

Building and Turning the Shallow Stave Bowl

Front Range Wood Turners

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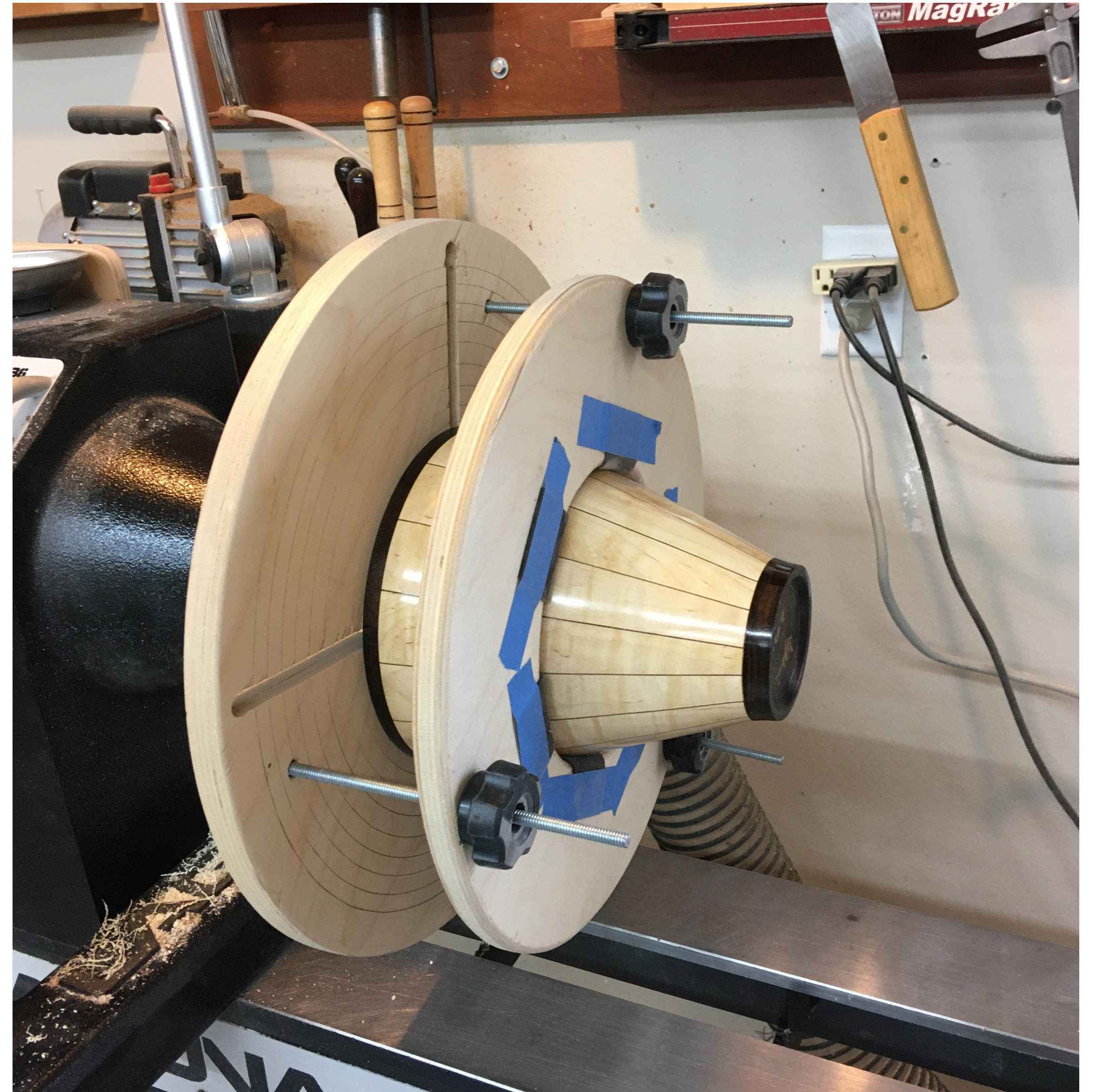
Why?

- Shallow stave bowls afford the opportunity to design using wood grain
- Dramatic patterns may be achieved and repeated with relatively common woods
- Infinite combinations of rim and foot treatments makes each bowl unique
- Significant advantages in wood availability, cost, utilization

But, There are Problems !

- Cutting accurate staves
- Glue up clumsy, difficult
- Wobbly mounting, spinning rods and brackets to impale you!
- Difficult grain orientation for turning

Don't try this at home!



