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Issue # 59

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PUBLISHERS
Paul Fulcher, Linda Fulcher

EDITOR Carl Duguay
CONTRIBUTING EDITOR Michael Kampen

WRITERS
Rob Brown, Allan Cusworth, Dorothy Dearborn, David Hill, Vic Tesolin, Don Wilkinson

PHOTOGRAPHER Ray Pilon
PREPRESS Bonnie Wittek

GRAPHIC DESIGN Gerry Wiebe
ADVERTISING (519) 449-2444

PROOFREADER Robert E. Johns
SUBSCRIPTIONS Maureen Fulcher 1-800-204-1773

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CANADIAN WOODWORKING
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E-mail: circdept@canadianwoodworking.com

TEL. (519)449-2444 FAX (519)449-2445
e-mail: letters@canadianwoodworking.com
website: www.CanadianWoodworking.com

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editor'sletter

BY CARL DUGUAY

cduguay@

A couple of weeks ago I was asked what it takes to become a good woodworker. I was caught somewhat off guard, and I think that I mumbled something about good design skills, proper training, and a strong back. Now that I've had some time to ponder the question I think it has a lot more to do with attitude, understanding and effort – constantly striving to do the very best work that you are capable of doing, acquiring the skills and techniques that you need to do good work, and investing the time and effort, both to enhance your skills and to put the best effort you can into each and every project.

At Canadian Woodworking there isn't much we can do to affect your attitude or your effort – these you must attend to yourself. However we do try to have some effect on your understanding. In 'Wood Science' Rob Brown helps you understand the interrelationship between wood and moisture, and the impact it can have on your woodworking. Knowing how moisture affects wood will go a long way in helping you resolve wood movement issues in your woodworking projects (incidentally, a topic that Rob will cover in the next issue). Vic Tesolin, in 'Preparing Plane Irons', discusses some fundamental principles that will help you prepare and maintain hand plane blades. Once you understand how to tune your plane blades, practicing how to use them will be that much easier (Vic will show you how in a follow up article), and hopefully a heck of a lot more enjoyable. As we see it, acquiring a basic understanding of the principles and techniques of woodworking is the basics to becoming a better woodworker. At least that's our hope.

You'll find a lot more interesting reading in this month's issue. Mike Kampen shows you how to flatten wide boards without the expense (and perhaps marital discord) of purchasing an industrial sized planer. Alan Cusworth gives some insight into turning a pair of lovely ring stands, and David Hill shows us his interpretation of a Nakashima style grass-seat chair. Just so you don't think that woodworking is all sweat and toil, Don Wilkinson takes a lighthearted look at some finer points of wood carving.

I've taken Shrek's advice that "change is good, donkey" to heart. After three years as editor of Canadian Woodworking I am handing over the keyboard, metaphorically, to Vic Tesolin. You'll be somewhat familiar with Vic through his recent articles on dovetailing and hand planes. While not as good looking as I am, he's none too shabby a furniture maker. Happy woodworking!

SPECIAL PROJECTS
PAUL FULCHER
pfulcher@

CONTRIBUTING EDITOR
MICHAEL KAMPEN
mkampen@

PHOTOGRAPHER
RAY PILON
rpilon@

FORUM ADMINISTRATOR
BILL MACDONALD
bmacdonald@

All emails @canadianwoodworking.com

reader'sletters

A Little Help Please, and Thank-you.

The March 2007 Canadian Woodworking e-newsletter featured a CD rack built by Chris VanderZwan. I'm a Cabinetmaking student from Montreal. I would love to build something similar for my program but I wanted to ask Mr. VanderZwan for permission to use his design as well as any pointers he could offer. I've been searching for his contact info but couldn't find anything so I was wondering if you knew how to get in touch with him. If so, could you by any chance send me his email address or forward this message to him?

Thank you very much for your time.

(One week later)

A heartfelt and sincere thank you goes out to everyone who took time out of their day to help me get in touch with Chris VanderZwan. It's quite comforting for a novice like myself to discover just how much commitment and support the woodworking community has to offer. This project would have never seen the light of day without you!

Sincerely,
Gill B., Montreal, QC

Great Magazine

Many times I thought to send a comment about your magazine, however this is the first time to write to you, because I just met you at Hamilton woodworking show.

I want to thank everybody who contributes to this great effort, it is like a magic wand that has hooked me to the most wonderful hobby of woodworking, with all of it's professional articles about techniques, designs, new tools, finishes, and materials.

I feel proud every time I go to a woodworking show or a tool dealership, and think - hey I know almost everything, cos I read it before in your magazine!

A lot of times I felt this magazine is so small and I can finish reading it the same day I got it by mail. But I get surprised how it can keep me busy till the next issue.

Please keep it up and thanks again to everybody!

Awny E., Mississauga, ON

Thank-you so much for your expression of gratitude. I am very happy that Canadian Woodworking has helped you to better enjoy your hobby.

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BY MICHAEL KAMPEN

Cedar Garden Bench

This garden bench will make a wonderful place to relax and ponder life's mysteries.

