



TURNING GREEN WOOD BASICS

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My purpose here is to present some basics needed to successfully turn green wood. I will start with some definitions and discussion of selection, storing, preparing then actually turning and drying green wood.

What is green wood? Green wood is usually thought of as freshly cut and still wet. Wood has two types of water in it: FREE water and CELL water. Free water moves up and down with the seasons as we all know. Choosing when to cut makes a huge difference in the weight of the wood and time available for storage. A tree cut in early spring when the sap is starting to rise is in the GROWTH cycle when it lays down new wood just under the bark; therefore the bark is very loose and easy to knock off and will probably fall off later (important for natural edge pieces). Wood cut in winter has a much tighter bark. Wood stored over the summer will grow mold throughout (spalting) and eventually rot.

If you have ever turned a very freshly cut piece the free water is what is slung all over the shop. Wood can be stored for a few months while it gives up its free water. So let's talk about storage. Your stock pile should if possible be in a shady/north side of you shop area. Keep it out of the direct sun if possible. Cut logs into the longest manageable lengths that you can handle. The fewer exposed end cuts the better. Some sort of seal needs to cover the end cuts to prevent cracking. Standing logs on end and covering with leaves or tarp works. I recommend painting the ends with a good sealant like Sealtite end grain sealer, which is a heavy wax when dried. Here is a picture of what I use to apply Sealtite. Get a sports squeeze bottle with a snap close lid, and an old cheap brush. Just squirt it on like ketchup and spread with brush. The brush can be rinsed or not for reuse, it doesn't matter.

The reason for sealing the end grain is to prevent cracking, so let's talk about cracking. Wood cracks mainly because of uneven water distribution. There lots of other reason such as internal stresses and flaws etc. The one we can control is water lose.

The other kind of water in wood is CELL water. The cells are fat with water. When the free water is gone then the cells begin to give up their cell water which causes them to shrink in width much more than length, about .1% in length and 5-8% in width. If you have a 10" wide log that starts giving up cell water on the ends where the open veins are, then you have about 9 ¼" of dry surface with 10" deeper swollen wood, which causes stress leading to cracks. THIS is the key to understanding water control & cracking. By plugging the end grain, slowing down but never stopping water loses you reduce that stress that causes cracks. Only a small percentage of the water exits sideways.

It is important to plug the end grain with Sealtite, paint or whatever you have to preserve the wood you have. Once a crack starts it will run down through the entire log. This is cellulose after all. The rule of thumb is that wood dries about 1" a year. The longer you store the wood you get into issues of

spalting, rot and bugs etc. This brings me back to my original goal of turning green wood because I am not patient enough to wait.

There are three ways to approach this: 1. wait until the log is completely dry; years 2. turn green to about 1" or 10% of total diameter, set aside until dry; 6-12 months 3. Turn to final thickness once and accept the warping, this is my focus here.

First thing to remember is that wood warps, you can't stop it. So when you plan on cutting a green chunk of wood you must understand how it will move. If you pay attention to the symmetry of the grain then the final warping will be symmetric and actually add to the design. Remember it shrinks in width not length.

We will make a side grain bowl. Select a log segment and look at the end grain. Most of the time the pith is not centered in the circle. Measure through the pith in such a way that the pith is equal



distance from the two sides, cut the log lengthwise.

This will result in a deeper bowl and a shallower bowl. Cut the corners with a chainsaw. Next, mark the



midpoint down the pith line for the drive center. I use a 1" spade bit to make a shallow (1/4") hole for my 1" drive spur. This gives a wall that helps keep the spur in place should the spur tear loose from the fibers.



Mount blank on the lathe with the surface vertical and parallel to drive head. You will make some adjustment later. Bring up the tail stock and begin turning. Working from the bottom to top, refine the shape leaving a tenon on the bottom to grab with a chuck.



It is important to NOT have the pith in or near the lip of your bowl. Cracks often radiate from the pith and will ruin your work. General rule of 1" below pith or clear of any existing cracks. It is also important to have sharp tools and cut "downhill" or "downgrain".



At the point that you get it almost round you need to make an adjustment to the two axis of rotation: PITH axis and BARK axis. This is a most important step in the symmetry process. Put a piece of tape on the tool rest and mark where the each pith passes. If there is any difference in the two marks hold the block steady, with one pith next to tape and loosen the tail live center and split the difference in the two marks. This should ensure that both piths are in the same plane; symmetry.



