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Aviation Accident Investigator
OAS

Date: July 09, 2024

Subject: ERA24LA258, Pilot's Statement and Engine Examination

Contact: William Clapp, Pilot / Engine Builder, [REDACTED]
Michael Tils, Atlanta FAA/FSDO Inspector, [REDACTED]

The pilot, Mr. William Clapp, provided the IIC his statement along with a summary of the engine examination that was performed on June 17, 2024, by Mr. Clapp and FAA inspector, Mr. Michael Tils.

June 26, 2024 Pilot Report and analysis – William M Clapp - Pilot, designer, builder

Incident date 6/10/2024 Aircraft N120SW Saberwing Prototype - Valdosta, Lowndes Co. Georgia

To whom it may concern,

Details concerning incident on 6-10-2024 as follows from Pilot Perspective.

Earlier that Day: I had flown another Saberwing gathering Data for carburetor and cooling adjustments. That was early afternoon. Then I test flew my Pietenpol after changing out the oil cooler to a larger one to see changes in oil temps. Good results there. Did some engine ground runs on first plane changing carb settings.

7:15 pm Evening looks nice after hot weather so decided to get N120SW out of hangar for nice flight doing some engine timing/temp baseline tests in flight.

7:30 After performing pre-flight got my water and phone/headset from hangar. Fuel quantity about 7 gallons in header and 12 in wings. Planned for 1 hour of flying. Conditions were VFR with wind from the west @10 knots. Asked for runway 22 and notified tower I would be in my test area about 6-8 miles southwest of airport @3500 feet. Runup was normal and all conditions normal. Used Electronic ignition for takeoff, climb-out and cruise. Did standard climb-out to altitude to my test area. Off ground before 8 I believe (didn't look at time).

Once out to my area I set up for cruise and let temps settle in. Running on electronics set at 30 degrees BTDC and 25"MAP and noted temps and then switched ignition to points (26 degrees BTDC) and then let temps stabilize to see comparative power, temps, speeds and fuel flows. Reduced Power slightly to 24"MAP and switched to electronics when the engine lost power. I switched back to points but nothing happened. Climbed for altitude while reducing speed to 85 MPH (best glide) and headed toward Valdosta Airport Runway 04. Contacted tower with position and Emergency condition. Attempted Restart. Ran through fuel checks , ignition and such... no bringing it alive. Turned ignition off and concentrated on best glide back to airport. Knew it was marginal but had tailwind so put chance on that. Always had emergency field options during glide back About 4 miles out I told tower I would not make airport but had field picked out and gave location . Set up approach diagonal across field, lowered flaps but did not see powerline. Top line caught across bottom two blades of prop, sheared them, then caught on main gear (taildragger) until right gear leg broke. Plane rotated forward, right and down and impacted on right wing tip and nose. Power wire broke but also caught on horizontal as the plane flipped onto its back.

Canopy and cabin section were intact and the canopy was shifted over so I could get out between the turtledeck and canopy. I got heavy scratches on my head from hitting the canopy lock and headset hangars while getting out. I noticed my wrist was broken from control stick sudden movement when horizontal or wing were snagged by wire. (not sure which as it happened too fast). I walked toward the road and house when a couple met me and helped wrap my head. A friend of mine showed up by the road to help as well. Sheriff was there very quickly and EMT a couple minutes later. Crash

happened about 8:20 pm and I was enroute to Emergency care 10 minutes later. Everybody did their jobs well and were well positioned from the data I was able to provide. Testing has its risks as we know and we try to stack stuff in our favor as much as possible.

I stayed conscious during the whole time but bit fussy of a couple items at the hospital. Of course, once I was in their hands I relaxed and focused on my wife 😊. Making sure she was calm was important. Released from hospital Wednesday morning after one day for observation due to cuts in head and checking for any internal injuries.

Today is the 29th of June and I have had surgery on my wrist and no other symptoms due to the incident. Looking forward to flying my Piet again!

Post-Incident Evaluation of Aircraft:

Knowing that the engine failure was our prime suspect we began to check several items. With FAA Michael Tils we reviewed ignition circuits, fuel, and such. The main battery seemed to be a possible culprit since it was discharged, and the engine turned over and had some compression. We did these checks on 6-17-2024. Afterwards I pulled the engine off the plane and tore it down in the shop.

Conclusion: Engine failure occurred when crankshaft to cam gear slipped due to sheared woodruff key. This engine (built in 2007 era as test engine) had several ground run hours but only 20 or so flight hours. I had removed our turbo engine from the airframe for testing on our dynamometer and installed this engine in the interim. Flew off 5 hours and then to Sun n Fun 2024 for Air Show. Flew it back. All systems nominal. It was when I was testing the ignition that the failure occurred. When switching from points to electronic there is a small interval when electronics power up so there is a jolt across the engine once power is restored. This jolt at a high power setting was enough to rotate the gear and shear the key.

This gear is installed with a .004" interference fit and hardened key requiring @ 40 tons+ pressure to remove it. Early (2006-2007) test gears only had .002" interference and normal keys. We never had a failure in testing but noticed that removal of a test gear only took 5 tons of pressure so we changed our process to higher interference fit. There have not been any gear or keyway failures to date with new tolerances.

Below are pictures showing the removed crankshaft and sheared key.

If you have any further questions please contact me at [REDACTED] or email at [REDACTED]

Thank you.

William M. Clapp A&P [REDACTED] and Pilot

[REDACTED] Valdosta GA 31606



Crankshaft as removed from Engine prior to hub removal – timing marks on gear do not match crank position – about 30 degrees off



Notice sheared key



Inside of hub/gear showing sheared key. Striations on inside of hub show some non-contact areas. Hub came off with only 3 tons pressure – early hub design.



Complete Hub Assembly

-FINISH-