

Northern Woods

The Newsletter of the Minnesota Woodworkers Guild, Est. 1982

Volume: 140

Issue: August - September 2012

President's Notes

BIG NEWS!! We are having a picnic to acknowledge those people who volunteer to help the Guild and for our generous Guild sponsors. Read about the invitation to a recognition picnic on August 28th.

[Full Story](#)

What's On Your Bench?

Some woodworkers prefer to work on one project at a time, some have several simultaneous projects. And then there is Steve McLoon - he has dozens of projects on his bench at any given time. Take a look....

[Full Story](#)

June Meeting: Mortise and Tenons

You can make them with hand tools or power tools. You can make them plain or fancy. Mortise and tenon joints are a great example of woodworkers finding multiple methods to accomplish a task. At the June meeting presenters demonstrated five ways to tackle the M&T. We also had a great Instant Gallery, as attendees brought along their first woodworking project.



[Full Story](#)

July Meeting: CNC Woodworking

What is woodworking like when a computer is controlling the tools? July meeting attendees were shown several CNC devices made for woodworking.



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What's On Your Bench?

Story by Steven McLoon

Photos by Steven McLoon

A Tour of Millennium Studio with Steven McLoon

Welcome to my studio. Yes, I call it a studio, which is common for those of us who call ourselves artists. (Artists are people who do not have enough work to call him(her)self a craftsman... but we can let that ride for now.) Photo 1 is the view from the door. What you cannot see is all the equipment in a storage room. My shop... I mean studio... is small. Most equipment is on casters, and I roll it in when I need it. This often means I roll it in, use it, roll it out, realize I had not finished, and roll it back in. That is life in a small shop. I also have a small sharpening room with a sink and a wood storage area.



I was asked "what is on my bench?" I typically have 20 projects going... alright that is an exaggeration... I guess it is probably 30-40 projects. I was only counting the ones I think about. I will give you a counterclockwise tour of the shop, which will give you an idea of the types of projects I have underway.

First stop is the lathe (photos 2A&B). Today I have a couple of bowls I am working on. They are spalting birch. Because of the heavy spalting, they could not be the most functional bowls. Thus, I made the base somewhat small. I always have something I am turning. I enjoy turning, and I typically spend some time

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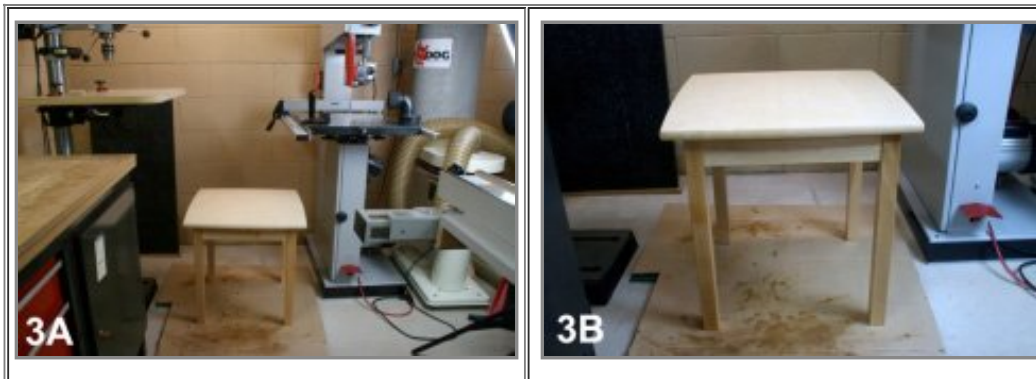
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every day at the lathe. Turning projects are usually faster than flat work, and I think it is easier to do something truly different with turning (see below).



