

It has been over two weeks since my last update and the last week was not to be believed. Everything started out well, but soon went from bad to worse. After spending a couple of days making the special jigs needed to do the rocker arms (Pic #2) the CNC program was modified and after destroying 3 carbide taper end mills, at a cost of over \$60.00 each, the rest of the week was spent completing the rocker arms. As I have stated on several times, normally two jigs need to be made. Too much time is lost when only one jig is used! Picture #1 shows the before and after. Unfortunately you cannot see this but on the bottom side of the rocker arm I needed to use a .093 Ball end mill to make a perfect receptacle for the mating surface on the push-rods. Keep in mind, these are castings which are quite small and extremely difficult to clamp and hold in place while machining. In addition to the rocker arms, the pivot, which is in the center of the rocker arm, must be machined. This part is even smaller. Take into consideration that there are 40 engines and with 16 rocker arms, there are a total of at least 640 parts that need to be finished. Add to this the same number of pivots and you can easily understand why it is taking so long. Like I said before “machining 1 part or 10 parts is no problems, but when you need hundreds or thousands it is quite evident why special and in most cases multiple jigs and CNC programs must be written.

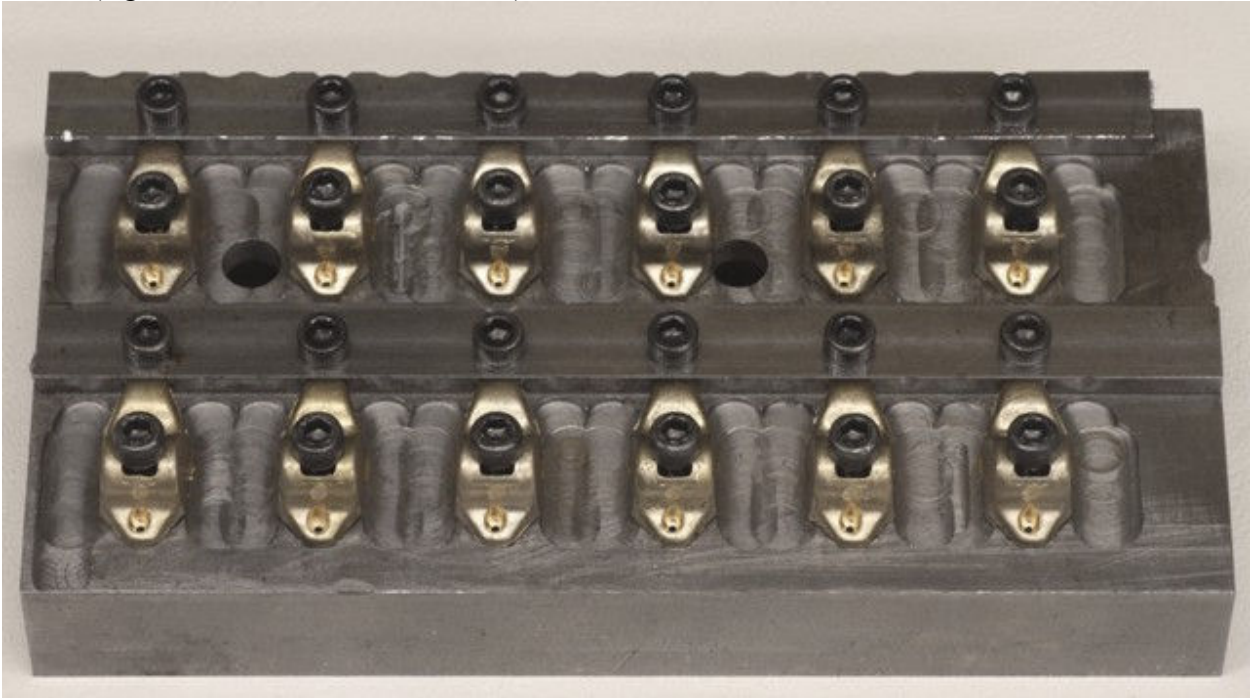
Anyway, “things were going quite smoothly”, or at least I thought they were. The next part that needed to be made were the toggle clamps, which hold the intake manifold to the heads. The first stage of the machining process is to write a CNC program which make the profile of the toggle and then repeat this program to machine 5 additional pieces on the same piece of metal. The finished strips can be seen in picture # 6. These strips were in there initial machining process when my CNC machining center decided not to do what it was programmed to do and no it was not a “Conley screw-up” this time. There is a 7 hp spindle motor which must know exact where it is, throughout a 360 degree circle. When I say “exact” I mean not just close but it must be perfect. There is no chance for error, or at least I thought. To make a long story –short, it took almost two weeks of numerous phone calls, service calls (which are \$150.00 per hour and does not include travel time), parts, more phone calls and additional service calls to finally get everything back to order. Initially they informed me that I may need a spindle drive motor and/or encoder, which could be as high as \$7,000.00 to \$8,500.00 to get installed. Luckily I did not need to replace either of these parts, but what I did loose what if far more valuable – and that is time. This is another good example of what happens in a small shop, when every other project, part, procedure, etc. must be “put on hold” to get the machine fixed. Luckily I have two great employees which are able to continue with other items on the engine which require small finishing or assemblies. Even then, sometimes I needed to remove them from a job because I needed a “second pair of hands” to help with the machining center. Although every precaution is made and machine maintenance is always #1 priority, some time “things” are out of my control. Keep in mind my week does not end with Friday or at 5:00 pm, it continues until the work is finished. In order to get these engines completed, my day now starts at 5:00am and with luck, I can finally get in bed by 11:00pm. Believe me; I know how important it is to complete this first run on engines. Maybe then I can get back to a normal schedule or take a weekend off. Wouldn't that be nice! I am ever so hopeful! Just thought everyone should know how unexpectedly things happen, which are totally out of my control.

