



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

May 10, 2022

AIRFRAME AND ENGINE EXAMINATION SUMMARY

WPR22LA090

This document contains 6 embedded images.

A. ACCIDENT

Location:	Ravendale, California
Date:	January 28, 2022
Aircraft:	N420WT
NTSB Investigator-in-Charge:	Andrew Swick
FAA Inspector-in-Charge:	Ronald R. Green

B. PARTICIPANTS

Ronald R. Green-FAA FSDO
Henry Soderlund-Textron Aviation

C. EXAMINATION SUMMARY

Examination of the engine revealed a separated induction tube at the right turbocharger compressor outlet connection. Several band clamps and rubber couplings were found on the engine that did not match part numbers from the manufacturer's parts catalog. The lower spark plugs were removed and exhibited dark deposits in the electrode areas. The airframe revealed no evidence of preexisting malfunctions or failures that would have precluded normal operation.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination



Figure 1-Main wreckage.

During the recovery process the wing was removed from the airframe. Upon request from the NTSB investigator-in-charge, the recovery company drained from the fuel filter assembly located in the center wing area and no contaminants were noted. About 20 gallons of avgas remained in both wing tanks during the examination. The horizontal stabilizers and elevators were also removed during the recovery process. The upper cowling was removed onsite to facilitate the lifting of the airframe, then reattached.

The left wing had leading edge impact damage. Aileron control continuity was attained from control rods near the center wing area where the ailerons control tubes had been disconnected during the recovery process. Flaps were positioned between 10 and 15 degrees down. The flap handle on the instrument panel was positioned to the takeoff position. Flight control continuity was established from the cabin area to the aileron wing connection, rudder and elevator linkage in the tail cone area. The nose and main landing gear had impact damage.

The fuel selector valve remained in the center wing area and the valve's control shaft was rotated by hand and operated normally. Fuel flowed from the outlet fitting while the valve was positioned to each wing tank.