Next stop is a small table that might look vaguely familiar to you (photos 3A&B). I made the table base as part of the mortise & tenon demonstration for the last MWG meeting. I had no plan for the table base until I noticed a beautiful piece of curly maple in my wood collection. The next thing I knew, I had a tabletop made for the base. The top has slightly curved sides and a bullnose edge. I just put the first coat of finish on the table. I used a tung oil, varnish mixture. The oil really pops the interesting grain of the top, and the varnish will help protect it. Before finishing, I raised the grain with water followed by sanding to 400g. I feel that raising the grain with water is essential for tabletops. I will wet-sand with 600g while applying subsequent coats of finish. After a few coats, I will top it off with paste wax. I do not enjoy finishing, which probably explains why I do not have a dedicated place for finishing. I have no particular plan for this table, so let me know if you need a nice end table in birch and curly maple.

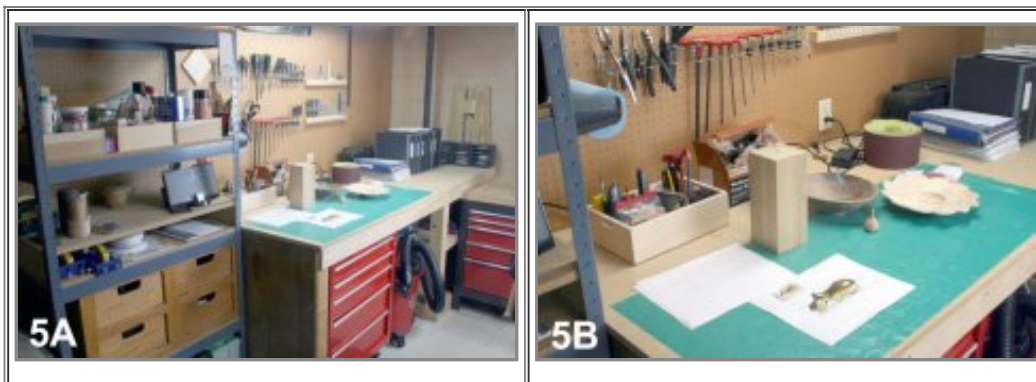


Moving further around the room, we come to my holding bench (and sometimes finishing bench). There are a couple of noteworthy projects here (photo 4). One is a small entryway table in birch and wenge for a client. I typically work from a full size drawing. The drawing for this table is on the wall over the milled parts. I still have more to mill before I start the joinery. The small case in cherry on the left is meant to be in the 'Krenov style'. (Its drawing is rolled up behind it.) I started it last summer in a course I took with Craig Stevens at the Center for Furniture Craftsmanship. Craig was a Krenov disciple. (He would be great for the fall symposium.) This case is interesting because it has a coopered door. (It is hard to appreciate the curve and grain pattern of the door in the photograph.) I just recently decided that I should finish this case before the fall shows start.



