

Thin Walled Turning and Surface Design Techniques

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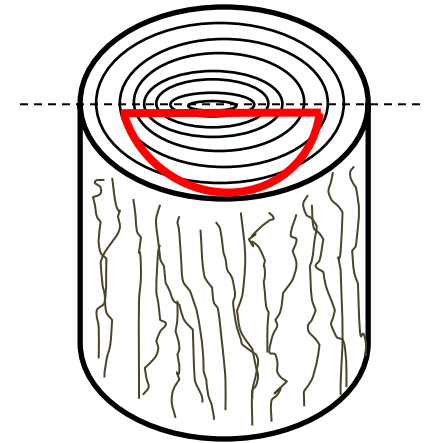
Thin-Walled Turning

- Why Thin?
 - Not to show off turning prowess
 - Facilitates later surface design techniques
- Material
 - Light colored, green wood easiest to use
 - Allows for specialized thickness gauging techniques
 - More forgiving and fun to turn
- General Techniques
 - Always start between centers then reverse onto chuck
 - Hollow to finished thickness (1/16" to 3/32") and smooth surface in stages
 - Blend stages together by shear-scraping

Face Grain and End Grain Techniques

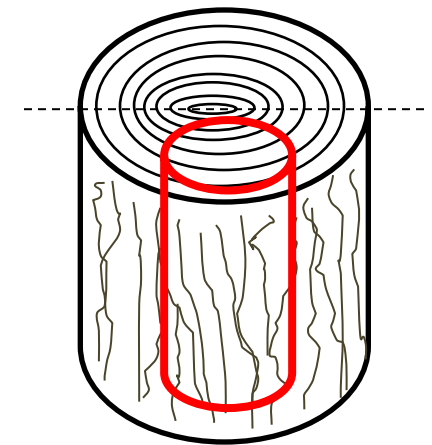
- Face Grain Techniques

- Grain orientation on the lathe is perpendicular to the lathe ways
- Bowl will dry slightly oval
- Turning a very thin bowl with conventional tools = working from edge inward
- Cuts are made with gouge and scrapers