As you can see from the pictures the toggle clamps are finished and polished. The initial process, machines the contour of 6 pieces, on a of 1/4" square rod and can be seen in picture #6. This piece is then inverted and all extra metal is removed, resulting in a completed toggle clamp.

Pic #1 (Rocker arms – before on right, after on left)



Pic #2 (Jig used to machine rocker arms)



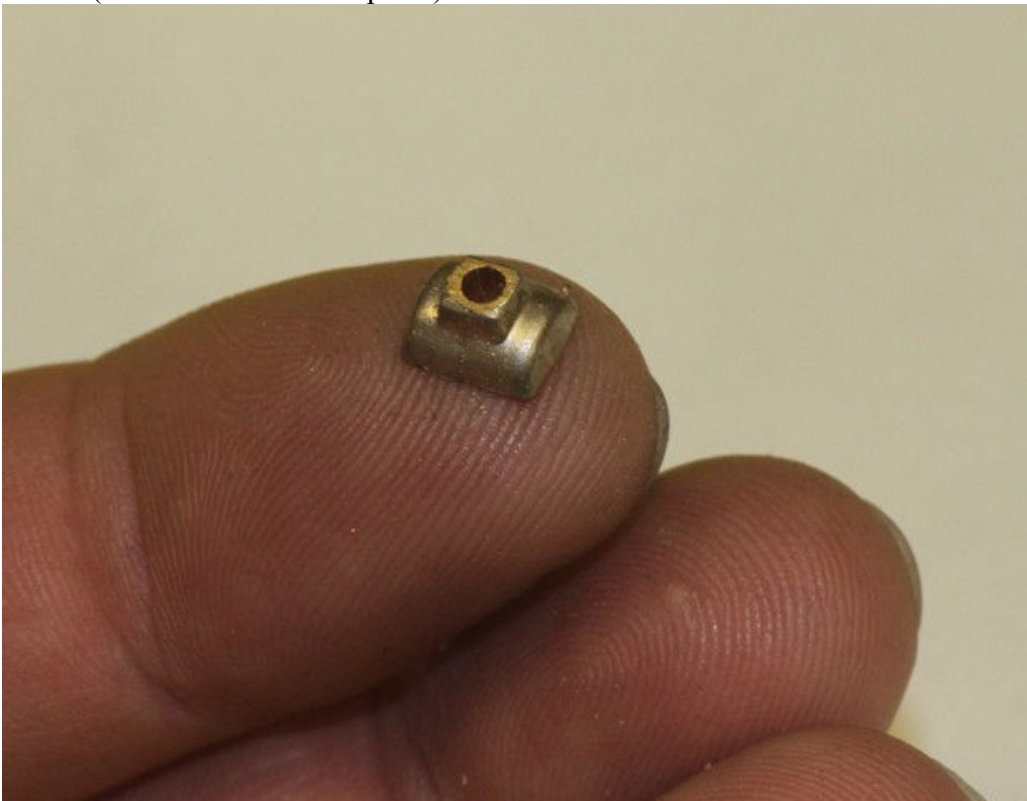
Pic #3 (Partial box of finished rocker arms)



