

Engine Inspection and Evaluation: Accident Number WPR17LA015

Investigator In Charge: Thomas Little, NTSB

Engine: Jabiru 3300A s/n 33A1941

Aircraft: N235SC, Ryan W. Gross Arion Lightning

Date: January 11, 2017

Location:

Jabiru North America, LLC (Party to Investigation)

Shelbyville, TN 37160

Inspecting mechanics:

Benjamin R. Krotje, A&P [REDACTED] and Ronnie D. Crosslin, A&P [REDACTED]

Report prepared by Katherine B. Krotje

Sport Aircraft Services, LLC-- Servicing Agent for Jabiru North America

Shelbyville, TN 37160

Initial Inspection and Test Preparation

- The engine crate was opened at 8 a.m. with Mr. Little present. The engine was correctly stored and installed in the crate.
- The engine exhaust manifolds were not present. A temporary serviceable straight-pipe exhaust system was installed for the test run.
- The engine mount plate was found to be bent aft at the lower right side next to the fuel pump, which opened a slight gap between the mount plate and the oil pan, which is normally a sealed joint.
- The oil pressure sender was found to be removed from its standard location. A temporary standard serviceable VDO oil pressure sender was installed for the test run.
- The right distributor cap #3 spark plug wire terminal was found to be broken from the distributor cap. A new right side distributor cap was installed for the test run.
- The left distributor cap #4 spark plug position was found to be disconnected, so we connected it.
- The existing oil cooler, oil lines and oil cooler adapter were removed from the engine to facilitate installation on test stand. A temporary oil cooler adapter and new NAPA Gold 1394 oil filter were installed for evaluation engine run.
- The engine was removed from the lower half of the crate and installed onto the test stand.
- One spark plug from each cylinder was removed and a hand-rotation tool was attached to the propeller flange to rotate the engine by hand to check for rotation, compression, and normal valve train feel. The spark plugs were all found to be loose.

- Upon rotating the engine by hand, the flywheel magnets made contact with the ignition coils at the rear of the engine. The bent backplate had shifted the coil mounts, creating interference with the magnets. We set the coil/magnet gap on both coils to .010" using the standard Jabiru maintenance practice to accommodate the bent mount plate.
- After adjusting the coils, no anomalies were felt during hand-rotation.
- A cold differential compression test was completed: Cylinder #1 compression was 32/80, leaking badly from exhaust valve. All others were 60-75/80 cold (all normal).
- The starter cable was found to be disconnected from the starter and not present. We removed the accident starter and installed a used serviceable starter with a cable.
- The engine was installed onto the test stand. The throttle control was attached and tested for its full range of motion.
- Our standard test stand propeller, carburetor, fuel lines, and sensors for oil temperature, oil pressure, and cylinder head temperatures were installed. The engine was serviced with 3 quarts of Aeroshell 100. The accident spark plugs were reinstalled and all 12 were torqued to 12 ft-lbs per the Jabiru 3300 Engine Maintenance Manual.

Test Run #1: Standard Test-Stand Carburetor

- The fuel pump was switched on for about 10 seconds to prime the carburetor, then turned off. The engine started after 2 or 3 revolutions with the propeller. It idled smoothly at 800 rpm and held 40-42 psi oil pressure as temperatures increased evenly for all cylinder heads and oil.
- The RPM was held at about 1400 until the oil temperature reached 110°F and all cylinder head temperatures were above 200°F.
- We ran the engine up to 1880 RPM and performed a magneto check. The left mag dropped 20 rpm and the right mag dropped 10, all normal indications. Returned engine to idle.
- A slow application of power from idle to full throttle yielded smooth operation throughout the full range, peaking at a static RPM of 2920. Oil pressure was steady at 42 psi and oil temperature reached 133°F.
- The engine was reduced to idle for a cool down period, then shut down.

Service #1

- The run stand carburetor was disconnected from the engine and test stand, and the accident carburetor was installed. The throttle control was attached and tested for its full range of motion.
- The engine was again pulled through by hand, finding even compressions on all six cylinders. A hot compression check was performed on Cylinder #1, which had shown 32/80 on the cold check, and found to be 76/80.
- The spark plug removed for the compression check was reinstalled and torqued to 12 ft-lbs.

Test Run #2

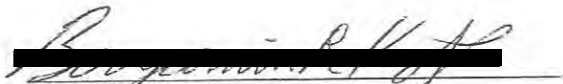
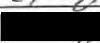
- The purpose of the second run was to test the accident carburetor on the engine. No jetting was changed to accommodate the test propeller.
- The engine started after 2-3 revolutions of the propeller and idled at 800 rpm. Throttle was set to approximately 1400 rpm for warmup. Once the head temps were above 200°F, the power

was reduced to idle, then power increased from idle to full. Peak RPM was 2900, settling in at 2870 RPM static with 43 psi oil pressure, 136°F oil temp, and head temps in the green range between 200°F and 300°F. A magneto check was performed at 1830 RPM with a drop of 10 RPM on the left and negligible RPM drop on the right; All normal indications.

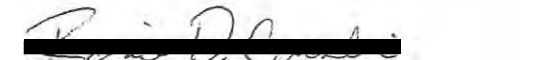
- The engine RPM was reduced back to idle for a cool down period, then shut down.

Service #2

- The hot compressions on all cylinders were found to be normal at 65/80 or above.
- We drained the oil and removed the starter, right distributor cap, sensors, and exhaust manifolds. The engine was removed from the test stand, put back into its found condition, and placed back into the crate.


Benjamin R. Krotje, A&P 

Owner, Sport Aircraft Services, LLC


Ronnie D. Crosslin, A&P 

Mechanic, Sport Aircraft Services, LLC