2.0 Engine Examination

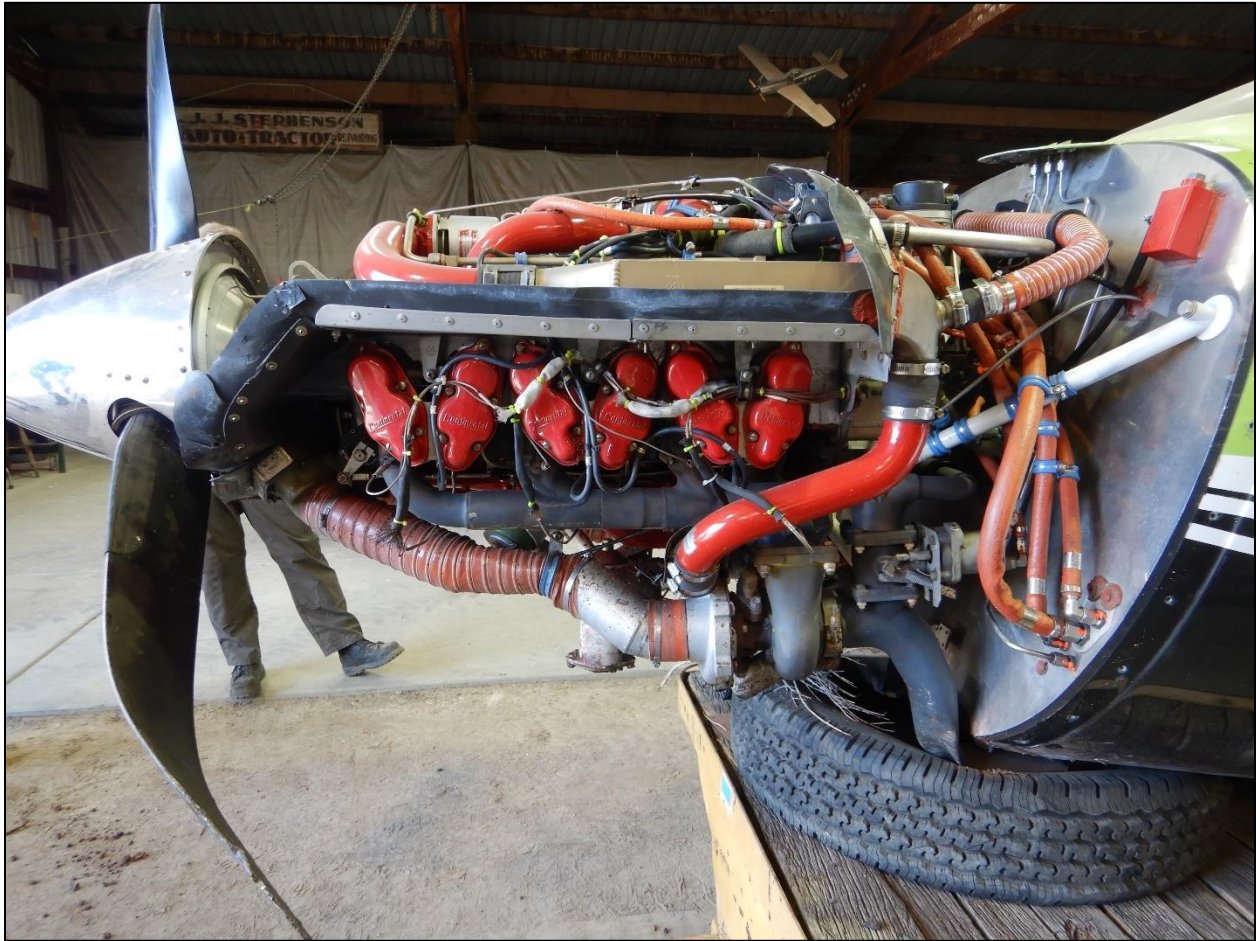


Figure 2-Engine and propeller assembly.

The engine remained attached to the airframe. The engine mounts and carriage assembly were undamaged. The cabin engine control continuity was established. The propeller assembly remained attached to the engine and had impact damage to the hub and its blades. The blades had multidirectional scoring on their cambered sides and were bent rearward. The lower engine cowling had impact damage on the right side and rear center section. The upper cowling was undamaged. The cowling was removed from the engine and impact damage was noted to the induction tubes connecting the air intake box and turbocharger compressor inlets.