Whether you place this bench in a quiet corner of your garden or beside the door as a convenient place to rest when putting on your shoes or to set down your bags as you unlock the door, this simple project can be easily completed in a weekend. The bench is comprised of a top, apron and four legs; a shop-made template, bandsaw, and a portable hand sander are all you will need to make the curved legs. You'll also need access to a jointer and thickness planer for the other parts. All the pieces for this project can be made from commonly available dimensional deck lumber. If you have trouble locating the thicker pieces, you can easily glue up thinner cedar fence boards.

The Top

The top (A) on this bench started out as a couple of cedar 2 x 6's. Cut the 2 x 6 stock 1" longer than the final length, and then use a jointer and thickness planer to dress the pieces to the final thickness. Joint one edge of each board to remove the rounded edges and then raise up the cutter head on your planer and pass the pieces through on edge so that the other edge can be squared up. Use a cross cut sled on the table saw to square up one end and then use a stop block on the sled to cut the pieces to the same length.

To ensure perfect alignment during the glue-up you can use a dowelling jig or biscuit joiner to facilitate alignment of the pieces. While this is not necessary for a successful glue-up, it significantly reduces the sanding time resulting from misaligned boards. Apply glue to the joints (check the boards for alignment if you are not using dowels or biscuits), and tighten the clamps carefully to avoid damaging the soft cedar edges.

When the glue has cured, trim the panel to ensure a straight edge at each end. To continue the line of the curve suggested by the legs, tilt your table saw blade over to 80º and undercut the ends using a cross cut sled on the table saw. Undercutting the sides on a right hand tilt table saw will pinch the top between the fence and the blade, setting up the conditions for a dangerous kickback. You are best to make this cut on the jointer by tilting the fence and taking several passes until the required material has been removed.

The hard edge on the seat must be broken and this is best done on a router table. Install

a ½" round over bit in the router table and use a fence to limit the amount of the cutting edge that is exposed to the outer portion of the bit. This will create a soft curve at the edge without having the complete round over ruin the undercut profile of the top. You can now finish sand both sides of the top.

The Apron

Mill the long (B) and short (C) aprons from either a 2 x 6 cedar or some 5/4 deck boards. With these pieces milled to the correct cross sectional dimension, cut them to length. Use a dowelling jig to drill seven dowel holes in the end of each board for the leg to apron joints. Set up the table saw to cut a groove ⅜" down from the top edge on the inside face of the apron for the Z-Clips, leevalley.com, that will hold the top in place. Sand each of these pieces for finishing.

The customer I was making this bench for requested that I include his favourite quote by one of the great thinkers of the 20th century. I used a CNC router to carve the inscription into the front apron, carvewright.ca, but this could also be done using a router with template guides or the old-fashioned way, by hand with a fine carving knife, prefereddedge.com.

The Legs

The legs are the only portion of this project that might throw you a curve; two actually. Each of the legs has a concave face on the two faces that face out from the bench. Adding a curve to a project gives it a sense of movement and makes its outline seem a lot less blocky. The two curves in each leg serve to visually lighten the look of the bench; by removing a little material from each leg, the appearance of the entire bench changes dramatically. I found some rough cedar 4 x 4's at the local yard but dressed stock would work just as well, although you will need to reduce the cross sectional dimension just a little to accommodate the smaller stock. When choosing stock for the legs, pay particular attention to the grain. Try to choose material that has the grain running straight up the leg on all four sides as this will result in a clean appearance on the final leg; flat grain showing on the legs would give the bench a confusing and busy look. If you can only find pieces with vertical grain on two or three sides, use the straight-grained sides for the curved faces and orient the flat grain to face inwards.

Mill the rough stock into flat square blanks for each leg. Use a cross cut sled on the table saw to cut them all to the exact same length. Again, use a dowelling jig to drill dowel holes in the two inside faces of each leg for the leg-to-apron connection.

Before cutting the curves on the leg stock, take the time to make a pattern so that all eight cuts will be identical. Cut a piece of MDF to the same size as the leg, and use a drawing batten or a 24" stainless steel ruler to trace a gentle curve onto the MDF. Then cut this out using a bandsaw. If you plan on using this template with a bearing-guided router in the future, take the time to smooth the curve with a sander. If you will only be using it to trace the curve onto the legs, such as in this case, the band-sawn edge should be smooth enough.

Place the template onto the leg stock and then trace out the curves on the two outside faces. Cut these curves out on the bandsaw in one slow, smooth operation. Set the off-cuts aside as they will be needed during assembly. Take your time cutting this thick stock or you may find that your blade wanders or you may find yourself with a barrel shaped cut. Before making the cut, check to see that your bandsaw table is 90º to the blade or you will have additional sanding to do to square it up again.

Using the largest drum on an oscillating spindle sander, remove the saw marks from the curved faces. Keep the legs moving against the drum or you will end up with a series of ridges running across the face of the piece. If you don't have a spindle sander, you can use files and sandpaper attached to a contoured block of wood. After removing the saw marks, use a random orbit sander to sand the legs for finishing. Use a sander, block plane or file, to slightly round over the bottom edge of the legs to keep the sharp corner from snagging on something and chipping out.

