

Some tips and opinions (in no particular order):

- Hemostats useful for removing shavings and for sanding.
SAFETY ISSUE: Do not put your fingers in handle while sanding on the lathe!
- Long air gun nozzle lets you get behind the shavings (13 inch works well)
- Using a mini level with a magnet makes horizontal tool presentation easy
- Attach blanks with #14 screws on faceplates if possible
- Card scrapers are great for refining and finishing the outside of forms, and for checking flats.
SAFETY ISSUE: Be sure to grind off sharp card corners and hold it trailing!
- Carbide is very effective and getting cheaper to use
- Custom calipers can be made from armature wire
- Reverse-chucking mandrel useful when vacuum chuck not feasible
- Make your own boring bars; use harder steel than 1018; make parts interchangeable
- Laser circle lens can make laser systems far easier to use
- Articulated system better choice than the large captive systems if you can only have one (but who says you can only have one)

Source list:

Below are links to sources for various items that I will likely mention in the demo. I have almost certainly forgotten to mention some great sellers out there, so please look around and don't limit your search to the names I give below. I have also left out the usual places like Packard, Craft Supplies, Lee Valley, Woodcraft, Rockler, etc., which are always worth considering.

Boring bars, captive hollowing systems, lasers, etc.

- Steve Sinner's Advanced Lathe Tools. My "big" system is composed of Steve Sinner's adjustable bar trap and a double 1.25" homemade boring bar. The bars are expensive to ship, so if you want to buy his system, consider buying it at Turn-On-Chicago where you can pick it up in person. Steve also sells MunroHollowerII cutters. I think these are the Cadillac of shielded cutters, but it is expensive. (<http://www.advancedlathetools.com>)
- Lyle Jamieson. There is a wealth of information on Lyle's website about how to make a boring bar system as well as an online store for Lyle's pre-made system and components. He also has a newsletter that you can subscribe to. Lyle will be demonstrating this summer at Turn-On-Chicago. (<https://www.lylejamieson.com>)
- Monster lathe tools. MLT's articulated hollower is what I currently use, though I have made my own laser system and boring bars rather than using MLTs. Very well machined piece of equipment. (<http://monster-lathe-tools.com>)

- JT Turning Tools. I have seen the "Gizmo" at a recent symposium. It appears to be a very nice articulated hollower. Contact JT Turning for pricing. (<http://www.jtturningtools.com>)
- Carter Products. Carter sells two systems. The Hollow Roller is a simple trap system that is placed in your banjo. I've seen it demoed and it looks simple and easy to use. Carter also sells a completely different, extreme system (Hollow Roller XL) that was developed (and until recently sold) by Brian McEvoy at onegoodturn. For truly huge hollow forms this might be your ideal system. See Brian's DVD on the boring bar if you want to get a sense for what you can do with the XL system; you can view his website for other information at <http://onegoodturn.ca>, including the use of light to judge wall thickness. Carter's product line can be found at (<http://www.carterproducts.com/lathe-parts-accessories/hollow-roller-lathe-boring>).
- Elbo tool. I've used this a few times. It is very solid and works well. It attaches to your tailstock instead of a bed post. (<http://www.elbotool.com>)
- Harrison Specialties. Here is a source for low-cost, pre-made articulated systems. I have no experience with this product, but it looks very reasonable price. (<http://www.harrisonspecialties.com/simple-hollowing-system-with-or-without-carbide-tipped-turning-tool/>)
- DIY articulated rig. Bill Bolen has photos and discussion of an articulated rig he made. There are others you can find with google. If you have a drill press and don't mind spending a day cutting, drilling and tapping steel, you can put something nice together that is as good as the commercial articulated systems for a fraction of the price. (<http://www.woodworkingtalk.com/f6/hollow-turning-rig-4177/>)
- Trent Bosch. Great source of hand-held hollowing tools, bars and carbide inserts. Also look at his tool "stabilizer" as a very simple captive hollowing system. Be on the look out for his "visualizer" (I think this is coming soon); it is an alternative to using a laser for determining the location of the cutter in the vessel. He will be demonstrating this and other hollowing techniques this summer at Turn-On-Chicago. You will not be disappointed. (<http://trentbosch.com>)

Carbide cutters, etc.

- Trent Bosch sells 3/16" round shaft carbide inserts which support Hunter #1 carbide cutters (6mm, chipbreaker); the inserts have a very nice head to support the cutter. The current price is \$60 for an insert, including the carbide. Hunter #1 replacement carbide tends to sell for around \$20 per cutter. Lots of other people sell inserts which support the Hunter #1 cutters. In most cases the inserts sell for \$60-70, including the carbide.
- Tim Rinehart. (Ebay.com, "timofcharlotte") Tim sells simple cutters that will also support the same Hunter #1 carbide cutter. Tim's price is about \$27 per insert, including the carbide. This is a really good price, as far as I can tell. I've got a bunch of them so I don't have to constantly swap my carbide inserts across my tools.
- Easywood tools. I am a particular fan of the mid-sized hollowers that use the Ci5 cutters. These work very well when hollowing end grain in green wood. (<http://www.easywoodtools.com>)

I have mounted my midsized hollowers on Stuart Batty bolsters so that I can change the handle lengths very quickly. (Plus, the SB bolsters are iron, so I can secure a magnetic mini level on the handle. Easy wood tools are non-ferrous.)

