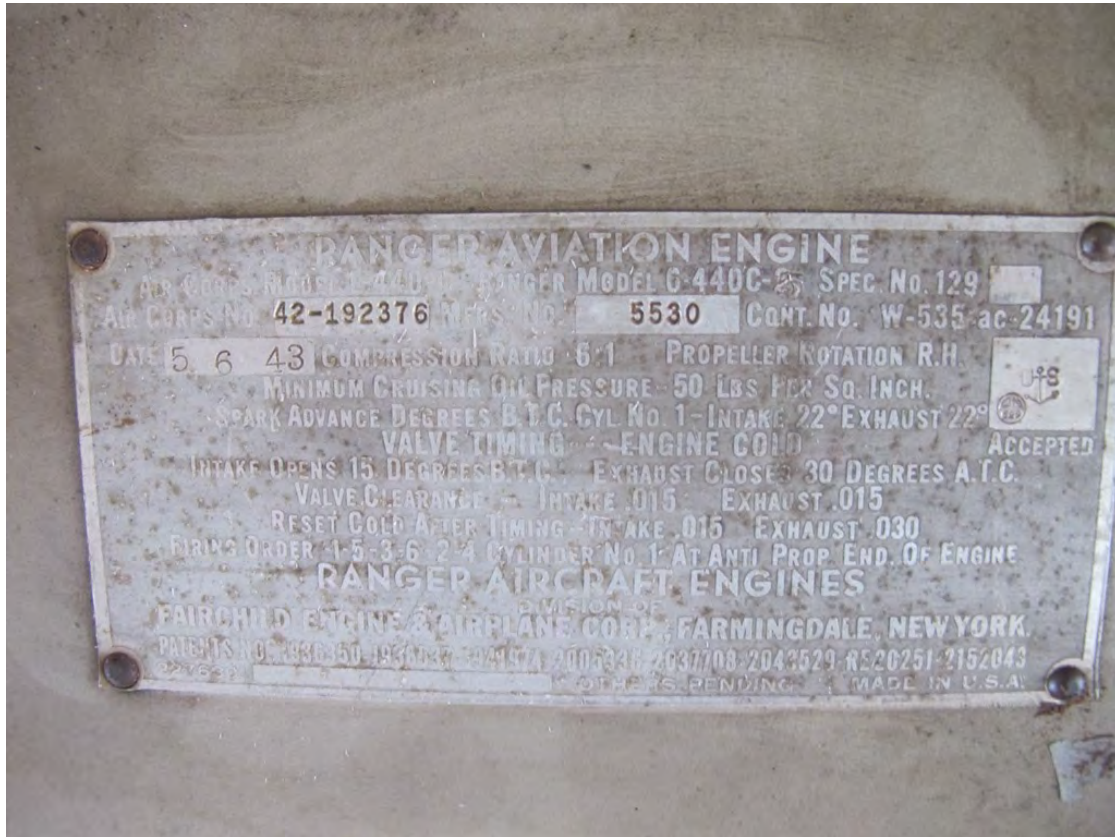


Photo 11 Engine Data Plate

The engine was separated during recovery, and it was slung inverted from a hoist.