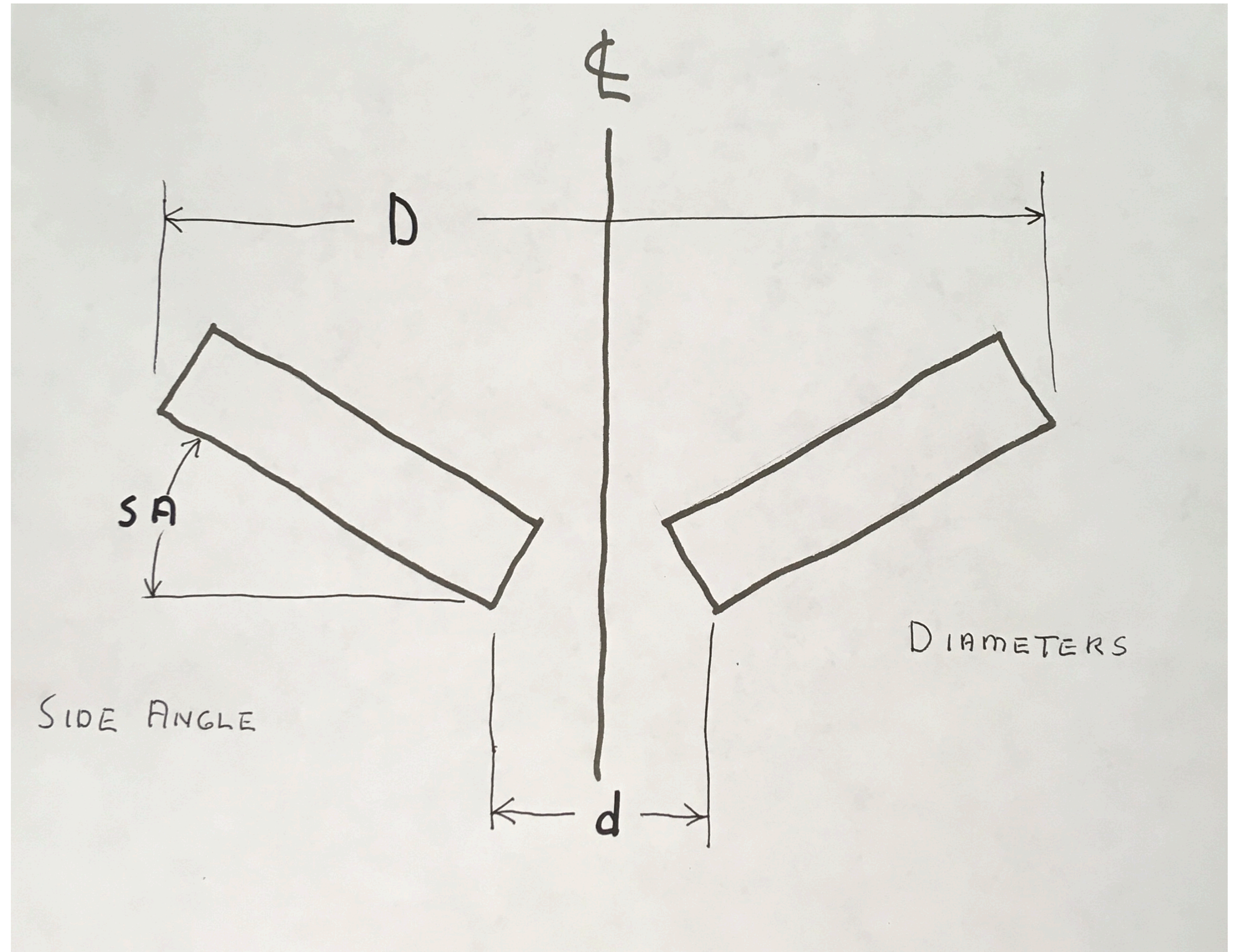
Design

- Side angles from 20 degrees to 60 degrees
 - Favorites; 30 and 55 degrees for bowls
 - 75 degrees for open vases, urns
- 8-10 staves work best to display grain features and ease of turning
- 8" to 12" diameter
- General rules:
 - 10 stave bowl diameter is 3.1x large stave width, **W**
 - 8 stave bowl diameter will be 2.4x large stave width, **W**
 - Stave length will determine ω , thus, base diameter

