Turning Hollow Vessels

Presentation by Bill Haskell

1. The turning of a hollow vessel can be done from either a faceplate or a 4-jaw chuck.
I prefer a 3" faceplate A 4-jaw chuck will usually work fine if secured properly

2. All outside turning and sanding should be completed before starting on the inside
Leave the area immediately attached to the faceplate, or 4-jaw chuck, as well as the neck opening, larger than the final form to give strength to these areas while turning the inside.
Turning the foot and neck ends to a final form will be the two last things done after everything else is complete.
Complete all sanding, down to the final grit.
When I use a CA finish, this is the time I apply it:
With the lathe stopped, squeeze a drop or two of medium viscosity CA glue to the piece, and immediately spread with a covered finger.
Use a latex glove, just a latex finger cot, or a piece of Saran Wrap stretched over the finger and held in place with the other fingers.
Apply to a 2-3 square inch area at a time. Smooth out quickly, or else the glue will start to set up. Do not go over same area more than three times.
A CA finish will also provide strength if a thin wall is planned and if there are weak areas in the stock.
Briefly and lightly sand the CA coat with the lathe on, and smooth out the rough surface (220 grit) – be careful to not sand through the surface.
With the lathe off, hand sand where there are low shiny spots, "orange peel" dimples, or other imperfections. This takes some patience, but this is where the difference between a good and poor finish is determined.
After finish is smooth, sand with 320 grit and burnish with 00 steel wool with the lathe on.
Apply a second coat, repeating the steps described above.

3. To turn the inside, drill a center hole down the full length of the vessel, to where the inside bottom will be (usually ½ to ¾ of an inch from the outside bottom).How thick you leave the bottom at this point depends on how you plan to turn and finish the bottom (parting loss and concavity).
This center hole removes the hard to turn center core, plus it helps you know where the bottom of the inside is when turning on the inside "in the blind".

4.Two methods of drilling are:
Using a twist drill bit long enough, held by vice grips or a handle, insert at the exact center of revolving piece.
Push in and drill to the desired depth, removing often to extract sawdust.
If left in too long, the sawdust will swell and bind, making it difficult to extract the bit.
Richard Raffan and John Jordan use this approach.
Craft Supply, Provo, has a 3/8" by 12" depth drill for this purpose.
Using a planetor or forrestner bit held in a tailstock Jacobs chuck.
Extract often to remove sawdust.
Use a bit extension if deeper drilling is required.
I usually use a 1" or 1¼" bit, but smaller and larger sizes may also be used.5. Measure to determine depth of center hole:
Drill all the way; it is difficult to return later with either a drill or a turning tool to go deeper.

5. A simple dowel or any kind of a rod (or even a lathe tool) inserted into the center hole will tell you how deep the hole is - remove the depth measuring item and place it in front of the piece, lining up with the top of the piece, and it will tell you how close the hole is to the outside bottom.

6.I use a steady rest if the piece is longer than about 10".

7. There are a number of turning tools available, or ones that can be made with which to turn the inside of the vessel - many use a small 3/16" machinist's cutting tool.
Dennis Stewart System with arm braced handle
David Elsworth's crooked tools for smaller vessels
The Steve D'Arc/Bob Devoe Roto-Excavator
Woodcut (New Zealand tool) Mighty Midget, Cobra, Promaster
Glaser Boring Bar with articulated cutting bit

8. To hollow, start at the top, just inside the neck - I hog out all the way down inside to a wall thickness of about ½" to

5/8".Stop the lathe often to remove sawdust and chips – methods include:
Finger or a small long handled "rake" made for this purpose.
Take piece off the drive spindle and shake out.
Either compressed air to blow sawdust out (best), or a vacuum to suck out sawdust.
When wall thickness is under 1", measure thickness with calipers often.
Use a light source (small flashlight or anything else that will direct light inside your vessel) to see what is happening.
When turning thin, fragile walls may require support – e.g. CA glue, masking/duct tape, wire girdle, etc.
Strengthen or repair cracks with CA glue.
Then starting at the top, I will take the wall thickness down to about ¼ ".If there are bark inclusion windows on the wall, or if there is a visible center nub on the inside bottom, I will sand it off (with lathe both still and running) with a small (1-1½ " disk) on an extension mounted in an electric drill.The very last cutting I do on the inside is with a scraper on a Stewart tool, to take the wall down to about 3/16" and to smooth out ridges.

