

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24FA095

EXAMINATION SUMMARY

June 4, 2024

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A. ACCIDENT

Location: Little Rock, Arkansas
Date: January 21, 2024
Time: 1320 CST
1920 UTC
Airplane: N255JP, Cirrus SR-22, S/N 3084

B. EXAMINATION SUMMARY

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C. SUMMARY

The examination was conducted with Continental Engines, Cirrus Aircraft, Tornado Alley Turbo, and the FAA at Dawson Aircraft in Clinton, Arkansas on June 4, 2024. The examination consisted of both a visual and teardown inspection of the Continental IO-550-N engine. The examination revealed out of gap tolerance spark plugs with no other mechanical failures or malfunctions of the engine that would have precluded normal operation.

D. DETAILS OF THE EXAMINATION

1.0 Engine Examination

The Cirrus SR-22 was equipped with a 310 horsepower turbonormalizing Continental IO-550-N engine S/N 691748. The turbonormalizing components were a Supplemental Type Certificated (STC) system provided by Tornado Alley Turbo, Inc of Ada, Oklahoma.

Visual examination of the engine prior to teardown showed no issues or abnormalities beyond fire and impact related damage. The air intake system was missing up to the throttle assembly/metering valve. The exhaust system was missing aft of both turbochargers. The engine also had upward crush damage to the exhaust pipes and turbo system consistent with ground impact. The propeller spinner had crush damage inward along with a slight upward bend to the entire propeller assembly. The right magneto was separated from the accessory system gear drive. The right-side turbo system had upward crush damage and the turbocharger power section housing was missing. The accessory system had fire damage to all components. The oil filter was found to be missing with the mount intact. The turbo system manifold controller was found separated and attached only by the associated oil lines. The oil sump had upward crush damage with the drain plug missing from impact damage.



Figure 1. Engine prior to examination teardown

The oil dipstick was removed and no oil was observed on the stick. The rest of the oil system was unable to be examined due fire damage, a missing oil filter and an impact

compromised oil sump. However, oil was observed in the propeller governor and rocker boxes with residual oil in the sump.

The upper spark plugs were removed and observed to be all normally worn, except the spark plugs of Cylinder #6, as compared with the Champion Spark Plug Card. The upper spark plug from Cylinder #6 had debris and lead fouling along with rust deposits. The upper spark plugs electrode gap distance were examined with a Spark Plug Gap Gauge and found to be severely worn with all exceeding .022, except the spark plug of Cylinder #5 which was .019. The Continental Maintenance Manual, *Table 6-9 Spark Plug Application Chart*, recommends an electrode gap of .016 to .021 for the URHB32E.

The lower spark plugs were not removed due to crush damage of the exhaust and turbo system. The spark plugs were examined with a video borescope and observed to be all normally worn, except the spark plug of Cylinder #6, as compared to the Champion Spark Plug Card. The lower spark plug of Cylinder #6 had debris and rust deposits covering the entirety of the plug electrode.

All spark plugs were observed to be Tempest URHB32E Massive Electrode.



Figure 2. Upper Spark Plugs

All six cylinders were borescoped with no abnormalities observed.

The engine drive fuel pump and left and right magnetos were removed, examined, and magnetos bench tested with no observed abnormalities. The fuel pump drive coupling was intact and the pump freely rotated when moved by hand. The left

magneto, TCM P/N 10-500556-101 S/N D08BA315, had impact damage on the drive side of the unit. However, the spark was produced, with the harness cap removed, using a section of safety wire on all distributor terminals. The right magneto, TCM P/N 10-500556-101 S/N D08RA876 had impact damage to the distributor gear, a foreign black wet substance covering both contacts, and water present inside the housing. Once the contacts were cleaned and dried, spark was produced on one contact when the magneto was rotated by hand. Spark on the second contact was unable to be produced due to the damaged distributor gear.



Figure 3. Right Magento contacts prior to cleaning.

The fuel manifold, P/N 646433-9A4 S/N C086A025, was removed and examined with no observed abnormalities. The fuel screen was clean and the gasket intact and flexible. All fuel injector lines were attached and secured with no debris or blockages observed. All six fuel injectors were removed and examined for blockages and general condition. The fuel injectors were STC General Aviation Modifications, Inc (GAMI) with a fuel flow code of 19B. The fuel injector passage was examined by holding the injector to a flashlight. No abnormalities were observed. All fuel lines aft of the engine accessory section had fire damage and were separated from the engine driven fuel pump.

