Stabilizing Wood

What is stabilizing?
Stabilizing is a method of saturating wood with resin or any other sort of wood hardener to give it desirable properties.

Why Stabilize?
Stabilizing hardens wood which makes it much stronger, denser and reduces shrinkage and expansion greatly. It reinforces the fibers to reduce (if not completely remove) tearout common to punky/soft wood and end grain.

Color can even be used during the process to deeply penetrate the wood with dye.
How to Stabilize:

There are many methods of stabilizing wood including. Most of them involved saturating the wood with some sort of hardener and curing it either in an oven or air cure.

• Vacuum method – submerge the wood in a solution and place in a vacuum chamber to draw out the air. Once the vacuum is released, the solution soaks deep into the material.

• Soak in a solution – simply submerge the material into a solution and let it soak. Many commercials products are sold specifically for this method. Most are air dry similar to applying Danish oil.
  
  - Some examples include: Resinol, Lacquer, Epoxy thinned with DNA, thinned glue, Polycryl, Minwax or Elmer’s wood hardener, Cactus Juice, “Wood Juice” Rockler, Pentacryl Woodcraft (for green wood)

• Casting – this isn’t necessarily stabilizing, but a way to support fibers.
  
  - wax casting - http://davidbelser.com/ example of a basket cast in wax to hold the fragile parts while turning
  
  - Alumilite is another great product for casting items
    http://www.youtube.com/watch?feature=player_embedded&v=ATPL2DadXp0 Example of stabilizing and casting in alumilite by Mike Meredith (Dr’s Woodshop)

• Apply locally with Epoxy, CA glue, etc
  
  This is a very common method for filling voids, retaining bark for a natural edge bowl or stopping a crack from propagating.
What can be stabilized?

Most woods “can” be stabilized. There are many factors to how much benefit you will get from it.

- Dry, open grain, punky wood will see the most benefit
- Dense/Oily woods will see very little benefit (Mesquite/Lignum Vitae)
- Wet/Green wood – unfortunately, this process does not seem like a good method to prevent cracking from drying wood (Pentacryl is formulated to displace water and moisture in wood fibers of green wood).

Cost to Stabilize:

The cost of stabilizing depends on method and product. The amount or resin needed varies by wood type and product used.

- Cactus juice $90 / gallon + Shipping
  - 5 spalted maple pen blanks uses about 5oz of fluid.
  - A Ø5” x 5” tall spalted maple blank used ~24 oz of fluid.
- Rockler Wood Juice - $20 / 32 oz
- Minwax $15 / 16 oz
- TMI stabilizing Resin & Catalyst $34 / 32 oz
- Pentacryl $18 / 32 oz
  - 6” x 6” x 2” uses 2 oz solution (from the product description on Amazon)

There are services that will stabilize your wood for you. On average, it looks like it costs ~$12 / pound to get your wood professionally stabilized (plus shipping both ways).
This process uses a vacuum chamber to saturate the wood with Turntex Cactus juice brand thermoset stabilizing resin into wood.
Turntex Cactus Juice / Vacuum chamber stabilizing

Step One: Injecting the resin

- Insert wood into chamber and remove all air with a vacuum pump.
  - Keep submerged in the chamber with a weight under vacuum until all air bubbles have stopped. Every small void in the wood is filled with air. This will draw all of the air out and create a small vacuum internally.
  - This can take anywhere from 5 minutes to many hours. The denser the wood, the longer this takes.
  - Once all of the air is removed, release the vacuum and let soak in the solution for twice the amount of time it took to remove the air. This allows the fluid to be sucked into all of those tiny chambers throughout the wood.
I found a tray that fit a set of 10 pen blanks (2 rows of 5 on top of each other) quite well and fit inside my vacuum chamber.

The aluminum rods keep the blanks submerged. Later I found it took several more of them to keep the blanks submerged.
Step Two: Curing the resin

- Wrap blanks in aluminum foil. Resin will expand and bleed out during the process. Uncovered, the blanks would all melt into each other.
- Put in an oven at 200 degrees F to cure the resin.
- More time or heat will not hurt the process so err on the side of caution. Less time will prevent the solution from fully curing and leave it in a sticky mess that will never cure once cooled. Higher temps will allow more resin to bleed out.
- The resin itself cures in 6-8 minutes, but the internal temp of the wood needs more time to get that hot.
- So far, 2 hours at 200 degrees has cured a batch of 10 blanks and 2 batches of 5”x5” cylinders. 45 minutes cured a couple of pen blanks.
Spalted western maple blanks prior to stabilizing
Combined weight - 4 oz

Spalted western maple blanks after soaking
Combined weight - 12.9 oz

Spalted western maple blanks after curing
Combined weight – 9.3 oz

Before and after stabilizing
Curly Eastern maple blanks prior to stabilizing
Combined weight - 8 oz

Curly Eastern maple blanks after stabilizing
Combined weight - 11 oz
Spalted Maple cylinder prior to stabilizing

Weight - 15.4 oz

This one took a little more weight to get it to stay submerged
Spalted Maple cylinder after soaking

Weight: 2lb 3.9oz

Spalted Maple cylinder cooking for 2 hours

All this resin bleed out during cooking and almost ruined my thermometer

Spalted Maple cylinder after cure
Spalted Maple cylinder cured –

Add pic here when Laura is finished =D
• Reference section

• Supply List
  • Vacuum chamber – ebay, turntexit.com
  • Resin
    • Turntexit.com
    • Woodcraft
    • Rockler
    • Amazon
  • Pump - ebay
  • Toaster Oven - anywhere