By now the bark should be coming off leaving a "saddle" effect on the sides. Do the same thing with the bottom of the bark lines as with the pith. This will hopefully assure that the two axis of the wood are symmetric, vital in even warping.



Mount the bowl in your chuck and hollow out the the inside of the bowl, working from the rim down. As a good practice, at about half way down the side, go to the center and establish the final bottom of the bowl. MEASURE TWICE. This will give a point to work toward and not blow through the bottom. Once the inside is finished, you will need to reverse turn the

bottom to remove the tenon. If possible, leave a center point on the bottom. This will help in trueing the bottom after drying.

The reward for close attention to the grain symmetry will be a balanced X or H of the grain in the bottom of the bowl.

CAUTION: DO NOT ever leave the work unattended; even for lunch, without covering it tightly in a plastic bag. It will warp uncontrolled. You can actually leave it for days if it is tightly wrapped.



NOTE: The thinner the walls the more dramatic the warp. I shoot for $\frac{1}{4}$ " wall thickness. It is very important to have consistent thickness, even across the bottom, to reduce cracking; back to consistent water distribution. You can go much thinner, which will impress another woodturner or jury judge, but it is hard to sell. The average buyer will be afraid of it.

Once the shape is final, you can usually go ahead and sand. The first couple grits will clog up, but the heat from friction will dry out the surface. **NOTE:** clean the clogged paper with an air hose held

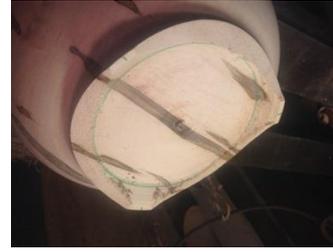


against grit and blowing off the pulp.

If it is just too wet let it rest in a paper bag for a day or more, checking daily. Be aware that it will warp, but at a slower rate than in open



air. Air temperature and humidity are also factor. **CAUTION:** Once you commit to starting the drying process **DO NOT** try turn it any more. It can explode! Cool and humid is best. **NOTE:** after the piece is dry the bottom will not be flat anymore. This will require a re-turn on the lathe to true up the base. For this reason you need to leave a center point for mounting. Then the bottom has a final sanding. Or you can make three feet that will not wobble.



While sanding look for small imperfections and tear out. If the wood is very wet and soft and the blade sharp, there can still be tear out. So pay attention to the direction of sanding; I call it sector sanding. A rotating sander works well, just sand "down grain" in the sectors where needed. As always the first grit is 50% of the work. The rest is easy.

Now the most important part: CURING without cracking. Remember thick wood tends to crack; thin wood is less likely (no guarantees). The goal is to control the water concentration in the wood. The first thing is to plug the end grain pores. I recommend a heavy coat of whatever your final finish will be; oil, polyurethane, lacquer. This coating also will help keep basement mold from settling on the surface. Do not use wax, it will come back to haunt you in the final finish.

Next is to control the drying environment for a month or two. I put my pieces into an old upright freezer with some 2" vent holes top and bottom. With some cheap filters over the holes, this gives a dust free controlled atmosphere. By adding a light socket to the floor I can control heat as well. A 25 watt bulb adds 15 degrees (from 60 up to 75), 100 watts adds 40 degrees. Don't be in a hurry. The bowl will last forever; so will a crack that ruins it if forced too hard. It takes 4-6 weeks to dry. Pick it up and if it feels cool then it is not dry. Dry wood feels dry and warm. After drying is completed some minor re-sanding may be needed to remove whiskers.

If you must hurry up the process, add heat of 15 to 30 degrees for part of each day, then turn off heat to let the water redistribute overnight. Drying time can be cut by 1/2 or 2/3 if careful.

Microwave heating has been used to hasten the drying process. I have found that it does work but forces sap and dirty stuff to the surface that stains the work that must be dealt with. I'm not in that big of a hurry.

Other controlled drying methods that work are: Put wood in a brown paper bag or cardboard box or both, which creates a micro environment for the water loss. Bury in a pile of chips or saw dust does the same thing.

In summary: 1) Uneven water distribution cracks wood, 2) pay attention to grain symmetry from the first cut of the log, 3) keep pith 1" away from lip of bowl, 4) don't leave green wood unwrapped while in the works, 5) wood shrinks mostly in width almost none in length, 6) after sanding coat with a heavy coat of your final finish, 7) control drying rate; don't be in a hurry.

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