



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

July 16, 2017

AIRFRAME AND ENGINE EXAMINATION

WPR17FA150

A. ACCIDENT

Location: Schellville, CA
Date: July 13, 2017
Aircraft: Cirrus Design Corp. SR22T, Registration Number: N821SG
NTSB IIC: Albert Nixon

B. EXAMINATION PARTICIPANTS:

Albert Nixon
Aviation Accident Investigator
National Transportation Safety Board
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Brannon Mayer
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Cirrus Aircraft
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C. SUMMARY

Examination of the airplane's airframe and engine was conducted on July 16, 2017, at the facilities of Plain Parts, Pleasant Grove, California. No anomalies or evidence of preimpact mechanical failure or malfunction were noted during the examination of the recovered airframe and engine.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Examination of the airplane revealed that the engine and wings were removed for recovery. The fuselage was previously cut near the vertical stabilizer to access the Remote Data Module (RDM).

Flight control continuity was established to the rudder, ailerons, and elevators. All associated pulleys, safeties, and hardware were in place.

The left flap and aileron were attached. Leading edge wing damage was observed on the left inboard half that was crushed aft. The left flap sustained impact damage about mid-span. The left flap was observed in the up position. The left main landing gear buckled and was delaminated. TKS (deicing fluid) from the left-wing tanks leaked out. The left-wing tip outboard of the TKS tank was bent aft.



Figure 1: Right wing as viewed from the bottom side.

The right flap and aileron were attached. Leading edge damage was observed on the right inboard half of the wing, that was crushed aft. The right wing had residual fuel leaking out (about 2 cups). A crease was observed at the main spar.

The empennage was relatively intact. The rudder was not attached and was removed during the recovery. The elevators were intact and remained attached to their respective horizontal stabilizer. The left horizontal stabilizer had a chordwise crease near mid-span.

The gasolator had no residual fuel and the lower drain line was loose, breached, and the screen was clear of debris. The left and right fuel tank continuity was established to the tank by utilizing compressed air blown into lines. The fuel caps were locked in place and intact.

In the cabin, the pilot seat and seat rails were in place and exhibited impact damage. Impact damage was observed on the sixth hole from the front of the rail. Both seat's locking pins and the locking bar were intact. The front seat belt airbags were deployed. The Hobbs indicated 423.1 hours and the flight hours indicated 339.7. The cabin door latches were observed in the close position.

The fuel selector was removed and examined, and the valve was determined to be selected to the right fuel tank. The flap activation cable was fractured about 40 inches from the handle and the fractured cable ends were consistent with overload. The fuel boost pump switch position was unable to be determined due to the damage sustained. The flap actuator was measured and determined that the flaps were selected in the up position.

Miscellaneous personal items were weighted at 51.5 lbs. Additionally, three damaged personal electronic devices were located in wreckage.

2.0 Engine Examination

Examination of the Continental TSIO-550-K1B engine, revealed that the engine sustained impact damage that fractured all the engine mounts. The right magneto had separated, the engine driven fuel pump, some of the fuel pump fittings, and the oil sump, sustained impact damaged. All rocker covers were removed, and the cylinder overhead areas were lubricated and unremarkable. The crankshaft was rotated by hand, utilizing the propeller, and rotational continuity was established throughout the engine, accessory section, and the valve train. During crankshaft rotation, thumb compression and suction were attained on all cylinders. A borescope inspection of the cylinders revealed evidence of normal operational conditions.

The right magneto was examined. The drive shaft was intact, and all the distributor gear teeth were intact. Manual rotation of the magneto produced a spark at each distributor tower in firing order. The left magneto remained attached, but two leads were separated from the harness. The left magneto was removed, and rotation of the drive shaft resulted in a spark from each of the distributor towers.

The turbocharging system was examined and revealed that the left and right compressor rotated freely and the oil supply and returns lines were intact and in place. The pressure controller was separated from the firewall, but the oil and reference lines to and from the controller were intact and remained in place. The wastegate actuator and the oil lines to and from it remained intact. The wastegate actuator mount was fractured and the linkage was slightly displaced. When compressor air was applied to the actuator ports, appropriate actuation was noted. Examination

of the induction system revealed no anomalies.



Figure 2: Airplane Engine viewed from the Bottom Side.

The top sparkplugs were removed, and 4 of the 6 sparkplug insulators were fractured. The top spark plug electrodes were dark in color, consistent with a slightly rich fuel/air mixture and exhibited normal wear signatures when compared to the Champion Check-A-Plug comparison chart. In addition, the bottom sparkplugs were examined with a lighted borescope and no anomalies were observed except for the No. 6 sparkplug that was surrounded by debris, consistent in color and consistency with separated combustion deposits.

No anomalies were observed in the ignition system. Fuel was present in the fuel lines from the engine driven fuel pump to the fuel manifold valve.

The fuel manifold valve remained secured on the topside of the engine with the fuel injection lines in place. Fuel was observed in the line between the fuel metering unit and the fuel manifold valve. The fuel tested negative for water contamination using a water detecting paste. The fuel manifold was disassembled and revealed it was full of fuel, the screen was clear, and no anomalies noted were noted with the internal components. The fuel injection nozzles were

removed, and all were clear and free of obstructions.

The engine driven fuel pump was removed and examined. Fuel consistent in color and odor as 100LL AVGAS poured from the fittings. The fuel pump shear drive coupler was intact and when rotated by hand, the drive shaft rotated freely. The pump was disassembled, and the vanes were intact and there were no signs of contamination.

The examination of the engine revealed no evidence of pre-impact mechanical anomalies or malfunctions that would have precluded normal operation.

Submitted by: Albert Nixon