ART,

After air cutting and since the first two in Al came looked good I just decided to test the correction out. This is a summary of eight threads 4 in Al and 4 in CS.
All were set up as shown in Figure #1 and all were cut using the same Gcode.
Mach ver-.028 / 63 – reply 629 posted application
¼-20-UNC / 402 RPM / 44 PASSES (.004 first pass - .002 remainder – except #43 was .0004 and #44 was .0002)

The lead error on the tests were excellent.

Will get a little long winded here but bear with me as I just make a whole bunch of comments.

Figure 1 shows the set up. ¼ -20 was selected since visually you can see a bad pass and what is going on and not trying so much to measure, etc. When you do this thread and the setup is as shown the 100# to 150# threading force will deflect the piece some 0.010 to 0.020". If the index timing / acell, etc is off some you may catch the end. If it's consistant the cutting is very smooth. That could make for a ruined thread but it also gives you a good indication on how well the planning will take care of practical situations. The start of the threading is short ie; normaly in a scribe test I would allow 3 to 5x pitch for acceleration.
Just for you techie guys. Since the same Gcode is being used, the rpm will slow down at a different pass# / point since the difference in the modulus is offset by the difference in machinabilty, etc, etc . So calculate if wish, your wasting your time. Enough said!

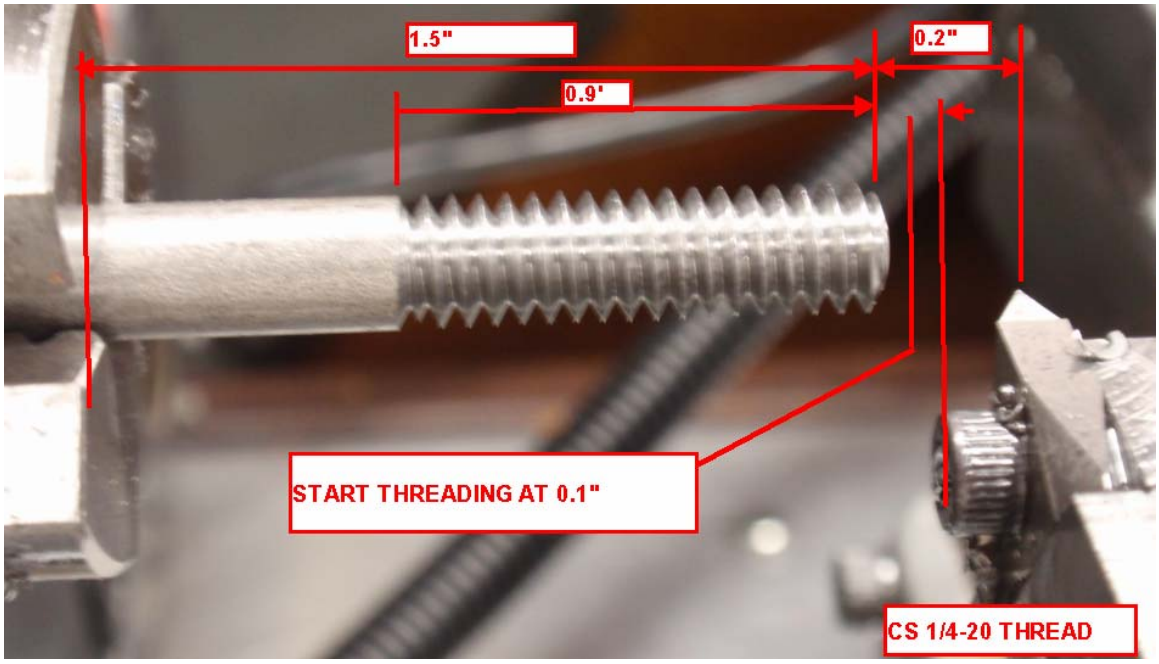

FIGURE 1

You can see in Figure 2 that both the Al and CS threaded well.
But there are basic differences. When measured the lead error was approx within .001”/ inch for both. Now the AL thread is a class 2B and the CS is a 1A. Not because of lead error, but because of change in the pitch diameter, OD is in spec. Yes the gage goes on both of them but one is loose and the other (Al) is a nice fit. Actualy the CS tapers due to deflection. So on the practical end of things this just reflects setup and has nothing much to do with the software side of things.