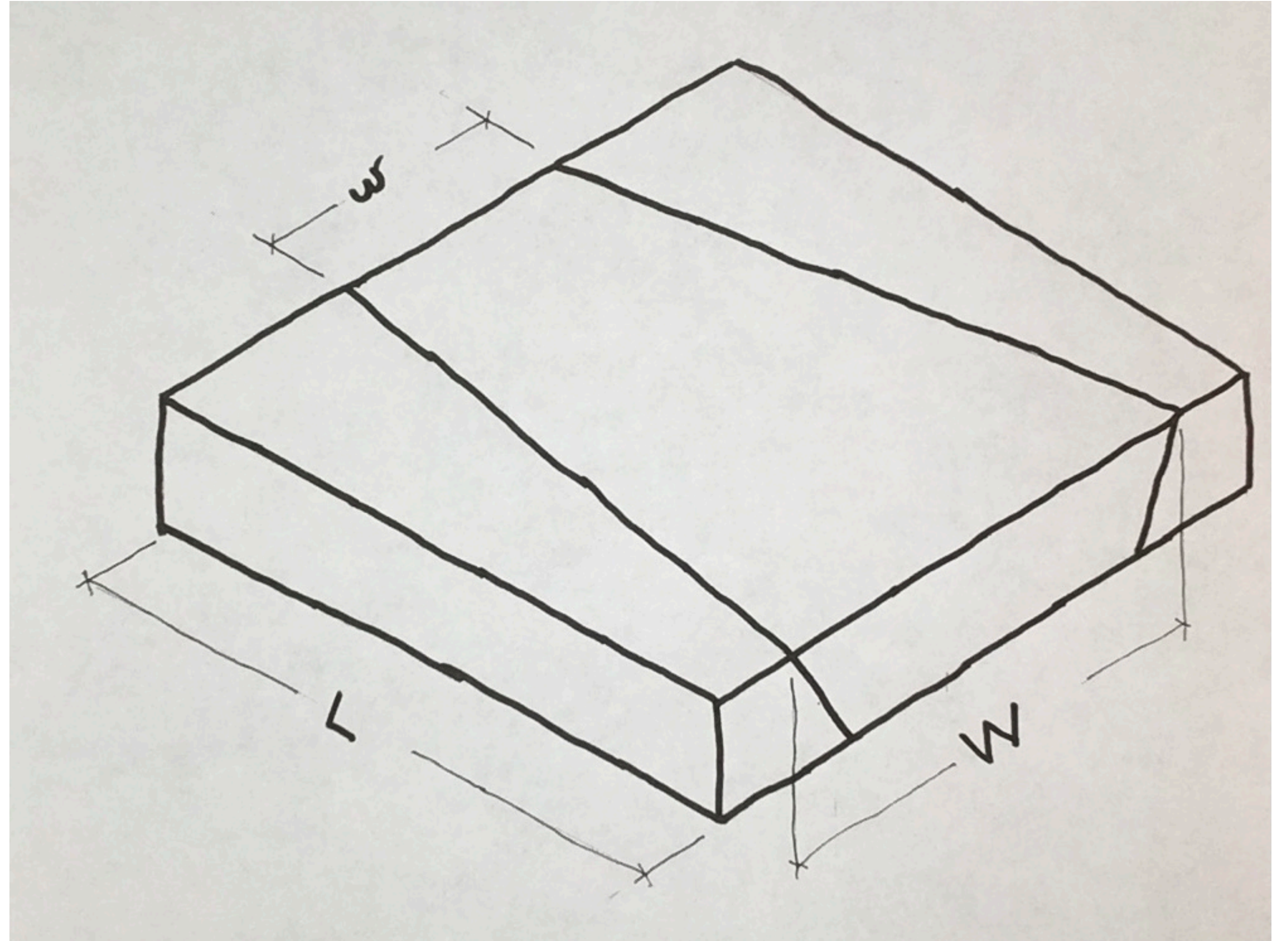
Design: Step One

Chose side angle (SA)

Chose Diameter (D)

