

# RF-30 Mill/Drill: What Gives?, Version 2.1

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By R. G. Sparber

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Yesterday I received a very interesting challenge from "sidious\_kto". Back in 2009 I made the claim<sup>2</sup> that movement of the head of my RF-30 was due to the column bolts stretching. Sidious did not buy it. So I went back into my shop to take a closer look.

My approach was to apply a known force to the head and note how much my finger Dial Test Indicator moved.

## Test 1

The DTI is supported by the vise and the finger is touching the top surface of the spindle bearing support. I first zeroed the DTI with no weight on the belt cover. Then two steel cylinders are placed and the DTI read again. Finally, the weights are removed and I verify the DTI again reads zero.

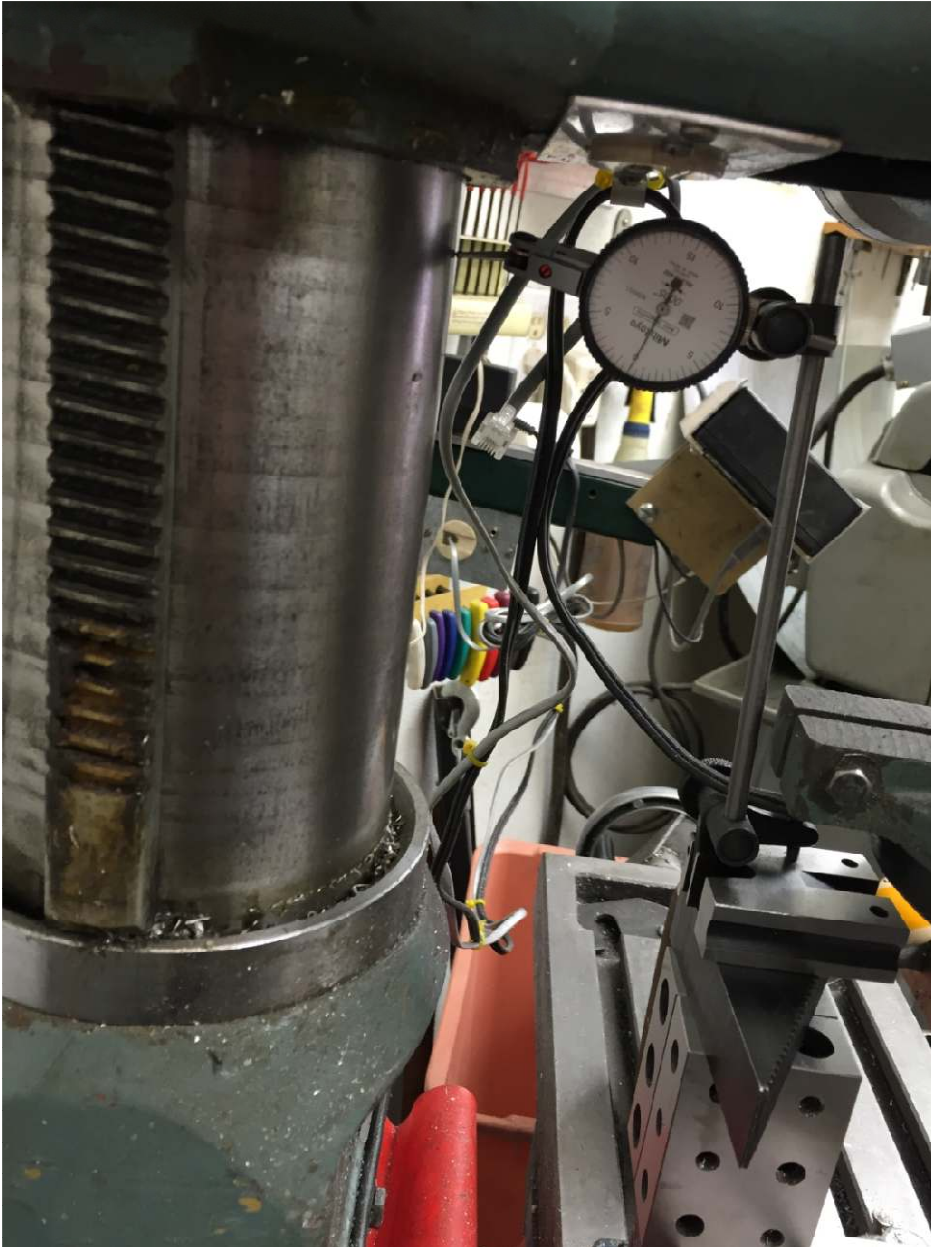
I measured a drop of 0.0009".



<sup>1</sup> You are free to distribute this article but not to change it.

<sup>2</sup> See <http://rick.sparber.org/TM.pdf>

## Test 2



The DTI is supported by the table. The finger is touching the column 1" below the bottom of the head.



I saw a 0.0005" forward motion.

## Test 3



The DTI is supported by the table. The finger is touching the column 16.5" above the base casting.



