Michael Mocho Florida Symposium 2010 www.mmocho.com

Demo Title: "On-Lathe Textural Techniques"

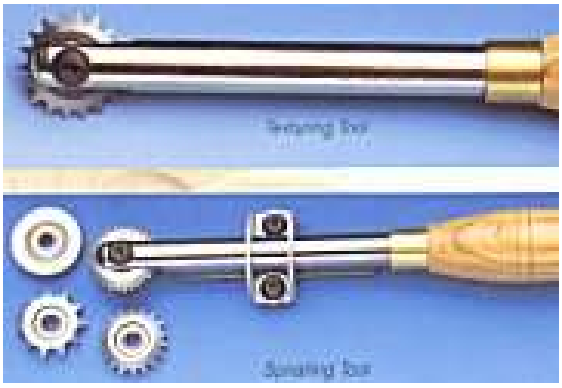
Chatter work: A texturing technique that involves presenting a cutting edge to the spinning wood surface in such a way that the resistance causes the tool to deflect and rebound in a millisecond, creating a textured surface that further perpetuates the vibration of the cutting tool.

1. Any tool can be a chatter tool- it is the cutting dynamics and conditions that create chatter

2. The major factors involved in chatterwork are:
   - **Material density:** end grain works best, due to the relatively even resistance, and the orientation of the fibers that allow for crisp detail. Side grain doesn't chatter as well due to the inconsistent resistance and the tendency for the fibers to compress rather then be cut
   - **RPM:** the faster the work piece spins, the farther the surface will move between oscillations of the cutting tool. Slower RPM creates finer chatter / faster creates courser texture
   - **Angle of tool presentation:** tools are more easily activated by pressure that is relatively perpendicular to the axis of the tool shank. The most effective chatter involves using the tool below centerline, at approximately the "7:30" position on the rotating surface relative to the axis of the lathe. The proportional area of edge contact to material density also effects the pattern, as does the orientation of the cutting edge relative to center.
   - **Relative flexibility of the tool:** determined by the cross section of the tool shank and the relative distance of the tool rest to the surface being cut. The vibrating length of the tool produces a corresponding frequency: shorter = faster, requires relatively more force to activate ; longer vibrating length = slower frequency, requires relatively less force to activate.
   - **Amount of force:** too little and tool won't chatter / too much and the texture becomes burnished or burned
   - **Duration of tool contact:** over-chattering tends to pulverize the wood and ruins crisp detail
   - **Direction of travel:** moving from large diameter to center tends to be better than from center out -due to the required 'flow' of wood over the tool required to make it vibrate.

Embossing: can create detail in contrast to smooth surfaces.

- End grain embossing produces the best clarity of pattern since the fibers are simply pushed below the surface without bending.
- Cross-grain embossing sometimes requires the punch to actually sever the fibers.
- Common leather punches held in a simple device that fits into the tool rest base used in combination with indexing can produce interesting patterns
- The larger the surface area of the punch, the harder it must be pressed into the material.



Sorby spiral tools:

- SST wheels come in a variety of sizes and can be used to produce embossed textures and spiraled surfaces of different pitches
- Although the SST is advertised and demonstrated for use on side grain only, it can be used on other surfaces if a few factors are considered:
    - Material density: woods of even density produce more regular textures
    - RPM: although slower speeds allow the cutters to work without jumping out of the cut, faster RPM is required for a cleaner cut and reduces the tendency for the cutters to cut deeper into softer areas such as side grain.
    - Angle of cutting edge presentation: the flatter the cutter is presented to the wood, the slower it will spin / the more angled it is, the faster it spins- If it is vertical, it will rotate at the same RPM as the spinning wood.
    - Remember: the vertical edge of the wheel teeth is the control surface / the equivalent of the bevel
    - Think of the SST as a rotating negative-rake scraper. The cutting gear must rotate without vibration in the handle, which requires use of all 3 thin washers.

TOPIC #2

Demo Title: "Making Connections"

This demo will address the details involved in making connections between turned components: how to drill accurately centered holes, and turn perfectly fitting tenons for knobs, finials, feet, rings, box lids, etc.

Calipers:

- Traditional "spring leg" calipers: be sure to slightly lightly file the tips round, and make sure the legs are in the same plane and not bent. DO NOT wrap your hand around them or put your thumb or finger in the top spring- it can result in a disastrous and painful catch. Hold them gently between finger and thumb from above and behind the spindle, perpendicular to the axis of the lathe, and in a vertical plane, with gentle pressure on the top tip contacting the spinning wood.