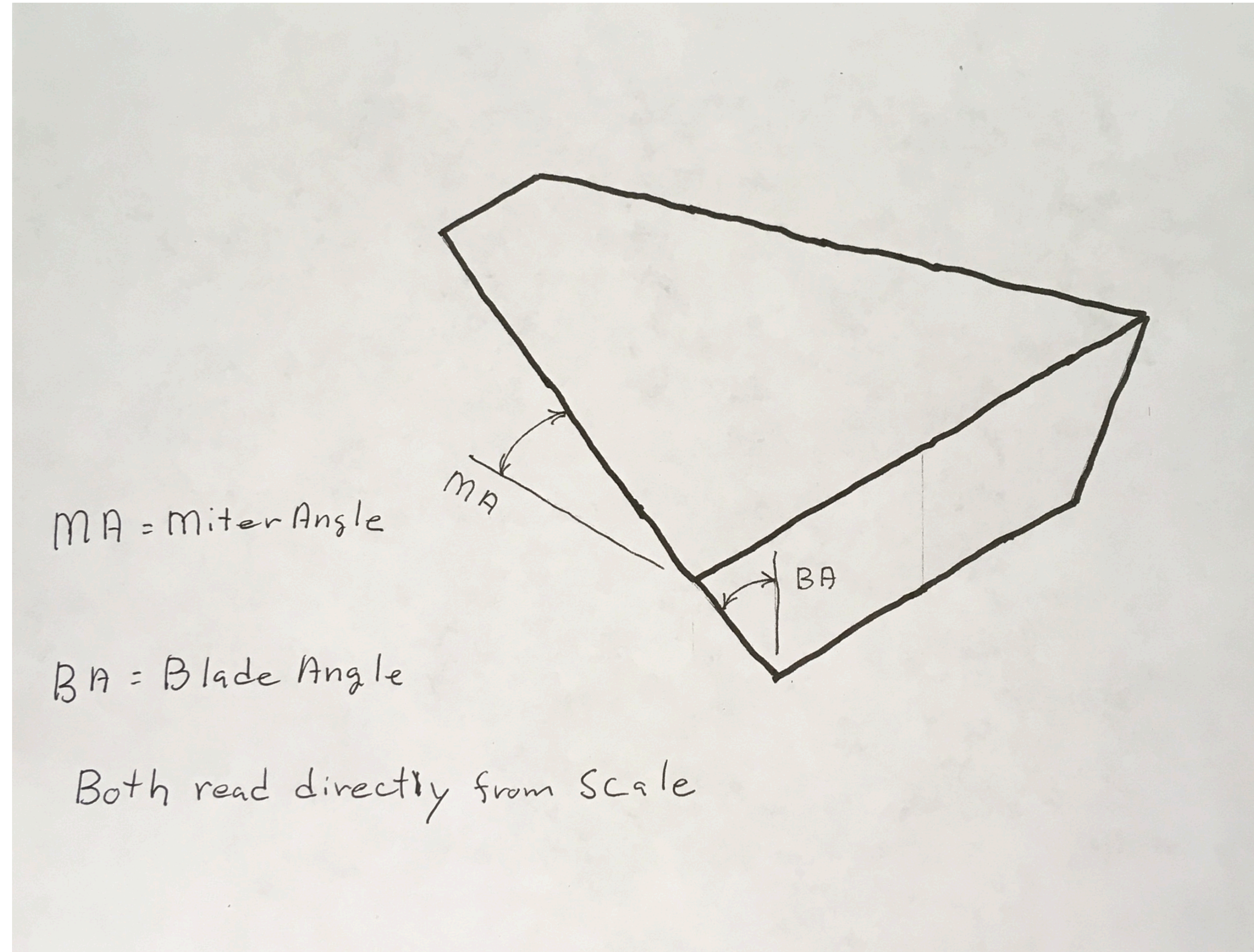


Design: Step two
Trade off bowl height and
base/foot diameter (d) to
determine stave length (L)



Design: Step 3

Determine Miter Angle (MA) and Blade Angle (BA) to cut the stave



Getting the Angles

- Miter Angle, MA, is read directly from miter gauge. i.e. 0 degrees is a 90 degree cross cut
- Blade Angle, BA, is read directly from tilt adjustment scale, i.e. 0 degrees is 90 degree vertical blade

Compound Angles for Staves

Side Angle	8 Staves		10 Staves		12 Staves		16 Staves		24 Staves	
	Miter Angle	Blade Angle	Miter Angle	Blade Angle	Miter Angle	Blade Angle	Miter Angle	Blade Angle	Miter Angle	Blade Angle
0	22.5	0.0	18	0.0	15.0	0.0	11.25	0.0	7.5	0.0
15	21.8	5.7	17.4	4.6	14.5	3.8	10.9	2.9	7.3	1.9
30	19.7	11.0	15.7	8.9	13.0	7.4	9.8	5.6	6.5	3.7
45	16.3	15.7	12.9	12.6	10.7	10.6	8.0	7.9	5.3	5.3
60	11.7	19.4	9.2	15.5	7.6	13.0	5.7	9.7	3.8	6.5
75	6.1	21.7	4.8	17.4	4.0	14.5	3.0	10.9	1.9	7.2
90	0.0	22.5	0.0	18	0.0	15.0	0.0	11.25	0.0	7.5

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Design, cont.