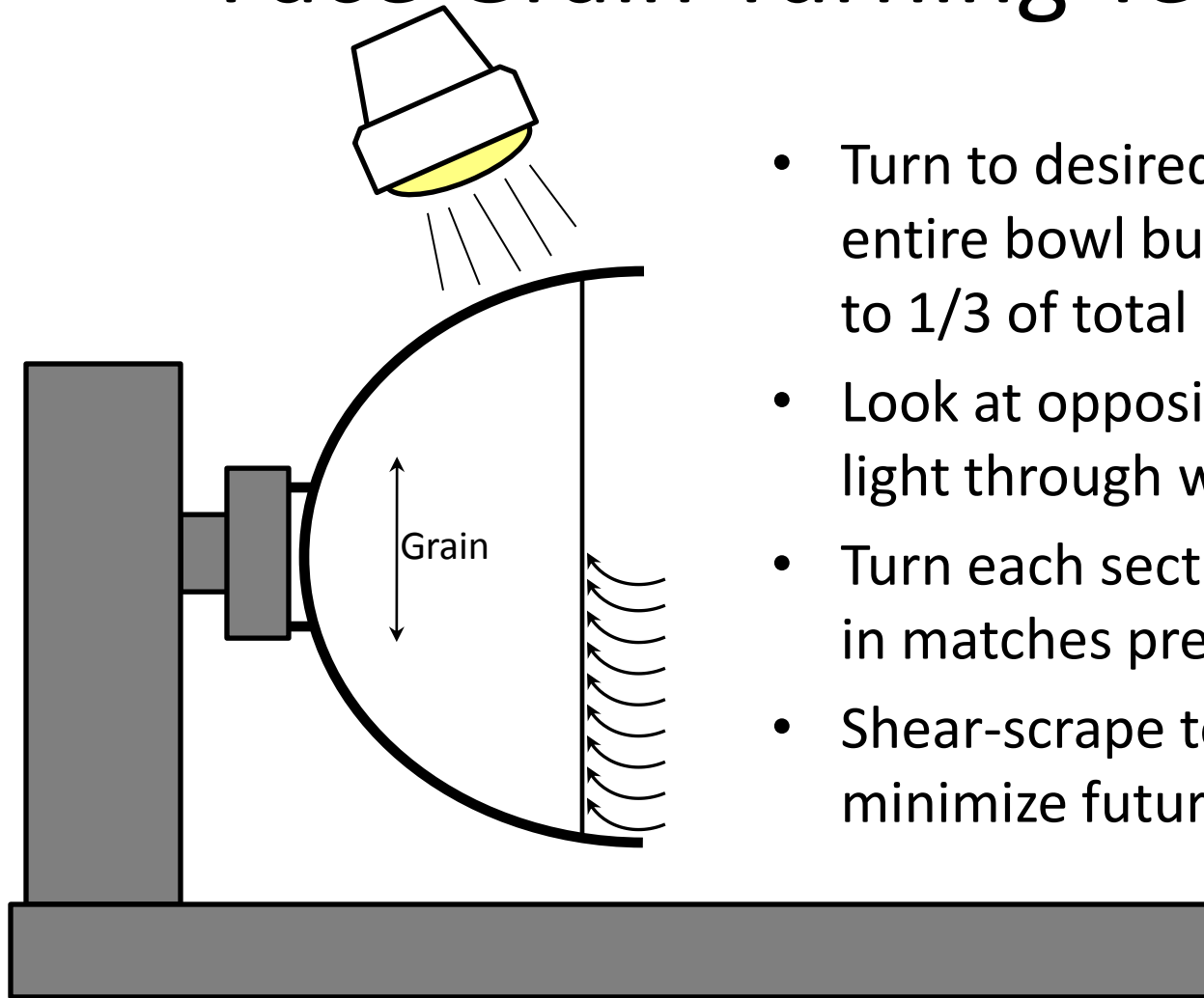


- End Grain Techniques

- Grain orientation on the lathe is parallel to the lathe ways
- Vessel will dry more round (especially if centered on pith)
- Drill to desired depth first
- Basically an end-grain hollowing operation = working from center out
- Cuts are essentially made with scraping tools

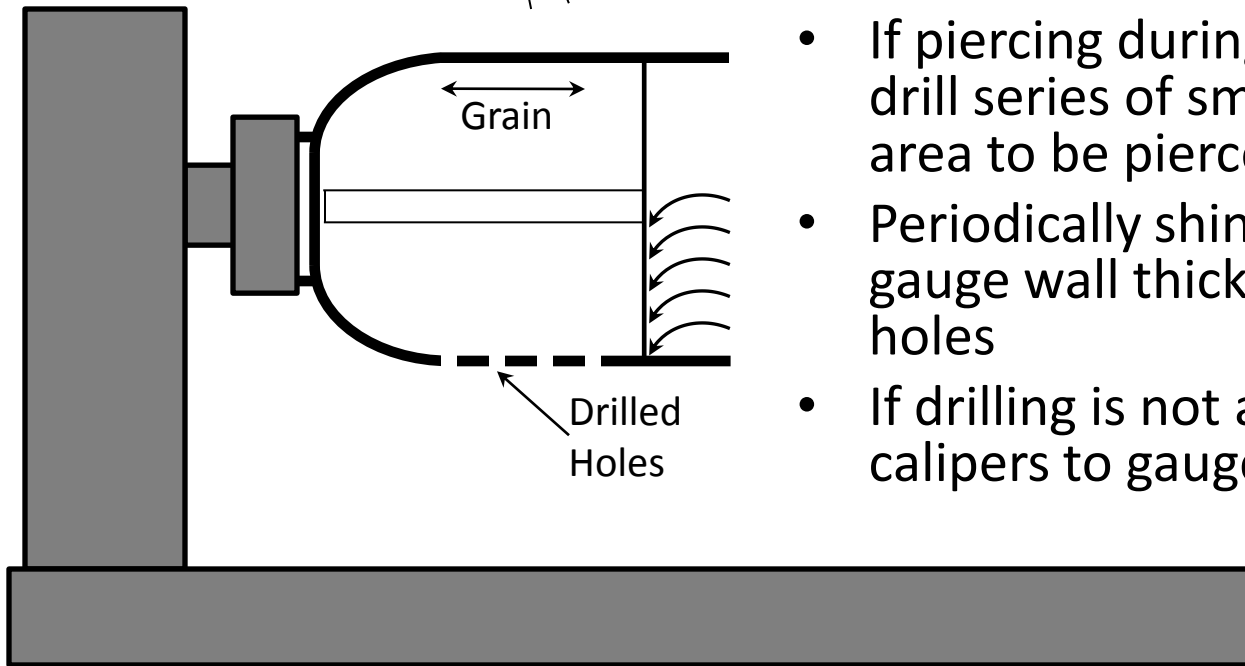
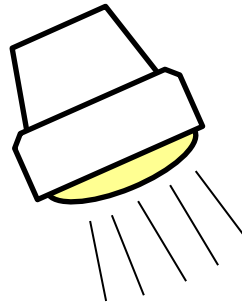


