

# Creating threads in your turnings

Kurt Hertzog explores the subject of creating threads in your turnings and looks at a variety of ways in which these can be created

For the most part, there isn't a large call for threads in woodturned objects. That is probably a good thing since wood really doesn't lend itself to being threaded. There are several ways to cut threads into wood but the fact that wood has grain really makes the strength of those threads less than ideal when compared with other materials. Some species are better than others for taking and keeping threads. Why might you want to put threads into wood? Several woodturning projects lend themselves to being threaded. Lidded boxes can use threaded connections as a closure method. Urns and other deep hollowed pieces needing a secure closure of the

opening can use threads. Threading in your turning allows for disassembly for shipping or storage with the goal of easy assembly later on. Large turnings, sculptural-type pieces and walking canes fit into this category. An often overlooked reason for threading in wood is just for processing and the jigs/ fixtures that need fastening to the lathe. Much like you can put a chuck screw into your bowl blank and drive it gripped in your chuck, depending on the size and species, you can thread the blank using the headstock threading to attach it. With the tailcentre in place, it is as safe as using a screw and it eliminates the need for the chuck. Let's look at some of the ways to create and use threads.

## KURT HERTZOG



**About the author:** Kurt is a professional woodturner, demonstrator and teacher and writes for various publications as well as *Woodturning* magazine. He is on the Pen Makers' Guild Council and is a member of the Board of Directors of the American

Association of Woodturners (AAW).  
**Email:** kurt@kurthertzog.com  
**Web:** www.kurthertzog.com

## WHAT IS WRONG WITH THREADING WOOD?

Wood is inherently a poor material choice to thread. Think about the characteristics of wood. It expands and contracts forever with moisture change. It expands at different rates based on the grain orientation. What do you think happens when you cut nicely shaped 'V' threads across the grain? Do you think the peaks of the threads are very strong or have much lifetime? Worse yet, think about cutting threads into a face-grain orientation where you'll have face grain,

cross grain, and end grain presented. Imagine the problems with that wood movement. In spite of the inherent problems with threading wood directly, there are many successful threaded wooden products from the ancient shipboard examples of massive carved threads on shipboard to the modern era. Any threads cut into the wood directly will always be at the mercy of the fragility of the parent material. Where the need arises, we'll look at alternatives to wood for the thread area.



Even with dense, straight-grained woods such as this African blackwood (*Dalbergia melanoxylon*), the threads are still fragile based on the grain orientation with respect to the peaks of the thread



Threads can also be cut into the face grain like a bowl, as opposed to the usual spindle threading orientation. Weakness is still an issue and now comes the problem of expansion and contraction orientation



Because of the weakness of the peaks of the threads, they are not always brought to a point. Corian, by contrast, will take and hold threads without the thread peak weakness and durability issues

## WHAT DO YOU NEED?

Depending on your needs, you'll be driven to different methods of creating threads in your turning. Other than the fittings sold for turned canes so they can be broken down, I can't think of threads that are manufactured to be installed in woodturnings. Perhaps there are a few but none come to mind right now. Before you

head down the path of creating threads, give some thought to your strength requirements, rotational resolution needed, frequency of use, mating alignment for appearance or accuracy and ease of creation based on diameter and pitch. Any of these needs can drive you down a different path. There are four main ways to create threads that I've used in my turnings.

These are hand-chased threads; machine-tool taps and dies; inserted threads, whether purchased or created, and special machine-cut threads. All have their place and often more than one of these methods will get you to the desired end point. We'll explore each of these four methods and highlight the strengths and weaknesses of each.



Whether threading the bowl blank for use or embedding nuts and bolts into jigs and fixtures, always be aware of the strength needed for your application. Always over design for the sake of safety

Machine-cut threads are readily detected by the absence of a run-out area. The thread can start and stop as needed without concern for the hand-chase tool to be disengaged from the work



Whether hand-chased or machine-cut, attention to detail matters. Even these demo pieces were done to teach the tuning needed so that the grain matches when top and bottom are threaded closed



◀ HAND-CHASED THREADS

Many create hand-chased threads specifically for the bragging rights. Much like rolling beads with a skew chisel, hand-chasing threads is sometimes equated with woodturning prowess. Hand-chasing threads isn't for everyone and certainly does take more skill than the other methods. That said, it offers many advantages that are missing from some of the other methods. On the plus side, the tools are not extremely expensive, considering you need three different tools to cut mating inside and outside threads and the run-out area. Each pitch desired is a once-in-a-lifetime purchase that, with proper care and sharpening, should never need replacing. The thread pitches available are somewhat limited. There aren't many tool manufacturers making these tools and there is a limited range of functionality of different pitches when cut in wood. Some of the shop-handy turners make their own thread-cutting tools but most opt to buy them, living with the pitches that are commonly available. This plays right into the strength

and material issues that all threads cut into wood face. Common hand-chased threading tool pitches range from 12-20 threads per inch. The coarseness of the thread interacts with the number of turns needed as well as the thread strength. The beauty of hand-chased threads is that they are diameter independent. You can cut your chosen pitch into diameters from very small to very large without any problems. The technique used is the same regardless of the diameter.