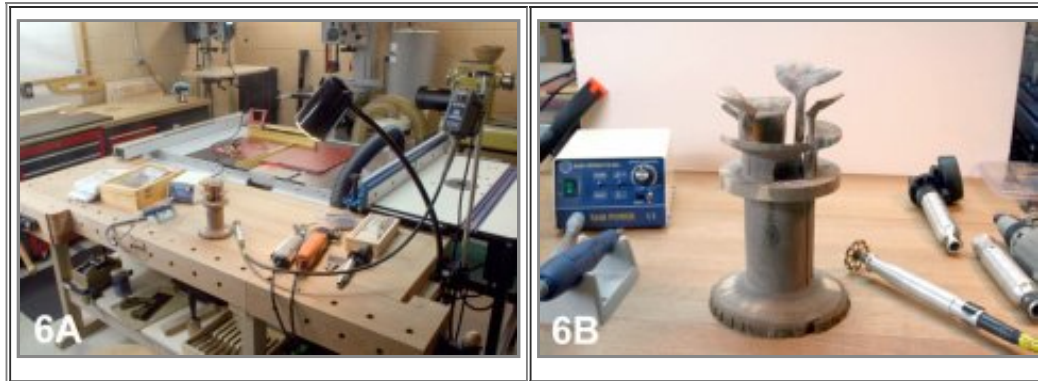


Next is my multipurpose bench (photos 5A&B). This is where I handle shipments and repair equipment. It is also where I plan projects. Preliminary drawings for two projects are in the foreground. One is a small hippopotamus, which I will make using multi-axis turning. The idea came from a hippo I saw in an interior design magazine. I scanned it, enlarged it, and then superimposed a grid to plan the turning. The other drawing is for an asymmetric bench with storage in cherry and wenge. I will head to lumberyards today to start the hunt for the cherry. I want rift sawn for the slats of the bench top, which I know will be hard to find. I may end up ordering it. Rift sawn will give a nice grain pattern on all sides of the slats. I have another project underway on this workbench. I decided that the paper in my life was out of control. I am organizing my equipment manuals, project ideas and useful articles in notebooks (far end of the bench). (I feel like a better person already, and the manuals might actually be useful now.) The blue notebook is always close at hand. It has things I refer to constantly including tables of safe speeds for various types of drill bits, router bits and the lathe, tables for converting among the different grit scales, set up instructions for my lock-miter and other bits, tables for converting fraction inches, decimal inches and millimeters... you get the idea. I think everyone needs a notebook like this near their bench. There are other projects on the bench that require some thought as 'new design opportunities' appeared during construction.



The last stop is the center of the shop (photos 6A&B). My woodworking bench, tablesaw and router table fill this area. With the addition of an insert, the workbench serves as the outfeed table for the tablesaw. My newest endeavor is on the bench. It is a... hmm... how about a sculpture. I turned a walnut limb to a cylinder leaving several large beads. I am currently in the process of cutting away waste to leave... something. I have tried almost every tool in my shop for

removing waste. You might notice my brand new micromotor to the left of the sculpture, which I am using to shape segments of the beads. The sculpture has a very organic feel right now. It might end up as firewood; however, I am excited by the possibilities. Stay tuned for the progress on this one.



The last side of the shop (not shown) has space to wheel in equipment (planer, jointer, scroll saw, etc.) and the wall is covered with hanging guides and clamps. I hope this answers the question of ‘what is on my bench’. Feel free to contact me if you have questions.

steven@millennium-studio.com

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Classifieds

Advertising in the classifieds is provided to members of the Minnesota Woodworkers Guild free of charge. Ads placed should be for goods or services of general interest to the woodworkers who make up the guild community. Ads for services will run until cancelled. Other ads will run for one issue unless renewed. Submit ads to [Jerry Beutel](mailto:Jerry.Beutel)

Tools

SHOPSMITH Mark 5 with attached jointer and a speed increaser that I would like to sell. Price \$2000.00 or best offer. I also have a **SHOPSMITH band saw** with power stand for \$200.00, a **ryobi surface planer** \$100.00 and a **craftsman radial arm saw** \$100.00 all immediately available.
Jerold.hahn@comcast.net

Drum sander looking for a new home. Homemade 220V, ~20" head drum sander needs a new home for \$50. This works well, I just don't need it anymore. Please contact Mark Fritsche at markfritsche@skyline.com with inquiries. Photos available on request.

Wood

Walnut \$100. The main piece is 3.25" x 8.5" x 8.5' long. Also included are these smaller pieces: 4 @ 2.75X.75X17 inches, 8@ 1.75X.375X17 inches, 1@ 2.75X.375X10 inches, 1@ 2.75X.375X12 inches, 1@ 2.75X.5X10 inches. All for \$100 alans@att.net

Red Oak Timbers. I am a Sawyer, I have recently started to cut up some Red Oak Timbers that have been down for approximately four years. I'm interested in selling the slabs, they are 1" X 16" X 10'. If you are interested, you can contact me at: kattermaggie@comcast.net 763-443-2628

Veneers and marquetry tools. Variety of marquetry tools(including a press) and veneers for sale. A list of veneers follows: Rosewood burl ,African Mahogany, East African rosewood ,Rosewood ,Premium Walnut ,Olive ash,White Oak, Red Oak,Poplar Birch,Sycamore,Dyed Black, Hare-wood Maple,Walnut,African cherry,Aqua Birdseye,and Dyed green. Any halfway reasonable offer will be accepted. Private party. Contact surselyd@msn.com