Grain Considerations

- Flat sawn lumber will produce “petals”
- Rift sawn lumber (or off-cuts from flat sawn staves) will produce “feathers”
- Quarter sawn lumber will produce “rays”
 - Consider avoiding 8 stave with quarter sawn to avoid “crosses”
- Foot/base is best made from built-up piece
 - Adds attractive pattern
 - Avoids rocking with grain shrinkage

The Basics

To avoid frustration:

- Cut True, use a sled-type jig
- Glue True, with a few tricks
- Mount True, with draw bar and expansion jaws or plate
- Turn True, with plenty of wood for shaping your form

Cutting with a Jig

Accuracy is important; Safety is essential

- A table saw sled works best, absolute repeatability is key
 - Must use mechanical hold downs
 - Off cuts fall clear of blade
 - Ease of set up
 - Safety, safety, safety
- Compound miter saw may work
 - Devise a safe, easy to use mechanical hold down

Glue Up

- Align edges, tape with paper tape or strapping tape
 - Masking tape will fall apart at just the wrong moment
- Fold up for test fit: NO Gaps, recut if necessary
- Glue on pegs w/ hot melt or CA glue
- Test fit AGAIN using hose clamps to pull tight
- “Butter” the joints with Tite-Bond and clamp

Mounting

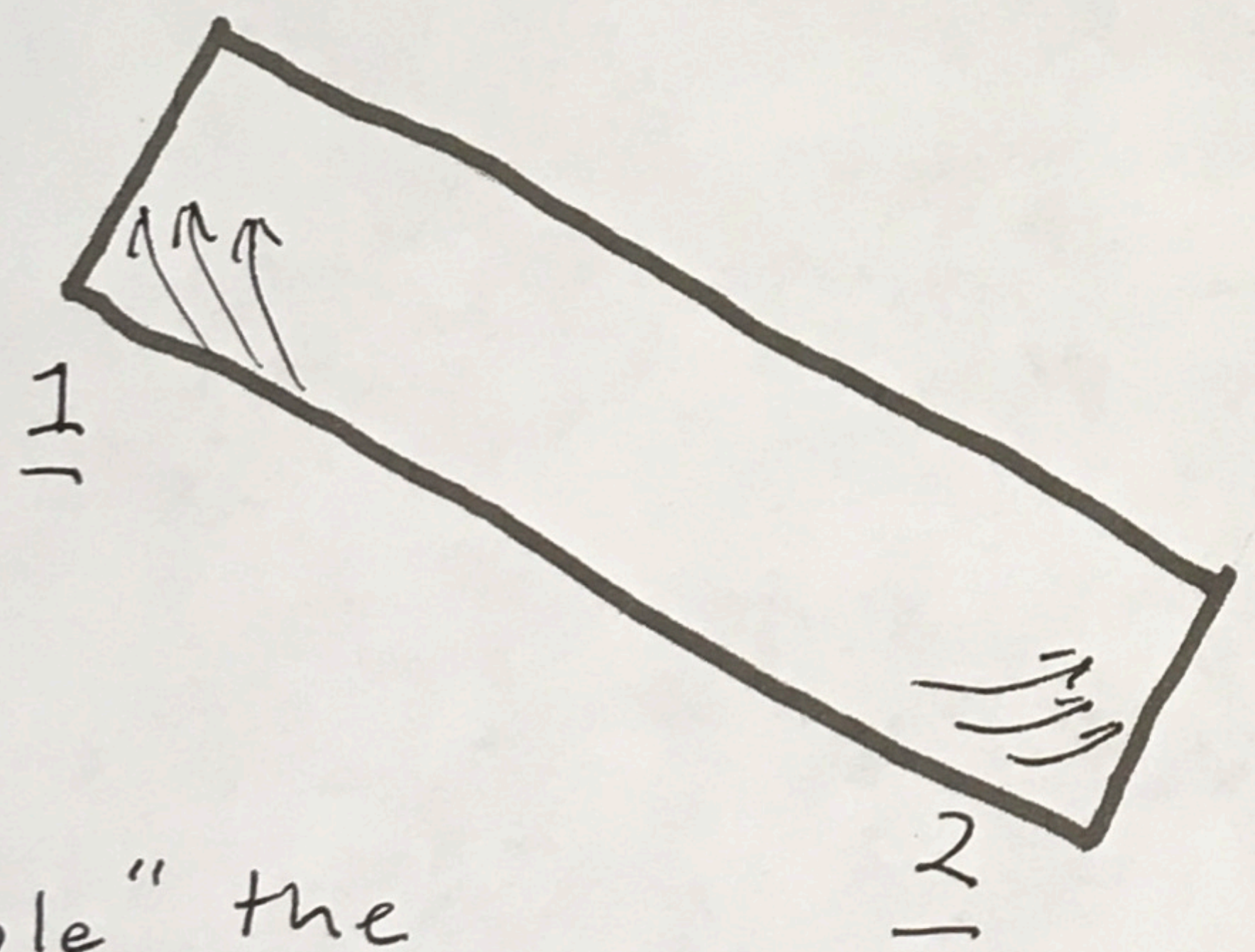
Get out the wobble, leave enough wood to shape the curves!

