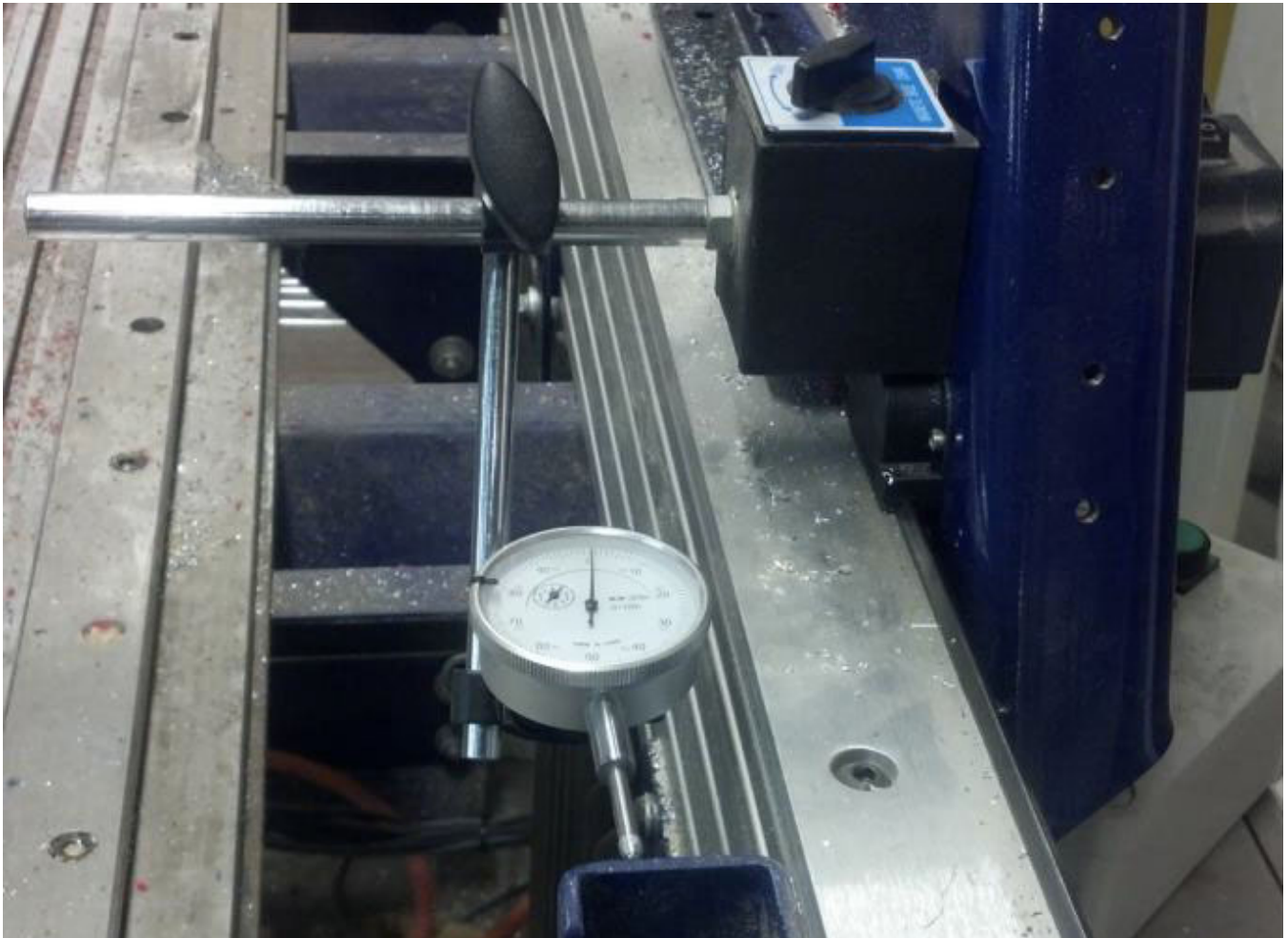


Checking Pinion Play

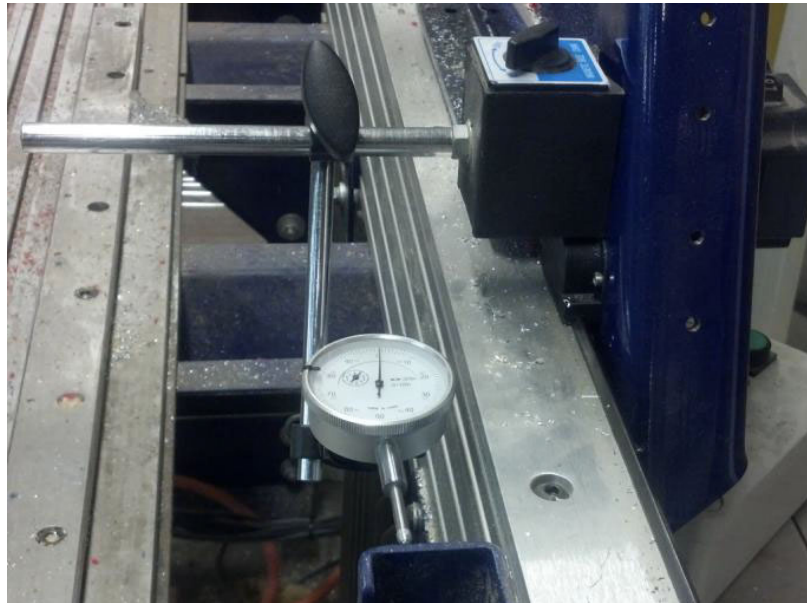


Process

When the pinion to rack adjustment is not maintained on a regular basis the result is the bit can be deflected off the cutting path. This may show up during a cut when density of the material changes, or most often during plunge, retract, start, stop or entering and exiting corners. Most users can use the “Push/Pull” test to check to see if their pinions are loose, but in many cases, the machine “feels tight”, but the cuts are still unacceptable. In other cases the deflection may be just too small to feel.

The deflection can be caused by a loose bearing or a stack up of tolerances from multiple bearings and are virtually undetectable without use of a dial indicator. In many cases, play that is not noticeable by using “hand” methods will be visible when using a dial indicator.

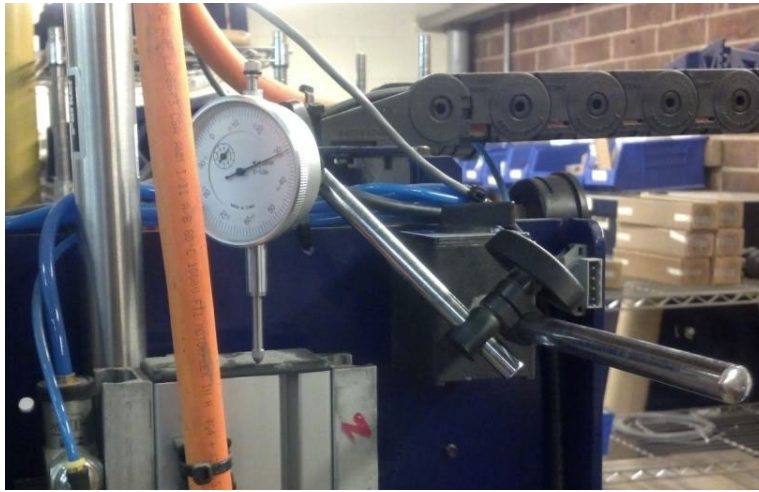
The following is a picture of the X axis setup showing magnetic base attached to PRS side plate with the dial indicator against a table leg. Push/Pull in the X direction on each side plate.



Picture of a Y axis setup with the indicator base attached to a side plate and the indicator against the Y motor. Push/Pull on the YZ car in the Y direction.



This setup is used to measure play in the Z axis in the vertical direction. The base is attached to the YZ car and the indicator touches the top of the Z extrusion. Grab the spindle or Z extrusion and Push/Pull in the Z (vertical) direction.



The following two setups have the base attached to a table leg and the indicator is touching an upside down 1/2" bit to measure deflection at the bit in the X and Y directions. Push/Pull on the bit or collet nut directly at and away from the indicator.



The first 3 setups are directly aimed at the pinion/rack adjustment. The last two, which will show lateral deflection at the bit, can show play in the lower YZ car bearings, play in the Z bearings or a loose spindle connections. To gain an accurate assesment at the bit, all play must be removed in the first three tests prior to setting up for the last two.

In each case, put approximately 25 pounds of force in the appropriate direction - X, Y or Z. 25 lbs. is the equivalent weight of a five gallon bucket half full of water. Make multiple tests with each set-up and write down the results from each. This will be valuable if unable to diagnose the problem and wish seek help from another user or ShopBot Tech Support.