Unfinished hardwood picture frame molding, in lengths. Liquidating my inventory. Beautiful, various woods: cherry, maple, walnut, ash, poplar,

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birch. Several profiles including floater moulding. Moulding is unfinished and sold by the stick, average length 8 - 10 feet. See profile examples at:

[https://www.facebook.com/media/set/?](https://www.facebook.com/media/set/?set=a.1455897894148.42875.1734387448&l=4c7d9cbea4&type=1)

[set=a.1455897894148.42875.1734387448&l=4c7d9cbea4&type=1](https://www.facebook.com/media/set/?set=a.1455897894148.42875.1734387448&l=4c7d9cbea4&type=1) Prices vary depending on wood and profile, start at \$1.30/foot. Contact me for more info at: info@sheralynbarnes.com

Shop Space

Shop space at 11490 Hudson blvd Lake Elmo. Three 2400sq.ft wood working bays available in Lake Elmo off of Manning ave and Interstate 94. Piping for pressurized air, heavy power, ventilation and an interior drive in so you product will never get wet. Great access to Interstate 94. The whole complex is either wood working shops or a pallet company so you never have to worry about running your equipment. \$850. Contact Chad at chad@javaprop.com

The Mill is a new educational industrial arts/maker space in Minneapolis, Minnesota that celebrates the do-it-yourself culture and creative communities by providing members with access to tools, equipment and instruction. From woodworking to metalworking and electronics, members of the Mill will work on individual or collaborative projects in a well-stocked, industrial grade fabrication workshop. The Mill offers a unique solution to address the knowledge, space, storage and social constraints of building projects at home.

The Mill is community resource. Beyond its identity as workshop, the specific purpose of the Mill is to encourage technical, scientific and artistic skills through individual projects, social collaboration and education. The Mill is conceived as an infrastructure provider for technical-creative projects. We will also fulfill our role as a community resource by hosting classes in a number of areas including electronics, woodworking, digital fabrication, metal fabrication, artistic use of industrial equipment and any other skills that our members or guests are willing to share.

The mission of the Mill is to serve as an incubator of ideas; to foster a collaborative community where members utilize industrial arts concepts, cutting edge technology and time tested fabrication equipment to create innovative solutions to technical issues in fabrication and making. Through classes, group interaction, and an inclusive environment, the Mill is a space where innovation and creativity can be fostered for novice and expert alike.

www.mnmill.org

The Mill

2300 Kennedy St NE

Suite #130

Minneapolis, MN 55413

Dream Workshop Space for rent /to share (several areas to pick from): 2303 Kennedy Street NE. 4500 s.f. total shop space. Industrial

building with mushroom pillars. 12' high ceilings and concrete floors. 10 hp Quincy air compressor. Heavy power - 3 phase and single phase. Private build/work space. Heat/electricity included. Loading dock. Easy parking. Spray booth available on second floor. Room for your own tools/machines. Internet available. Southern exposure/natural light. Many possibilities for the serious hobbyist or professional. Affordable. No curfew.

Optional use of Altendorf sliding table saw, 10" Unisaw, Holzher edgebander, edge sander, pocket drill, system drills, pallet rack, drill presses, lathe, panel carts, 36" wide steel storage lockers, etc. Private office/drafting table available. Contact: **Dale 612.812.5331 for viewing.**

North Country Woodshop – Woodshop Open to the Public. The easiest way to describe North Country Woodshop would be this: It's a health club for woodworkers. But, instead of treadmills, we have table saws...instead of dumbbells, we have drill presses, lathes, joiners, sanders, and so on. If it belongs in a woodworking shop, North Country Woodshop has it. And the best part, all the tools are available to use with a simple membership to North Country Woodshop.

Have your own hand tools? Bring'em! Don't have your own hand tools? Rent ours. Our staff of veteran woodworkers will show you how to swing that hammer without hurting yourself...or others. If you need lumber for your project, but don't have time to pick it up yourself, give us a call and we will have it waiting for you when you get there. And when your project is done, we can deliver it for you as well.

