Reestablishing Position On a Round Column Mill, version 1.0

By R. G. Sparber

This article is intended for those new to the hobby of metalworking although plenty of experienced people have had this problem too.

With great care, you establish your (X = 0, Y = 0 (origin) on the workpiece. Then you go to install the drill and it doesn't fit. If you are using a keyless chuck, sometimes the extra headroom can be found by switching to a keyed chuck. But in this case, I'm already using a keyed chuck. Damn! Nothing to do but raise the head unless I want to saw off the end of the drill bit.

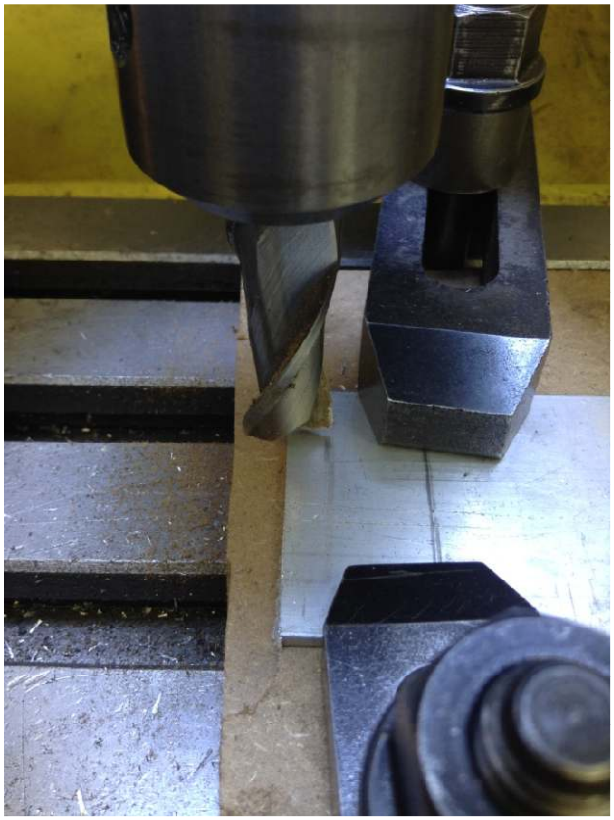
This article will explain one way of reestablishing your origin after moving the head.

[1] You are free to copy and distribute this document but not change it.

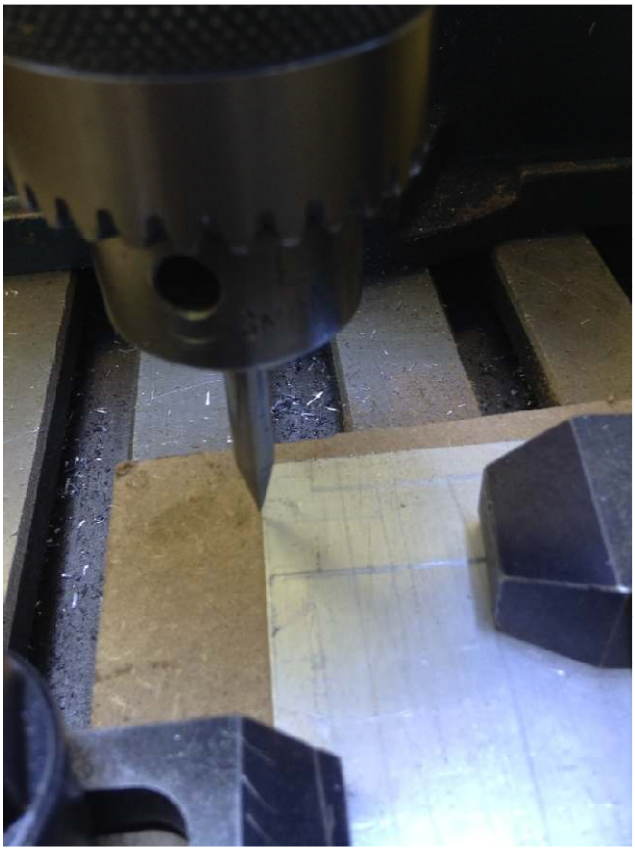
I will start back before my origin was first established. I have a piece of aluminum strap with straight side edges. I used the back edge to align the workpiece with the mill's X axis.