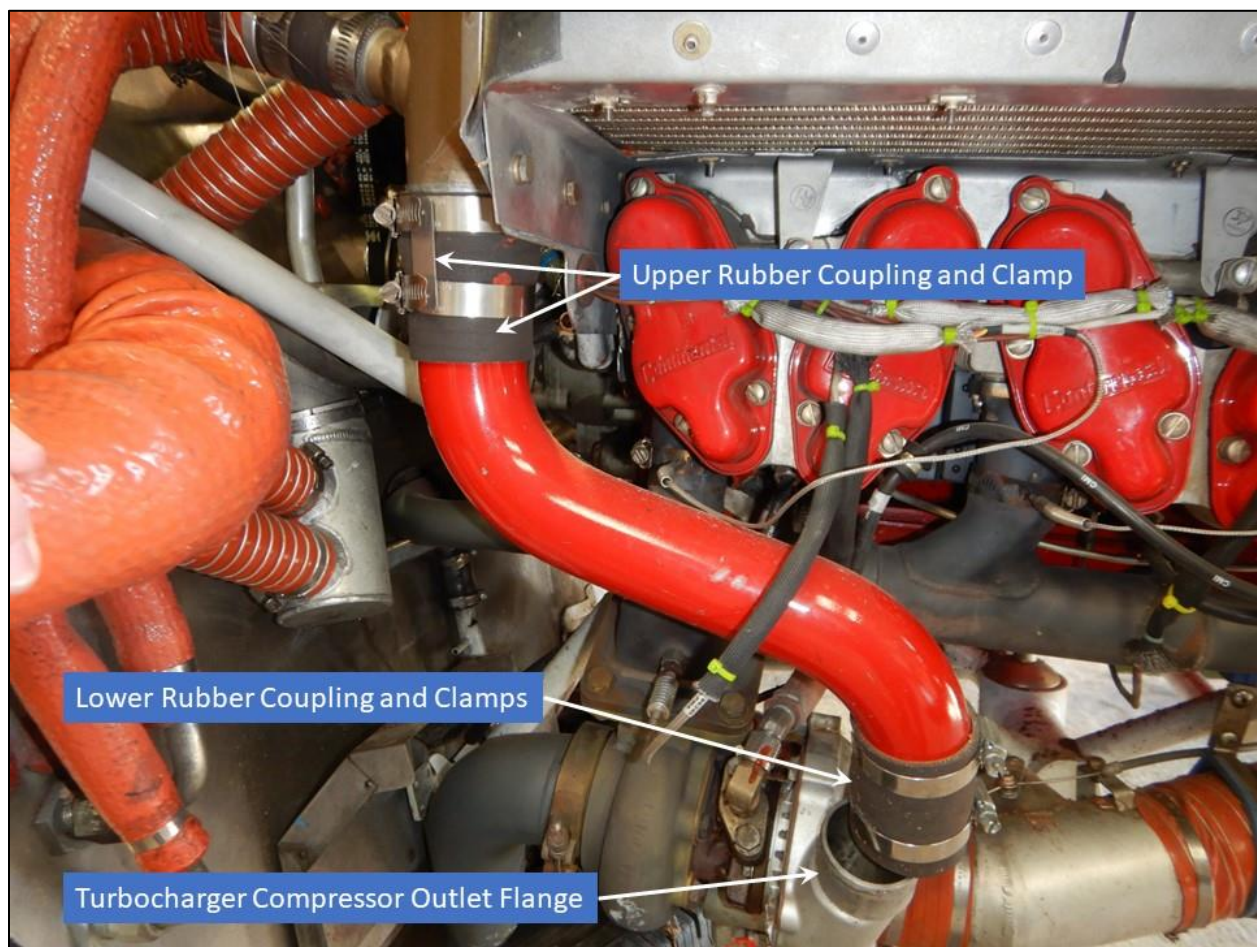


Figure 2-Right side induction tube and rubber couplings.

The right induction tube connecting the turbocharger compressor outlet to the intercooler inlet, separated from the turbocharger compressor outlet flange. The induction tube lower rubber coupling and band clamps remained attached. The tail end of the band clamps separated near the adjustment screw. Both clamps did not have a stamped part number but instead showed dimensions of the clamp's limitations (1-13/16 and 2-3/4). The clamps were tight to the coupling. Two inches of the induction tube was installed into the 3-inch-long rubber coupling leaving only 1 inch remaining to be installed on the turbocharger compressor outlet flange.

The upper rubber coupling had a band clamp assembly attached and was positioned flush to the top side of the rubber coupling. The band clamp assembly was not marked with a part number but with the clamp's limitations and manufacturer's name (1-13/16, 2-3/4 and Aero Seal Breeze). The spacing between the band clamps was 13/16 of an inch and appeared to be a non-manufactured part. According to the Continental Motors the required clamps are a band clamp assembly with the part number of 629163-7. The spacing between these clamps are 1-3/8 inch.