North Country Woodshop offers a wide variety of classes for all levels of woodworking ability. We offer classes from beginner to advanced with a large variety of projects and techniques. Our classes are taught by our team of expert woodworkers as well as local and world renowned guest instructors. Contact info at [North Country Woodshop](#).

Space available to rent in Bespoke Minneapolis'/St. Paul workshop.

Rental costs include: full use of shop facilities, finishing room, and all utilities and trash. Shop equipment includes Altendorf sliding table saw, Format cnc shaper, Format digital 20" planer, SCM 16" jointer, Laguna cnc lathe, as well as 16" disc sander, belt sander, moulder, router tables, hydraulic veneer 4' x 8' cold press; 5' x 14' veneer bag press, Laguna 16" capacity re-saw bandsaw, Powermatic 14" bandsaw, drill press, dovetail jigs and etc. Please view our website www.bespokeminneapolis.com to see the type of work which is produced in our shop. Total rent is \$925.00 per month.

Services

Mike Siemsen's School of Woodworking. Woodworking with a hand tool focus. We have a great line up this year including some tool sharpening and tool tuning classes. Our Workbench Class was a huge success and will be offered again in the future. Take a look at my website, improve your sharpening or furniture making skills! Classes are held in my shop on a quiet rural setting 35 miles North of the Twin Cities. The shop is heated and air conditioned for your comfort year around. Reserve your spot now! Visit my [website at www.schoolofwood.com](http://www.schoolofwood.com), e-mail mike@schoolofwood.com or call ~~651-257-9166~~ for more information.

Woodcraft Education Program. Located in Bloomington, we offer the Twin Cities most complete selection of woodworking classes. Our classes cover furniture making, carving, turning, hand and power tools, and finishing. We also offer free demonstrations every month. Close by, small class sizes and the best local and national instructors make it a great place to bring your skills to the next level. Website: [Woodcraft Bloomington Store](http://WoodcraftBloomingtonStore.com) *Phone: 952-884-3634*

Workbench Plans. Plans now available for Adjustable Height Workbench with a built in Mobile Base. Email Charlie Kocourek at Charlie@Jack-Bench.com or visit my [website www.Jack-Bench.com](http://www.Jack-Bench.com)

Plane soles milled flat, price ranges from \$12 for a block plane to \$40 for a #8. Sides can be milled square to the sole for \$15-\$20. Contact Chuck Pitschka at ~~952-935-0660~~, or by e-mail at cepitschka@yahoo.com

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Story by Charlie Kocourek

Volunteer & Sponsor Appreciation Picnic!

Tuesday August, 28th
Central Park in Roseville
6:00-8:30



The Minnesota Woodworkers Guild is what it is because of the members and organizations that support it. The members who attend meetings, the members who use the discounts, the members who participate in Northern Woods, and most of all THE MEMBERS WHO GENEROUSLY VOLUNTEER THEIR TIME! The nature of the Guild would also be very different without the equally GENEROUS SUPPORT OF OUR SPONSORS!!

Seriously, I can't stress this enough because it is absolutely true! To emphasize my point I am using the President's Notes column in a little different manner - to

tell you how we plan to honor our volunteers.

The Guild has decided to put on a Volunteer and Sponsor Appreciation Picnic. We really want to make this something special. We sincerely want to recognize all the people who have helped to build the Guild by volunteering their time over the years.

There will be:

- FREE FOOD!
- OVER \$600 IN DOOR PRIZES!
- CAMARADERIE!
- FUN!
- Spouses, Kids, and Guests are Welcome to attend!!

This picnic is for ANYONE who has ever volunteered, AND ANYONE WHO WOULD LIKE TO GET MORE INVOLVED, TOO!

This picnic is for you if you have ever:

- "Manned the booth" at Northern Woods
- Participated in "Rockler Days"
- Taught a class for the Guild

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- Passed out nametags at a meeting
- Helped with a Guild related project
- Served on the Board of Directors
- Brought beverages to a meeting
- Served on a committee
- Sponsored an award
- Offered a discount to Guild members
- Written an article/taken photos for the newsletter
- Presented at a meeting
- Helped with anything in any way!