The air intake system forward of the throttle assembly & metering valve was missing from impact related damage. The throttle plate and arm had correct and full movement when moved by hand. The throttle control was still attached to the arm with the cotter pin and the control aft of the arm was missing with a postaccident

recovery cut. The mixture control was still attached to the fuel pump with the cotter pin and the control aft of the arm was missing with a postaccident recovery cut.



Figure 4. Fuel Manifold

The engine was unable to be rotated by hand beyond about 10° of travel due to impact damage of the crankshaft. Movement of the accessory gears and one set of valves were observed in the limited rotational travel.

The right-side turbocharger, waste gate and cooler, were unable to be examined due to impact related damage. The turbocharger power section housing was missing along with all exhaust tubes. The turbocharger was unable to be rotated by hand or with tool assistance. The compressor section was examined using a video borescope. No rotational witness marks were observed on the compressor housing due to fire damage and the compressor had bending of the blades.



Figure 5. Right-side Turbocharger Compressor

The left-side turbocharger P/N 466304-003 S/N KLL-0144**, waste gate P/N 470842-0004**, and system controller, P/N 470688-0010 S/N H-AFN003**, were removed and examined. The system controller part number is listed by Tornado Alley as not compatible with Cirrus Aircraft. The turbocharger had fire damage and was unable to be rotated by hand or with tool assistance. The waste gate had fire damage and sooting on the exterior surface and was separated from the turbocharger. The waste gate control arm was bent from impact related damage and unable to be rotated by hand. The controller had fire damage and sooting on the exterior surface and was also separated from the engine accessory section. All removed parts were boxed for future examination, if needed.

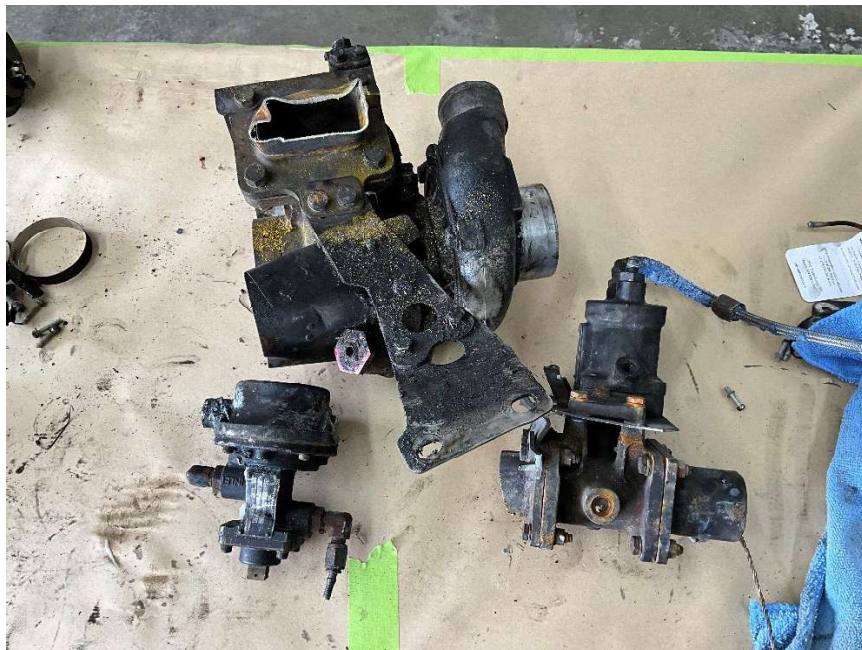


Figure 6. Left-side Turbocharger System, as removed.

2.0 Propeller Examination

The propeller assembly was found attached to the crankshaft with a slight upward bend. The spinner had inward crush damage from the tip to the bulkhead and all three blades were missing at the root with damage consistent with overload. The spinner was removed and the propeller cylinder was found with inward crush damage consistent with ground impact. Oil was observed in the cylinder when the propeller was rotated by hand. The propeller was a Hartzell PHC-J3YF-1N S/N FP6801B and a McCauley propeller governor P/N C290-D3R/123 S/N 072010 was installed.



Figure 7. Propeller damage

Submitted by:

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