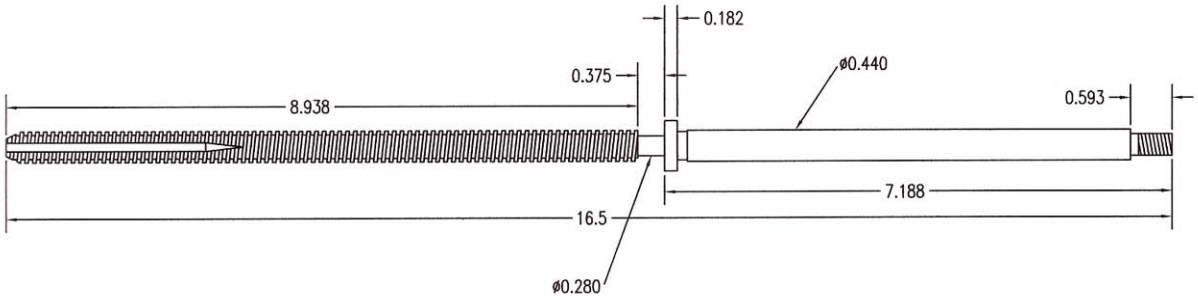
# Revival & Improvement of the 10L Crossfeed Taper Screw

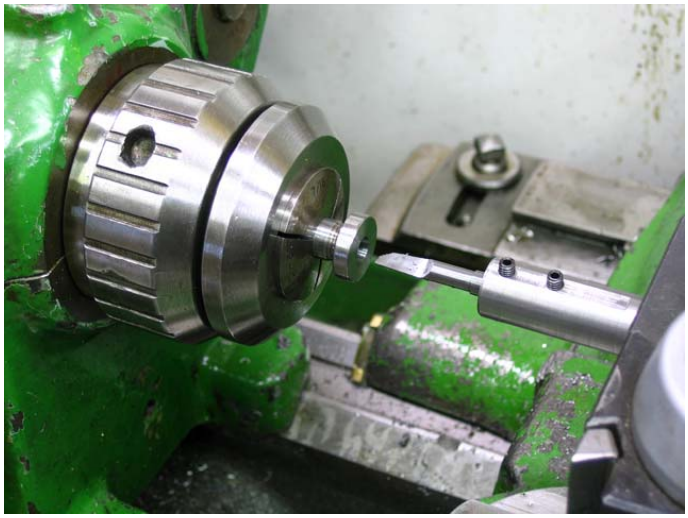
**By TJ Schmidt**




Much like anything I've made or repaired in my home machine shop, this crossfeed screw project was new territory. The following is certainly not the only way to go about it, just how I did it.

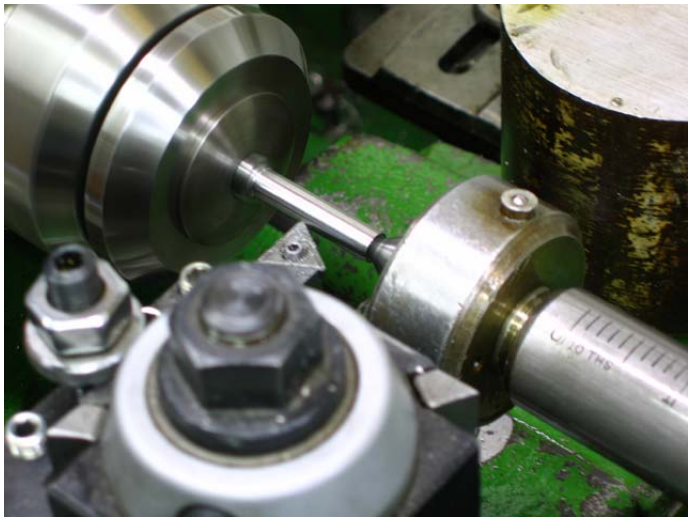
With only one lathe in the shop, it'll be necessary to either have a spare crossfeed screw to repair, or make a new taper attachment end from the 3/4" collar to the 5/16-18 threaded end. I had a spare screw to work with.

Begin by measuring the total screw length first and make a note - 16.5" on my 1952 Model A Heavy 10. When the new screw section is fit into the old taper attachment (TA) stub it will need to end up the same length.

