



What you need to know about hollowing rigs

Kurt Hertzog shares his thoughts on selecting hollowing rigs

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There are many ways to create hollow woodturnings ranging from the very traditional gouges to some of the more modern implementations of carbide cutters. With that said, what tools are used is driven mostly by the types and depths of hollowing being done. A bowl is a hollow turning as much as a lidded box, it has a different aspect ratio but it is certainly a hollowing. For the

most part, hollowing of those types of items is pretty straightforward and is accomplished using the standard woodturning tools. What about far deeper hollowed forms such as vases, urns and the like? They certainly range in size from the 'normal' to very deep. In *WT* 280 - June 2015, we explored hollowing in the generic sense and the basics using hand tools on the more common applications. This month, we'll delve into the realm of hollowing rigs. These are the units that take the tools out of the hands of the turner and provide the mechanical support to control the tool forces. With this support, it allows the user to simply guide the cutting process by manipulating the bar. These are pretty widely varied in their implementation but all share the goals of making deeper hollowing easier and safer. This is especially true when you wish to hollow through a relatively narrow opening. The mechanisation of the various offerings differ somewhat but their goal is to allow for greater reach over the toolrest while restraining the rotational torque that presents itself while cutting.

For those who already own a hollowing system, you might pick up a few tips on setup but we'll mainly focus on the basics for those who haven't yet committed to a system. My goal is to lay out enough of the basics to be helpful in the selection and setup of a hollowing system for newcomers. The cutters and scrapers used in the hollowing rigs are a topic of their own. Nearly every offering in the cutting and scraping arena will fit on or can be adapted to nearly all of the hollowing systems. We'll touch on them this month but they deserve more in-depth coverage of them in a future issue.

Safety

One of the beauties of the hollowing systems available is, by design, they take advantage of good support and leverage control. When hollowing with hand-held turning tools, the user can overreach creating potentially unsafe conditions because of the leverage issues and forces involved. When using any of the hollowing systems you might

encounter, you still need to be aware of the overhang limitations and leverage effects. Stay within the bounds recommended by the manufacturer and even temper those recommendations to the safer side if you think appropriate. By far and away the most critical issues are bar support on the front end and the locking mechanism for

the bar in the rear support of that design. Be certain you are cognizant of supporting the front of the bar in all instances being certain you don't ever let it slip off the front rest on either side. If your design includes using a bar capture system on the rear, use the safety pin, locking mechanism or whatever you are provided with by the

manufacturer to ensure that the back end of the bar always stays within their trap. A mishap at either end can create unsafe conditions in the blink of an eye. Of course, all of the standard good turning safety practices still apply as well and you should be using all of the appropriate PPE whenever you are turning.



Care must be taken to ensure your bar doesn't slip off your toolrest. Custom hollowing rigs provide stops



Regardless of the bar design, the safety pin to prevent coming out of the trap, depending on design, is imperative

Question yourself on your needs

As you think about selecting any of the available hollowing systems, you probably should ask yourself several basic questions. The answers to these will usually point you to the hollowing system(s) that can meet your needs best. How big will your typical hollowed turning be? Working on a mini-lathe versus an extended bed large swing lathe along with your choice of turned piece size can help point you correctly to the right sized unit. How deep or, more appropriately, how far over the rest will you need to work? Hollowing 150 or 200mm deep is far less demanding than hollowing half a metre

or so down into a vessel. How thin will the walls of your work need to be? Nearly any rig will let you work to whatever wall thickness your skills will allow but bigger work with thin walls may drive the selection of a laser and possibly a centre steady. Both of these are handy to have but are additional costs that may not be essential if you do thicker walled work that isn't particularly deep. Beyond the laser for wall thickness knowledge, there are now several video options available, but these will be covered in a future article. Are you going to be working through

a small opening? While most hollowing rigs can be but aren't often used for a bowl type turning, they are usually used to hollow vessels. If the opening at the top of the vessel will be small with respect to the size of the turning, your choices for a hollowing system might be impacted. Perhaps the most difficult question is, will your system need to grow? You may work on a mini now but there may be a larger lathe in your future. Many systems are adaptable to a certain degree so thinking through this a bit may prevent the purchase of another unit later on.