The Finish

Glue that gets onto cedar will make a mess of any finish you plan on using so it is best to finish these pieces completely before assembly. The finish you put on this bench will be determined by where it will be placed. If you are placing this bench outdoors, then a finish that will protect it from sun and rain is required unless you want the bench to fade to the natural gray appearance that cedar takes on when exposed to the elements. Early on in my woodworking career I used a film forming finish on cedar and while I still have some of the pieces I built a dozen years ago, they

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Top	1	1 ⅜	16	46 ½
B	Apron, long	2	1 ¼	5 ¼	30
C	Apron, short	2	1 ¼	5 ¼	5 ⅝
D	Legs	4	3 ⅝	3 ⅝	17 ¾

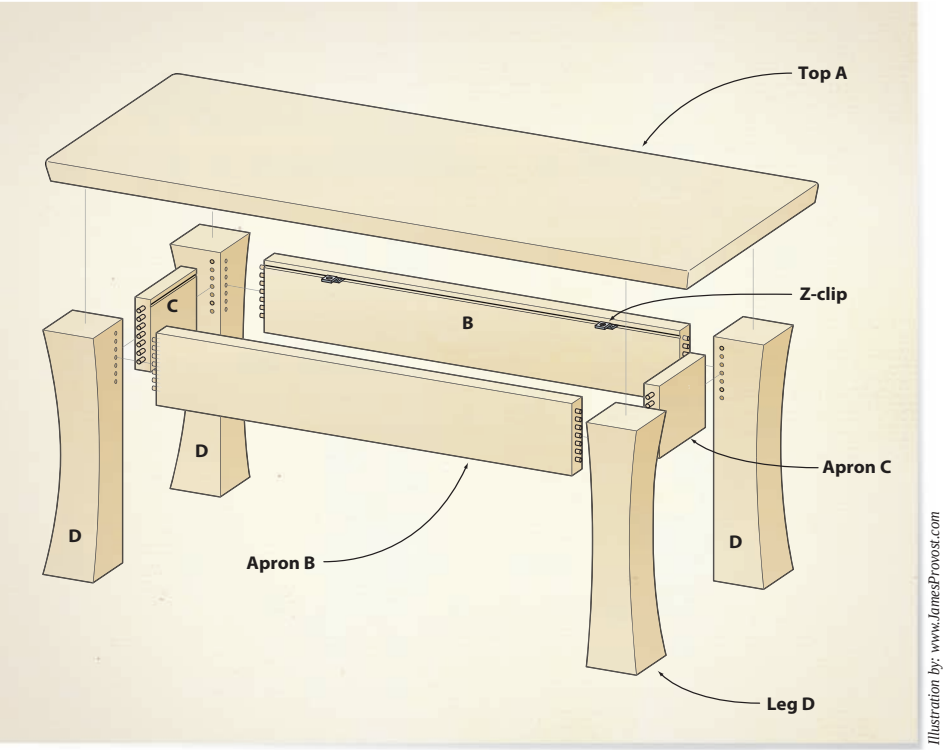

Illustration by: www.JamesProvost.com

no longer have any finish on them. Cedar is a very soft wood and will dent and deform much easier than the finish covering it, so wherever there is a ding, the finish separates and allows water underneath. Eventually the moisture under the finish causes it to peel off almost completely. I now use a non-film forming finish for outdoor cedar projects as these can easily be renewed every year without the need to strip off old finish completely. As this bench was destined to be placed in an enclosed front porch, an easily repairable coat of Tung oil and wax is all that was required.

Securing tops with Z clips

Web clamp

The Assembly

Place some glue into the dowel holes in each leg and then insert the dowels. Because the dowel holes are drilled on adjacent faces, they will intersect and you will need to insert 2" dowels into the holes on one face and 1 ½" dowels into the holes on the other face. Be sure these have bottomed out completely in the holes. Place some glue into the holes on the ends of the apron pieces and assemble the base of the bench. To apply clamping pressure, use the off-cuts from the legs that you had set aside earlier and place them over the curves so that you have a square surface to clamp to. To keep the legs open and parallel as they are clamped, cut some spacers to the same dimensions as the aprons and set them between the bottom edges of the legs. As I mentioned, cedar is very soft and if there are any saw marks or ridges on the off-cuts, the clamping pressure will transfer these to the sanded faces of the legs. Place some form of gasket material between the two surfaces to prevent this; I keep a roll of sill gasket on hand for these occasions but the thin foam packing film that surrounds electronics in transit will also work for this purpose. When the glue in the base has set, turn it upside down on the inverted top and use the Z-Clips to fasten the base to the top.

You're bound to get a lot of great compliments over this project, and hints about upcoming birthdays and anniversaries, so you might want to consider making several at a time.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

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BY DOROTHY DEARBORN

Shaker Bentwood Box

The Shaker tradition of simplicity in design continues to hold sway in Hampton, New Brunswick where Brent Rourke makes traditionally inspired oval boxes.