- Rim and foot must be parallel
- With foot on faceplate, mount with drawbar
 - Four jaw, Cole jaw, face plate, Longworth jaw etc.
- Cut small recess for expansion mode mounting with four jaw chuck
 - 130 MM works best
 - Test before dismount!!
 - May need modified hex key for deeper bowls

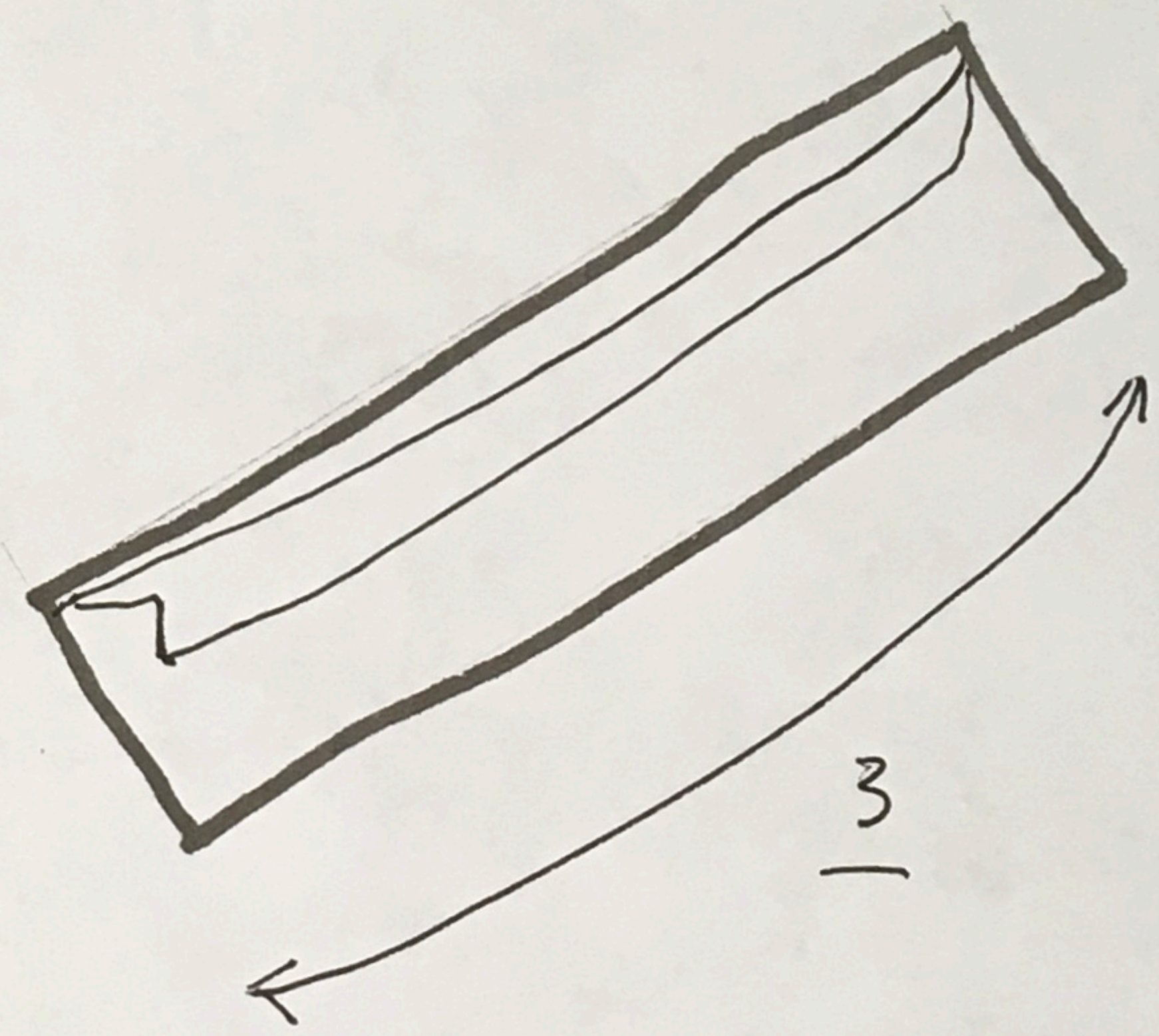
Outside Turning

- Understand the grain orientation
- Basically, face plate turning, with “worst” orientation always coming to the tool
- Stick with favorite bowl gouge
- “Nibble” each end away to establish curve
- Finish cut with horizontal handle in bevel rubbing position
 - Spindle gouge may be needed for tough grain
- Smooth curve with shear scraping
- Expect that some sanding will be required!!!

shallow bead.



"Nibble" the ends to create curve.