This picnic is for also for you if you “might” like to help with any of these things or if you “might” like to get more involved in the Guild. Please join us on August 28th.

Thanks,

Charlie Kocourek

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Upcoming Meetings

The program committee has lined up the following speakers for the next four monthly meetings. Notices of meeting details will be sent out to all members signed up to receive the blasts. You can also watch for [meeting notices](#) on the website.

August: Tim Heil, woodturning on a lathe

September: Richard Tendick, woodturning without a lathe

October: George Vondrisk, guitar building

November: Robert Van Norman, Fall Seminar

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June Meeting: Mortise and Tenons

Story by Ron Corradin

Photos by John Griffin-Weisner

The June, 2012 Guild meeting was hosted by Greg Flanagan at The Mill in Minneapolis. Several members took Guild President Charlie Kocourek's advice and brought in their first woodworking project. They were well done, especially for first projects, and they included:

Table
Pencil holder
Stool
Jewelry box (2)
Horse profile bookends
Abstract sculpture
Spool rack
Rocking horse
CD rack
Clipboard
Flute Hanging lantern
Bow saw
Bookends
Bench made from 100+ year old wood from a corn crib



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Instant Gallery: Members' first projects

The M&T

The topic of the meeting was mortise and tenon joints. Five different approaches to making them were demonstrated, some producing mortises and tenons with rounded corners and some with square corners. Mortises $\frac{3}{8}$ "

wide would be cut in table legs to receive 3/8" wide tenons cut on the side pieces to make small end tables..

Guild members were told the mortise and tenon joint is the strongest, most fundamental woodworking joint. It has the mechanical strength to resist torsional forces and plenty of glue area that does not use end grain. Mortise and tenon joints have been found in thousand year old furniture in Shanghai, China. Traditionally a tenon is one-third the thickness of the board, and two to three times as long as the board's thickness. So a tenon on a 3/4" thick board would be 1/4" thick and 1-1/2 to 2-1/4" long.

Traditional Hand-Cut

In the most traditional approach to making a mortise and tenon joint, Jeff Hand used a 3/8" mortising chisel, a backsaw, and layout gauges. First he laid out the size and position of the mortise on the table leg with a marking gage. Then he re-set the marking gage and laid out the tenon dimensions on the table's side piece.

Jeff clamped the table leg to his workbench, mortise area up, and began cutting the mortise with shallow cuts of the 3/8" chisel. The chisel's width set the mortise's width, and the how hard the chisel was hit set the depth of cut. After each set of cuts Jeff would use the chisel to lever out the waste until he got to the desired depth.



Hand cutting mortises with chisel



Cutting tenon with backsaw

To cut the tenons, Jeff clamped the side piece vertically in his workbench vise and made the cheek cuts with a backsaw. This takes practice to do well. Clamping the board to the workbench he made the shoulder cuts, again with his back saw. Any cleanup in either piece was handled with a shoulder plane or a chisel.

Mortising Machine/Drill Press & Table Saw

Cutting mortises on either a mortising machine or a drill press with a fence was demonstrated by Jeff Anderson, using the Mill's Jet mortising machine and their Jet drill press.

A mortising machine or mortiser has an auger bit turning in a hollow, square chisel to cut square holes for mortises. It works quickly – drill a line of square holes in a row and you have a mortise. The Jet mortiser had a vise on a carriage with hand wheels to control left-to-right and in-and-out movement. The long handle on the mortiser and a stop on it controlled the depth of cut. This design helped to keep things straight and square.

The drill press used a simpler version of the same idea. There, the leg was held against a wooden fence that was



clamped to the drill press table. A 3/8" forstner bit cut a line of overlapping holes for the mortise as Jeff moved the table leg along the fence, fully withdrawing the forstner bit after each cut. The material between the holes was cut out with a chisel to straighten the mortise

sides. Tom Caspar of Woodwork magazine recommends clamping another block above the work piece to guide the back of the chisel when doing this.