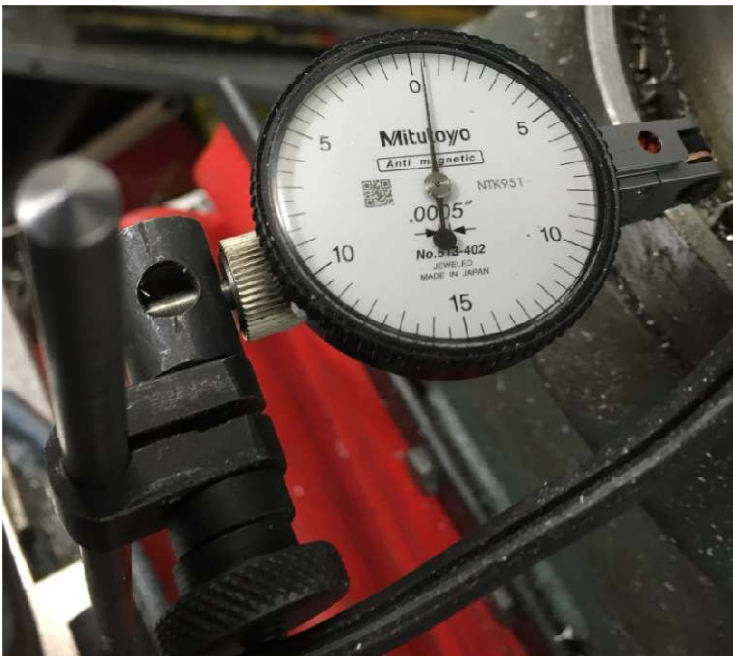
The DTI showed a forward motion of 0.0005"



## Test 4



The DTI is supported by the table and the finger is touching the top of the ring marking the bottom of the round part of the column.



I measured a forward movement of 0.00045

## Test 5



A bar was secured to the table. The DTI is supported by the bottom flange of the column casting. The DTI finger rests on the top of the bar.

No movement of the DTI was observed.

## Recap

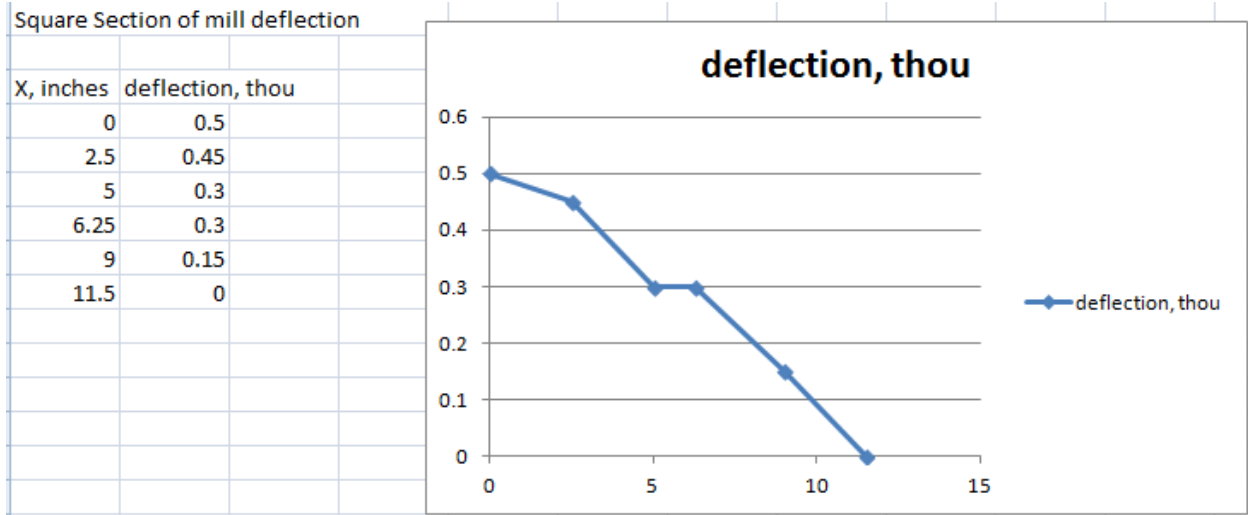
1" below the head the column moved forward 0.0005". About half way down the round part of the column the movement was also forward by 0.0005". At the transition between round and square the movement was 0.00045". At the column casting's base flange I saw no movement.

## Conclusion

It appears that the round part of the column did not deform. All of the bending was in the rectangular part of the column. Now, that is not what I expected to see!

## Follow-on Tests

I measured deflection down the rectangular part of the column. X = 0 is at the center of the transition ring between round and rectangular. X = 11.5" is the top of the base flange.



Note that the graph is almost a straight line. This tells me the deflection in the rectangular part of the column is uniform and nothing is broken.

The bottom of the column casting bolts to the base which has a square hole in it. It is possible that clamping a plate across this hole might reduce deflection if the root cause is the weakness of an open box construction.

## Acknowledgment

A warm thanks to "sidious\_kto" for pointing out my wishful thinking.

I welcome your comments and questions. In particular, I would like to hear about other tests I can do to zero in on the root cause of this deflection and hopefully find a way to reduce it.

If you wish to be contacted each time I publish an article, email me with just "Article Alias" in the subject line.

Rick Sparber

[Rgsparber.ha@gmail.com](mailto:Rgsparber.ha@gmail.com)

[Rick.Sparber.org](http://Rick.Sparber.org)

