

National Transportation Safety Board

Office of Aviation Safety

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AIRFRAME AND ENGINE EXAMINATION

October 17, 2024

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A. ACCIDENT

Location: DeLand, Florida
Date: June 26, 2024
Time: 14:59 Local
18:59 UTC
Airplane: Alexander S Rolinski Aventura II
Registration: N727TK

B. AIRFRAME AND ENGINE EXAMINATION

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C. SUMMARY

On June 26, 2024, around 1459 eastern daylight time, an experimental amateur-built Aventura II, N727TK, was substantially damaged when it was involved in an accident near DeLand, Florida. The pilot and passenger sustained serious injuries. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 test flight.

D. DETAILS OF THE EXAMINATION

1.0 Airframe Examination

The wreckage was recovered to Florida Air Recovery in Jacksonville, FL and examined on October 17, 2024. One of the fuel lines routed into one of the electrically-driven fuel pumps was found to be loose, cracked, and partially obstructed. When the fuel pump was tested, air was heard entering through the loose-fitting attachment point and the pump would not pass any fuel. When the fuel pump was operationally checked with serviceable fuel lines, it operated normally.

The engine was test-run using serviceable fuel lines and operated normally.

1.1 Fuselage

The fuselage sustained significant impact damage with most of the damage occurring to the forward fuselage. The airplane hit the ground nose down, crushing the bottom hull and creating a large crack across the bottom. The fuselage above the cockpit also experienced crushing damage. Throttle cable continuity was confirmed, though the cables had suffered some crushing damage either at impact or through recovery and therefore the throttle control in the cockpit could not be used to smoothly operate the controls at the carburetors.

1.2 Empennage

The airplane impacted in a nose-down attitude and the empennage sustained little to no damage at the time of the accident. The tail was cut off to transport the wreckage to the examination site. Flight control continuity was confirmed for the rudder, elevator, and pitch trim through cuts that were consistent with salvage efforts.

1.3 Wings

The wings partially separated from the fuselage on impact and sustained crushing damage in multiple locations. Flight control continuity was confirmed to both ailerons and flaps through cuts that were consistent with salvage efforts.

1.4 Landing Gear

The left landing gear wheel and axle assembly broke free from the attach point upon impact. The landing gear switch was found in the down position with the switch guard securely in the closed position.

1.5 Survivability

The left seat's inboard and outboard attach points were broken on impact. The right seat's inboard attach point was broken on impact. The left seat belt was cut in a way that was indicative of first responders extracting the occupants. The right seat belt was found undamaged and at the wreckage examination site was in the locked position.

1.6 Airframe Fuel/Fuel System

The 23-gallon fuel tank placarded as "For Marine Use Only" to contain "87L" gasoline was secured with nylon straps aft of the seats. A fueling access point was located on the left rear fuselage with the cap on and secured, however, the hose connecting the fueling port to the tank had disconnected either from impact forces or

during transportation of the wreckage and was open to the environment. The tank was about half full of blue fuel that had the color and odor consistent with 100LL avgas. Visible debris contamination was found on the bottom of the tank and the internal fuel float system had broken off and was floating in the tank. The system has no fuel sump installed and no quick-access panel to check within the tank for water or debris contamination. The fuel tank pickup tube finger screen was in place with no visible blockage. While the POH provided a depiction of a fuel drain valve mounted to the bulkhead, no such installation was found on this airplane.

Fuel System

The Aventura II fuel system consists of one main fuel tank (behind the main cockpit), one electrical fuel pump, one engine mounted mechanical fuel pump and a choke control.

To drain water and sediment from the fuel system, a fuel drain valve is located on the gascolator mounted to the bulkhead.



Figure 1 - Excerpt from Aventura II POH depicting fuel drain valve installation.

The system had two electrically-driven fuel pumps installed in parallel. The fuel line from the pickup tube to the intake manifold was loose and able to spin by hand. One of the fuel intake manifold lines was loose and could be removed from the pump by hand. That same line appeared to have been internally damaged during installation and exhibited about a 75% internal blockage. PTFE thread sealant was used on all the attach point fittings throughout the inlet and outlet manifolds. Some of the fuel lines were not consistent with FAA-approved aviation-rated flexible fuel hoses and two of the lines had plastic internal sleeves that were cracked and misshapen within.



Figures 2 through 5 - Blocked and broken manifold lines for electric-driven fuel pump

During function testing, a vacuum leak was detected, which prevented the fuel pumps from drawing fuel from the tank. Each pump was removed from the damaged lines and function tested with new lines. The first pump, manufactured by Pierburg (Model 06T270, SN 07.0190) is the same type of pump used with the Rotax 914 engine. The pump was functionally tested and operated normally. The second pump had no visible markings or identification on the exterior. The pump was functionally tested and operated normally.

The fuel filter was transparent, and some fuel visibly remained inside. The contents were poured into a jar and tested negative for water contamination with water-finding paste.

