

Chucking Details: some afterthoughts.

Wells Shoemaker, Feb 26, 2023

Thanks to many of you for comments, questions, and challenges following our Chucking demo Feb 18!

www.scwoodturners.org/uploads/4/8/2/3/4823810/chucking_feb_2023.pdf

Here are a few afterthoughts:

1. **Tenons on dry vs wet wood.** We talked about the ideal diameter of a dovetail tenon as the inner diameter of your closed jaws plus about 1/8". That results in a tight, circumferential grip, which is vastly stronger than the grip of widely open jaws. However, that recommendation applies for dry wood.

- If you are roughing out **wet wood**, remember that as the wood shrinks, your tenon will become elliptical and maybe lumpy. (Some dynamic shrinker woods like madrone, sycamore, and live oak do so spectacularly!)
- Cutting that elliptical contour to make it round again will result in a **loss in diameter**. You don't want that to become **too** small!
- Solution:
 - Make the green wood tenon a bit larger than the ideal dry wood tenon, say inner diameter of jaws plus 1/4 to 3/8". That way, you'll still have enough wood to create a perfect grip after it dries and shrinks.
 - Make that tenon as large as your piece can accommodate. Not only is it stronger and safer, but if you do pare off too much as you refine the contour of the dried tenon, you can still grab it with the next size smaller jaws.
 - Almost all of us have a chuck with jaws to grip a 2-3" tenon. Invest in the next size up jaws for your chuck when you're feeling flush, and then you will have that flexibility.

2. **Glue blocks: Moisture and temperature.** Gluing wood of different moisture contents is not a great idea for cabinetry as well as glue blocks. Glue blocks should always be dry, so that the block won't shrink, warp, or split. It will maintain its perfect circular contour for a safe, efficient grip in the chuck. However, if the wood blank underneath is wet, that wood will inevitably shrink, possibly enough to split the glue block or pull up fibers from the blank and weaken the bond. Beware the UFO!

- Glue blocks ideally bond face grain of dry wood to face grain dry wood.
- If you are working with a "dead wet" green wood blank, just don't trust a glue block. Better to sacrifice some depth and make a tenon.
- If you are using partially cured damp wood, wait until its moisture content is down to 16% (range 14-18%) before trusting the glue block.

Low temperature hazard:

- If you are using **PVA glue** (Elmer's, Titebond 1 & 2) in a winter shop where ambient temperatures are flirting with the low end of the temperature range for glue (usually 55 degrees), there's a risk of a weak bond and failure.
 - Titebond 3 label gives a lower border of 45 degrees. I had one of those chilly glue joints fail in a laminated cutting board with perfectly jointed contact surfaces. Maybe that was just an anecdote, but *yikes* if that were spinning on a lathe.
- One solution: You can warm the blank, the glue block, and the glue itself for 3-4 hours in the house where the temp is likely in the mid 60's. Take the warm materials back to your chilly shop and assemble promptly and clamp.
- They'll hold the heat long enough for PVA glue to set, which is generally less than an hour. Leave overnight before stressing the joint.
- No harm in wrapping the freshly glued assembly with a towel, bubble wrap, old sweatshirt, or foil faced material to hold the heat a little longer.
- Perhaps blow a low wattage electric heater on the assembly.

- Using **epoxy**? Check the package for temp range. Some are quite fastidious! Epoxy always cures more slowly in the cold...or not at all.
- Not sure? Do an experiment! Glue two pieces together in the conditions you will be using for the real thing. If you can cro-bar the experimental pieces apart the next day, **don't trust it**.
- Same goes for other **alternative glues** such as Gorilla Glue.

3. **Mortise depth.** Size matters. A large diameter (5-7") mortise, such as you might make for a good sized, well balanced platter blank, will hold nicely even if it is only 1/8" deep. Why? The large circumference ($\pi \times \text{diameter}$), as long as it makes nearly a **perfect circle corresponding to the outer diameter of the nearly closed jaws**, gives plenty of grip for a balanced, relatively thin (1 1/2 - 2 1/2") circular blank. If you don't have jaws that large, remember you have a birthday this year! Maybe even borrow a set for a couple days.

- What about a mortise for an **unbalanced blank, heavy load, or a deeper vessel** (as in a 4-8" deep bowl)? (Not a great idea in general, and definitely a risky idea for wood which is wet, spalted, soft, or weakened by checks.)
 - It's almost always a bad idea to trust a mortise with a thin rim (should be **at least 3/4" wide**...more with unsound wood).
 - If you want it narrower for aesthetics...**wait until after the high-torque cutting stages** have been completed to trim it to finished size.
- For an ungainly blank, you need a deeper mortise...at least 3/8"...since the stresses conspiring to yank the blank away from the grip are so much more difficult.

- Emphasize the perfect circle grip with the jaws...otherwise you are gripping with 4 points of contact, and that is insufferably weak.
- Spin it more slowly than your usual, and keep the tailstock engaged as long as you possibly can.

4. **Reuse jam chucks.** If you have made a jam chuck with sound, dry wood, label it with the range it is designed to fit and keep it where you can recover it—bin, shelf, sock drawer. Chances are you will be able to use it for a future project and save time, or make a minimal modification and get it done. ¹

- If it's a size you will use often, say bowls 5-8" diameter, it might be worthwhile to glue a cushioning gripping surface such as strips of foam tape, leather, old wetsuit, inner tube, or rug mat to your blank.
- You may have a blank in the advanced drying process. If it's close to the right size, use it as a jam chuck, and then go ahead and finish it as a craft piece.

Good luck...and no involuntary dismounts this year!

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¹ (Yes, I do have packrat DNA, but the validation is so sweet when it works out!)