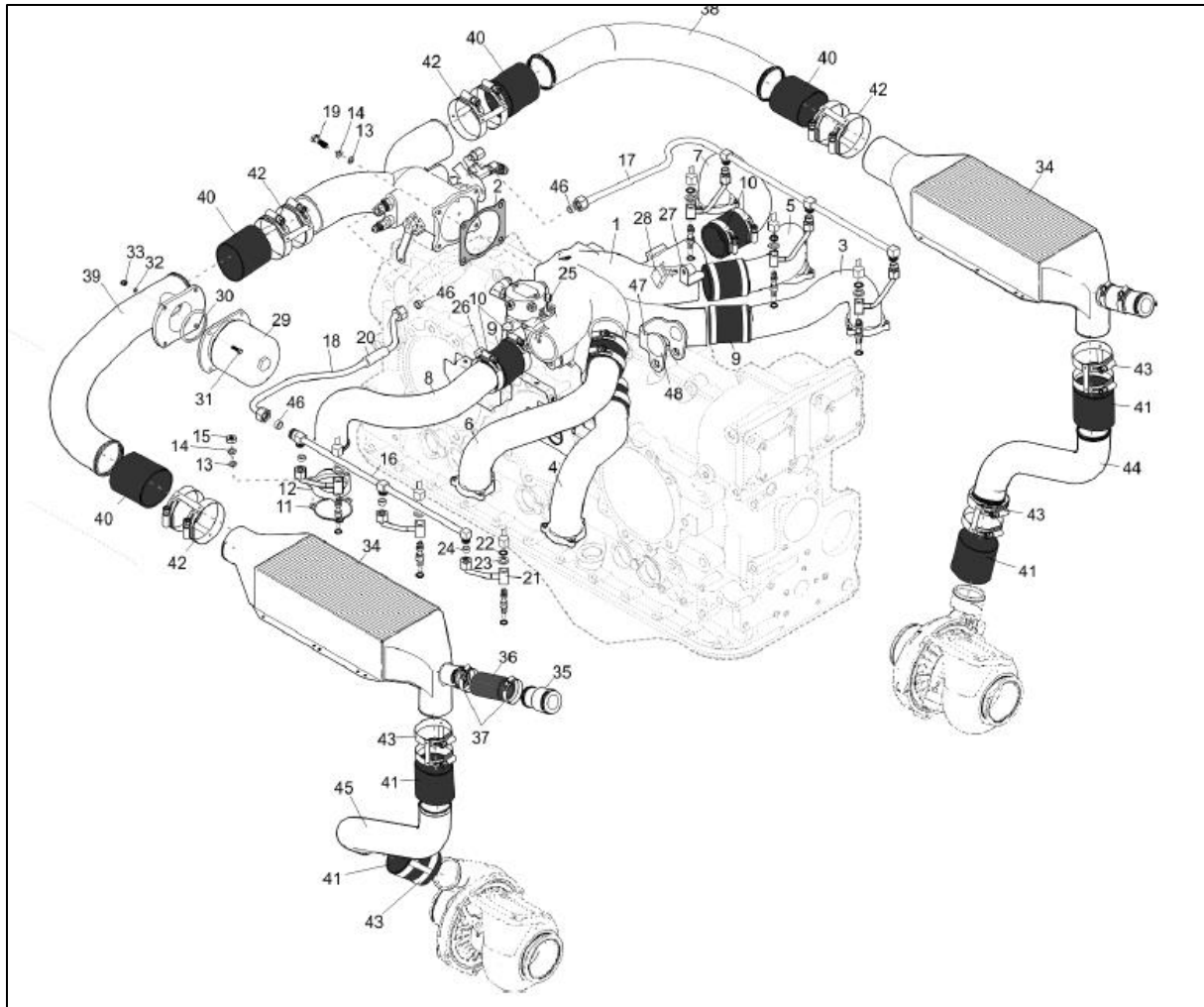


Figure 3-Continental Motors TSIO550C20B induction system parts drawing.

The left side induction tube connecting the turbocharger compressor outlet to the intercooler inlet remained attached. The two single band clamps on the turbocharger compressor outlet side did not have a stamped part number but instead showed dimensions of the clamp's limitations (1-13/16 and 2-3/4). The two clamps on the intercooler side had a part number of MS-35842-13. The tail end of the band clamps separated near the adjustment screws. See Figure 3, part 41, which shows the correct band clamp assembly (629163-7).

The induction tubes and exhaust pipes were removed from the turbochargers. The turbochargers were undamaged, and the turbine shafts rotated freely by hand.

The ignition leads were removed from all sparkplugs. The lower spark plugs were removed from the cylinder and displayed in a rack. The electrodes showed no signs of wear and the electrode areas were dark in color.



Figure 4-Lower sparkplugs.

The manifold valve was removed and disassembled. The diaphragm and the internal components were undamaged. The manifold valve had fuel in the cavity and the inlet screen captured a small amount of fibrous debris.



Figure 5-Fuel manifold valve, disassembled.

The wastegate valve was found in the open position and moved freely to the closed position with normal spring resistance. The overboost valve was undamaged and the valve moved by hand with resistance.