The downsides of hand-chased threads are being stuck with the limited thread pitches available; needing additional skills to be successful; failure usually ruining the project and the need to cut a 'run-out' area. With the common pitches being from 12-20 threads per inch, something other than that will probably require you to have your tools custom made. This isn't a show stopper but can be beyond your skills and equipment, requiring you to find a maker. Learning to hand-chase threads is like any woodturning skill. There are a few rules that need to be adhered to and the rest is

practice. With sufficient practice, I think most woodturners can be successful at hand-chased threads. Probably the most critical problem is the catastrophic failure mode. Depending on your process flow, whether you cut your threads early in your project or near the very end, failure in your threading usually makes the turning scrap. Clever design will allow some recovery but, like cutting beads with a skew chisel, the unsuccessful attempt is often the source of bad words and work to be scrapped. While not a huge downside, there is the need for a run-out area at the material end of the threading unless the threaded area is open at both ends. This area allows the time for the thread-chasing tool to be disengaged from the work before it hits a stop. If there wasn't this time to disengage, the threading tool would hit the shoulder or corner whether inside or out and tear up the threads that were being cut. A quick indicator of hand-chased threads is the presence of this run-out area since it isn't required for any of the other methods of creating threads.



Hand-chase threading tools for different pitch threads, including inside and outside cutting tools along with the tool used to cut the inside thread run-out area. All of my threading tools were made by Crown Hand Tools



There are those who sharpen their threading tools on a grinder to freshen the top edge. I favour using a diamond hone. Laid at a very slight angle off top flat, a few strokes will provide a new edge



My choice of wood to thread either standalone or as inserts is always English boxwood (*Buxus sempervirens*). Boxwood being expensive, hard to find and small in diameter, makes African blackwood my second choice



Hand-chased threads for inside, outside, or matched pairs are mastered with a bit of practice. You can easily do tapered threads as well. Like all woodturning skills, time at the lathe is needed

MACHINE-TOOL TAPS AND DIES

Any of the machine-tool taps and dies made for metal will work very nicely on wood. All available sizes aren't necessarily appropriate based on size, pitch and ultimate thread strength, but they have the capability to cut wood well and last a long time. This is particularly helpful when making accessories to be used on the lathe. A revolving tailstock nose threading is  $\frac{3}{4} \times 10$ tpi, which is standard for Oneway and JET tailcentres. Being an industry standard makes the taps readily available at modest cost. The hole or shaft sizes needed for any particular tap or die is easily found and the tap or die are used in the same fashion as metal except without lubricant: advancing, breaking the chip, advancing, breaking chip, and repeating until completed. Obviously this method requires somewhat less skills and practice than hand-chasing. It is also far less prone to failure. Failure will still lead to catastrophic loss but is far less frequent. This advantage of a much higher success rate makes it the method of choice when the sizes needed are available. There is a huge array of pitches and

diameters available in the machine tool supply chain but the cost rapidly escalates with size. A few of the very common woodturning thread standards are offered through the woodturning retailers. Mostly taps, these allow you to make jigs and fixtures for the headstock and tailstock threading as well as thread turning stock for direct mounting.

TOP: Standard machine-tool taps and dies will work nicely on wood. More readily found at the industrial supply house, nearly any thread is available. Common woodturning sizes are now coming into stores

MIDDLE: When creating jigs and fixtures, drill and tap, then use the tap as a mandrel. Turn the rest of the needed shapes and subsequent drilled holes while fixed to the tap, which allows for best concentricity of the final result

BOTTOM: Feel free to make a batch of headstock and tailstock accessories. My mandrel savers, metal and wood, accept sanding disc pads as well as a host of other special holders, pilots and friction blocks



My original tailstock threaded blackwood block fastened to my tailcentre was to be a mandrel saver. Designed long before the commercial versions arrived, it still is far superior in function

INSERTED THREADS

There are a few different permutations of inserted threads. The first is to buy threaded fasteners, nuts and/or bolts, for insertion into your project whether a finished turning or a shop aid. Rather than tie up a faceplate, a friction pad could have a nut embedded in it to allow for direct threading on the headstock. The same concept would work for turning aids for the tailstock. These are especially appropriate where higher thread strength is needed. Both males and females can be brought to bear for assembled turned items where the fastener won't be visible. High strength, low cost, easy to use and long functional lifetime make this method attractive for shop jigs and fixtures as well as turnings needing assembly and disassembly for transit or storage. Nuts and bolts are available in every conceivable size, although not from the local woodturning retailer but through industrial supply.