- Inexpensive stamped steel calipers that have a locking feature and can be used directly on the spinning wood to set diameters with a parting tool. (General brand –available at most home centers and Ace hardware stores)
- Dial or digital calipers: great for checking diameters with the lathe OFF. The thin contact points of the jaws will compress or cut the wood if it is spinning. (Can be purchased for under $20 from Harbor Freight and many other tool stores.)

Drilling on the lathe: always cut a dimple in the center of the spinning wood to assure that the drill bit enters exactly in the lathe axis. If the drill bit is wiggling as you advance the tailstock ram, then the tailstock may not be accurately aligned with the axis of the headstock. This is a problem with many moveable headstock lathes

- Remember to ALWAYS hold on to the drill chuck when you are retracting it from the hole or it can pull out of the Morse taper in the tailstock and spin, burn the hole, or fall to the floor.
- keyless chucks are now much more affordable, and when used on a morse taper with a CLEAN tailstock ram will produce accurate holes without the drill bit slipping.

Very accurate tenons can be turned using a metal drill sizing plate and the following method:

a. Hold the tenon stock in a chuck and turn the tenon rough oversize
b. bevel the tip so that it is a bit less than the desired diameter and will start into a hole of that diameter

c. slow the lathe down to under 600 RPM
d. remove the live center from the tailstock ram, and with the tailstock locked tight to the bed of the lathe, place the drill plate flat on the end of the ram and use it to drive the plate over the spinning oversized tenon. If the edge of the hole in the metal drill plate is not rounded over, it should create e shaving that will roll back as the plate is forced onto the spinning tenon.
e. The shaving must be removed from the tenon to create a clean shoulder
f. Be sure to always have the drill plate flat on the tailstock ram and always moving on axis with the face of the plate perpendicular to the axis of the lathe.
g. Work down to the desired size by starting with larger holes and gradually reducing the tenon diameter.
h. This system doesn't work very well with plastic drill sizing plates

Topic # 3

Demo Title: "Sculptural Techniques for Small Turnings"

Advantages of abrasive carving:

- Factors such as wood density and grain direction are of relatively lesser importance
- Creates less force to the surface being worked compared to conventional cutting tools
- Abrasive techniques provide a powered method of material removal that allows for hand-held manipulation of the work rather then requiring a static holding method of the piece.
- drums- commercial rubber drums / shop made rods & drums / sanding sticks
- belts- a simple drum spinning in a drill press or in the lathe can drive a 3 x 24 or 4 x 24 sanding belt over a shaped block covered in graphite coated canvas

Topic #4

Demo Title: "Hand-chased threads without using expensive woods"

Getting clean and accurate hand-chased threads:

Contributing factors:

- Cutting geometry- grind / hone angle, clearance angle
- Angle of tool presentation and contact point relative to center.
- Relative support of the tool rest or moveable arm rest
- RPM: too fast = tool jumps out of the cut / too slow = tool cuts too aggressively in the softer grain causing the cut surface to be out of round and creates erratic threads
- Proportions of bevel contact in relation to engaged cutting edges
- How much pressure is being applied- both axially and radially
- The feed rate and direction that the tool is being advanced into the material

Common problems with Hand–Chased Threads:

- Irregular "drunken" threads – caused by lathe running too slow, too much pressure, irregular feed rate, wrong cutting geometry, wrong tool rest position.
- crumbling threads / torn grain
- improper sizing / tapered threads

Suggestions: Practice threading on short sections of PVC- it's cheap, readily available, and has very even density, so it is relatively easy to thread. However, it does stink when being turned, so use a fan and proper breathing protection to divert the toxic fumes.

Special threading elixr:

- lubricates the cutting action
- Reduces the brittleness of wood fibers
- Reduces the tendency for some woods fibers to collapse
- Gets your dishes sparkling clean

To receive your very own Special Guaranteed Threading Elixir* in the special compact deluxe handy dispenser bottle, just send $25 (cash, gold, cashier's check, or certified money order)

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Sources of supply:

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Thread chasers & #2 MT sizing gauge :	Mark St. Leger	www.markstleger.com
Leather punches:	Tandy leather	www.tandyleatherfactory.com
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