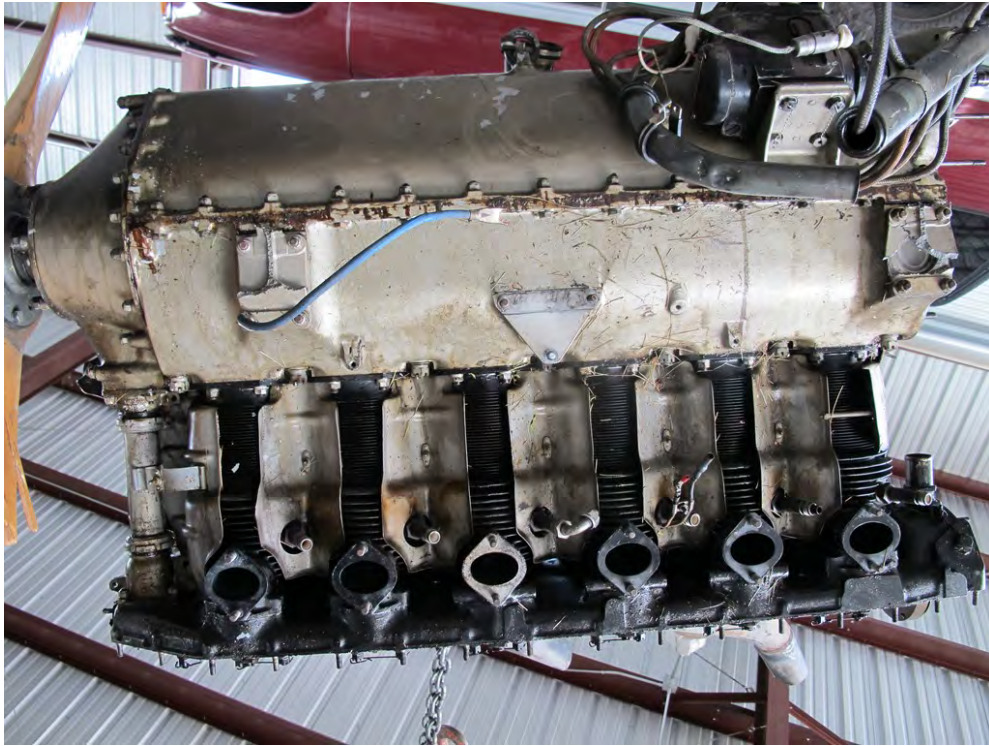


Photo 12 Top of Engine



Photo 13 Bottom of Engine



Photo 14 Right Side of Engine



Photo 15 Left Side of Engine



Photo 16 Rear of Engine

The IIC removed the spark plugs. All spark plug center electrodes were circular with no mechanical deformation. All spark plugs had four ground electrodes except cylinder number four on the right side, which had two. The electrodes were gray, which corresponded to normal operation in accordance with the Champion Aviation Check-A-Plug AV-27 chart.



Photo 17 Spark Plugs

The IIC manually rotated the crankshaft with the propeller. The crankshaft only rotated about 200 degrees. Removal of the alternator, starter, and accessory case did not create any additional travel. The valve cover was removed. Recovery personnel rotated the crankshaft, and the IIC observed movement of the exhaust valves on cylinders one, four, and five. The intake valves on cylinders two and six moved; neither valve moved on cylinder number three.



Photo 18 Valve Train



Photo 19 Valve Train

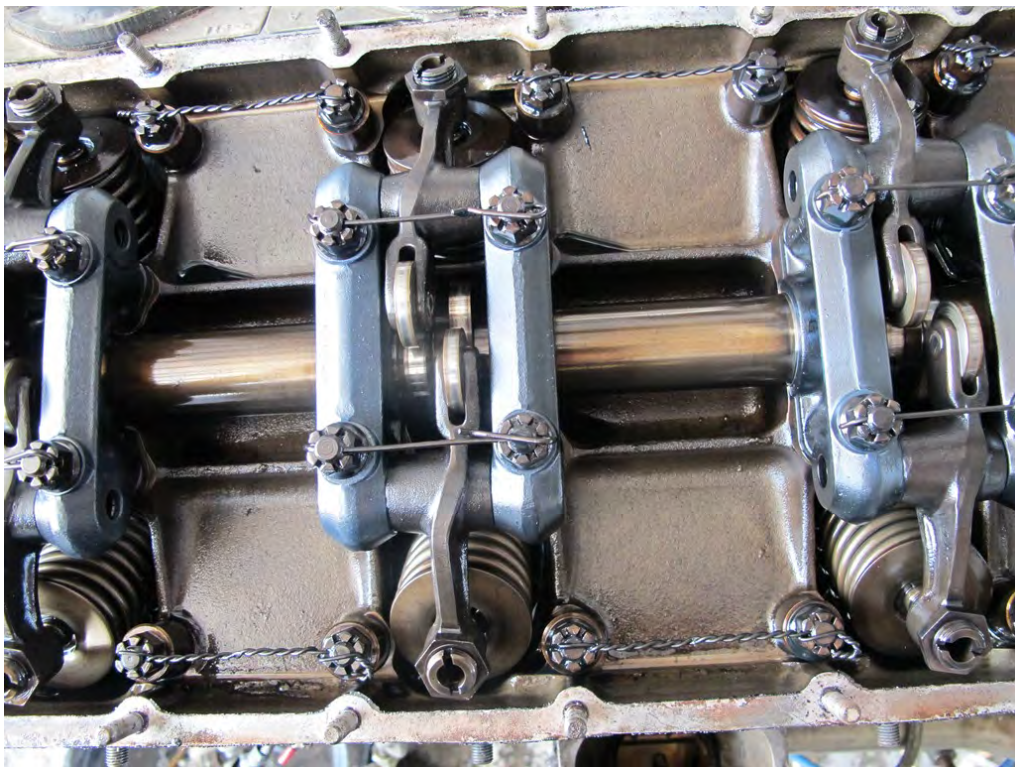


Photo 20 Exemplar Valve Rollers and Camshaft

The crankshaft and camshaft gears in the accessory case turned freely.