Another aspect of inserted threads is hand-chased or created with machine-tool taps and dies but from a different material. This allows the use of different species of wood

more conducive to threading or solid-surface materials such as Corian or another brand. Not only can the material be selected for its inherent benefits but the threading can be done prior to insertion. Failure at that point doesn't ruin the work; it only requires another try at making the threaded parts needed for insertion in the finished turning. Sometimes the more thread-friendly material is fastened into the turning and then threaded. This is often needed based on the size, location, or fragility of the to-be-threaded material. Urn makers often insert English boxwood or Corian into the necks for threading. Both offer excellent threading characteristics and strength. The mating part might receive an insert of special material as well.

Inserting finished threads has many virtues from a risk standpoint. Inserting more thread-friendly materials, while helping with the threading and durability problem, still presents the risk of failure while threading. Of course, failure of threading can be remedied by turning away the inserted material and replacing it for another try. Along those same



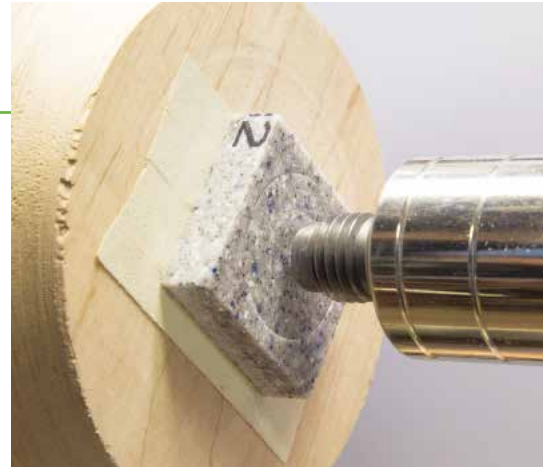
My start of an insertable set of matching threads. Using hand chasers, the inside thread is cut in Corian and then an outside thread from another piece of the same material is threaded being tuned to fit

## ◀ INSERTED THREADS (CONT.)

lines is casting in a material to be threaded. Cutting a pocket to receive epoxy or some castable material selected for the threading characteristics allows for the same idea. Cast in the area to be threaded. Thread it successfully and move on. Fail at the threading and cut away the cast-in material and repeat the casting process. The damming

of the area or the progressive filling of material channels requires some time and thought, but is certainly doable.

**This matched pair is now mounted on double-sided tape to a block to trim the outside and inside of the thread pair to the desired dimensions. Both wall thickness and thread length can be adjusted**



Tailcentre only removed after the outer diameter is completed and the inner diameter is nearly done. Tailcentre removed to allow access, light inside cuts until the bottom breakthrough occurs



Yet to be cleaned up, the matched thread pair is done. Notice the scoring cut into the outer diameter wall. Avoiding smooth, I want a rough surface with 'glue traps' to provide for a good glue surface



Ready for gluing into and onto the mating surfaces to provide a very durable and high strength threaded interface. You can get nearly any colour you want. Threads well and is tough, durable and inert

## SPECIAL TYPES OF MACHINE-CUT THREADS

There are several thread cutting machines for the wood lathe available commercially. These and the home-build versions work along the same principles. The cutterhead is rotated in the lathe headstock and the work to be threaded is rotated and advanced into the cutter via a set of mechanics based on the pitch desired. Sometimes the mechanics are a bit different but the relative motions are the same. The cutter is usually a 60° cutter angle that is used to progressively deepen the thread. The pitch is controlled by the screw thread mechanics and the thread diameter is controlled by the adjustability of the fixture. The two versions of this that I am familiar with are the Klein and the Baxter thread-cutting fixtures. There are others as well as the homebuilt versions. The advantage is the lack of run-out area needed by the hand-chasing process and the high rate of success. A little practice and the process is easily mastered. The biggest downside is the cost. These commercial machines are expensive. Depending on your threading needs, it may or may not be a favourable economic proposition. Because the threads cut via this method will still be subject to the threaded material shortcomings, inserting better suited materials is certainly an option even when using this type of machinery.

## CONCLUSION

I suggest that you try threading somewhere along the way as part of your woodturning journey. Whether you intend to use it often or just that once to see what it is all about, you'll gain an appreciation for threaded turnings. I recommend that you practice and develop your skills on inexpensive materials that are conducive to accepting threads. I find that Corian and other solid-surface materials work wonderfully both as practice and real use materials. The fact that there is no grain to contend with and the material cuts nicely will let you refine your technique. After mastering the technique, then move on to the more difficult and potentially more expensive materials. If you move on to threading wood itself, help yourself by threading woods that are dense and straight-grained. My favourites are African blackwood and English boxwood, preferably boxwood but it is difficult to find, expensive and usually small in diameter. If you find a good source, be certain to treasure it. Blackwood, while also expensive, is easier to find and is available in larger diameters. Don't give up on your first efforts. Like the skew chisel, a few rules must be followed

without fail and the rest is practice. Give it a try; I think you'll enjoy the results. ●

Tapered threads are a lot of fun once you've got the hang of hand-chasing threads. Do a few to prove to yourself you can and then accept there is little call for them and give them up



Threading, whether inserted bolts or hand-chased versions from your own materials, can be a lot of fun and adds to your skill sets. Give it a try. It will add one more thing to your bag of tricks when needed