The end of the workpiece was roughly sawed so I will use an end mill to true it up. This procedure will also give me a very accurate position for X = 0.

I take a light cut along the end of the workpiece.



My X position is then exactly half of the diameter of the end mill from zero. This is a 5/8" end mill so I move over .3125" and set X = 0. We are half way home.

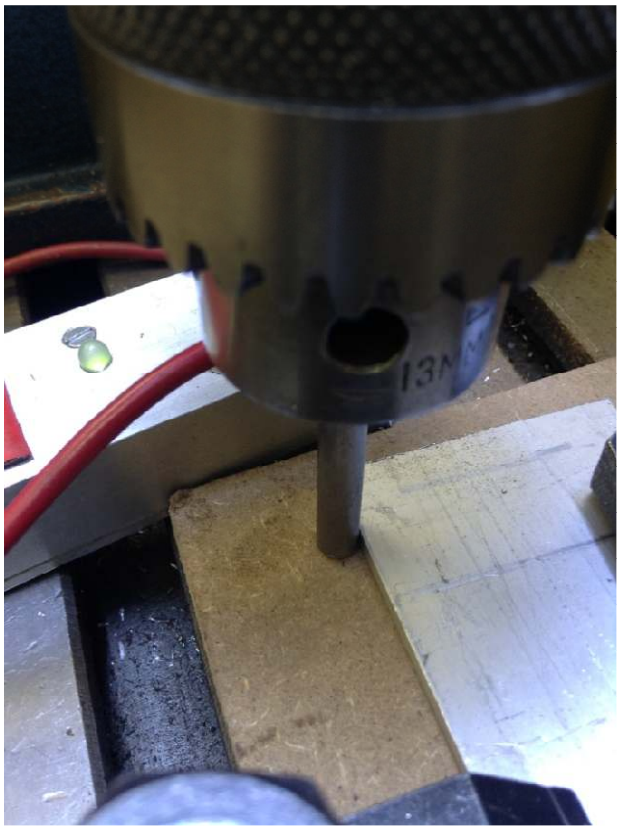


Next I need to set my Y = 0 point. If I had cut along the X axis, I could use the trick just presented with the end mill. But the edge I have is fine and is close enough to parallel with my X axis this time.

You might have noticed that the clamp on the left was moved. The workpiece is clamped in three places. This lets me move any clamp and not risk shifting the part. It is also an added degree of safety. Two clamps can be enough if the workpiece is ridged. One clamp is asking for trouble. Regardless of clamping force, the part can spin around during milling operations.

I will suggest two ways to find the Y = 0 point. The first involves the use of a "spud". This is a piece of round stock with a sharp point on the end. It was made on my lathe so the point is close to centered. I chuck up the spud and lower the spindle until the point is just above the edge of the work piece. Depending on your eyesight and ability to avoid parallax, you can get fairly close. It all depends on how much accuracy you want. If this is good enough, then set your Y = 0 point and we are done with this step.

If you want better accuracy, then some form of edge finder is needed. There are mechanical ones that are low in cost and accurate. They do require you to run the mill at a low speed and closely watch for a jump in the tip to indicate touchdown.