Your first decision is to determine your needs for depth of hollowing or reach over the toolrest



Hollowing systems offer a laser attachment that will help with determining wall thickness as you are cutting



Adjusted to your desired wall thickness, when the laser beam falls off the edge of the turning you are there

▣ Sizes of a hollowing bar system

There are many different implementations of 'non-hand-held' hollowing systems. These provide for the capture and control of the back end of the bar via a trap or other mechanical system with the front end riding on a toolrest. The very basic features that the shopper should be aware of are the size of the system and the type. When talking about size, the real key is how deep you intend to hollow and how big is your lathe. Nearly all of the hollowing systems are sized based on the lathe they will be used on. The bar sizes I'm familiar with range from 5/8in to 1 1/4in diameters. The 5/8in bars are for the depth of about 9in or less while the 1 1/4in bars are rated for 33in or less. Obviously a table-

mounted mini-lathe will be far smaller than something intended for a lathe with a 24in or larger swing. When you are selecting your future hollowing system, pay attention to those that will upsize to a larger lathe. Depending on the manufacturer, you can get toolrests that will fit into a 3/4in mounting and shim to a 1in. Depending on the style, your system may work on a 10 or 12in swing lathe and be able to be adapted to a 24in swing. Of course, the bar size may be a factor if you use your smaller rig on a larger lathe. Remember, the diameter of the bar and the mass will be the main determinant of how far you can reach over the rest as well as how much dampening your rig will provide.



The differences between the 5/8in bar and the 1 1/4in bar is reach and dampening



Made for smaller lathes, this hollowing rig is capable of about 9in reach over the toolrest



My larger hollowing rig with a 1 1/4in bar can reach 33in over the toolrest



The dampening of both size systems is considerable with the dual welded bars of 5/8in or 1 1/4in

Types of hollowing systems

The capture hollowing rig first began as a bar with an outrigger shape to prevent rotation. It worked and still works extremely well. There is a trap at the back that the outrigger travels in and now with a safety catch pin to prevent it from disengaging from the guide trap. An alternative to this design is the side by side welded bar design. It uses the same concept of a trap at the back to support the back end with the side by side bar preventing rotation due to the guide trap. This system also uses a safety locking pin to prevent slipping out of the guide trap. The third common system

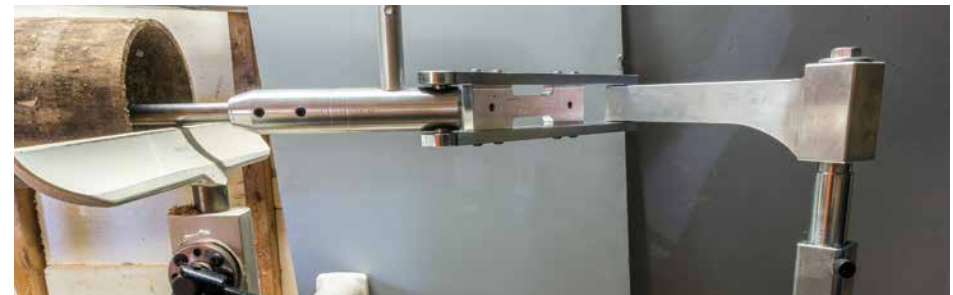
is a scissors type of system that avoids the need for a guide trap at the back end. It is held at the back with a support post fastened to the bed of the lathe. The front of the hollowing rig uses the same support as the other systems counting on the toolrest to provide the height adjustment for the cutting edge. Which is better? I have systems of all three types and they all work nicely. The scissors types I own are a bit less heavy duty by design and are quite nice to use. For the longest reach, I use my largest dual welded bar design.



