Stabilizing green wood

If you have ever turned green wood from our “urban forest” you have most certainly encountered issues with movement and cracking as the wood dries.

As wood dries free water is released reducing the moisture content; then as cellular water starts to be released the cells begin to shrink. The wood structure also shrinks mostly radially around the ring structure, to a lesser extent tangentially across the ring structure and very little along the length of the grain. Each species behaves differently and to a greater and lesser extent. What we try to do is prevent the uneven shrinking from tearing the wood apart, generally along the medulla rays or other weak areas across the ring structure.

Slowing down of the drying allows more time for the wood to move, readjust internal stress and *not* crack. Here are several different techniques in regular use to address the problem:

Stabilizing the green rough turned vessel

Proper rough turning
Turning to a uniform wall thickness is very important to equalize the drying. Be sure to address the tendon and foot areas which many times left too thick thus allowing cracking to occur in this area. As a rule I leave a wall thickness of 10% of the vessel diameter

Proper storage
Storage is important to reduce stress during the drying process. I pack the roughed out vessel with some of its own chips, then place it in a one or two brown Kraft paper bags, label, and date it. Store the vessel in a cool location which has good air circulation.

As the vessel dries and begins to loose moisture you can move it to a warmer location. Typically I would start out placing the wrapped, sealed vessel on the floor in a corner and later move it onto a shelf then up the shelves to the top location. Drying can still take from weeks to months. Regularly check moisture content with a moisture meter or by regular weighting.

Sealing end grain
Separately or in addition, seal the end grain of the bowl or vessel to prevent more rapid drying through the open end grain fibers. Rapid end grain drying will introduce stress as the end grain dries and shrinks while side grain areas of the vessel have not moved. Wax, paraffin, paint all will work.

Finnish turn the vessel and add finish
As an alternative complete the turning to final dimension as rapidly as possible, sand, and finish. Sanding can be difficult with wet wood as the process loads the sand paper, raises the surface temperature of the vessel and may lead to small surface fractures. Try wet sanding with water and slower lathe speeds.

Finish with a penetrating finish inside and out, load the vessel until it cannot absorb more finish; wipe away the excess and set aside to in a cool airy location. Repeat until the desired finish is achieved.

Now if you want to manipulate the vessel and possible speed up the process try one of the following methods:

Water replacement processes

Pentacryl and PEG 100 (polyethelyene glycol 100) displace the free water with heavier molecules which remain in the cells preventing the shrinkage. The wood is soaked in the solution until all the water has been osmotically replaced, sometimes 2-3 months. The weight may actually go up as these molecules are heavier than the water being replaced. Finishing techniques may also be affected due by this technique.

Some recent experiments suggest that soaking in denatured ethanol followed by careful drying may also reduce the loss and while shortening the total drying time. Deformation is still possible.

Cell rupture processes

Boiling, freezing, and soap soaking all seem to allow the cells to release the cellular water more easily by fracturing the cell membrane and releasing the trapped water.

The soap process is usually made of the cheapest liquid soap cut 50/50 with water. Soaking can be from a few days to a few weeks. The serates in liquid detergents are very similar to the material forming the fiber walls thus weakening the fiber's bonds and opening the structure and allowing water to pass through.

Freezing also address the issue the cell walls since water at 4 degree C actually expands rupturing the cell walls. Freezing is done two different ways:

1) The rough turned vessel is frozen, thawed, and then turned after a day or two.
2) The vessel is frozen and left in the freezer until the frozen water has desiccated and the vessel is dry. Some shape change takes places but the cracking is reduced. Desiccation is a function of the size of the vessel and will take months. It's like evaporating ice cubes.

Green wood turning is inexpensive forgiving to the tools and with the wood movement – exciting.

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