Finish w/ bevel rubbing continuous cut, grain

Rim

To rim or not to rim, that is the question!

- Decide now, before you flip the bowl
- An untouched rim leaves nice “curved” sections
 - Optical illusion
- If turned or applied rim is desired, true up the rim at this time

Add Foot and Flip

Promise you'll never touch a tool to the outside again

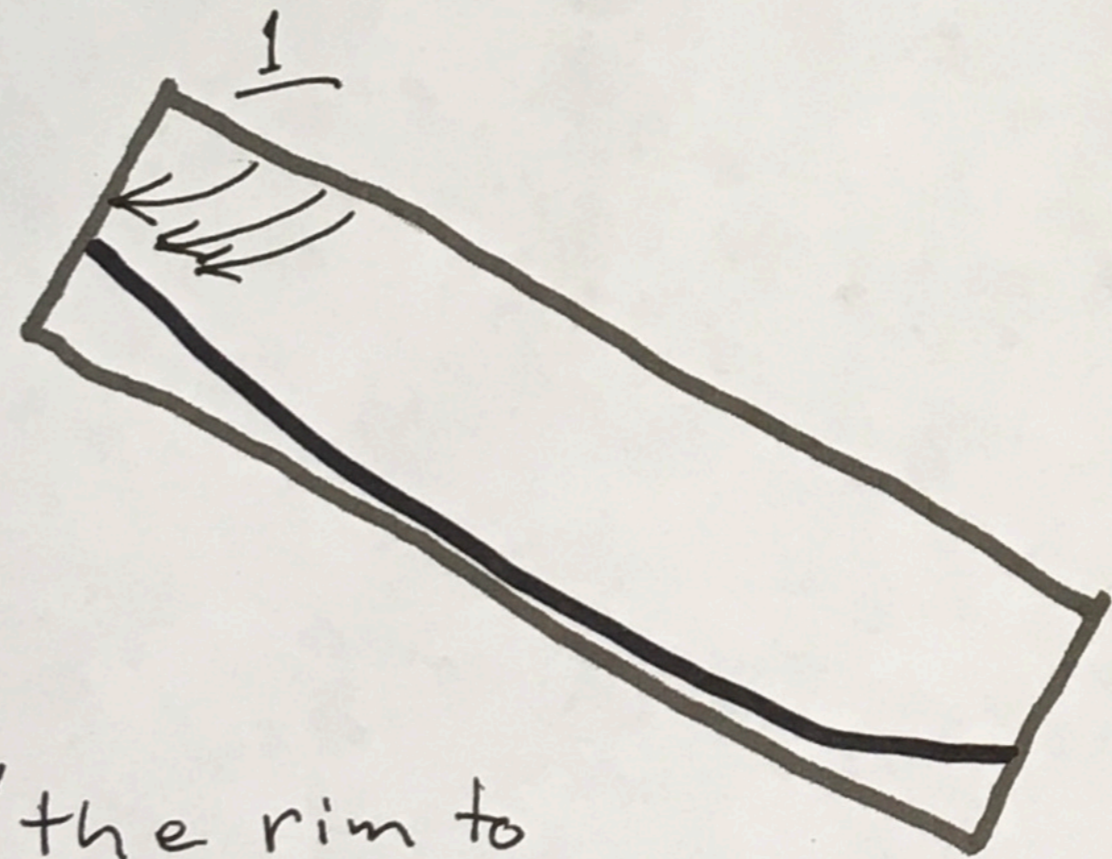
- On bowl, create 3/8" deep socket with 3/8" flat
- Mount base and turn appropriate diameter tenon 3/8' long
- Use tailstock and centering tool to clamp for glue up
 - TiteBond, allow overnight cure
 - CA seems to work fine for immediate continuation of work
- Turn desired foot
- **Important:** Bring up tailstock and true up mounting groove for close fit and no runout when reversed

