



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

FUEL PUMP & CARBURETOR TESTS

WPR17LA148

Accident Date: July 10, 2017
Exam Date: October 16, 2018

A. ACCIDENT

Location: New River, Arizona
Date: July 10, 2017
Aircraft: Arion Lightning, N273DB, Serial # 171
NTSB IIC: Michael Huhn

B. EXAMINATION PARTICIPANTS:

William Hess
FAA Inspector
Nashville, TN

Ernest Elliott
FAA Inspector
Nashville, TN

Paul Jones
FAA Inspector
Nashville, TN

Nick Otterback
Owner/President/CEO
Arion Aircraft
Shelbyville, TN

C. SUMMARY

On July 10, 2017, about 0745 Mountain standard time, an experimental light sport Arion Lightning airplane, N273DB, was substantially damaged in a forced off-airport landing near New River, Arizona. The private pilot was uninjured. The builder/owner/private pilot was not injured, and reported that the engine sustained a partial loss of power when he attempted a cruise-climb about 10 minutes after takeoff.

An FAA inspector conducted a partial examination of the airplane on-scene a few hours after the accident. The airplane was recovered to a secure facility. . Examination of the airframe and engine was conducted at the secure facility by the NTSB IIC and the same FAA inspector who responded to the accident on July 26, 2017. No evidence of any preimpact mechanical malfunction was noted during the examination.

The engine-drive fuel pump (EDP) and the carburetor (with associated components & lines) were removed and sent to the Nashville TN FSDO for testing at the nearby Jabiru North America facility on an exemplar engine. Before that testing could be conducted, the Jabiru NA facility was closed, and activities were taken over by Arion Aircraft in Shelbyville, TN.

The fuel pump and carburetor were tested on an exemplar engine at Arion on October 16, 2018. The testing revealed that the EDP performed normally, and that the carburetor was possibly improperly jetted for the application.

D. TEST DETAILS

1.0 General

Arion Aircraft did not have an engine on a stand that could be used for testing. The decision was made to install the articles on the same make and model engine that was already installed on an airplane to perform the testing. The airplane used was an amateur-built Lightning (N335CE) with a Jabiru 3300 series engine (ser# 33A 1563).

The airplane engine was run prior to any testing to ensure proper operation. No abnormalities were noted. An inspection of the supplied (accident) parts was completed with the following items noted:

- The fuel pump gasket had silicone on it, which is not the correct sealant to be used, and the gasket is much thinner than what is normally seen installed.
- The carburetor was noted to have a green type substance on a bottom plug however; none of the noted items appeared to impact the testing.

2.0 Fuel Pump

The accident fuel pump was installed using the supplied (accident) rod and gasket leaving the gasket on the engine block. The engine was started using the boost pump and was allowed to stabilize. The engine RPM was adjusted to 1,400-1,500 then the boost pump was turned off. The engine ran approximately 5 minutes at varying RPM up to 2,300 RPM static then shut down.

The fuel bowl was drained and the engine was then started with the boost pump in the 'OFF' position. The airplane was repositioned so it could be run up to a higher RPM. The engine was run approximately 7 minutes at varying RPMs up to 2,750 static and 2,780 at brake release. No abnormalities were noted during this testing.

3.0 Carburetor

The accident carburetor was then installed to include the supplied (accident) HACman mixture control. The fuel line had to be swapped due to being too short (It appeared to have been cut for removal from the accident airplane). The boost pump was run to fill the fuel bowl then shut off prior to engine start.

The engine was started and allowed to stabilize. It ran approximately 5 minutes at varying RPMs up to 2,200 static. The aircraft was repositioned as before, and then run approximately 7 minutes at varying RPMs up to 2,650 static and 2,680 at brake release. There were no major abnormalities noted during this portion of the testing.

However, it was noted that at the high power setting the engine did run rougher with the accident carburetor installed. Additionally it was noted that there was also a slight decrease in maximum RPM's and EGT (compared to the performance using the test engine's original carburetor).

The Arion representative reported that this was likely due to the fact that the accident carburetor is improperly jetted for the application on the exemplar airplane/engine.

The FAA and Arion representatives reported that it was their opinion that at all times the engine (and thus EDP and Carburetor) performance was well with limits and specifications.

4.0 Arion Aircraft Company Owner Additional Observations

He has been installing, operating, servicing, and performing maintenance services on Jabiru engines personally for 16 years. Arion Aircraft was opened in 2004 and has been doing the same since. The A&Ps that Arion Aircraft has on staff have almost 12 years' experience with the engine in all phases (up to zero-time overhauls) and both at one time were former employees of Jabiru North America. The A&P who performed the work for the test was recently hired by Arion Aircraft from Jabiru when they closed.

The carb was improperly jetted for the aircraft we tested it on. It may not have been improperly jetted for the aircraft it came off of.

Propeller load has a lot to do with the jetting. The carburetor was running rich at full throttle on the test aircraft, which likely means the test propeller has more pitch than the accident airplane propeller, but could have been correct for the accident airplane if the accident propeller pitch was in fact less than that of the test propeller.

In addition, the accident airplane was equipped with the HACman mixture control. Sometimes the builders will leave the stock (richer) jets in the carburetors so the pilot can manually lean the engine as desired.