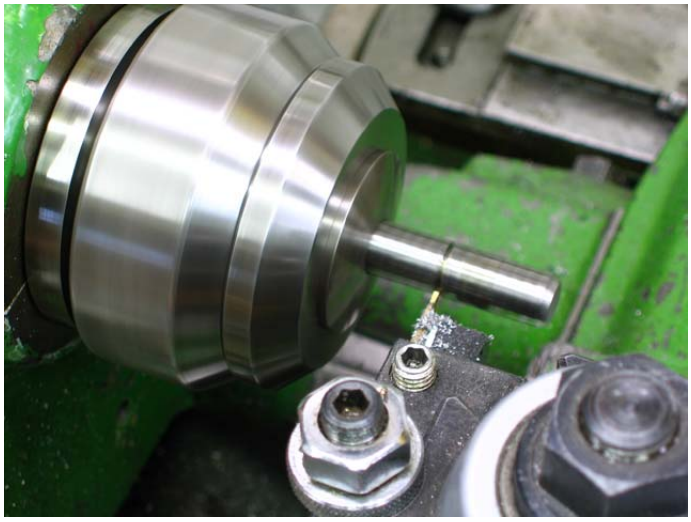


Chuck the smooth TA end of the old screw into a 7/16” collet and part off the acme threaded portion right at the 3/4" collar. Then bore a 0.280 hole about an inch or so deep. This is where the new acme screw will fit. Put the TA end aside for now.

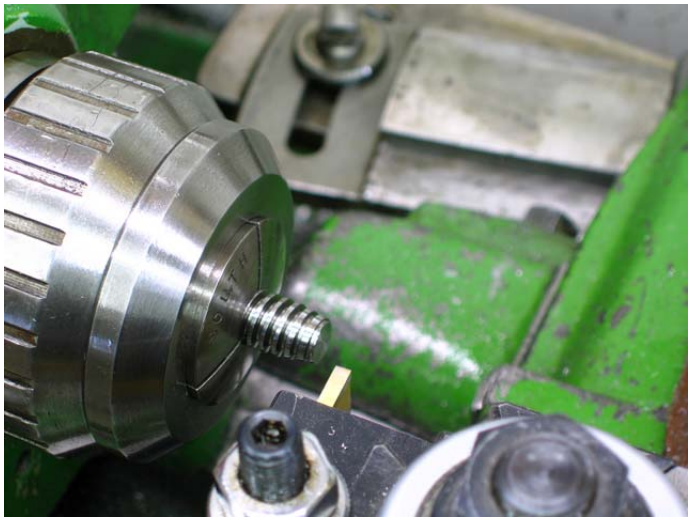
Turn down one end of the new acme screw to a diameter just under the size of the bore just made in the TA section. 0.279” x about 1.25” in my case. These figures are not critical. You just need a decent diameter to length ratio in order to get a good bond between the new screw and the old TA end. Keep the diameter as large as possible, but remove the acme threads entirely for maximum surface area contact.



Dry fit the parts and measure their total length to determine what excess will need to be taken off the handle-end of the screw. Set the TA section aside and part off the calculated excess from the thread-end of the screw.



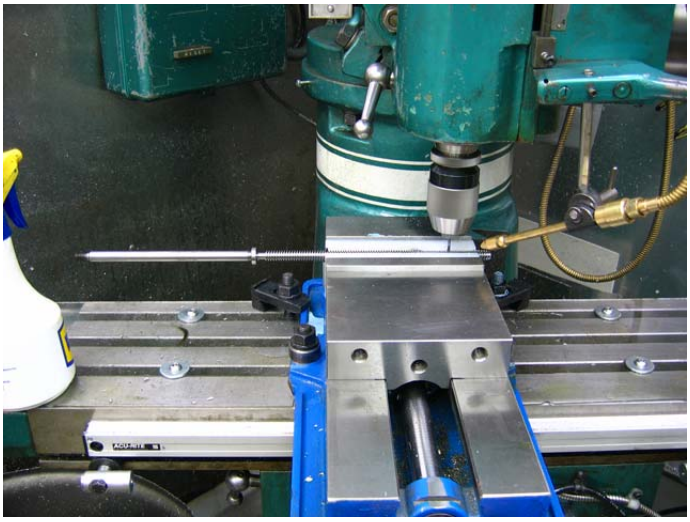
The original Southbend leadscrew has a taper on the handle end of the screw, presumably to make installation of the handle assembly with the screw already in place easier. I set the taper attachment on my machine to its limit and approximated what I saw on the original. The carbide parting blade isn't exactly the right tool for the job, but it's square shoulder minimized the amount of material a radius nose tool would roll off the edges of the threads. Use a jewelers file or emery cloth to debur the acme threads. I also center drilled the end like the original.



At this point, there are only two steps left. Bond the screw to the TA section and cut the 1/8" keyway along the acme end. I chose to bond the parts first.

File a small flat on the smooth screw section to serve as an air-release. Prepare the TA bore and the corresponding area of the leadscrew with Loctite Primer "T", observe the dry time, then assemble the parts using Loctite 680. I left the screw assembly to cure chucked in the lathe and supported with the tailstock. Once cured, I used a dial indicator to check and straighten the leadscrew.

