

## Hercules Engine News

Including Economy, Arco,  
Jaeger & Thermoil

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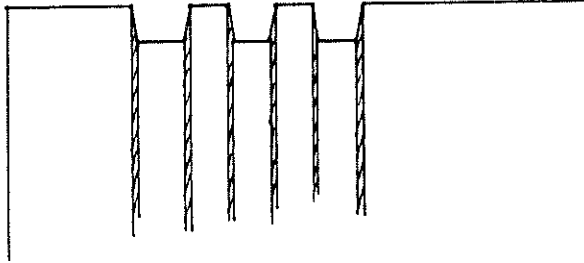
This article will deal with the piston and cylinder as it pertains to the 3¼ inch bore Hercules built engine.

There are several problems that may affect the cylinder bore. These include being badly rust pitted, scored walls, worn out of round and/or ring ridges at both ends of the ring travel area.

Generally, problems with the piston itself are limited to worn ring grooves. Seldom is the piston pin hole or the piston skirt worn enough to cause problems. As outlined later, the piston pin and connecting rod bushing may need attention.

If the cylinder is rust pitted badly enough that it won't hold enough compression to fire and run, there are three choices. You can obtain another block with a good bore from someone who parts out engines. You can have the cylinder bored and refitted with a suitable piston or have the old piston flame welded and machined to size. The cylinder can be bored and sleeved back to the original bore size so the original piston can be used. The latter is what I do. It usually costs about \$125 to \$150 locally to get that done.

These are times when an "as is" engine will run fine. When it is taken



apart, cleaned up and reassembled, the compression seems to have left. If this happens, it is likely that the cylinder bore is worn out of round. Before disassembly the piston rings had worn out of round, too, but conformed to the cylinder walls. When reassembled with new or the old rings, they no longer conform to the cylinder walls and there is blow by and enough compression loss that the engine won't run or runs poorly. The solution is the same as that mentioned above.

Scored cylinder walls can be caused by two things. One is by a loose piston pin that slides to one side and makes two parallel grooves on one side of the cylinder. The other is by grit getting into the cylinder. This is most apt to happen in areas with sandy surroundings or on concrete mixers where someone is careless when shoveling aggregate. Again, the solution is as outlined above.

If the piston ring grooves are worn badly, there are several solutions. New pistons are being reproduced or a usable used one can be obtained. The present piston can be put in a lathe and the ring grooves machined to accept a standard ring along with a contracting filler ring

available through automotive machine shops. The piston can be machined to accept custom made rings slightly wider (1/64 inch or so) than the originals. When fitting with new rings, make sure that they are not too thick as to bottom out in the grooves. Newly fitted

rings should also be loose in the grooves rather than snug.

The diagram above shows piston ring groove wear (exaggerated) and the shaded areas that must be machined away to "square up" the groove.

The piston ring and connecting rod bushing are the last consideration in this article. If the connecting rod bushing needs replacing, I go to a local bearing supplier and get a brass bushing 5/8" inside and 7/8" outside diameter. It will likely have to cut to the proper length. Press out the old one and press in the new. For the piston pin, I use 5/8" drill rod. Put it in the lathe and run emery cloth on it until it fits the bushing in the rod. Grind or machine a notch for the piston pin retaining screw. Be sure to bore an oil hole in the bushing after it is in the rod. Once the refitting is done, slide the piston and rod into the bore without rings and check to see how the rod lines up with the crankshaft throw. The rod is of dropped forged steel so it can stand some bending to realign it if necessary.

Coming up next is the crankshaft along with the bearings and shims. ○