KOEHLER KORNER

This month's article is a follow-on to last month's story. You may remember last month I confessed to installing a cylinder on a C-182 engine and failing to install the plug in the fuel injection port above the intake valve in the cylinder head. This hole in the induction manifold allowed so much air in that the new cylinder would not fire at low rpm. It took a while to find the problem and the engine ran, at low power levels, for about 15 minutes in this configuration.

After discovering the problem, we fixed it with a brass plug from the old cylinder and proceeded with the cylinder break-in, which involved flying the plane at a high power setting that would generate enough friction in the cylinder to get the rings to properly seat on the cylinder walls. Under normal circumstances, Superior Millennium cylinders have a reputation of breaking in relatively quickly, typically in an hour or two. They have through-hardened plain steel cylinders and chrome piston rings. The owner started the C-182 and got it airborne within a few minutes, as the recommended break-in procedure recommended, but the new cylinder immediately showed a very high CHT on the multi-probe engine analyzer.

Let's quickly review the CHT limits on this Continental O-470 on this C-182. The maximum allowed CHT is 460°. The owner stated that typically on a normal climb the CHTs never exceeded 400°. The multi-probe engine analyzer had a warning set at a CHT of 430°, well below the limit so as to warn the pilot early and thus preclude the possibility of damaging the cylinder. Well, on the first break-in flight the warning light went off at about 250 feet on climb-out! The alarmed pilot did an emergency return to the field and shut down. We investigated and could not see anything mechanically wrong, and I assured the owner that the max experienced EGT was only about 435°, a good 25° below the limit.

So, we tried another break-in flight, but this time shallowed-out the climb and reduced power enough to keep the EGT just below 430°. We then ran the plane at the highest power that would keep the CHT below 430°, hopefully leading in an hour or so to break-in, which would be indicated by a dramatic drop in CHT. By the way, the other five cylinders' CHTs were running at 80° to 100° below the temperatures on the new cylinder. Also, the EGTs were even for all the cylinders, or as even as they usually were for the O-470.

Since the owner was a bit anxious to get home and the plane was legally flyable, he decided to do the five or so hours cross country, monitoring the new cylinder CHT all the way. We all hoped the cylinder would break-in along the way and the temperatures would come down to normal. However, it did not. Temps remained within limits but still 80° to 100° higher on the new cylinder.

At this point with 7+ hours on the new cylinder, we decided to take it off and have it thoroughly inspected. We contacted Aero Services of Winchester and they agreed to inspect the cylinder. To make a long story short, we worked through Tom Schweitz at Aero Services and they did a whole series of tests. They found a minor seating problem with the exhaust valve and reground the seat and lapped in the valve. I was extremely pleased with their work and

expertise. If you have engine problems in the DC area, think about working with the Aero Services guys in Winchester at (540) 665-0193.

We put new rings on the piston and installed the cylinder for the second time. Again, long story short, the high CHT problem was still there, albeit maybe 5° to 10° cooler than before, but definitely very high and not right. We are now talking with the Superior tech rep and possible warranty replacement. Tune in next month for more of the story! Any ideas anyone has, send them to me. I have never seen this before.

We all agree that the earlier problem with the missing plug in the injection port probably has nothing to do with the break-in issue, at this point. One possibility is a crack in the exhaust valve seat. Another borescope is planned, and possibly another visit to Aero Services.

I hope this discussion of the ongoing issue of breaking-in the new cylinder helps you more successfully understand and maintain your plane.

Keep building, flying, and maintaining.

Dick 06/2025