Face Grain Turning Technique



- Turn to desired thickness across entire bowl but only down about 1/4 to 1/3 of total depth
- Look at opposite side of bowl to see light through wall
- Turn each section until color of light in matches previous sections
- Shear-scrape to blend sections and minimize future sanding

End Grain Turning Technique



- Drill depth hole first
- Hollow from center outward following same techniques as for face grain until it is difficult to see into vessel
- If piercing during later part of design, drill series of small holes down vessel in area to be pierced
- Periodically shine light into vessel to gauge wall thickness through drilled holes
- If drilling is not an option, use light and calipers to gauge thickness

Thin-Walled Turning

- Differences and methods for measuring wall thickness
 - Light translucence
 - Drilling in pre-defined areas to be pierced
- Potential Problems
 - Turning too thin – Be careful in curve transition areas
 - Thickening/thinning as you hollow deeper – Blow out shavings, go slow and measure!
 - Quickly out of round = chatter – Thin wood dries out quickly, once you leave an area don't go back, final cuts must be as clean as possible
 - Bumps between sections – Mark with a pencil and lightly cut away pencil lines to remove bumps, be careful not to add another!
- Drying Techniques
 - Air – In paper bag/box or newspaper covering for 1 week or so, until dry
 - Microwave – 30 secs high power : 30 mins cool down; 4-5 times until dry
- Sanding
 - Get surface as smooth as possible off of the tools to minimize effort once dry
 - Most sanding is done off of the lathe

Surface Design

- Pyrography (wood burning) and Branding
- Piercing
- Many other possibilities: Carving, Air-brushing, metal leaf, patination, etc.

Pyrography & Branding

“Drawing with fire”

- General wood burning power supply and pens for drawing on pieces, minor surface decoration and shading
 - Fixed or replaceable-tip pens
 - Can be used to outline areas to be pierced or to add character to the surface of a piece
 - Want PS to work well at low burning temperatures
 - Optima, Razor Tip, Detailmaster, etc.
- High power supply and pens, substantial tips for branding
 - Home-made supply from battery charger or computer power supply – recovers fast
 - Ny-chrome wire for custom brand/pen tips (mcmaster.com – McMaster-Carr)
 - Partial designs or complete surface coverage
 - Black color can accentuate and highlight form
 - High power burning can be used as a pseudo-carving technique
- Fan to blow smoke away or air filter to capture smoke
- Clean tips of carbon regularly during burning/branding – wire brush/blade
- Hone tips to maintain sharp edge – honing compound on leather strop

