THREAD-CHASING 101; Really Thread-chasing 100 ½

By

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Thread-chasing cannot be learned by observing someone else thread-chasing a piece of wood. It can only be learned by practicing it yourself. So, my objective is to give you enough pointers and information on how to thread-chase so that those of you who are interested can go home and practice, practice. If you have problems, I'll try to answer your questions at the next meeting, and If necessary, we'll have a hands-on thread-chasing session at one of our future turnarounds.

Emory McLaughlin is going to demonstrate chasing a male and female thread and I'm going to demonstrate mechanical thread-chasing male and female threads, if time permits.

Thread-chasing is not an advanced skill.

POINTERS:

1. **A LATHE CAPABLE OF SLOW SPEED**
    a. If you take a survey of everyone here, you'll find numerous types of lathes with different capability of rpm. We have lathes that have belts for changing speeds, and we have rheostats on some lathes to vary the speed. On the jet-mini the slowest speed is approximately 500rpm. This lathe behind me is 400rpm at slowest speed. I have a stubby and I believe the Powermatic is similar where you can turn the rheostat to approximately 0-3000rpm, and anywhere in between. But no matter what type of lathe you have, you must try to get a consistent lathe speed between 200-500rpm. When you turn your lathe on, you should consistently come up with the same rpm, between 200-500rpm. If you have a rheostat controlled lathe, and are capable of varying your speed down to 200rpm, you're going to find that the best speed is between 200-300rpm. Mine is 210rpm on my stubby. For those of you that can only get your lathe down to 500rpm, you can get used to that rpm, and be able to thread-chase. Quick overview, you now have a lathe that you can walk up to and consistently get the same rpm. On my lathe, I found my comfort speed for threading and I marked my rheostat with a "T". That way I can come back to the same rpm every time. If you have a constant speed lathe, you'll probably use the 2 pulleys that give you the lowest speed and will give you a constant speed.

2. **A SHARP SET OF MATCHING THREAD-CHASERS**
    a. Chasers come in a wide range of pitches. I find the best for woodturning is from 10-20tpi. You'll need a matching set of chasers for male and female threads with the same tpi. The chasers are nothing more than scrapers and should be sharpened similar to how we sharpen our scraper. All you have to do is to sharpen the top part of the tool. Sharpening can be quite straight-forward for the beginner. I recommend the flat stone

method to begin with. The other method is the hollow grind, which is a similar grind to sharpening the skew. I really do not recommend this method on the thread-chasers because you can mess up the teeth if you go too far forward, and it is really an overkill for sharpening a thread-chaser. After you master the chasing, you may want to sharpen your chasers with a negative-rake angle. (Draw a picture of negative-rake angled tool). **On a new set of chasers, a slight bit of grinding may be necessary to remove the leading part tooth on both the male and female chasers. In other words, if you buy a chaser and the first tooth is only ½ a tooth, remove it so that you are starting with a full tooth.

Round back of female chaser or shape.

3. **BACK CORNERS SHOULD BE HONED TO A SLIGHT RADIUS**
    a. It is very important to gently round the back corner of the tool to remove the sharp edge. This will allow the tool to travel along the tool rest and prevent the tool from snagging as it moves along the tool rest. You can take a piece of sand paper and rub the edges to knock the square down just a little.

4. **A SMOOTH TOOL REST**
    a. You have heard in the past about how important a smooth tool rest is while turning a bowl. It is ten times more important to have a smooth tool rest when thread-chasing. The top face of the rest therefore should be smooth and polished to make it as smooth as possible. For example, a slight application of candle wax can make a tool rest smooth. I cannot stress enough the importance of this.

5. **TIMBERS SUITABLE FOR THREAD-CHASING**
    a. It is best to use hard woods and close-grain woods, such as boxwood, cocobola, blackwood, fruit woods, such as pear and apple, and many more such as these. You can use some acrylics, such as corian, pvc, and so on. Since they have no grain structure, they can be better to learn thread-chasing with that natural woods. Personally, I do not allow my thread-chasing to dictate what type of wood I use. I love to use burl and many times I am not able to thread it successfully. Then, what I do is make a sleeve, both male and female, that I know I can thread and insert the sleeve.