Shaker bentwood boxes were originally made in a random choice of sizes, often on the whim of the maker or the availability of materials. While the sizes have gradually become standardized over time, you can make a box of any dimension you choose. The wood you select must be straight and even grained so that it will bend and tack without splitting. Maple, walnut and cherry are all suitable choices.

In this article I'll take you through the steps that Brent follows in making his bentwood boxes. The box is essentially made up of two 'bands' (pieces of thick veneer), one for the body and another for the lid band, and two flat pieces, one for the lid top and one for the base. The bands are typically ⅛" thick, with the lid top 5⁄16"and the base ¼" thick. You can mill these pieces using a bandsaw and then thickness plane them to final dimension. Make sure you square the stock before re-sawing it, and, to avoid a mishap, don't run stock shorter than 12" through your planer.

The most popular Shaker box sizes are show below. The first time you try making a box, concentrate on following the steps involved in the box making process, rather than on making a box to the exact sizes in this chart.

Typically these boxes have two 'fingers' on the end of each body band, except for the #4 size, which can have three fingers. Copper tacks, leevalley.com, hold the fingers in place, while pegs made from toothpicks secure the bands in place on the lid top and base.

The bands will be wrapped around forms to create their shape. Before you can wrap the bands around the forms they must be softened. The easiest way to do this is to boil the veneer in water; alternatively you could use a steam box. You will need a small anvil or convex shaped piece of metal (a length of train track comes to mind) to assist in nailing the tacks in place.

Make the Forms

You will need three oval bending forms, the same size as the base, around which to wrap the bands (two for the body band and one for the lid band). The forms can be made from pine, basswood or MDF.

Rough cut the shapes on the bandsaw and then sand them smooth. Then drill a couple of finger holes in the forms so that you can easily remove them from the box and lid after they dry.

Prepare the Bands

Begin by tracing and cutting out the finger pattern and mark the locations for the tack holes on one end of each band. The ends

POPULAR BOX SIZES (All measurements in inches)			
Size #	Base (W x L)	Body band (H x L)	Lid band (H x L)
1	2 9/16 x 4 9/16	1 1/2 x 15	1/2 x 15 1/2
2	3 1/2 x 5 3/4	2 x 19	5/8 x 19 3/4
3	4 1/2 x 7	2 1/2 x 23	11/16 x 24
4	5 1/2 x 8 1/4	3 1/16 x 27	3/4 x 28

of the fingers are about 3/16" wide, and they range from 1" (for the #1 box) to 2" long (for the #4 box).

Drill 1/16" holes on each of the tack hole locations, and then taper the opposite end of the bands to a fine point. This will eliminate a ridge on the side of the box and lid where the band ends. Tapering can be done with a stationary belt sander, oscillating sander, or portable belt sander. Depending on the length of the band the taper will be about 1" to 2" long. You will need to slightly bevel the fingers at the tips and the outside edges (5º to 10º).

Make the Lid and Base

You can use the same wood for the lid and base as you used for the bands, or you can use a softwood such as pine or fir.

Draw the appropriate size oval on the lid and base and cut it out on the bandsaw. Using a stationary belt sander or block of wood and sandpaper, sand the edges smooth. The base should be about 1/8" smaller than the lid.

Assemble the Box

In a metal tray bring water to a boil, and then reduce the heat slightly. Place the finger ends into the water for 15 to 20 minutes. Remove the bands and with a sharp knife cut a bevel on the inside of the band between the fingers and towards the end of the band. Turn band around and bevel cut towards the center. The two bevels will meet in the center of the fingers.

Photos courtesy of James Wilson jameswilson.ca

Driving in tacks

Form inserted into box

Place the body band completely in the boiling water for 15 to 20 minutes. If the water discolours, replace with fresh water. You'll want to use gloves or tongs to work with the bands at this time. Working quickly, wrap the band around the form and mark, with a pencil, where the end of the fingers align on the side of the bands. Be sure to hold all the fingers all the time otherwise the band could split up the middle between the fingers.

Remove the band from the form, re-align the fingers with the pencil, and slide the band over the anvil. Drive tacks through the band until they strike the anvil and clinch on the back of the band. Now you can place the drying forms inside the band to hold its shape.

