The ECI Cylinder AD and I, Part II

Tom Martin

Removing Hydraulic Lifters

In the last issue I reported on the problems that ECI had with some of their cylinders that were manufactured between 2002 and 2005. Unfortunately for me the six cylinders on my EVO F1 rocket were in this series.

I sent the cylinders back for either an inspection and rebuild or replacement if required. Mine were in the "A" group of cylinders. As reported in my last article the wait was long and I finally got them back in the last week of April. Four of my cylinders were replaced with brand new equipment and the other two were reworked to new standards. My cost was freight one way and my mechanic's costs for removal and replacement. Although the delays were long with not much information from ECI, at the end of the day they treated me very well and I am pleased with how it turned out.

Before shipping the cylinders back to Canada I had them sent to Lycon in California. This is a company that has a reputation for engine modifications, and have done many of the well known aerobatic performers engines as well as most of the Red Bull racers engines.

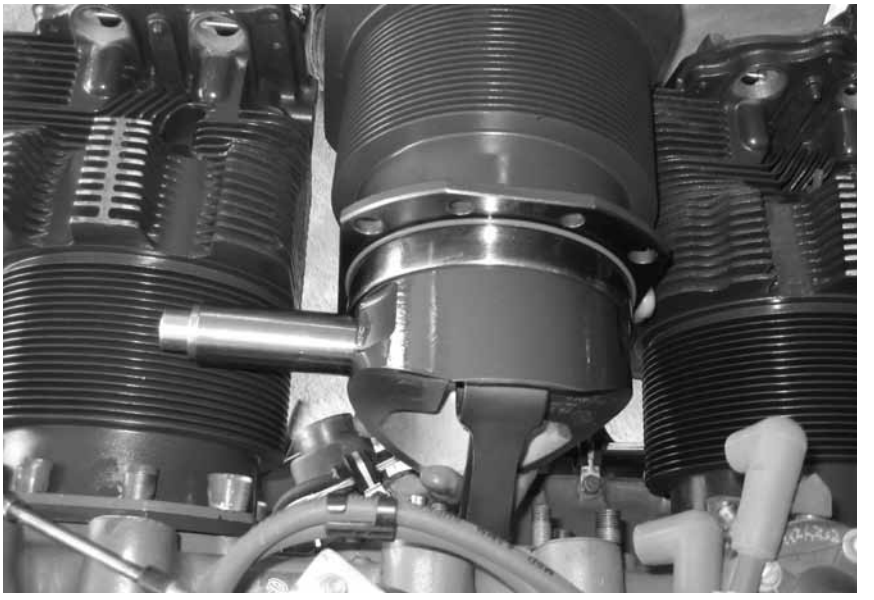
A couple of years ago an article in Kitplanes Magazine had detailed how Lycon had developed a CNC program that allows precision, repeatable, port and polish work on Lycoming cylinders. This allows a smoother flow of air into the cylinder and thus more horsepower. As I am always looking for areas of improvement the timing seemed right, so off they went directly from ECI to Lycon. Lycon promised me a five day turn around and they did the job in four days. As reported in the previous article, my pistons had experienced some increased wear due to piston ring blow by and had to be replaced. As an option Lycon offers coated pistons. This thin coating helps to protect the piston skirts and also to stop some of the heat transfer from the head of the piston. In the spirit of experimentation I opted for this treatment as well.

On April 26th, John Goris of Purple Hill Aviation helped me install the cylinders on my engine. The first step was to remove the valve lifters from the engine and bleed some of the oil from these simple devices. Essentially they are miniature hydraulic pistons that transfer oil from the engine through the push tubes and also maintain a constant pressure between the lifter and the valve tappet. Bleeding the oil from these lifters makes installing the push tubes and tappet assemblies much easier.

The cylinders arrive pre-oiled, with the pistons and rings installed. Each piston is carefully pulled out of its jug only until the pin can be removed. By positioning the cylinder up to the engine the piston pin can be aligned through the piston and connecting rod. The cylinder is then carefully pushed over the piston and seated against to the engine block. The cylinder base flanges and nuts are

then installed and the torque checked. Push tube covers, push tubes and tappet assemblies are then installed. With the addition of the valve cover the big parts are all in place. It just took a few hours to install all six cylinders but it took an additional full day for me to replace the baffles, fuel and spark systems, engine probes etc.

I now have 7.5 hours on the new cylinders and I believe the break in process is almost done. I ran the engine according to ECI break in procedures. They specified a partial throttle take off with the prop to remain at full fine for 3 to 5 minutes. After that, power settings of 24 squared, full rich, were to be maintained until engine temperatures peaked and came down or until oil consumption stabilized. I did not experience any high temperatures but there was some initial oil on the belly and increased oil consumption, one quart in 6 hours. The engine is quite smooth and getting better with each flight. According to Wayne Hadath it has a different sound than before surgery and it might be wishful thinking on my part but it seems to pull better as well. The first race of the season will tell the tale!



From the top down: Installing cylinder and piston on the connection rod; Removing the piston pin; The cylinders in place