Turn the Inside

Stick with your favorite bowl gouge

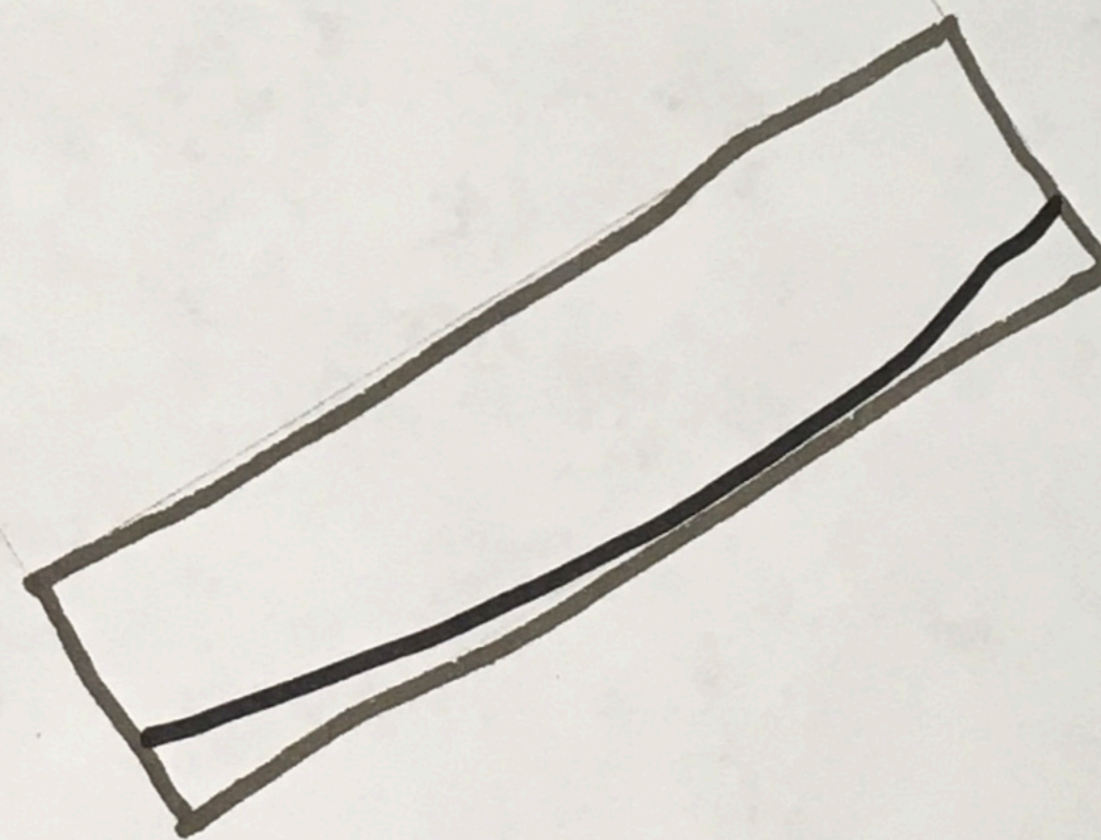
- This is basically end grain hollowing!!!
- Scoop out rim to about 1 inch with a pull cut towards the rim until you are satisfied with the rim
 - Bevel rubbing with handle near horizontal
- Continue with pull cuts in about 1"-2" increments smoothing as you go
 - Watch for vibration or singing
- Near base joint, switch to push cut with bevel rubbing, smooth the curve and dish the bottom

Inside Turning:
Is it end grain hollowing
or a long shallow cove?



"Nibble" the rim to
desired shape, thickness
with pullcuts

- Then, Choose your battle:
- Pull cuts to hollow, smoothing every 1"-2"
 - Start in the middle to create shallow cove.



Final Thoughts

- Expect to need some sanding, with the face grain orientation some tear out is almost unavoidable
- Highlight grain with coat of shellac, then fully sanded off
- Grain filler, dyes, liming wax also add interest.
- Questions?