Photo 21 Back of Engine with Accessory Case Removed

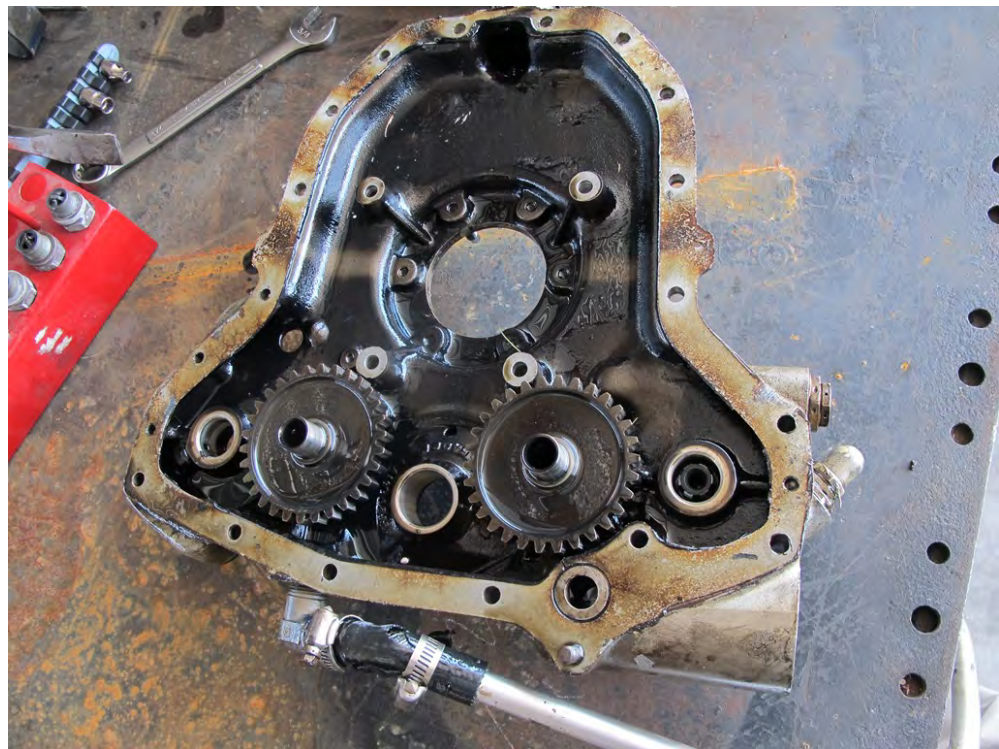


Photo 22 Accessory Case

The magnetos were Bendix Scintella models. The IIC manually rotated the magnetos, and obtained spark at all terminals.



Photo 23 Magnetos

The carburetor was a Bendix Stromberg number 5807804, model NA-R4B, part number 382012-8. The throttle and mixture valves moved freely from stop to stop. The carburetor heat valve was in the open position, and moved freely from stop to stop.