Steel for tools: I buy most of my steel from onlinemetals.com. I also get aluminum and a few other metal materials from them. For the boring bars, tools bit holders, etc., I use one of the following types of steel (all under the "Cold Roll" tab on their webpage).

1018 - Cheap, basic mild steel. Easy to drill and tap. Great for jigs; not so good for boring bars. Not hard as other steels (Rockwell B71)

1144 - More expensive than 1018 (everything is more expensive than 1018). Almost as easy to machine/drill/tap as 1018. Much harder than 1018: Rockwell B95.

A513 Reasonably hard steel tube (B89). Note: Precise tolerances on outside diameter; precision not guaranteed for inside diameter.

Note that for tool bits (not the bit holders) you want to buy 3/16" or 1/4" HSS bits. They are very cheap. I get mine from www.use-enco.com or grizzly.com.

In that past, I have made boring bars by purchasing A513 tube with 5/8" inside diameter; I then epoxy a 5/8" round 1018 mild steel rod inside the hard tube leaving a tang off on end and a recess for tool bits on the other. Last time I tried this, the A513 tube I received had an inside diameter of around .620 rather than 0.625, and so I was forced to buy 39/64 drill rod. Going forward, I think I would opt to buy the slightly harder 1144 solid bar (B95) and drill each end with a 5/8" bit. On one end I would drill and tap a set screw for a bit; on the other I would epoxy a 5/8" tang for my various handles/rigs.

For jigs like my reverse-chucking mandrel that uses a 5/8" steel rod, 1018 steel is perfectly fine. For tool bit holders, I also prefer 1018 (easy to drill and tap). FYI, I've recently tried some metal spinning and for making spinning tools, 1018 is too soft; I used 1144.

In short, for anything that might bang against a hard tool rest, I would look into using a harder steel than 1018.

Lasers and circle diffraction gratings (I buy everything from AixiZ.com): Stick to red lasers (650nm or very close to this); do not use green lasers. 1mW or 5mW are good powers; for the laser circle, I'd get 5mW. Do not get anything brighter. 12x30mm cases are very easy to use; get 3.2v battery pack as well. The one that I use is 650nm, 5mW, 3.2VDC, 12 x30mm, price \$5. Circle defraction lens costs \$3.50 and fits nicely in 12x30 holder; they also fit *some* laser pens.

Reverse-chucking mandrel: I made mine using a length of 5/8" 1018 steel. To secure it onto my headstock, I bought a MT2 end mill holder from Grizzly (G9539, \$12.75). The shaft collar can be purchased from amazon.com for a few bucks. The seating cone can be from any hard wood or (in my case) UHMW plastic.

Miscellaneous: (most everything in this category is from amazon.com or harborfreight.com).

- 12 " hemostats (Amazon.com - 12" Straight and Curved Locking Hemostat Set, \$10.47)
- 13" air hose blow gun with long tip (try HF or amazon)
- Armature wire for calipers (various gauges) - amazon.com

- Tap and die set (HF sells an alloy steel metric and SAE set for \$40; get a 20% off coupon and it is \$32.) While you are filling up your shopping cart, also get some of their set screws (HF again; 150 piece assortment is less than \$10; look for sales).

DVD's for further study: Most of the following DVDs are in our Club's library. Everything else, I own myself and I'm happy to loan them out. My two all time favorite DVD's from this list (DVDs that I can watch again and still learn something new) are Mahoney's "Hollow Forms and Urns" and Raffan's "Turning Bowls".

- Nick Arnall - "Ying and Yang."
- Trent Bosch - "Vessels of Illusion."
- Ellsworth - "Hollow Turning." Older DVD from the originator of the hollow forms. Shows the use of hand held tools with tool bit cutters, including the use of non-swan-neck angled cutters. It forms a nice complement to Ellsworth more recent book, *Ellsworth on Turning*.
- Mike Hanbury - "Hollow Forms."
- Simon Hope - "Hope for Us All - Jarrah Hollow Form." Also provides an introduction to casting pewter to make a custom finial.
- Mike Jackofsky - "Making a Hollow Vessel." Emphasizes the use of handheld tools and, in particular, the use of his line of HollowPro tools (sold by Craft Supply).
- Lyle Jamieson - "Hollow Forms" and "Hollowing Techniques." Both videos are largely about captive hollowing.
- John Jordan - "Hollow Turning" and his AAW symposium demo which can be found on the first volume from the 2010 AAW symposium DVD collection. Exclusively about handheld hollowing.
- Mike Mahoney - "Hollow Forms and Urns." Really wonderful review of hand held techniques. Also demonstrates thread chasing for making threaded urns.
- Binh Pho - "Thin-wall turning." Nice review of tools and techniques.
- Richard Raffan - "Turning Bowls." The final three projects on this DVD are enclosed forms using handheld and captive hollowing techniques. Raffan makes one of the three hollow forms using only a bowl gouge. He uses captive systems on the others.
- McEvoy - "Mastering the Large Captive Boring Bar." If you ever wondered about the large hollow forms like those of Sudol, McEvoy and Steve Sinner, you will find this DVD fascinating, even if you have no interest in making such large projects yourself.
- Mark Sanger - "The Inside Story." Mark also has a recent series of articles on hollow forms in *Woodturning* magazine. (This is the British publication from GMC group; you can get a subscription on your iPad/tablet device.)

Further information: There is a huge amount that cannot be said in a short demo. If you have any questions about tools, techniques, etc., or if you want to share your own way of doing HFs that differs from mine, please let me know. I am really excited about hollowing and would enjoy having more discussions on the topic.