9. When the inside is done, turn the neck, the opening, and just inside the opening to a final configuration, and sand - If a finish is being applied on the lathe, do so to the just turned area.

10. When all but the fat bottom is complete, part the piece off.

11. Use a center finder or compass to determine as precisely as possible the center on the bottom, and mark.

12. Turn a tenon on scrap wood on either a faceplate or 4-jaw chuck that fits tightly into the opening of the hollow vessel – usually, the tenon does not have to be any more than ½" – 1" long.

13. After again remeasuring the bottom thickness, mount the vessel onto the tenon, and bring up the tailstock to the center mark on the bottom.
The smallest diameter and longest live center cup will provide more room to work on the bottom.
Turn the lathe on to test for concentricity - if out of round, stop and loosen the tailstock and adjust until concentric.
To help determine where the out-of-round side is, using the tool rest to support a pencil, touch lightly the revolving bottom section - stop the lathe to adjust the tailstock. The pencil line shows the high spot, which needs to be pushed slightly in the opposite direction, then tighten the tailstock.

Turn lathe on and test - repeat the foregoing steps if further adjustment is needed, until the piece is in round without wobble.

14. Turn the excess material off near the bottom that was left on for support.
Create the final configuration of the bottom sidewalls.
After sanding the sidewall to a final finish, turn the very bottom.
Small or miniature gouges, round scrapers, and skews work best.

15. After the bottom has been turned and sanded, the center nub where the cup center is, can be turned to a conical shape, very carefully, down to about 3/16" where it contacts the bottom surface of the piece.

16. Stop and remove your piece from the lathe – all turning is done.

17. With a carving tool, pare-off the remaining nub - hand sand to finish the bottom.

18. Sign your finished product.

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Diagram of hollow turning sequence 442K bytes

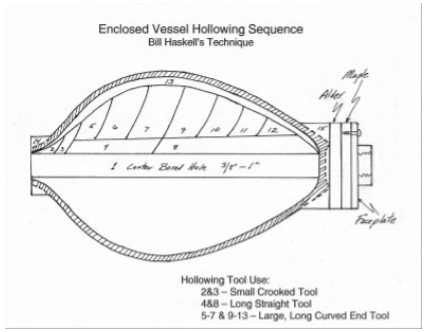
Tools for hollow turning 389 K bytes

Hollow Vessel Home-Made Tools

Ideal for Opening and the Interior first 1"-2"

Turn a wooden handle into which the steel shanks shown below can be inserted.

Use 3/16" by 2½" HSS M-2 steel tool bits, which typically cost between $0.50 and $1.00 each. Take the 2½" tool bit, grind/break in half to make two tool bits. Grind and shape each into a scraper. The part that inserts into the tool shank will need to have the corners rounded off until the bit fits into the hole.


Enclosed Vessel Hollowing Sequence
Bill Haskell's Technique
Hollowing Tool Use:
2&3 – Small Crooked Tool
4&8 – Long Straight Tool
5-7 & 9-13 – Large, Long Curved End Tool

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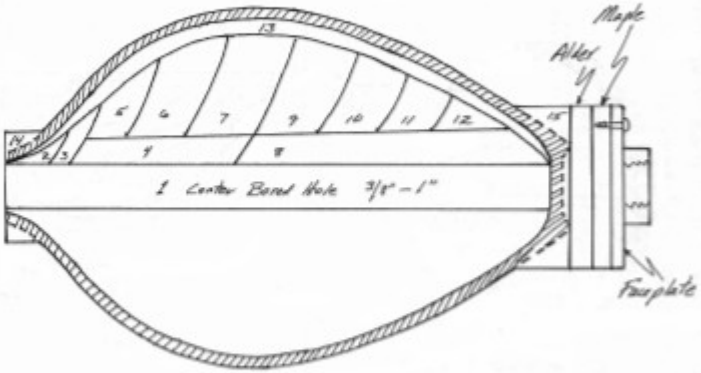

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