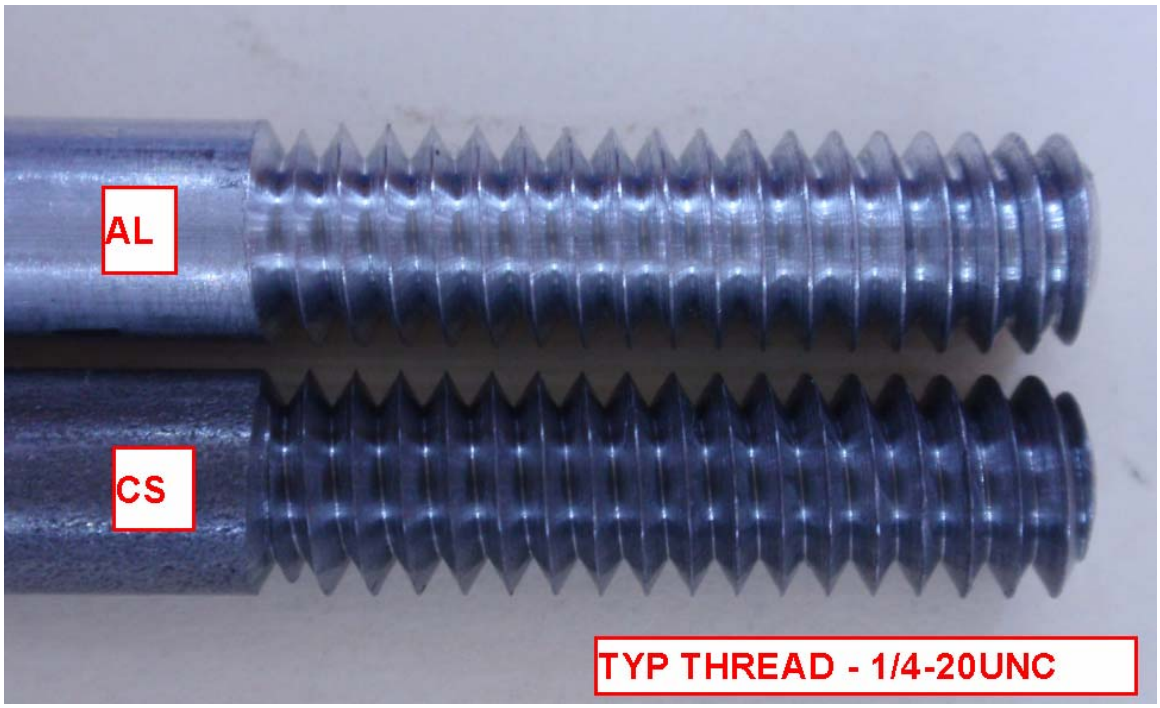

FIGURE 2

Figure 3 shows the profile of the CS more towards the anchored end of the stock.