Ed Neu used the Mill's SawStop table saw to cut tenons. First he used the saw's fence and a miter gauge in the left miter gauge slot to make the shoulder cuts. He set the distance between the blade and the fence to get the correct tenon length, then gradually raised the blade height on successive cuts to get the right tenon thickness and width.

Ed then used a Delta tenoning jig to make the cheek cuts. The jig rode in the right miter gauge slot. The work piece was clamped to the jig, perpendicular to the table. With the saw blade raised to the height of the cheek cut, Ed gradually moved the work piece towards the blade with an adjusting screw on the jig. Each pass narrowed the tenon by twice the cut width. Once the tenon thickness was right, the other tenons could be cut without further adjustments.

The last cuts were on the narrow faces of the tenons. For this, Ed went back to using the miter gauge and the fence. He used the distance between the fence and the blade and the blade height from the previous shoulder cuts. To make the new cuts he either made multiple passes past the blade along the tenon's

length, or just pushed the work piece along the miter gage into the blade at its highest point. The tenoning jig would also have worked for this.

A note on safety: While there were no loose pieces to get pinched between the fence and the miter gage and get shot back at the

operator, some of these cuts required removal of the saw guard. So be careful.



Router with Leigh M&T Jig

Steve McLoon took a more high tech approach with a Leigh model FMT mortise and tenon jig. A router was mounted to the jig's base plate. The base plate had two pins, one for cutting the mortise and the other for cutting the tenon, used in conjunction with the vertical guide. To cut a tenon, Steve clamped the work piece to the vertical guide. Once set up, he could do any number of identical tenons. (Different guides are available for different size mortises and tenons.) Using an up cut spiral router bit, Steve first did a climb cut in the clockwise direction (seen from above) all around the tenon. Then he did a regular cut in the counter-clockwise direction. With the guide pin in the tenon track the router bit made the cheek and shoulder cuts simultaneously. Steve said to be careful at the corners, which were the biggest source of mistakes.



To cut the mortise Steve clamped the table leg to the vertical guide and made a series of plunge cuts with the router. This time the base plate's pin followed the

inside of the guide, instead of the outside of the guide as it had for the tenon. He warned against using back-and-forth router movement when the bit was turning.

Steve claimed the jig was less complicated than the Leigh dovetail jig, and compared using it to programming a VCR to record a TV show.

M&T with a Carved Pattern

Finally, Mark Laub demonstrated making an insert mortise and tenon joint. In this technique, a pattern carved on the end of the tenon protrudes through a matching hole cut in the far side of the mortise.

The actual mortise and tenon are cut by hand or machine. The far side of the mortise is left $\frac{1}{8}$ " thick, and the tenon is $\frac{1}{4}$ " longer than the depth of the mortise. Mark uses a Dremel tool mounted on an aftermarket luthier's base with a small down cut spiral cutter (and a hose from an aquarium pump to blow away the dust) to route a pattern through the far side of the mortise. Often he cuts an Asian kanji character. Then he traces this pattern through the mortise on to the end of the tenon and mills away the end of the tenon so the pattern stands $\frac{1}{4}$ " proud of the tenon's end, and $\frac{1}{8}$ " proud of the mortise's far side. This is neither a half-blind mortise and tenon, nor a thru mortise and tenon, and the results are impressive. The technique is described on the back cover of issue 191 (June 2007) of Fine Woodworking.

Summary



Guild members got a visual lesson in how tight a mortise and tenon joint should be. If it won't go together, then it's too tight. If the tenoned piece falls out of the mortise when it hangs from the mortised piece, then it's too loose.

Getting a bigger hammer will not fix a too-tight joint. If you have the opposite problem, gluing veneer to the tenon's faces (or even heavy brown paper if veneer is too

thick) will fix a too-loose joint. Allow the glue to dry before reassembling the joint. Further cutting and sanding may be necessary to get a good fit.