Some Example Pyrography Patterns

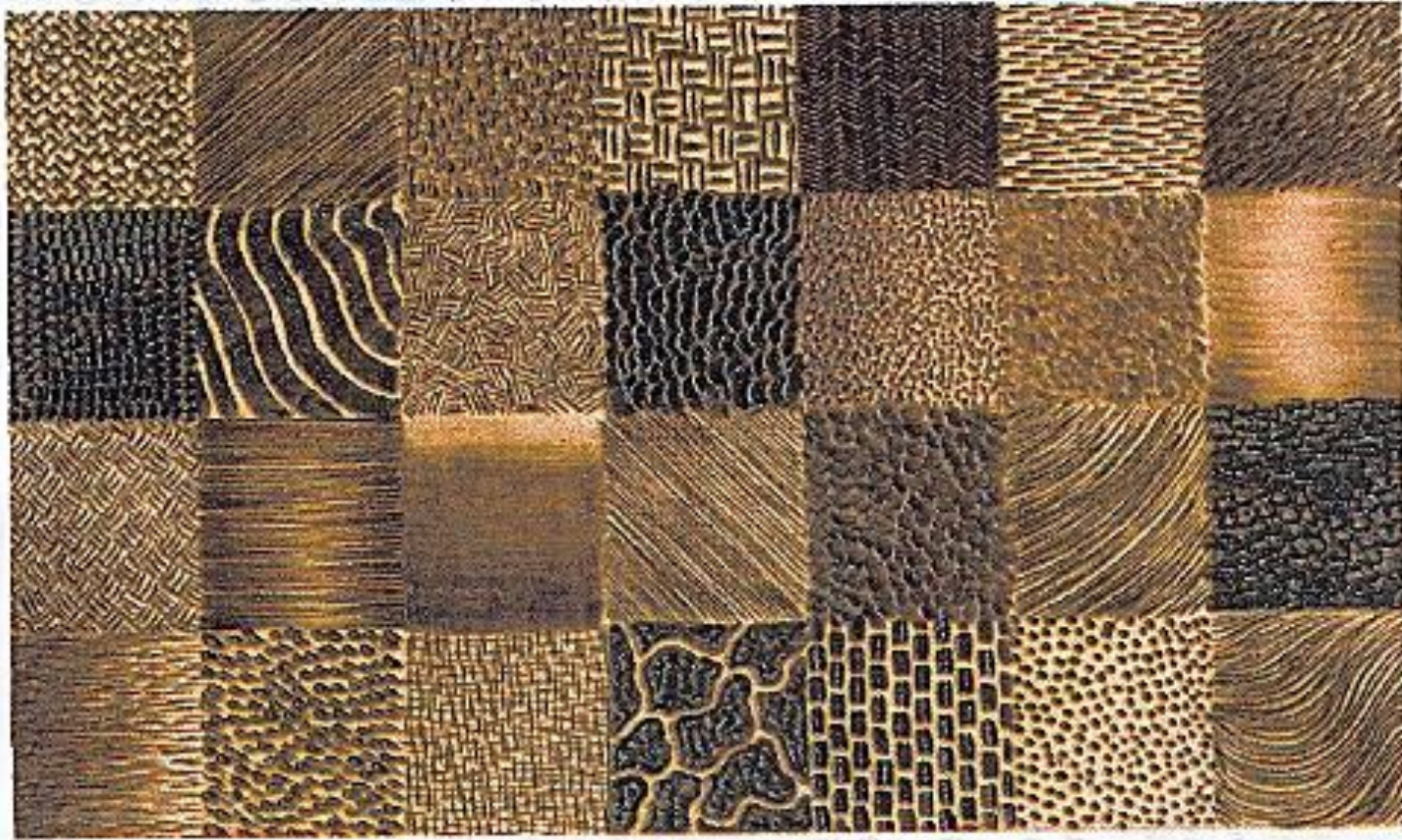


Image from pyrographer Sue Walters

Piercing

- High-speed, air-powered tools (350,000 – 400,000 rpm)
 - Air regulator and filter (~35-40 psi)
 - Dental tool (oil lubed) – more cumbersome connections
 - NSK Presto (no lube) – allows for “drawing” on wood
- Small burs (solid carbide, 1/16”)
 - Straight cross-cutting for piercing and scratching (699L)
 - Round balls for stippling (#1,2,4,6...)
 - Inverted cone for recessing and surface carving (#37, 39...)
 - Soft metal to clean burs (brass, soft steel)
 - Sources of burs & tools:
 - Bursforcarving.com (J. Paul Fennell)
 - Binhpho.com (Binh Pho)