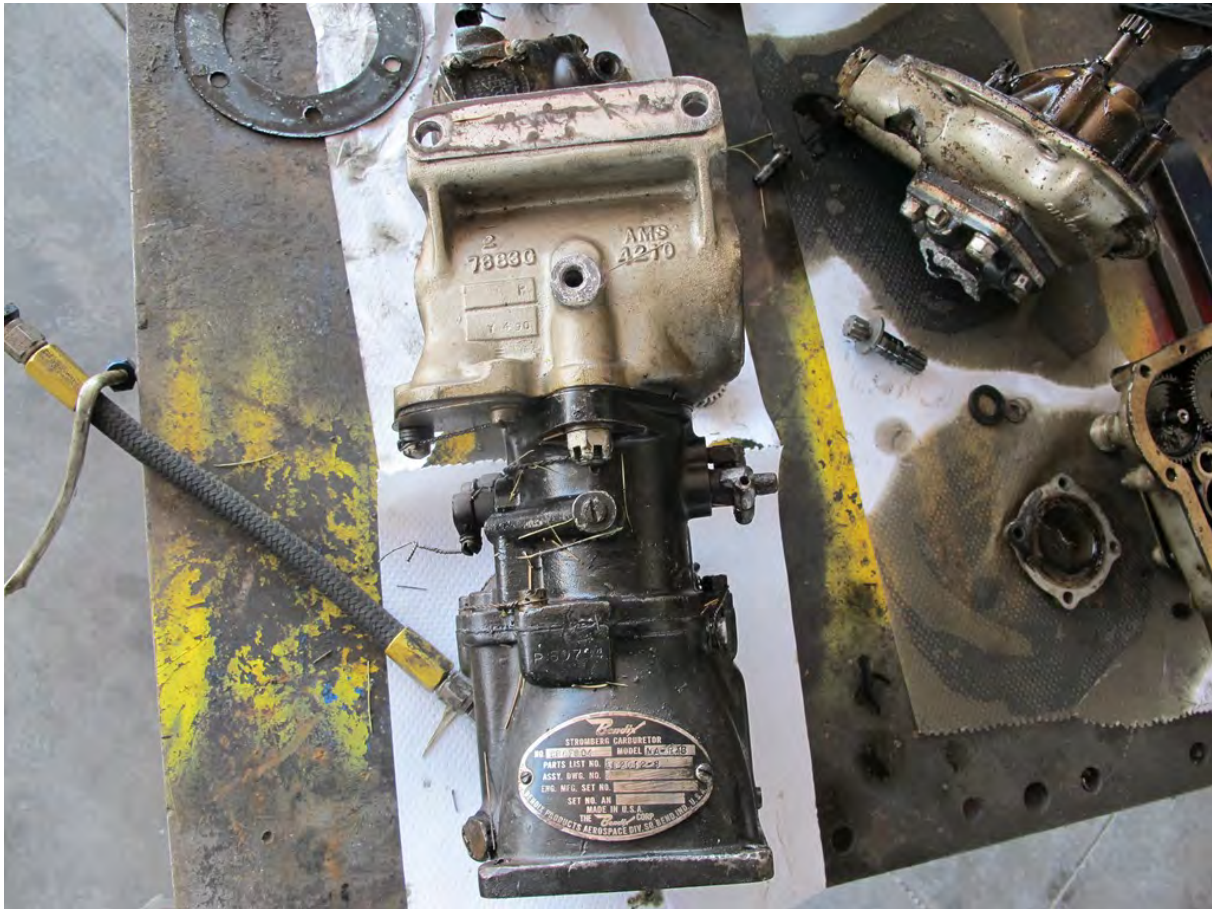


Photo 24 Carburetor

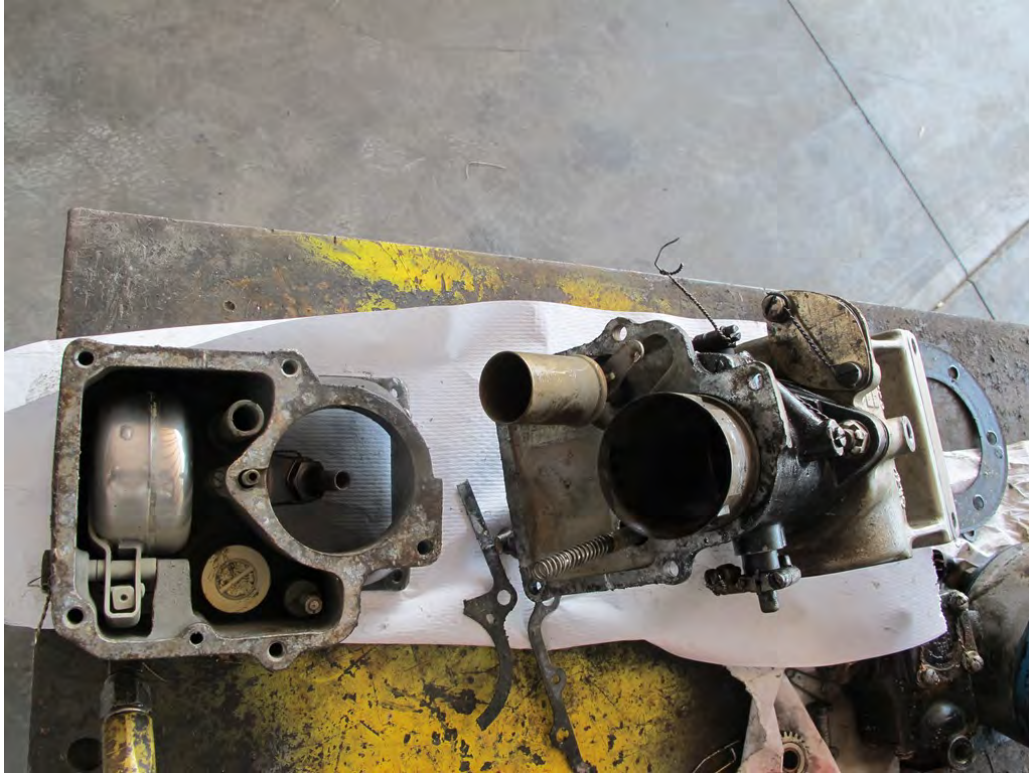


Photo 25 Disassembled Carburetor



Photo 26 Throttle Valve

The oil screen was full of a black clean fluid.



Photo 27 Oil Screen

### 3.0 Propeller Examination

The cambered side of the whole propeller blade had scratches.



Photo 28 Intact Propeller Blade



Photo 29 Back of Intact Propeller Blade