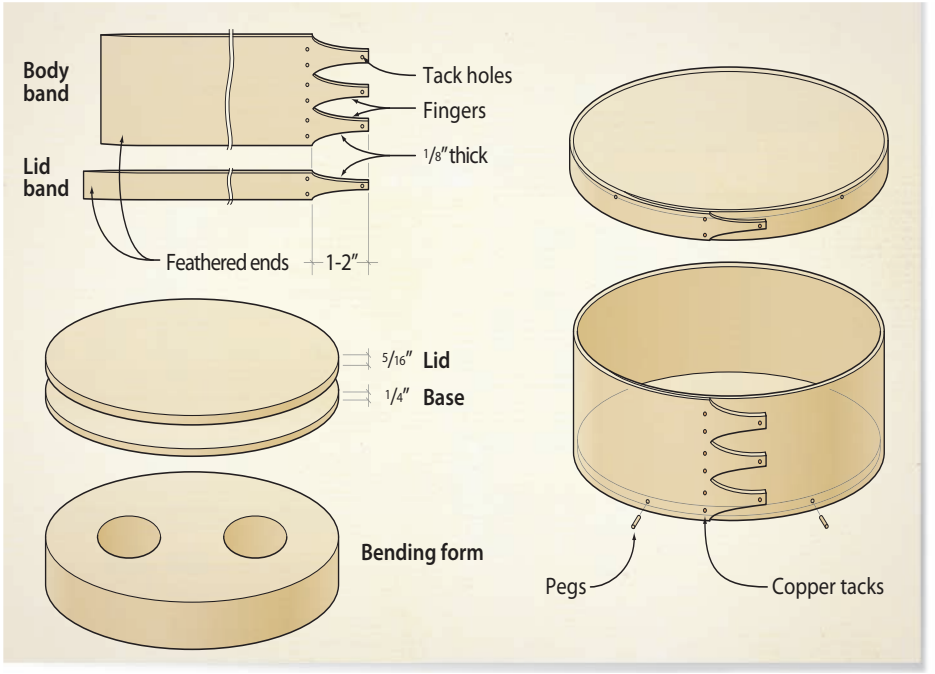

Illustration by: www.JamesProvost.com

The lid top is 1⁄8" larger than the base.

Follow the same steps to bend the lid band as you did for the body band.

Insert the lid into the lid banding, and the base into the body banding. You may have to lightly sand the edges of the lid or base to ensure a snug fit. Drill 1⁄16" holes every two to three inches along the top edge of the lid and bottom edge of the base. Drive wooden pegs (toothpicks cut in half) in the holes and cut off the protruding ends with a saw or wire cutters. (Note: the fingers can face either to the right or left). Allow the boxes to dry for two or three days.

Finish the Box

Sand the completed box by hand with 180 grit sandpaper. You can leave the box unfinished, and it will develop its own patina over time. If the box will be subject to a lot of use then you might want to apply a finish. Options include a penetrating oil, varnish, a water-based finish, lacquer or shellac.

As you can see, making a bentwood box is not overly difficult, nor time consuming. And, you don't have to be constrained by the traditional box sizes – you can make them to just about any size to suit your storage requirements.

DOROTHY DEARBORN
dearborn@nbnet.nb.ca

Forms ready for assembly

Drilling tack holes

Shaping lid band

Soaking bands

Wrapping bands around form

Box maker Brent Rourke

“I need one of those.”

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BY DAVID HILL

Grass-Seat Chair

Nakashima's style reflects the unadorned beauty of wood and other natural materials

Chairs are among the most complex and challenging woodworking projects to build. However, with patience and careful workmanship, it is well within the scope of anyone possessing intermediate level woodworking skills.

George Nakashima, nakashimawoodworker.com, had a seminal influence on what has been called Modern Style Furniture, a direct descendent of the Arts and Crafts movement that was popular in the first half of the 20th century. The two styles shared the philosophy that beauty in design came from simple lines, little adornment, functional utility, and especially, allowing the natural beauty of the wood to show itself. This meant little or no paint was used on these pieces, but rather stains and finishes that highlighted grain and other wood features. One way in which the Modern Style differs from Arts and Crafts is the belief that mass production would bring their utilitarian designs to everyone. The Arts and Crafts focus on the individual craftsman and hand production resulted in much lower output, higher prices and ultimately those pieces being available to the few, rather than the many.

George Nakashima was an influential Japanese-American modernist furniture designer in the mid to latter part of the 20th century. His early work designing wooden buildings in Asia and the influence of far eastern philosophies led him to a life of design that tried to reflect the unadorned beauty of wood and other natural materials in his work.

I came to his designs the same way he did; through Arts and Crafts, which makes sense because the Modern Style shares the same appreciation of simple beauty. During general reading on the topic I saw and fell in love with this elegant chair. No plans were available, so armed with only basic dimensions and two black and white photos, I scaled all the chair's measurements. I used hand tools almost exclusively to build this chair, but a machine made chair would still be true to the original designer's philosophy, and take much less time to build. Nakashima often used cherry and walnut in his work, but I chose mahogany.

The Seat Frame

Start by milling the seat frame pieces (A, B, C) close to size, and then hand planing them to final size, ensuring that all surfaces are flat and square. Notice the subtle angles on the underside of the front frame sections; hand plane this to around 10º before you cut the full width ½" tenons on piece B. The frame is angled inwards from back to front by just a few degrees, so you will need to cut the tenon shoulders on front and rear frame pieces (B, C) parallel to the side (A) pieces, not at right angles to the tenon face.

There are 14 holes that need to be drilled into the frame. Four of these holes are on the edge of the frame, six are on the top of the frame, and four are on the bottom of the frame.