699L



#2

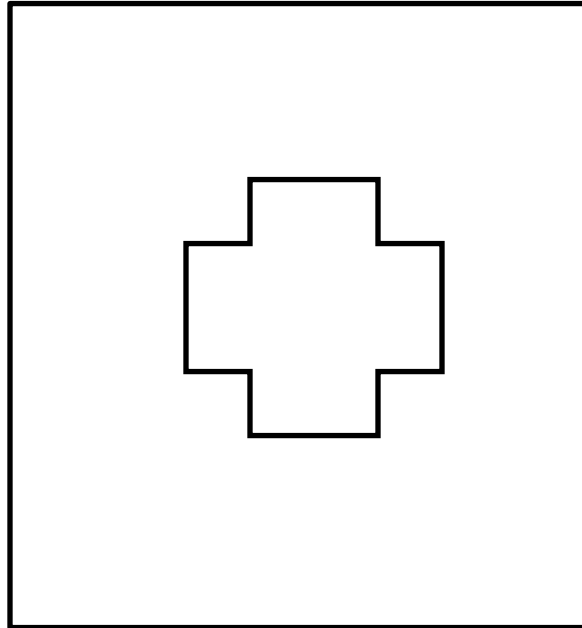


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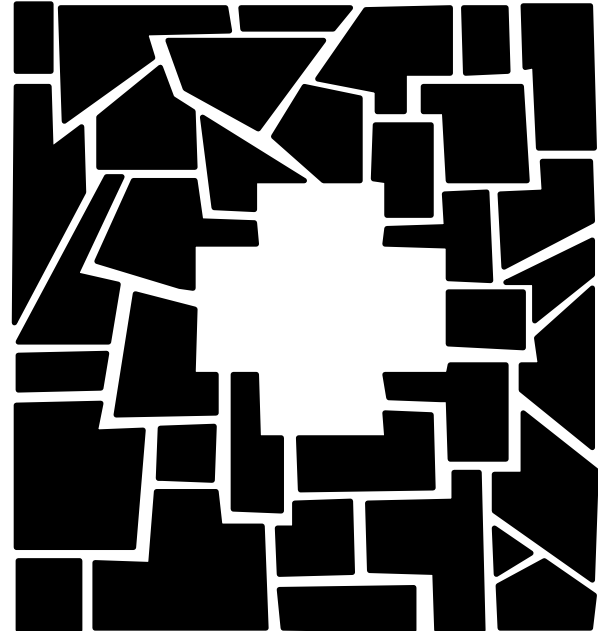
Piercing Technique

- Thin walls required
 - 1/16" to 3/32"
 - Tool must stay perpendicular to surface being pierced - especially on more severely curved forms
 - Cut in CW direction and clean-up in CCW direction
- Design entire turned piece first before doing any work with the tools
- Draw design in pencil and then burn in prior to piercing, as necessary