6. **GOOD VENEER SCALE OR THREAD CALIPERS FOR GOOD FITTING TOLERANCES**
    a. There is no set order for making the threads. Although it is often easier to measure the diameter of the male thread. But, I find that more time is put into the base of the vessel, such as my urns, and it seems best to do the female threads first, so that if you mess them up, then you can go back and remove them, until you can get a good set of female threads. Then, measure these threads and work on the smaller top that will have the male threads. I usually thread the male threads on the top and make sure I have a good fit with the female threads before I start carving the top. A helpful hint: I recommend that you try and produce a consistent opening by using a 2 or 3 inch female

opening, and thereby you will be consistently making the male threads, approximately 2 1/8 and 3 1/8. What you'll find yourself doing when you have a scrap tenon or waste block, is turning them down to these consistent sizes and threading them. Then you will have a collection of threaded tops.

7. A LIGHT TOUCH

a. This is self-explanatory, but needs to be thought about. Before starting to chase a thread, try to relax and don't grip the tool too tightly. You need to be comfortable in how you hold the blade, so you can make fluid, easy movements along the rest. Hint: Don't drink a lot of coffee before you do this!

8. A CAMFER AND A RECESS

a. A little bit of preparation prior to starting your chasing can make life easier for you. Cutting the camfer on the leading edge of the spigot(male) or hollow(female) is to help with striking the first thread before progressing along the remainder of the blank. And the other is to cut a slight recess at the end of the section to be threaded to allow the tool some clearance to be extracted before the blade hits the shoulder at the end of the thread. This would result in the blade not being able to move, the timber is still turning, and the subsequent destruction of the thread. The recess is extremely important on the male threads or spigot. You don't always need a recess on the female threads.

9. CORRECT RATE OF TRAVEL ALONG THE TOOL REST (better known as CRT)

a. This is it. This is what you have got to go home and practice. If you can come up with a constant speed on your lathe, the only variable is the CRT. The diameter of the work piece has no effect on the CRT. If your initial rate of travel is slightly too fast, you'll have too few threads per inch. Let's say 15tpi instead of 16tpi if you are using a 16tpi chaser.

And because the chaser can match only 16tpi, no more and no less, then the tool cannot cut cleanly, but will plow into the already forming threads and crumble them away. The same thing will happen if the initial rate of travel is too slow. The pitch will be too fine. You may even get a double thread forming, that's two threads instead of one.

In order for the thread to work we need to cut one complete thread per revolution for the work piece. (Gene demonstrates how to practice threading).

b. Since the rate of travel is a function of the lathe speed and thread pitch, it seems logical that you would be changing the CRT for every different tpi, which is what you would do if you don't have a rheostat on your lathe. But, if you have a rheostat on your lathe, and you like your CRT, you can keep your CRT for all tpi's, and vary the rpm a little. An example: My CRT is 13inches per minute. To find your CRT: Take your normal speed lathe(I set mine at 210rpm), and divide it by tpi and you'll get your CRT, which is 13 inches per minute in my case.

LATHE SPEEDS (RPM) FOR CORRECT RATE OF TRAVEL @ 13 INCHES/MINUTE

TEETH PER INCH	REVS PER MINUTE
26	340
24	312
22	285
20	260
18	235
16	210
14	182

c. Determining fixed lathe speed:
500rpm divided by 16tpi = 31 inches per minute CRT.
500rpm divided by 14tpi = 35 ¾ inches per minute CRT.
500rpm divided by 26tpi = 19 inches per minute CRT.

10. CONFIDENCE IN THREAD-CHASING

a. This will come with practice, but be bold! Don't be timid. Assuming that all the other nine points are understood, turn the lathe and strike the thread. The blade is presented at 90 degrees to the camfer and is moved along the rest in an arcing manner around the camfer, until the cutting edge is parallel in line with the main section to be cut. One trick is to make multiple light passes across the work, making the thread deeper with each pass. And remember to remove the blade as you reach the recess. This motion of moving along the rest and taking the blade off and reapplying it is almost a fluid oval motion. Continue this process until you have reached the end of the area to be threaded.