

# Turning Threads In Wood -- It's Easier Than You Think

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I first became interested in thread chasing while watching the Mike Mahoney video "Hollow Forms And Urns – A Workshop", in which Mike threaded a disk of boxwood that became a collar insert for an urn, into which a blackwood finial was later threaded.

When I spent a week in Mike's workshop in Provo, Utah, last December, I pressed him to include thread chasing among the projects we would attempt.

We wound up tackling thread chasing on our last afternoon and never got around to making inserts. We simply covered making inside and outside threads.

Tonight, the demonstration will cover the basics and some additional projects that can be accomplished using these skills.

## **Materials:**

Good threading can only be accomplished on woods that are dense, dry, stable and close grained. Most of the native woods we are accustomed to working with (Maple, Black Walnut, Cherry, Box Elder and others) are not suitable for thread chasing as they are too soft or too brittle.

### **Woods that are good for threading:**

Boxwood  
Lignum Vitae  
African Blackwood  
Pink Ivory  
Osage Orange

There are other exotic woods that thread well but the above are the more well known.

### **There are synthetic materials that can be used for practice:**

Corian  
Resin blanks (pen)

The wood used must be dry so that there is no later movement which would result in threads that would bind.

## Specific Gravity:

The measure of the “denseness” of wood is its Specific Gravity. Specific Gravity is the comparison of the weight of a cubic foot of water at sea level (which is 62.4 lbs/cu.ft.) to the weight of a cubic foot of wood. A cubic foot of wood that weighs 62.4 lbs/cu.ft. at sea level is assigned a Specific Gravity number of 1. Woods that are heavier (more dense) will have a higher number, and woods that are lighter (less dense) will have a lower number. Thread chasing requires a wood with a Specific Gravity of around 1.

<b>Specific Gravities:</b>	
Osage Orange	- 0.76
Pink Ivory	- 0.9
Boxwood	- 0.9
African Blackwood	- 1.2
Lignum Vitae	- 1.25

The only wood I used for thread chasing prior to preparing for this demonstration was Lignum Vitae. The benefit of using Lignum Vitae is that it is a naturally oily wood and as such is self-lubricating, whereas some wax is often used to lightly coat chased threads to facilitate the joining of threads.

## Thread Chasing Tools:

Outside Cutter: Has the cutting teeth on the end of the tool.

Inside Cutter: Has the cutting teeth on the side of the tool.



Relief Cutter: Cuts a recess behind the area to be threaded. The cutter is raised from the grooves it is cutting before encountering an obstacle.



The cutters have teeth that are offset from the vertical allowing them to create the thread as they traverse the threading area.

The number of teeth on the cutters correspond to the number of threads per inch (tpi) that the cutter creates. The most common tpi's are 10, 16 and 20. The greater the number of teeth on the tool the slower the tool is moved across the cutting surface. It is easier to learn thread chasing by using a higher tpi tool. For these demonstrations I will be using 16 tpi tools.

**Other Useful Tools:**

Vernier scale  
Calliper  
Parting tool  
Flat scraper  
Beading tool  
Robert Sorby Sizing Gage



## **Lathe Speed:**

Forming threads properly requires a slow lathe speed. A speed in the 200 – 350 RPM range is suggested as being ideal for thread chasing.

## **Sizing the work:**

Many turners suggest creating the female thread first and then measuring the base of those threads as the sought diameter of the male spigot to be threaded. This is the trial and error method. If once the male threads are made the two pieces do not thread because the male spigot is too large – then the threads have to be cut down and new threads established and the fit checked again.

Robert Sorby makes a thread sizing caliper that takes the guesswork out of sizing – ensuring a correct fit each time, no matter whether the female or the male thread is cut first. I will demonstrate its use.

## **Turning Threads**

### **Cutting the Female Thread:**

Mount the lid blank or the insert blank in the chuck. Hollow out the lid to the desired depth or hollow out the insert all the way through. The inside and outside wall must be parallel.



Cut a relief groove at the end of the section to be threaded. The groove prevents bottoming out the thread chasing tool, which would destroy the threads.



The outer lip of the inner wall then is chamfered or rounded over. That is the area on which the chasing tool will start the thread.

**Lathe speed should be 200 - 350 rpm**

The tool rest should be placed 90 degrees to the lathe bed and at a height that allows the cutting edge of the chasing tool to strike the wood on center or just above center.

The threading cut is begun at an angle to the wall being cut. For the initial threads, start with the third or fourth tooth. Repeat until the thread has started. Once started, the threading tool can be gradually swung around until it is parallel to the side of the piece. Make sure to lift the threading tool once the lead tooth enters the cut recess or relief area.

Once the thread is defined, the first tooth can be used to enter the thread. Using the first tooth will allow the chaser to be pulled into the work. Some apply a light coating of wax at this stage before making the final cuts to fully profile the threads.

### **Cutting the Male Thread:**

Mount the base section in the chuck. With the tool rest parallel with the lathe bed, face off the end and create a spigot. With calipers, measure the inside diameter of the female threads already created. When the spigot is chamfered, the lower edge of the chamfer should fit into the area created by the top of the female threads. Allow enough diameter along the spigot to form the male threads so that they will mesh with the female threads.

Cut a relief groove at the end of the area to be threaded. This can be accomplished with a parting tool.

**Lathe speed should be 200 – 350 rpm**



The thread chasing tool should be presented to the wood on center or slightly below, in a trailing fashion, for the best cut.

Make the cut starting on the rounded over edge area with a circular motion, striking the wood with the third or fourth tooth of the cutter rather than the first tooth. As the thread forms, gradually bring the tool perpendicular to the threading area as the threads are fully profiled.



Test the fit. If the spigot with the male threads is too wide than a beading tool or a flat scraper can be used to lower the male threads and those threads can then be re-profiled and the fit tested again.

### **Sharpening:**

The tools should only be sharpened by using a flat stone or diamond hone on the top of the tool. That will sharpen the cutting edge of the teeth. No other sharpening is necessary.

### **Other Applications:**

#### **Inserts in hollowforms for finials:**

This subject is covered nicely in the Mike Mahoney Video noted in the Reference Section and in the Robert Sorby Video. I encourage everyone interested in thread chasing to check out these videos and watch them closely. I'll include a couple of snipped pictures from the Mike Mahoney Video.

Cut a recess to accept a fitted collar –





Make the insert to be glued into the hollowform –



Thread the spigot on the piece to be used for the finial –



## **References And Resources:**

Woodturning Design Issue #46, December 2013, Sam Angelo pg. 57-61

Making Screw Threads in Wood by Fred Holder

Bill Jones – Notes From the Turning Shop

Bill Jones – Further Notes From the Turning Shop

All Screwed Up by John Berkeley

Turning Boxes With Threaded Lids by Bill Bowers

Videos and DVDs:

Hand Thread Chasing with Allan Batty

John Berkeley Screwplugs Series

Focus On Thread Cutting with Robert Sorby

Hollow Forms and Urns – A Workshop with Mike Mahoney

Youtube:

Wyomingwoodturner with Sam Angelo

Hand Thread Chasing with Allan Batty