

Assessment of My Gingery Shaper's Accuracy

By **R. G. Sparber**

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I have owned this shaper for over a year yet never seriously looked at its accuracy. Thanks to a prod from “Wonk” on gingery_machines, I got to work.

The technique I have used so far is to cut a 1” block of 6061 aluminum on opposite sides and then check how parallel the faces are with my best mic. In all cases the block is cut on one face, deburred, flipped over such

that it rotates along the axis of the ram, and then the second face is cut. I again deburr and measure it with my wiz bang mic.

The first thing I did was re-cut my vise’s softjaws. This cancels out any errors in the part of the shaper that supports the test block.

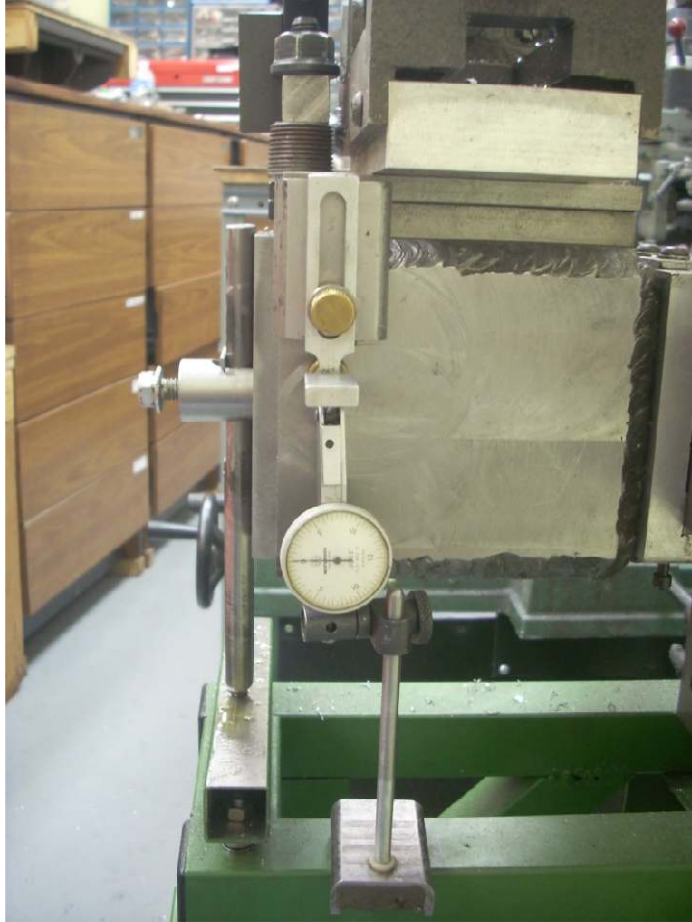
On my first run, I zeroed my mic at the bottom left area of the test block and looked at the variation at the other 3 corners. Then I returned to my zero point to verify it was still near zero. I saw:

+0.00345”	+0.00280”
0 and when done, 0.00005”	-0.00015”

This tells me that my front side to side thickness was varying by 0.0002” and my back side to side thickness was only varying by 0.00065”. However, front to back

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was off by about 0.003". Note that the side to side error on the front is of the same polarity as on the back. So the surface is lower on the right side by around 0.0001" to 0.0002" and front to back I am lower in the front by 0.003".



The first thing I checked was if the table was flexing. It was easy to place my finger against both the front support rod and the horizontal support and feel movement during cutting. I tracked this problem down to burrs on the rod caused by the locking bolt. I added a strip of aluminum between bolt and rod. The burrs on the rod were also ground off.

It now felt much more solid. I then put on my Dial Test Indicator to see just how solid it was. With a lot of pushing down, the needle deflected 0.0005". That should help.

I then had to re-cut my softjaws.

The second run came out to:

+0.00095"	+0.00030"
Set 0 and later read -0.00010"	-0.00155"

which is an improvement over my first run:

+0.00345"	+0.00280"
0 and when done, 0.00005"	-0.00015"

So that front leg, when properly pressing on the horizontal support, sure does help. It is better, but certainly not great. This is also just a sample of one so should not be trusted all that much.

