MEMORANDUM FOR RECORD

Stephen Stein
Air Safety Investigator
National Transportation Safety Board
Office of Aviation Safety - Eastern Region

NTSB Accident Number: ERA14LA130
Aircraft Registration & Make/Model: N19VC; Vans RV-9A
Accident Location: Apopka, Florida
Accident Date: February 23, 2014

Note: The following interview was conducted by the Investigator-In-Charge (IIC), Stephen Stein.

Interview Summary

Jan Eggenfellner
Gen 3 V4 Gearbox Manufacturer

Interview date/time: May 15, 2014; 0900 EDT
Telephone

Interviewers were Robert Drake (FAA), Tony James (FAA), John Clark (NTSB), and Stephen Stein (NTSB).

The following is a summary of the interviewers' questions and the interviewee's responses. After a brief introduction, Mr. Eggenfellner started the discussion on the topic of the solid flywheel.

Eggenfellner: The solid flywheel unit has been grounded for 6 years. The system is not airworthy. The dual mass flywheel is the only one that is safe to fly.

NTSB: Are you in a position to support this investigation?

Eggenfellner: I will not help at all with any information to prolong, inspect, or support this system. Anyone that has any of these parts should upgrade to the new system.

NTSB: Where were the spline shaft and drive disk adapter made?

Eggenfellner: The spline shaft is cut from a portion of a Nissan Pathfinder transfer case. The drive disk adapter is made from non-heat treated 4140 alloy steel and was built by a machine shop outside of Eggenfellner Aircraft. Time showed that the part was wearing, so Eggenfellner Aircraft put out a notice to stop using the drive disk adapter. They also developed a new drive disk adapter that was heat treated. The input gear of the PSRU is an internal spline part of the first gear in a transmission. The spline shaft and PSRU input gear are a matched set taken directly from the transmission in an automotive application.

NTSB: Do you have part numbers for the PSRU and associated spline hardware?

Eggenfellner: No part numbers. Customers would order the parts from Subaru and Eggenfellner Aircraft would modify the part to fit into the PSRU assembly. Eggenfellner also stated that he is willing to assist customers. He currently has spline disks, propeller hubs, internal gears, bearings, and drive parts but does not have any PSRU housings.

NTSB: Do you have any schematics or diagrams and photos?

Eggenfellner: The company that had the CNC files on the machine housing is out of business. The files were never retrieved, but they were able to recreate housing files through a CAD expert. The PSRU housings were never machined from the new CAD file. Eggenfellner stated that he only has sketches from a local machinist to illustrate how existing shafts were modified to be used inside the PSRU housing. The solid flywheel drive disk adapter was found to be too soft and was later grounded. The new drive disk adapter that affixes to the dual mass flywheel is hardened.

NTSB: Is there inspection guidance for the spline shaft?

Eggenfellner: There is an installation manual and a recommendation for customers to switch to the dual mass flywheel. Eggenfellner also remarked that the PSRU oil should be checked at 50 hour intervals. Furthermore, since the solid flywheel is a known issue, even with the new flywheel it would make sense to pull the PSRU off every year during annual inspection. Eggenfellner does not recall whether they provided this inspection guidance after purchase.

NTSB: Are there lubrication requirements for the spline shaft and PSRU?

Eggenfellner: Never saw a failure in the PSRU and never saw parts back at the shop that had failed. Eggenfellner stated that he only heard of one part that failed similar to the spline shaft on N19VC. The Gen 1 PSRU encountered input bearing failures. They were unable to repair the Gen 1 PSRUs because the units themselves were an automotive casing. The housings on the Gen 2 and Gen 3 PSRUs were beefed up.

NTSB: How many Gen 3 V4 PSRUs did you sell?

Eggenfellner: Produced 4 batches of 50 PSRUs. About 25% are in service and flying. Eggenfellner stated that he never did his own books and does not remember the sales quantities.

NTSB: According to the pilot of N19VC, he was told to wait until 500 hours before switching to the dual mass flywheel. Why was he told to postpone the purchase and installation of the new flywheel?

Eggenfellner: Never told anyone to hold off on switching to the dual mass flywheel because there was no reason for anyone to continue using the solid flywheel. Anyone operating an aircraft with a solid flywheel was taking a chance. According to Eggenfellner, he showed people how to perform the installation on his website. He also does not know why Victor said that he was told to hold off. Eggenfellner recalls that the pilot's airplane was also equipped with an IVO propeller, which Eggenfellner did not recommend because of the vibration. When the pilot upgraded to the new PSRU there was no requirement at that point to install the dual mass flywheel. Eggenfellner stated that he would never have told someone to wait until 500 hours to install the new flywheel.

NTSB: Why did you have the pilot purchase the spline shaft kit without the dual mass flywheel?

Eggenfellner: Customers would not purchase the dual mass flywheel directly from Eggenfellner Aircraft. They were given a part number to purchase the flywheel from Subaru. Customers would then purchase the spline kit consisting of the hardened drive disk adapter, bolts, spline shaft, pilot bearing, and snap ring that affixes to the spline shaft from Eggenfellner Aircraft. The new setup requires a snap ring to prevent the spline shaft from sliding all the way into the gearbox. The 4 cylinder engine models have a full sized dual mass flywheel. Some weight was removed in the dual mass flywheels to accommodate installations on 6 cylinder engines. If weight was not removed the starter would then need to be relocated.

NTSB: Who and by what means was the solid flywheel "grounded?"

Eggenfellner: The Eggenfellner Aircraft website and certain forums such as the Subenews Yahoo! Group. There was no time limit set for safe operation of the solid flywheel. The dual mass flywheel could be purchased for about $450 and the associated spline hardware for $500.

Stein Stephen

From: Viking <[redacted]
Sent: Wednesday, July 30, 2014 8:54 PM
To: Stein Stephen
Subject: RE: NTSB Investigation: N19VC - Input Needed

Sounds OK, other than that we did "ground" all aircraft using the solid flywheel.

Jan

Sent via the Samsung Galaxy S™III, an AT&T 4G LTE smartphone

-------- Original message --------
From: Stein Stephen
Date:07/30/2014 4:34 PM (GMT-06:00)
To: [redacted]
Cc: Clark John
Subject: NTSB Investigation: N19VC - Input Needed

Hi Jan,

Thank you for providing your technical expertise during the course of this investigation. I am in the process of concluding the factual report and wanted to run a segment by you.

I wrote this paragraph based on our conference call and wanted to see if there's anything you wish to add to it.

"According to a statement by a representative of Eggenfellner Aircraft, he recommended that PSRU operators remove the PSRU and inspect the spline components annually. The representative did not recall whether the company communicated the recommendation to its customers. The installation manual instructs customers to "wipe a small amount of anti-seize compound on the new spline shaft." When asked what the lubrication requirements were for the spline components, the representative stated they had previously seen only one other spline shaft failure. He added that due to the limited number of failures they had not issued any subsequent lubrication guidance to customers."

Thanks,

Stephen Stein

Air Safety Investigator

National Transportation Safety Board

Eastern Region Aviation

[redacted]