To cut the keyway into the screw, I set it up on my Burke MVN knee mill in the vice between some nylon soft jaws. Indicate the screw parallel to travel and perpendicular to the tool.



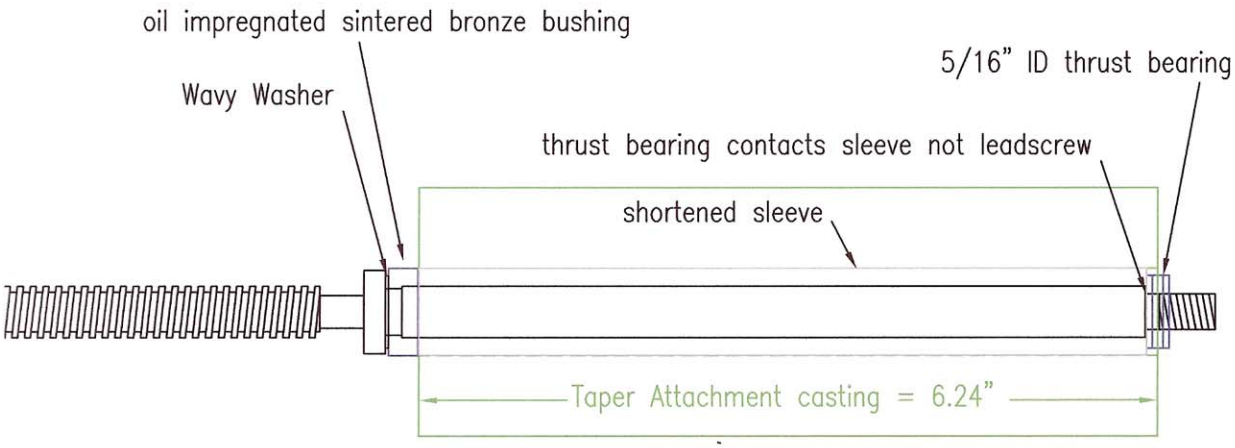
In order to minimize potential backlash in the lathe crossfeed, I used a 7/64" carbide endmill so that I could closely match the width of the corresponding key inside the handle assembly, which is roughly 1/8".

Since I was going through the motions of rebuilding the leadscrew, going the extra distance and fortifying the assembly with thrust bearings seemed obvious & necessary.

The 10L screw is captured by the taper attachment sleeve and from the factory relies on oil and one thick washer behind the 5/16-18 nut as bearing surfaces. Over time, the TA sleeve, leadscrew collar, and washer wear all contributing to backlash.

To eliminate this, I trimmed the TA sleeve length to accommodate an oil impregnated sintered bronze bushing and a 7/16" ID wavy spring washer which was placed between the leadscrew collar and the TA sleeve. I had originally employed a 7/16" ID thrust bearing assembly instead of the bronze bushing, but as I went to assemble things it became obvious that the OD of the thrust bearing needed to be no larger than the OD of the TA sleeve. This is because the leadscrew and TA sleeve telescope in and out of the heavy casting which supports the taper attachment. I was unable to find a 7/16" ID x ¾" OD thrust bearing so I settled on turning the bronze unit instead.

On the far end of the screw, I trimmed the 7/16" shoulder back so that a 5/16" ID thrust bearing behind the nut would bear up against the TA sleeve, not the screw and therefore allow the "slop" to be taken out of the leadscrew/TA sleeve. I replaced the Southbend nut with a metal locking nut so that just the right amount of preload could be put on the wavy spring washer without the nut backing itself off as the leadscrew turned.




The handle assembly on the 10L is separate from the leadscrew. That is to say, the screw is driven by a key inside the gear shaft and is permitted to telescope in & out when using the taper attachment. However, the feel of the leadscrew assembly can be greatly improved by installing thrust bearings.

To fit the thrust bearings onto the handle assembly, the threaded crossfeed sleeve must be shortened at the small OD end and counterbored on the large OD end. The graduated dial must also be counterbored as the needle roller thrust bearing is centered between the two parts.

Parts list:

http://www.wswells.com
(x1) LH 7/16-10 acme leadscrew repair section and nut
(x1) Boston Gear 17195 3/8" ID Thrust Bearing

Stock Drive Products (www.sdp-si.com)
(x1) S99BP3-PB245618 Sintered Bronze Bushing (turn ID & OD to size)
(x1) A 7Z 7031ST 5/16" ID Thrust Bearing
(x1) A 7X 9-3w06108 Wavy Washer(bag of 10)

Local Bearing supply house
(x1) Timken NTA-613 Needle Roller Thrust Bearing
(x2) Timken TRB-613 Thrust Washer

Ace Hardware
(x1) 5/16-18 Metal Lock Nut