Positive Dominant Piercing

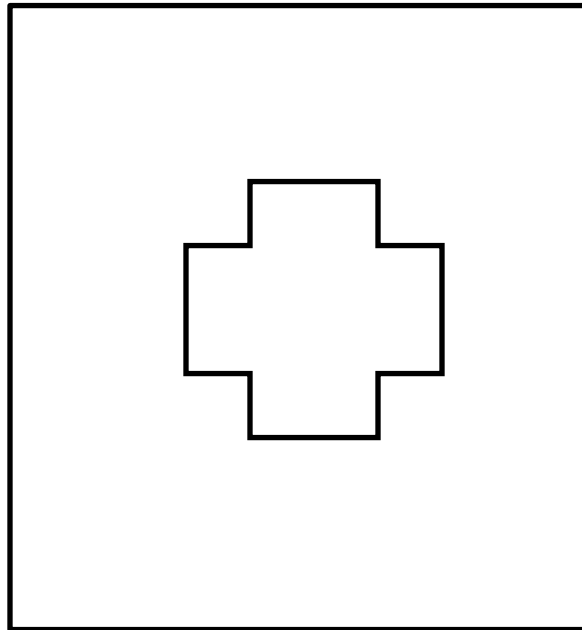


Black = Pierced
White = Wood

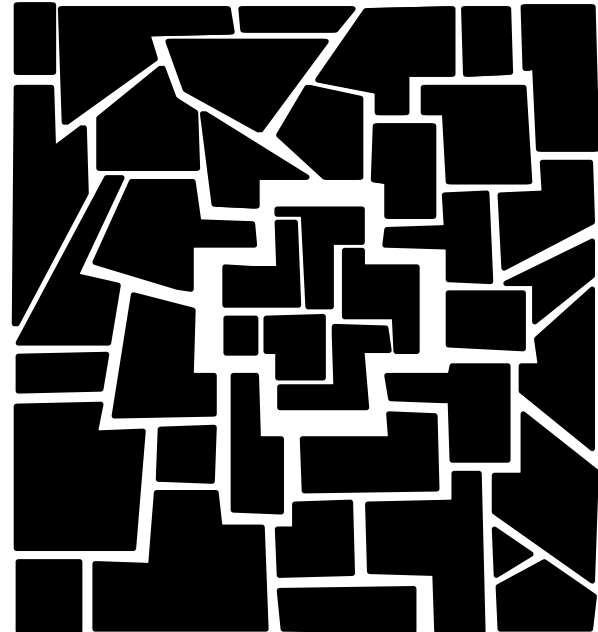


- Pierce right up to outline of object (generally burned in)
- Avoid running lines within pierced shapes
- Pierced shapes in character with object (i.e. sharp edged pierced holes with more angular object)
- Shape of object is revealed as solid wood within matrix of pierced holes
- Can also design so that pierced portions are mostly wood (i.e. positive dominant)

Negative Dominant Piercing



Black = Pierced
White = Wood



- Shape of object is revealed as outline of solid wood within matrix of pierced holes
- Closer look reveals hidden design elements

Links

- Greame Priddle battery charger woodburner and pens:
 - <http://www.woodturnersresource.com/extras/projects/priddle/WoodBurner.html>
- Alternate source for homemade pens:
 - http://www.fishcarver.com/images/burning_instructions.PDF

Steps for turning a thin-walled bowl

- Mount blank between centers with the pith area toward the headstock
- Rough turn the outside shape
- Turn a tenon for your chuck at the tail stock end, reverse the turning and mount in the chuck
- True up the outside shape to assure even wall thickness
- True up the rim
- Start hollowing down about 1 ½" – hollow all the way to the desired wall thickness of 1/16". Hollow with cuts into the center gradually moving outward toward the rim. Blow out shavings often to avoid errors in judging wall thickness
- Shear scrape the first section
- Hollow the next section about 1 ½" further look at the color of light through bowl wall and cut until colors match. Using calipers to verify wall thickness is also a good idea.
- Shear scrape second section until it is blended into the first
- Repeat hollowing steps until you reach the desired depth of the bowl but do not try to go back and turn on earlier sections as the bowl is now already out of round
- Mark the bottom of the bowl on the outside with a pencil by sighting through bowl wall to determine where the thin walls start to thicken
- When hollowing is complete reverse the bowl to a friction drive on a padded jam chuck with the tailstock pressure into the original center mark
- Shape the bottom of the bowl up to the pencil marks leaving a slight bit of additional material for truing up after drying. Remove as much material as reasonable from the center nub where it meets the bowl bottom to reduce drying stresses
- Dry the bowl for 1-2 weeks in closed a large paper bag, box, or newspaper wrapping
- When dry return to the lathe with padded jam chuck and tail stock pressure and true up the bottom
- Do whatever sanding you can to the outside as the bowl is now probably significantly out of round
- Remove the nub and complete sanding, surface enhancements and finishing off of the lathe

Steps for turning a thin-walled end-grain vessel

- Mount blank between centers with the grain running parallel with the ways of the lathe
- Rough turn the outside shape
- Turn a tenon for your chuck at the tailstock end, reverse the turning and mount in the chuck
- True up the outside shape to assure even wall thickness
- True up the rim
- Drill a depth hole down the center of the vessel to the desired finished depth
- If you know the piece will be pierced, you can also drill some 1/8" holes down the form in the area to be pierced to aid in gauging wall thickness
- Start hollowing down about 1 1/2" – hollow all the way to the desired wall thickness of 1/16". Hollow with cuts from the center hole outward toward the rim. Blow out shavings often to avoid errors in judging wall thickness
- Shear scrape the first section
- Hollow the next section about 1 1/2" further look at the color of light through bowl wall and cut until colors match. If you drilled holes, as they are revealed assure that the walls are consistent thickness by looking through holes. Using calipers to verify wall thickness is also a good idea.
- Shear scrape second section until it is blended into the first
- Repeat hollowing steps until you reach the desired depth of the vessel but do not try to go back and turn on earlier sections as the vessel is now already out of round
- Mark the bottom of the vessel on the outside with a pencil by sighting through bowl wall to determine where the thin walls start to thicken
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- When dry return to the lathe with padded jam chuck and tail stock pressure and true up the bottom
- Do whatever sanding you can to the outside as the vessel is now probably significantly out of round
- Remove the nub and complete sanding, surface enhancements and finishing off of the lathe