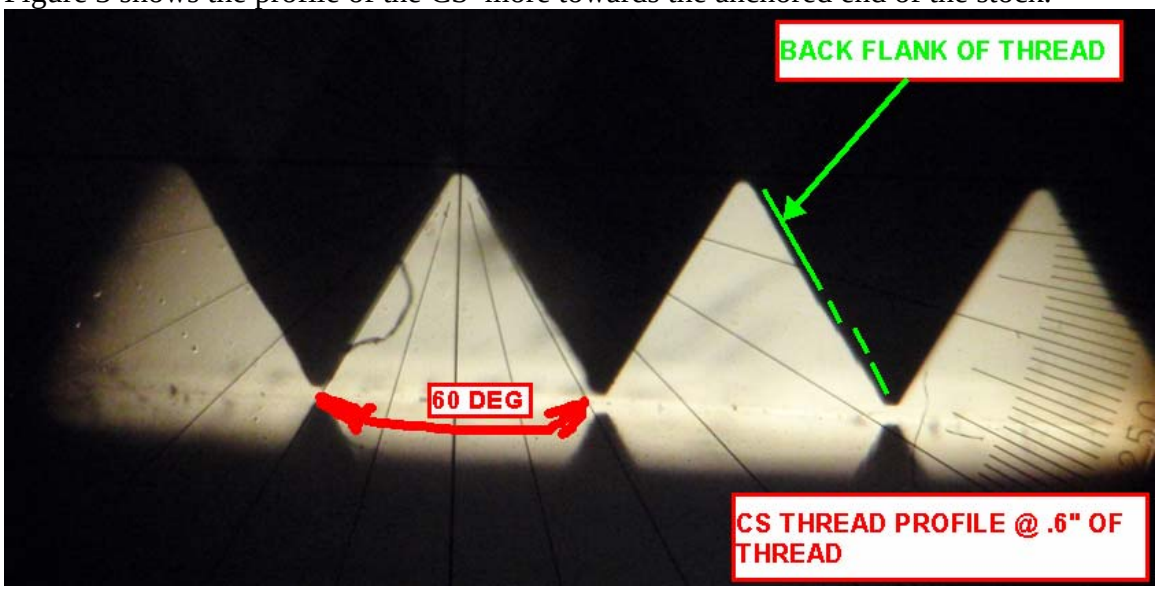

FIGURE 3

Figure 4 looks down on the thread showing the result of deflection. It is not chatter. The next picture provides expaination.

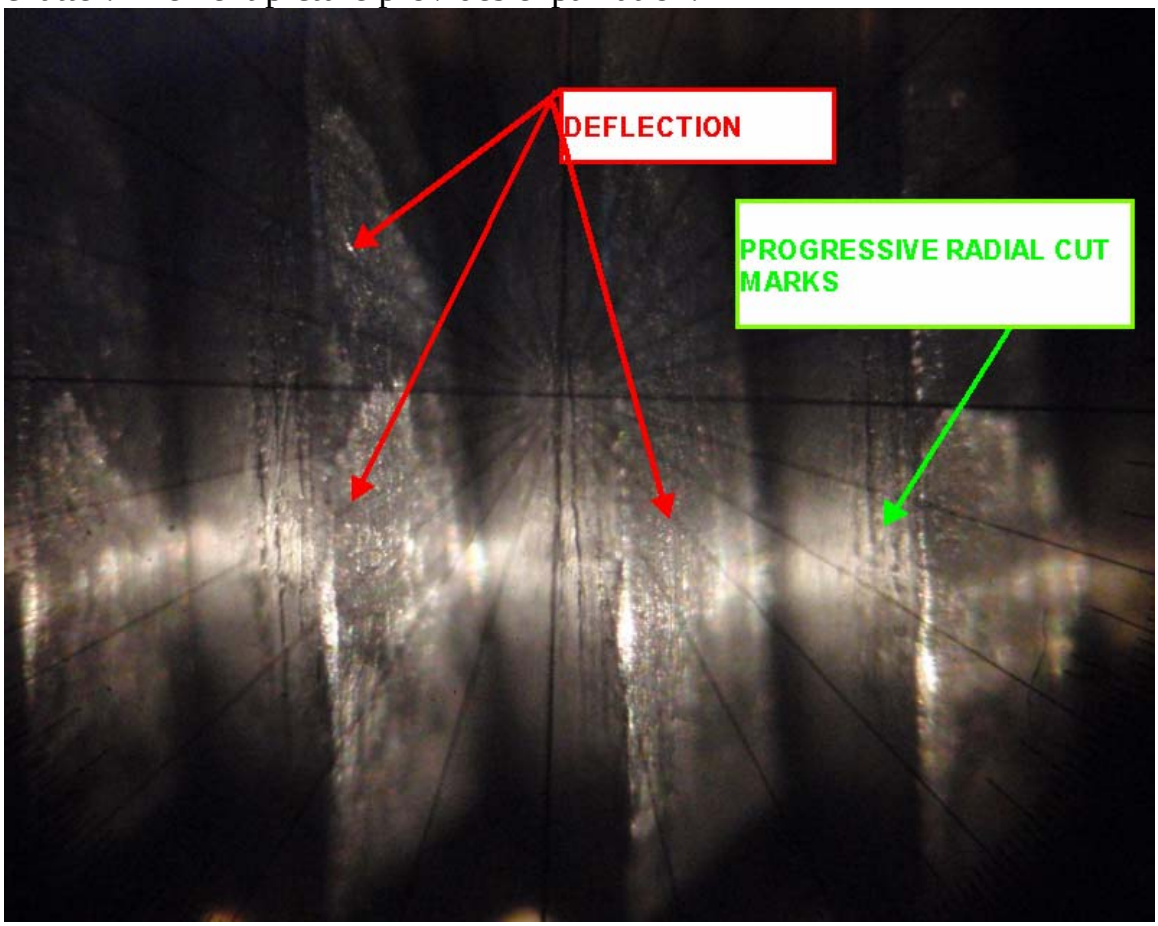

FIGURE 4

Figure 5 shows the finished CS thread. At pass #33 the deflection was rather great, the piece deflects, the spindle slows down some, the cutter cuts more deeply at the beginning of the thread, the spring reduces as you approach the anchored end and the cutting / shearing action of the tool progressively changes until the piece now longer is deflecting and normal cutting is restored.