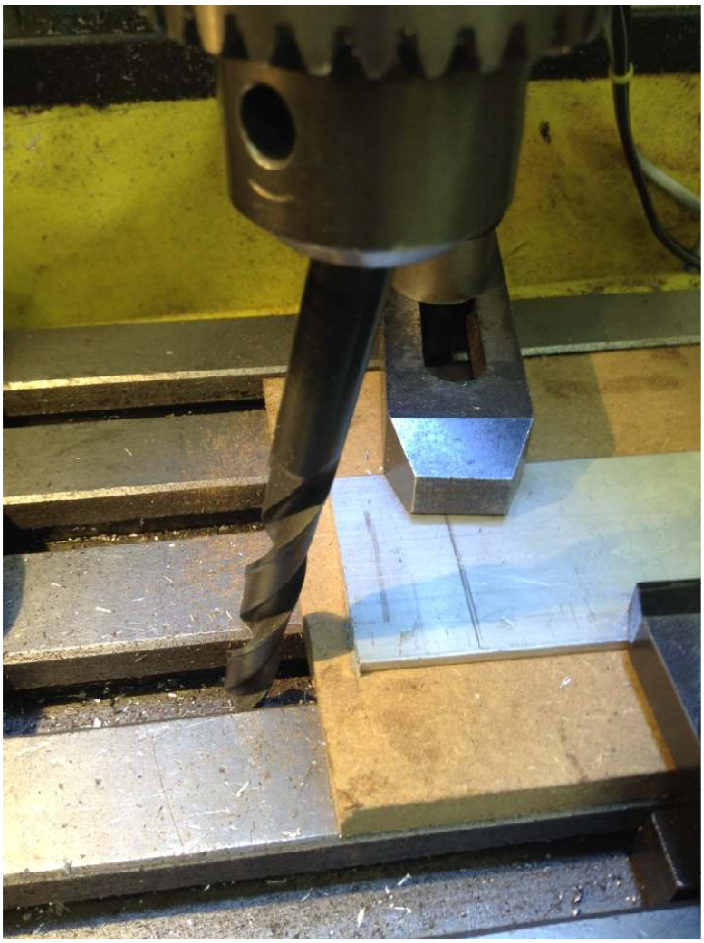


Another type of edge finder is an Electronic Edge Finder (EEF). The one I prefer is of my own design[2]. It was originally intended to be used on my lathe but has since shown to be useful on my mill too.
I chuck up a piece of ¼" drill rod and attach the EEF. When the drill rod is not touching the workpiece, the light is green.

At touchdown the light turns red. As long as the contact surfaces are free of swarf , touchdown is detected to better than .0002".

I then feed over by the radius of the drill rod and set my Y = 0.

[2] See http://rick.sparber.org/LEEF_Model_1.pdf



Here is where you get to practice your vocabulary of profanity. It won't help get the drill to fit, but it might make you feel better.

We just spend all of this time finding our origin and now are faced with the possibility of throwing it away by moving the head.

Not to worry. The establishing of the origin was not a waste of time.

Now, typically, you have other machining operations you need to do before drilling this hole. Go ahead and do them. The shorter the quill extension, the more accurate you will be.

When you are ready to use this drill, it is time to move the head.

I raised the head and even rotated it to the right a little just to show that it doesn't matter. My chuck was right over my origin before the move. Now it is far to the right and back from it.

If accuracy is not that critical, I can use my spud. A few turns of the X axis crank and my edge is aligned with the point of the spud. This was my X = 0 location before moving the head and it is now true again.

The key thing to understand here is that the position of the head relative to the column does not matter . All that counts is that we set the center of rotation of the spindle on the origin of the workpiece and again zero X and Y.

Just for grins, I verified my X = 0 point as set by the spud with my EEF. The spud was off by .02". That was a surprise because I thought my eyes were better than that.

I repeated the procedure for the Y axis. The mill table was moved until the spud's point was directly over the edge.

I again used my EEF to see how close the spud was to true. This time I saw that it was within .0005". Go figure.

With my origin reestablished using my EEF, I can continue machining my workpiece as if the head was never disturbed.

I put the spud back in the chuck as a sanity check. My errors tend to be big and this step flushes them out.

With the drill mounted, I have moved to a location .500" along the X and Y axis.

Acknowledgements

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I welcome your comments and questions.

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