

WPR17LA176

Engine examination field notes
N957TA
Cessna 172N
AV-Tech Services, LLC, Auburn, WA
August 22, 2017

Attending:

Tom Little (NTSB IIC)

Bruce Kitlinger (FAA)

Scott Peterson (FAA)

AV-Tech owner assisting with teardown – Jeff Poschwatta

AV-Tech technician assisting with teardown – Taylor Bezdicek

Date: August 22, 2017

Time: 0800 – 1500 pdt

Visual examination findings:

- 4 bolts missing that secure the right side of the accessory case
- 1 loose bolt on the left side of the accessory case
- Upper right magneto nut loose
- Bottom right magneto hold down nut loose
- On right side of the accessory case mating flange – separation observed
- Right magneto was loose
- Right magneto accessory gear area – significant amount of aluminum shavings observed

- Left magneto accessory gear area – significant amount of aluminum shavings observed
- Main vacuum pump (sn: OA4N10) no anomalies noted
- Standby vacuum pump (sn:)9T805) no anomalies noted
- Temperature sensor – no anomalies noted
- Oil bypass valve – no anomalies noted
- Oil filter housing – no anomalies noted
- Fuel pump – no anomalies noted
- Oil filter housing – no anomalies noted
- Impeller and body of oil pump – impeller would not rotate. Remnants of aluminum shavings observed
- Oil sump – extensive amount of metal shavings observed
- Crankshaft (sn: 13B47121-85)
 - ✓ observed broken into two (2) pieces at mid-span
 - ✓ component retained for further examination at NTSB lab
- Bearing passages:
 - ✓ rear/main oil passage clear
 - ✓ middle passages welded shut

Thomas M. Little
 Senior Aviation Accident Investigator
 Investigator-In-Charge

Tear down notes from engine on Cessna N957TA 172S

Tear down took place in Auburn, Washington, on August 22, 2017.

First visual notes of engine, no visual catastrophic damage was noted and the engine was frozen in place. The muffler was damaged slightly, the right magneto was canted back from the top about 3/8 of an inch from the accessory case, the attachment nut was loose and the lower mounting nut was loose at the bottom of the mount. There were four (4) accessory case bolts missing from the accessory case three from the right side at the bottom of the case, one on the left bottom and one bolt on the left side was half way out.

We began by removing the loose right mag, no noticeable damage to the mag gear on the magneto or inside, metal flakes were noted and it was noted, that the magneto gasket was torn. The left magneto was removed and noted it was tight in its mount, metal flakes were noted on the gears here also. The oil filter was removed, but the filter was not cut open for inspection due to a tool failure.

Next the rest of the accessories were removed from the accessory case, no damage was noted on any of the accessories, just metal flakes on all. After all the accessories were removed, all of the accessory case bolts were removed from the accessory case. The accessory case bolt mounts where the bolts are missing had no stress on the threads of the mounts. On the bolt that was half way out, no stress was found on the threads of the bolt. During removal of the accessory case bolts it was noted that more than half of the bolts were not tight and it noted that the bolts should be properly torqued down per the manufactures manual. These bolts have a star lock washer on them and no safety wire. No stress was found on any of the bolt threads or the mount threads.

Accessory case was removed and found to have metal flake throughout. The oil body, drive and impeller were removed to evaluate, since these had just been replaced 122 hours in front of this accident. The oil body was properly safetied with safety wire and inside it was found that the impeller was out of alignment so it would not move, but once pulled out and placed back into the oil body it moved properly, some wear was noted on the body and no breakage gears was found.

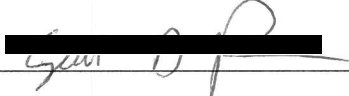
The oil pan was removed and it was noted that the bottom of the oil pan was contaminated heavily with metal pieces, large chunks and shavings.

The cylinders were removed and pistons also taken out, wear was noted on the pistons and cylinders, due to metal contamination.

Next the case was split apart and it was noted that the crank shaft broke apart right at the middle bearing. A very large piece of the shaft had broken off and was down in the bottom of the case.

The crank shaft was removed and the bearing was welded to the shaft. It appears that oil starvation was key to the crankshaft damage.

Oil ports all checked out except the one at the middle bearing which was welded over.

Scott D. Peterson  Date 9/29/2017

Bruce Kitelinger  Date 9-28-2017