Now in the past, chances are, that the compensation / threading would have just trashed the thread in the next runs. Visualy, passes 35 to 38 cleaned the thread up with clean cutting, pass #40 & 41 were more or less spring passes, but also fixed any lead error. The damage was due to deflection, but most important is that the software did it’s job, BTW all four times!

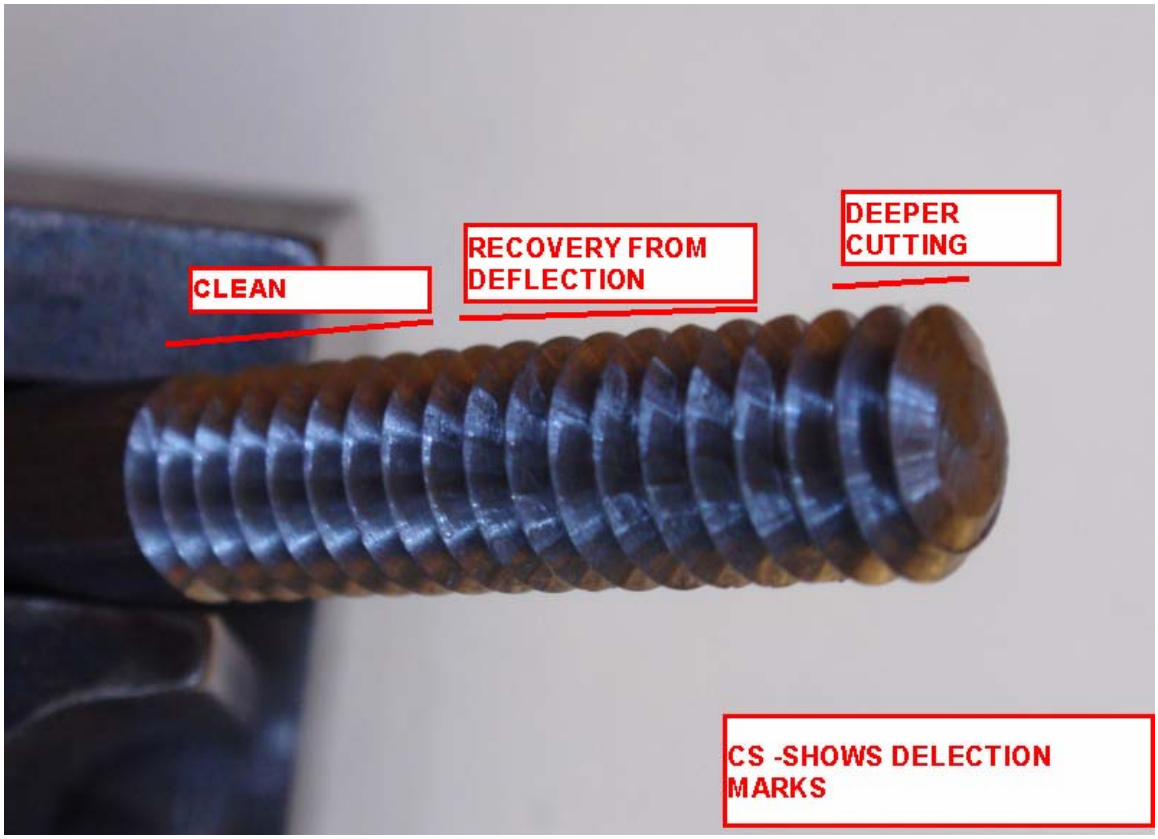

FIGURE 5

I will do a bunch of scribing tests at the various rpm and pitches to check lead and see if anything goes goofy. Looks very promising.
After the scribing then it goes back to actual thread cutting over some range of pitches and rpm. So it will take some time to gather comfirming data and will post on the scribe tests.

I have attached the error report. Any comments or questions just post.
Thanks for sticking with this. It's been a long year to get to this point.

Oh, BTW, in the Turn Diagnostics…..The locked threading rpm displays as 0.xxxxxxxx instead of 402.xxxx.
RICH