One of the early designs of the captured hollowing bar system. Still working well



A scissors type design implemented on one of my small lathes. No need for the guide trap by design



Another vendor of a scissors design hollowing system implemented for a slightly larger lathe



My large welded side by side bar hollowing system. Massive dampening and long over toolrest reach

Toolrests

You can use your standard toolrests to support the hollowing rigs but take care to work directly over the toolpost. The rest is the strongest there. Be careful if you have cast rests since they are prone to break if you load them too much away from the toolpost. I favour using the banjo and toolrest specifically made for the hollowing process. Compact and strong, they feature movable pins to control the edge point. Not only does the pin prevent falling off but it also allows the bar to be levered against it.



The standard banjo and toolrest will work well provided you work over the toolpost for maximum strength



I favour the high strength toolrests with movable pins. Note the rest on the left with adapter sleeve partially slid on

❏ Cutters

In the beginning, the tools of choice were a machinist's tool bit mounted either forward or canted to the side and a scraper bit that could be mounted. Many fine hollow forms have been and can still be created with these tools alone. Today, there are so many other choices that you'd be foolish not to give them a try. The many carbide cutters available can be mounted to the hollowing bar, as can the shrouded versions. Because these cut much more than the machinist's tool bit, you get curls and curls coming off rather than small chips of wood. Suffice to say, you'll have a world of cutting tools to bring to bear with the proper adapters for your hollowing rig. There'll be much more on cutters in a future



I set my cutter working edge height to be ever so slightly above the centreline of the work

issue. For now, whether you use a carbide cutter, shrouded or not, or a machinist's tool bit, adjust the cutter height to be on dead centre or slightly above centre for your inside cutting. I find that keeping the hollowing rig



There are an assortment of cutters available. These are my workhorses

level with my cutter adjusted slightly above centre allows for the best operation for me. There are other opinions out there so feel free to weigh those as you hone in on your own style.

Cutting and cleaning

Depending on your design of turning and type of cutter, you'll have to clean the debris at varying intervals. Hollowing through a small hole will prevent the cuttings from exiting the turning easily. As they build up inside, they will prevent a good cutting operation from happening. Stop regularly and clean out the debris for best cutting. An air hose inserted into the opening will usually blow out the chips. Be careful of your eyes and other people around you since the debris will be flying out and can easily be a hazard even if you're using PPE. Your style of hollowing will probably vary depending on whether you are a centre steady user or not. Starting at the centre and working out towards your desired wall thickness in stages will work nicely. Working an inch deeper at a time will leave sufficient stock to support the cut while you work. After you've achieved your desired wall thickness, work on the next inch down fairing the next wall thickness cut to the last. Using your same technique as hollowing the inside of a bowl will work nicely for you.



The debris needs to be cleaned periodically to allow for effective cutting. An air hose works well

To centre steady or not

Among the hollow form turners, there is a differing opinion on whether to use a centre steady. Those that do, typically create their outside shape to its conclusion prior to hollowing. Of course, they may need to leave some meat at the bottom for workholding strength but their planned use of a centre steady allows them to create and refine their form before they begin their hollowing. Those in the other camp who don't use a centre steady do their hollowing as they create their shape. By working step by step in the depth, they always have sufficient support to do their hollowing as they progress. Much like thinning the walls of a bowl in stages, this method prevents chatter and unsupported areas by working in stages arriving at the final form at the same time hollowing is completed. Either way will work. Both camps have plenty of their own good reasons for their choice. Personally, since I own several sized centre steadies, I usually employ them since they are already sitting beside the lathes. There are several styles of centre steadies available. There

are some that fully encompass the turning and there are some whose framework doesn't completely surround the work. The rollers can be positioned properly but the mechanics



Centre steadies are available in several designs and in sizes appropriate for your work and lathe

allow for adding and removing the steady without dismantling things. This has an advantage but does take a bit of extra fiddling around to get things adjusted properly.