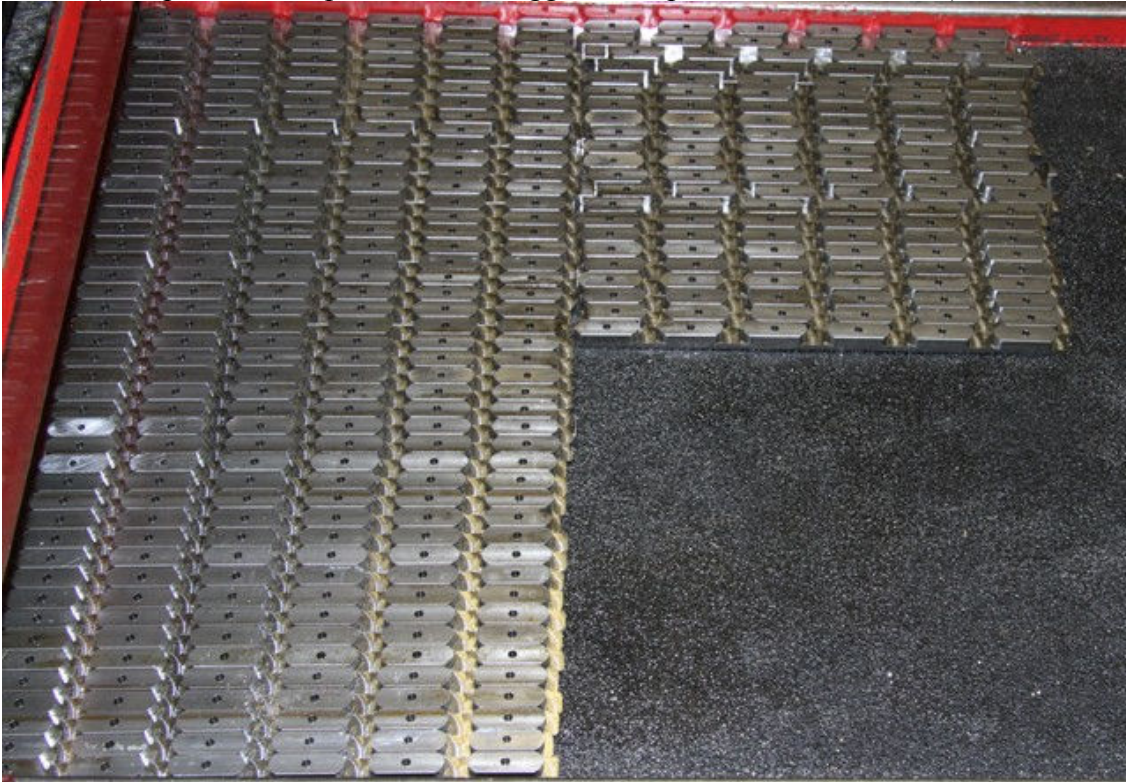
Pic #4 (Finished rocker arm)



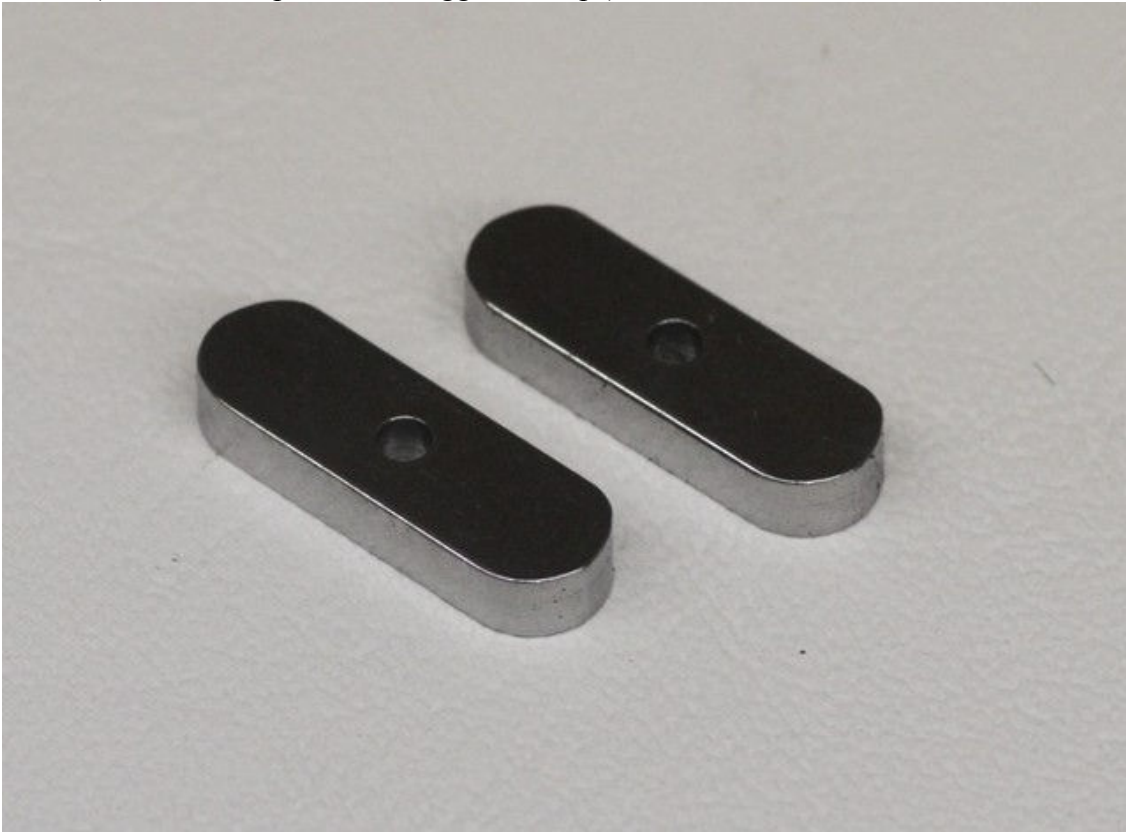
Pic #5 (Finished rocker arm pivot)