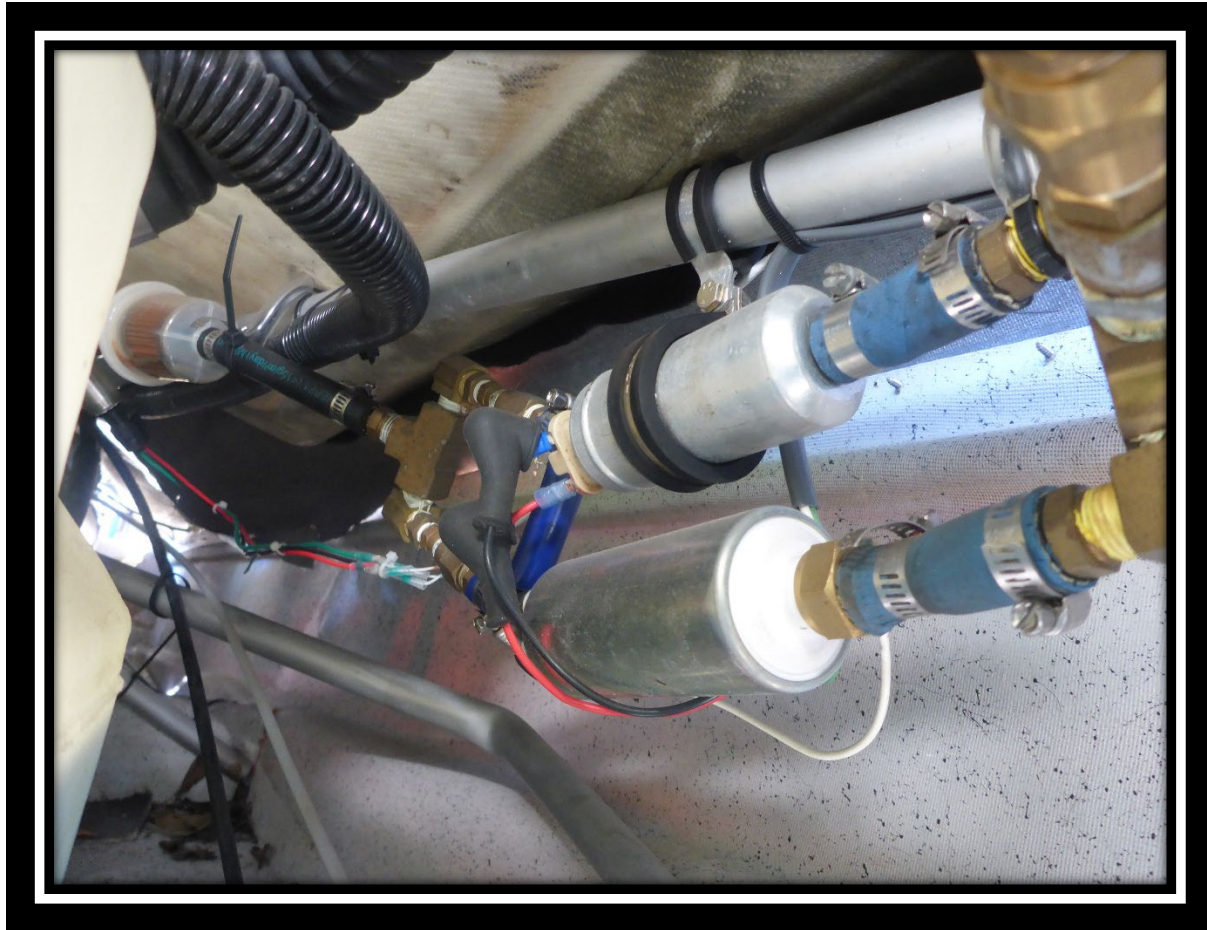


Figure 6 - Fuel pumps and fuel filter installations

2.0 Engine Examination

The engine remained attached to the engine mount but was resting on the empennage with the No. 1 cylinder facing downward. It appeared in good physical condition with no visible impact damage.

The top spark plugs were removed and examined. The No. 1 top spark plug was found wet and oily. The No. 2 top spark plug appeared to have a water bubble on the electrode. Despite these observations all top spark plugs were in good physical condition and displayed very little wear. All plugs were functionally tested during the engine test run, and no anomalies were detected.

The engine was visually inspected. The coolant radiator had sustained impact damage, and no coolant remained in the system. No other visible anomalies were discovered in the engine.

The fuel system and fuel lines were modified to allow for a test run. An external fuel tank with automotive fuel was used, with the fuel inlet and return lines placed into

the tank. The engine was lifted with a forklift and positioned so that it sat level and was securely held in place. The propeller blades were cut evenly, approximately six inches from the hub. The p-leads were modified to allow for easy grounding and an external battery was connected to the electric starter solenoid. One fuel pump was utilized for the test run with the power wires connected to an external battery source.

When the starter was engaged and the electric fuel pump was powered on, the engine rotated several times and then started and ran at idle. The throttle was manipulated, and the engine responded accordingly. Heavy smoke was observed coming from the exhaust pipe, consistent with a buildup of engine oil inside the turbocharger. The engine was run two times, with the second run conducted for a longer period of time and through higher power settings. No anomalies were discovered during the engine test runs.

3.0 Propeller Examination

The propeller was a three-bladed composite Warp Drive design. Two of the three blades sustained impact damage. One blade broke about six inches from the hub. Another blade displayed impact damage at the blade tip. The third blade was relatively undamaged.

4.0 Aircraft Information

The owner provided 3 photographs of maintenance logbook entries. One entry did not have a date other than year 2020, and detailed the installation of an Aeromomentum AM15HP engine. Another depicted the installation of the accident engine, Rotax 914, installed June 18, 2023. New empty weight was listed as 912 lbs, and new empty center of gravity as 117.23. The final entry stated that the "prescribed 5 flight test hours" were completed and a new weight and balance was "confirmed". It stated that the airplane was in "phase II operation".

Submitted by:

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