Mark and drill the four ⅝" holes into the edge of the side frame (A) pieces. The woven seat will be anchored to the frame through these holes. The holes for the side rail spindles (G) are set at complex angles and are a different diameter from the back rail spindles but are the same diameter as the back rail spindle holes. The holes are ⅝" at the base (slightly smaller than the ¾" diameter of the spindles shoulders) and drilled at 15º out and 15º forward. I made a 15º jig to lay on the drill press table

and added the second (complex) angle by adjusting the drill press plate itself.

As mentioned the holes for the back spindles (H) are ⅝", and are set at a simple 10º angle, tilting back. I also added corner braces (J) and you can make them now and test them for fit – remember, the angles of the seat frame are not square, but I cut the braces square and then used a small block plane to trim them to fit snugly into their respective corners. I pilot drilled and countersunk them, and set them with wood screws.

On the underside of the frame drill the 1" holes for the legs. Test fit the frame assembly, but don't glue it together until everything else is ready.

Legs and Spindles

There are four legs and eight spindles to be made. You'll find it helpful to make a couple of patterns (balsa wood is a good choice) and use them as a guide for shaping the legs and spindles. I used a drawknife and spokeshave on a shaving horse to make the legs and spindles. You could also turn them on a lathe. Aim to fit the legs and spindles snugly in their holes, but if you have a circular tenon cutter, leevalley.com, this will give you a tighter fit, faster, and the result will be stronger.

The legs (D, E) are narrowest at the bottom, which means the widest part of the leg (the belly) is slightly above the midpoint. This means that the tapering is a bit more gentle from the belly to the bottom of the leg than from the belly to the top.

The leg spindles (F) add strength to the chair. They are shaped similarly to the legs but on a smaller scale and the curvature is symmetrical from front to back. You will need to drill holes in the legs for the leg spindles. The spindles are parallel to the side frame pieces and therefore their corresponding holes in the legs are drilled at 15º. Because the legs go into the frame at an angle, and the spindles go into the legs at an angle, you have to cut the tenon shoulder on the leg spindles at the same 15º angle (parallel to the frame).

If you turn the leg tenons on a lathe (recommended as the better fit will strengthen the chair greatly) the tenon shoulder (where the leg meets the tenon) will of course be perpendicular to the long axis of the leg. Because the leg is fixed to the chair frame at a 15º angle the shoulder of the tenon (the part that should be flush with the bottom side of the chair when the leg is inserted) will not be parallel to the bottom of the chair, as it would be if the leg were coming straight down. So, you will have to trim a bit off the shoulder (by hand) to add the 15º angle and ensure a nice looking fit. This problem can be avoided if you cut a tapered mortise and fit a tapered tenon (i.e. with no shoulder), which depends on what type of drill bit you are using.

The back legs are ¼" shorter than the front legs to give the chair a slight backwards tilt – a subtle but very effective design element. I made all four legs the same, initially, then just trimmed the feet of the back two legs.

The back and side spindles (G, H) are narrowest where they join the back rail (I); the belly, however, is not quite at the midpoint, but slightly below. Therefore, the tapering is more gentle from the top to the belly, and a bit more acute from the belly to the bottom. The legs should fit snugly into their holes but not too tight. If you pound them in you risk splitting the side frame – remember, snug but not tight!

Rope tied off

Assembly

Final sand all the parts, and then glue and assemble the seat frame. Ensure the frame is still flat after tightening the clamps or the chair will be a rocker whether you like it or not. Optionally, you can use drawbore pins to secure the tenons. The frame is very strong, especially with the corner braces, yet remarkably light. Next, test fit the leg spindles into the leg holes and the legs into the frame. It is a bit tricky; the leg holes face in towards each other so that, as they slide in, they will also close on the leg spindle. It's not hard but you have to loosely insert the leg spindle, and then cinch it together as the legs go into their holes. Once you have tested the fit, and are satisfied all is well, add a thin coat of glue, and fit the parts back together, and clamp. When they are all tightened and the glue is dry, it is quite solid.

Back Rest

I made the curved back rail (I) by laminating seven ⅛" x 2 ¾" x 40" pieces of mahogany to produce a finished piece that was ¾" x 2 ½" x 39". To form the arc for the back rail I made a simple jig that consisted of two parallel rows of ¾" holes drilled into a 36" square piece of chipboard that was 1 ½" thick (two sheets screwed together). The dowel holes, spaced 3" apart, were drilled in the shape of the arc I wanted for the back. Three-quarter inch x 6" dowels were glued into the holes. The 3" spacing is an arbitrary distance I decided on; the main thing to consider is that you need enough dowels to provide a smooth arc, with the strength to hold the wood to be bent, but few enough that you can fit all of your clamps between them to compress the wood while it is in the jig.

After spreading glue on all the faces of the laminates (except the two outside faces), quickly stack and push them in between the rows of dowels. Apply small C-clamps (3" or 4" sizes work well) about every two to three inches to provide sufficient compression. Make sure that there are no unsightly gaps. Leave the sandwich in the form for 48 hours or as long as necessary for your glue to harden. You can then hand plane or joint the top and bottom of the back to 2 ½" in height. Slightly round the top edges of the laminate stack so as not to expose too much of the laminations from the front and back.