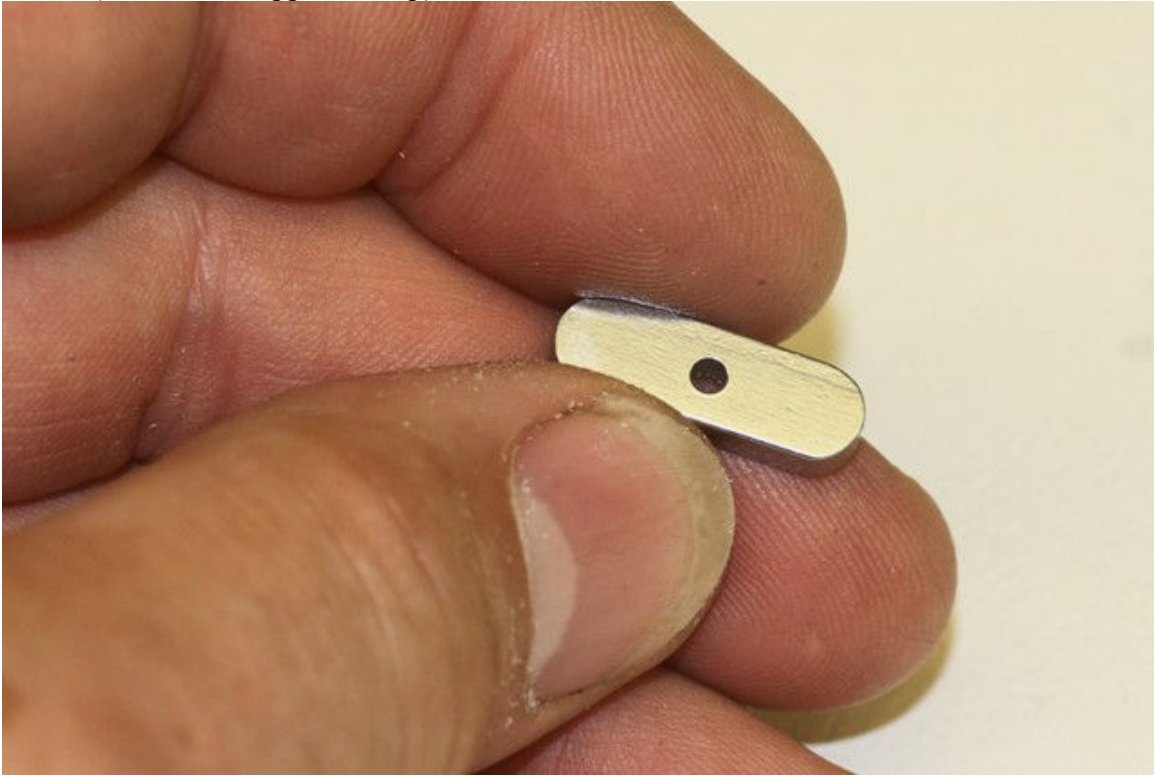
Pic #6 (Completed first operation on "Toggle" clamps for intake manifold)



Pic #7 (Finished and polished "Toggle" clamps)



Pic #8 (Finished "Toggle" clamp)



Pic #9 (Finished "Toggle" clamps ready for assembly)