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July Meeting: CNC Woodworking

Story by Jerry Beutel

Photos by Jerry Beutel

CNC (computer numerically controlled) woodworking equipment was once so expensive that only large commercial shops could justify the purchase. And those shops are still the primary users, but smaller less expensive equipment is changing the equation a bit. Now one-person shops and even many hobbyists can consider CNC. It seemed like a good time to show Guild members what is available in CNC and what the equipment can do. The program committee worked with Randy Johnson, Editor in Chief of [American Woodworker Magazine](#), and others at the magazine to host the July meeting at their Eagan, MN shop/offices



At its simplest, a CNC machine is a router-like cutting tool capable of moving in three axes controlled by commands from a computer. The operator positions the wood to be carved/cut on the CNC table, inserts the correct cutting bit and then tells the computer what shape is to be cut. If an object is designed on a computer the software files for the object (or the individual pieces that make up the object) become the instructions for the computer.

While it is certainly possible for a CNC machine to cut out square table legs, that isn't the best use of a smaller, less expensive machine, or what a hobbyist is likely to use it for. On the other hand, making multiple copies of a complex shape that would otherwise need to be carved certainly is where the CNC machine excels. In fact, some of the CNC makers call their devices carving machines.

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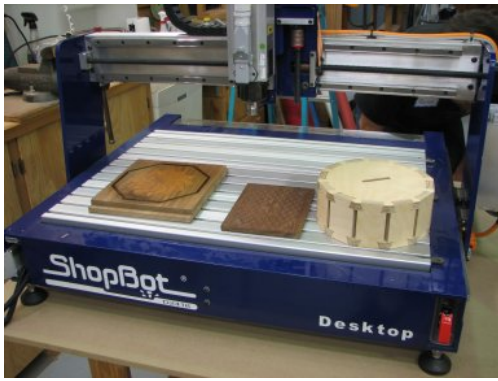
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ShopBot Desktop CNC



CAMaster Stinger CNC

Randy Johnson spoke to the group about his 5 years of experience using CNC equipment. In the shop he has a [CAMaster Stinger](#), two [Shopbots](#), a [Click-N-Carve](#), a General, a [CarveWright](#) and a [Shark](#). Another machine gaining popularity but not in his shop is the [Oliver](#). The machines range in price from \$1,600 to over \$10,000. They vary in horsepower, cutting speed, table size, range of motion and the software that goes with them. Click on the links to learn more about each machine's specifications.

Carvings created on various CNC machines:







Randy gave attendees a demo of Vectric software, used to design objects and drive the CNC cutter. The software has easy-to-use tools to create standard shapes such as stars, circles, rectangles, etc. Other often used features also have dedicated tools. For those who have used SketchUp design software many features will look familiar.

The second step of the design process is to use toolpath operations to specify cut speed, cut depth, feed speed, type of bit, etc. The operator determines how many passes should be made to complete a cut, specifying the depth of each pass. Another responsibility of the operator is to solve material challenges such as grain direction. CNC's tend to hold the bit more rigid than a router, therefore there tends to be less chipout. Randy said that he most often uses spiral bits. Several bit manufacturers such as Bosch, Freud, and Amana make bits specifically for CNC.

Vectric software also has the capability to optimize the cutting pattern. The operator specifies which parts and how many of each are to be cut from a given size board and the software will arrange the parts in a way to best utilize the material.

One cannot help but think that CNC woodworking will change the way some of us will do woodworking. Complex carved shapes that intimidated many woodworkers are now possible by someone who is comfortable doing design work on a computer. It changes everything while changing nothing. Some will continue to embrace traditional methods (whether that means 19th century hand tools, or 20th century power tools), while others will become proficient with the latest technology. One of the great things about woodworking is that there is room for many approaches.

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New Members

Welcome to these new members:

Pat Erickson	Burt Levy	Michael Mercier
Bryan Dobberpuhl	Daniel Castle	John Reese
Kent Seltman	Heidi Joos	Gary Fischer
Mark Schmidt	Jodi Johnsen	Paul Losik
Tony MacDonald	Lee Lundberg	Rich Streufert
Lee Lundberg	Rich Streufert	Gary Miller
Brian Nelsen	Lonnie Bryan	Alexander Van Osdel

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