The back is also tapered in both dimensions as it curves toward the front of the chair – the height narrows to 2 ¼", and the thickness gradually to ⅜". These tapers can be done with a hand plane, rasp or sandpaper, but should be done after the back comes out of the jig so that you don't have to worry about the pre-shaped pieces coming out of alignment as they are setting.

Using the same jig that you used to drill the seat frame holes, make the corresponding holes in the underside of the back rail. It's a bit tricky to get the two sets of holes aligned correctly. I tapped the back spindles (H) into the seat frame, placed the back rail over the spindles, and then marked the location where each spindle met the underside of the backrest. Remember that the holes in the backrest are facing backwards and in - the complements of the holes on the frame (drilled out and forward) so they are in effect the reverse.

Rope passed through seat frame

Seat Construction

The texture and colour of the sea grass seat beautifully compliments the wood in this chair and helps to make this chair look, as well as feel, friendly, inviting and comfortable. As rustic and simple as the seat looks, it can actually take a long time to get right – trial and error is the name of the game. I'd advise getting everything you need for this section ready, then place yourself in front of the TV and put on a favourite movie – or series!

The sea grass seat should be added after the legs, but before the side spindles and back, as it is a tricky job and you need all the clear space you can get. Part of the difficulty in weaving the seat is that the sea grass is very bulky, and to avoid splicing more than necessary it is best to work with as long a piece as you can, which means you are passing a huge ball of rope over and under the chair. Fortunately, the seat does not have to be super tight to be strong and comfortable, and that fact makes weaving the seat a lot easier.

I purchased Standard #3 (5/32") sea grass in 250' rolls, canerscorner.com. Start the front-to-back weaving first. It's a good idea to tie the grass to a chair leg to start, and then begin to weave over and under the back and front frame pieces in a figure 8 pattern. Hand tighten front to back every 3 or 4 rows – though not too tight, as it will be too difficult to thread through the cross over (side-to-side) pieces later. A bit of looseness won't affect the strength, look or comfort of the finished seat, but even so, getting the correct firmness is a bit of an art. Push the grass together laterally every four or five rows to keep it looking solid. Weaving the seat uses a lot of rope; one circuit is about 40 (generous) inches, and with 64 circuits on this chair, that is about 220 feet of rope. I am being very generous with the lengths here because, while sea-grass is generally very strong, it occasionally has weak points and an unexpected break while doing a bit of tightening can add a couple of feet to the required length after splicing. A roll of sea grass is about 250'. Don't measure out and cut a 220 foot length – it's better to make as big a bundle as you can handle, perhaps ⅓ or ¼ of the total. Try to strike a balance between ease of work and number of splices. Don't worry about splicing if you haven't done it before; just open up spaces between the braids and thread the piece to be attached back and forth for about a foot and test for slippage by pulling – when you can't pull them apart you have spliced the two ropes. Of course, make sure your splices occur on the underside of the seat so you can't see them.

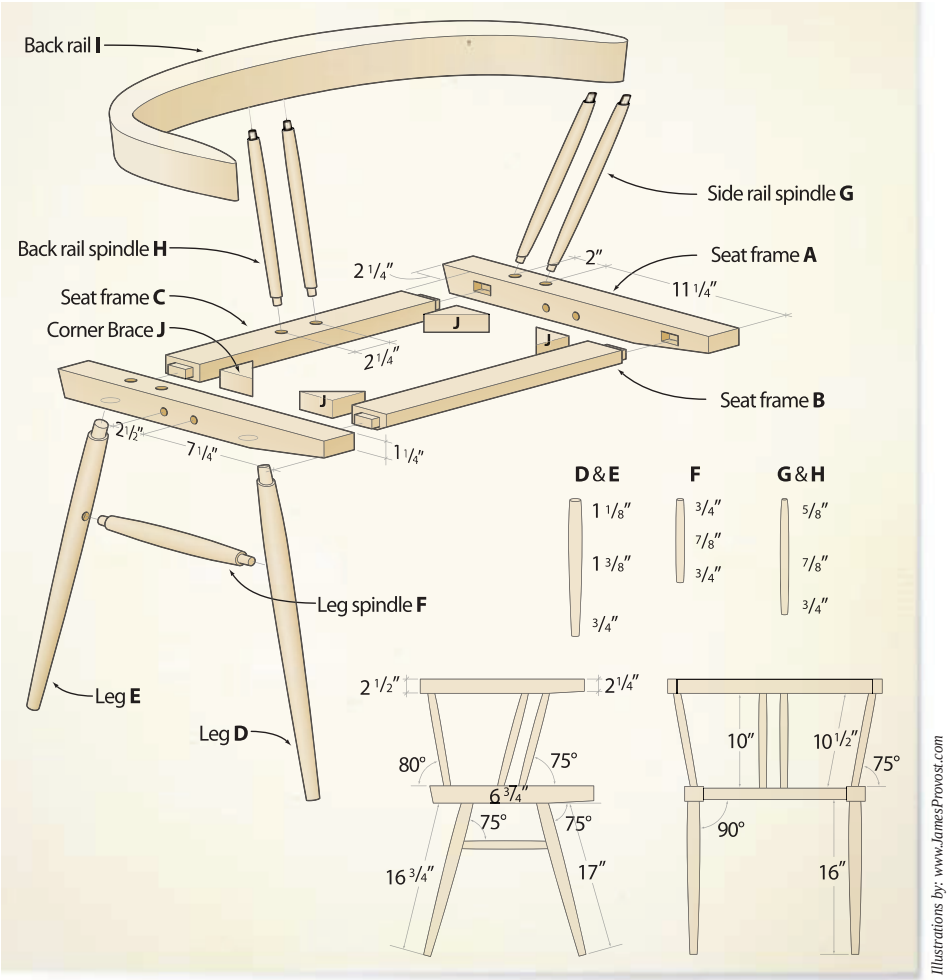
Once you have completed the front-to-back weave, you will have two loose ends (the start and the finish) at opposite sides of the seat. These can be left tied to a leg until the cross ropes are in, and then they can be tied off to them.