The propeller assembly rotated freely by hand and the magneto impulse coupling engaged. Spark was obtained from each of the ignition lead ends. Fuel briefly dripped from the inlet line to the fuel manifold valve. Gear continuity was attained to the accessory section.

The lower cowling was installed on the airframe and the damage located on the right side of the cowling was concentrated at and below the right turbocharger location.

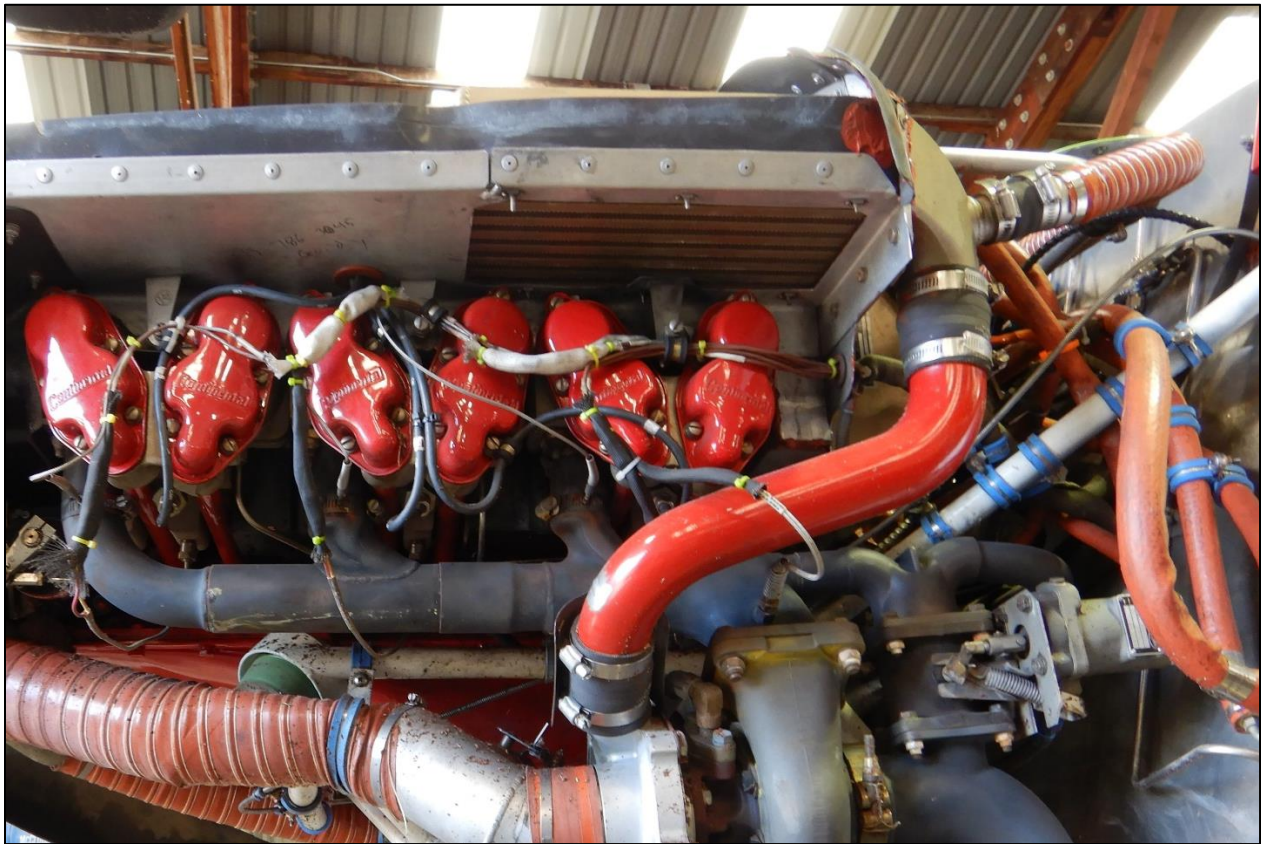


Figure 6-Left side view of the engine.

Submitted by: Andrew Swick