One of the newer centre steady designs whose frame doesn't surround the work

Measuring

We won't be covering the modern vision systems recently available for hollowing here but will in the future. A current lower-tech method is simply the use of a laser beam to indicate the wall thickness. Mounted above your cutting bar, you adjust the position of the laser with respect to the cutting edge so you'll know when that thickness has been obtained. The usual

method is to set the laser position away from the cutter edge by the dimension of the wall thickness desired. While cutting, the laser beam shows on the edge of the turning. When the beam falls off the edge, you've achieved that dimension of wall thickness. There are some tricks to setting the dimension based on the area of cutting and the type of cutter being used but those

are easily learned at the lathe. An even lower-tech option is the tried and true callipers method. Of course you'll need to turn off the lathe to measure but you can use the larger callipers for measuring down into your form to indicate wall thickness. These callipers come in many sizes and shapes and you can even use a bent coat hanger to check thickness.



Wall thickness can be measured with any of the standard measuring tools that will reach



My favourite is the simple coat hanger or welding rod closed to a gap and then compared as slid inside

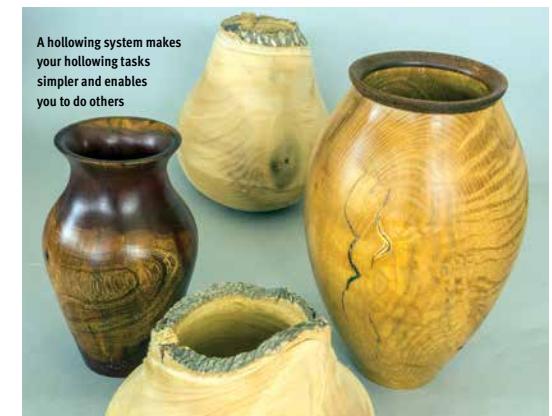
Your shopper's checklist

Are you buying for now, the future or both? The mechanics are your choice but the bar size depends on how big and how deep you intend to go. The original style, the scissors style or the two bar weldments will all do the same thing for you when sized properly. You choose your style and the size to cover your needs. Will you need or want a centre steady? They usually are sized based on the swing of the lathe and don't easily adapt as the hollowing rigs might. Is your current banjo and toolrest heavy duty enough for your needs or will you be in the market for a specific toolrest for hollowing? These are incredibly sturdy and will serve you well. They also have specific designs to help prevent falling off the edge. Your cutting choices are your own but the most economical to begin with will be the machinist's tool bits and scrapers. Very easy to grind and very modestly priced. Later on you can consider the carbide cutters if you wish. Pricier and a bit trickier so get your basics under your belt before you launch into these. If you are new to the market, don't be afraid to consider used equipment. Properly cared for, there is little to go wrong or wear out on hollowing equipment so bargain pricing may be had when buying second-hand. What about home built? I have used and own some home-built versions of hollowing systems. If they are built properly, they can be as functional as the commercially available units. Do take care that any home-built units are of the proper materials and have had quality welding done on them. Also be certain that the hardware is of the proper strengths. Commercial units will have grade 3 or grade 5 hardware to be certain it is up to the loading it will see. Be certain that home-built units have the appropriate hardware used.

Conclusions

Not every woodturner will have a need for a hollowing system but I must admit they are a lot of fun when you do. If you make hollow forms of any kind, you'll find the advantages of a hollowing system priceless. Once set up, the ease of 'steering' the cut with only fingertip efforts will get you spoiled. None of the systems I am familiar with are inexpensive but

they are a once in a lifetime buy if you select properly. Before you take the plunge, seek out a fellow turner who has a hollowing system they are willing to let you try out. With their assistance, spend a bit of time creating something from a fresh cut end grain mounted blank and I'm betting you'll be in the market for a hollowing system soon. ●



A hollowing system makes your hollowing tasks simpler and enables you to do others