A few more runs showed that I still had a maximum variation across the block of about 0.003" most of the time.

I then started to look at vertical motion in the cutter caused by vertical play in the ram ways. Using a torque wrench, I applied +100 inch pounds to the head and noted motion on my DTI supported by the table. Then I applied -100 inch pounds and read the DTI. This test showed a total movement of 0.006". I tightened the top bolts, ran the shaper for a few cycles and then tightened the bolts again. Rather than re-run the torque/DTI test, I cut another set of faces on my test block.

This time I also looked at more places on the face:

-0.00090"	-0.00055"	-0.00220"
-0.00055"	-0.00035"	(no data)
Set 0 and then saw -0.00070"	-0.00040"	-0.00245"

The first column is the left edge of the block. I start out at 0 at the front left corner and sink, at most, to about -0.001" at the back. If I use the second zero reading, the drop is only 0.00020"

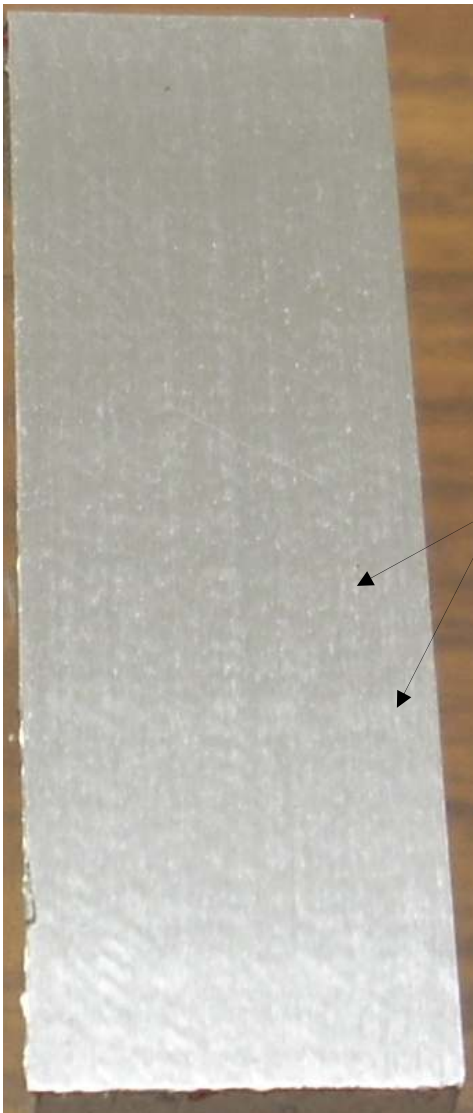
The center column shows a drop of about 0.00015" from the front to the back. I sure wish the entire test block looked this good.

On the right is a real anomaly. The right edge of the block is 0.002" thinner than the rest of the block. Furthermore, it rises by 0.00025" as I go from front to back. Not sure what that is all about yet.

I'm far from done with this study but am heartened by that center column of numbers. My next task is look at the side to side table ways. I need to find and fix the source of that large (0.002") side to side error.

My main technique will be to apply known torques to various parts of the machine and look with my DTI to see what is moving.

Surface Finish



The cutter starts its stroke below the bottom of this picture and exits the top.

I changed to a cutter suggested by people on the shaper BBS and it greatly improved the finish.

As a crude reference, I placed a surface identical to this on a sheet of 600 emery paper. Then I moved the surface about 4" over the paper 60 times and got a mirror finish. The roughness that can be seen in this magnified picture is difficult for me to feel.

If you look closely, you will see horizontal ripples. They are spaced about 0.1" apart. I saw and heard no chatter.

I tried having more overhand on the cutter and also less. It made no difference. Adding weight to the head also made no difference.

I have two questions:

1. Is this considered a good finish?
2. If not, what, besides rebuilding my ram ways, do you suggest?



This sample on the left was cut with the ram ways much tighter, a new slide block made of aluminum (the old one was Delron), and the test block is clamped down to the table without a vise.

This sample on the left does look a little better, I guess.

The sample on the right is a copy of the picture from the previous page.



I welcome your comments and questions.

Rick Sparber
Rgsparber@aol.com