



Memorandum For Record

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Date: March 23, 2020
NTSB Accident Number: ERA19LA032

The airplane owner sent NTSB an e-mail on February 29, 2020, at 1109 EDT, providing findings of the engine examination and disassembly. The entire digest of his e-mail is cut and pasted below.

“What photos I took, I will forward to you. [FAA inspector] Cheryl [King] did most of the photography and she documented the disassembly. The engine was disassembled by myself, my brother, and my CFI, all minor gearheads in our own rights. We would call out observations and torque values etc. to [inspector King]. My hands were too dirty to take many photographs, I only took a few that I knew people who followed my build might be interested in seeing.

The root cause, in my opinion, is, at the very least, an extreme reduction in compression caused by two melted pistons (and of course an engine wanting to seize for related reasons). The most damaged pistons were number 2 and number 5. On both of [those] pistons the edges of the skirts were melted to the point they would no longer hold compression. On three of the remaining four pistons the rings had seized in place, I believe that these pistons were beginning to soften, and aluminum was being transferred into the piston ring grooves. This too probably reduced the overall compression somewhat. So, the debatable question is what caused this to happen. As I told you once before, post disassembly I have talked to my DAR Jim Auman, who owns a T- 51 with the same Honda engine. Including my engine Jim says he knows of four Honda engines that MAY have suffered the same fate. These Honda engines were rebuilt by Titan using Honda replacement parts. This included cast aluminum pistons. As Jim and I have discussed, a Honda automobile travels on the interstate at 75 miles an hour with the engine doing 1800 RPM. In a plane, cruising speeds are attained with the engine doing about 3900 RPM and at take off the engine does closer to 5000. Jim told me as soon as he started hearing these stories, he replaced his pistons with aftermarket racing forged pistons. I wish I had known. It is interesting that the number 2 and number 5 pistons are the center two in the two heads, this means that they would normally be the hottest of the six. I know any time there is a piston melting situation people automatically jump to an engine being run too lean, but I don't believe this was the situation for two reasons. One, as one of the aforementioned stories was a builder named Jeff Payton who felt

or sensed an on-going engine problem. He lived in Ohio so he simply called the factory and the Titan test pilot took his plane up for a test run. By the time it landed the engine was fried. A little while later I talked to both Jeff and the test pilot separately. The test pilot was guarded in what he would say but indicated he thought the engine was running to lean. Jeff described what he observed after disassembly and it sounded very similar to what I found. He assured me that he was not running the engine lean. After learning his story I was very careful and during all of the ground run up work, I ran it to rich if anything. It is Jim's and my opinion that the standard Honda cast pistons are not designed for the higher RPMs required in an airplane.

Hope this information is of some help to you. Photographs forthcoming.
Dave Fowler”