Once the seat is done you can start with the side-to-side pieces. I used two separate pieces, one piece for each pair of holes. One trip around the seat is about 48 inches and you need four circuits for each hole; so that would be two pieces of about 16 feet each. I also add another four feet to each piece to accommodate any splicing that might be done in case of a break We all know it is easier to snip off a few extra feet at the end than to come up a foot short and have to splice. This is not the time to be frugal!

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Seat frame – side	2	1½	2	17½
B	Seat frame - front	1	⅞	2¼	16¼ *
C	Seat frame - rear	1	1	2¼	17¼ *
D	Legs – front	2	1⅜ d.		17¾ **
E	Legs – rear	2	1⅜ d.		17½ **
F	Leg spindles	2	⅞ d.		8¼ ***
G	Side rail spindles	4	⅞ d.		11½ *
H	Back rail spindles	2	⅞ d.		11 *
I	Back rail	7	⅛	2½	39
J	Corner braces	4	cut to size		

* includes two ½" tenons ** includes ¾" tenon on top end *** includes two ¾" tenons



Illustrations by: www.JamesProvost.com

The result is that you start with two 20 foot pieces of rope.

To start, tie a large knot in the grass or tie it to a small piece of wood to prevent it from passing through the side hole, but leave a 6" to 8" tail to tie off later, and begin the threading from the inside of the seat frame. The figure 8 weaving you did back-to-front definitely makes it tricky to thread through the side-to-side pieces because you have little room to work with. The rope has to pass through the 'V' tunnel made where the front-to-back rope crosses itself and this is tight. (Only one pass of each circuit needs to pass through this space, the return pass can just go across the bottom of the seat if you like.) As the drilled holes in the side frame begin to get busy with sea grass after a couple of passes, it can be difficult to push the rope through them. One solution is to wrap some soft but stiff wire round the end of the rope and use this to thread both down the tunnel and out the hole; then you can pull the grass through the hole a bit more easily. Once you have the two side-to-side sections done, you can begin to tighten them more seriously, by pulling them. When you are done, you should have two pieces of rope facing each other, and they can be spliced together as tightly as you can.

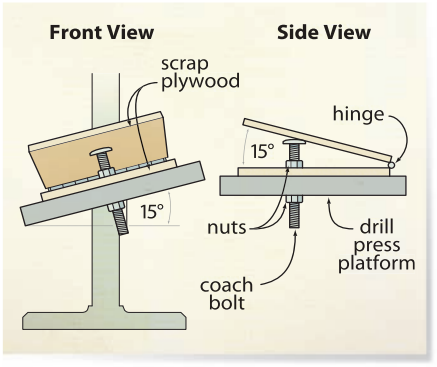
At this point you will still have two loose ends (tied off) that you left after weaving the seat. Pull these tight and splice them in to a parallel piece where they lie, or you can tie them off to the cross pieces that lie perpendicular to them.

Finishing

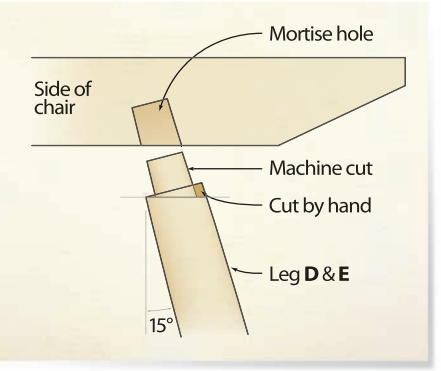
I used a Russet Amber aniline water stain followed with several coats of Tried and True semi-gloss varnish oil, leevalley.com. The stain seemed to virtually disappear as it dried, but the application of the oil brought it to life beautifully. You could also finish this chair with varnish or polyurethane.

I never tired of working on this chair, and every time I see it in our house, I get a thrill. If you choose to make one (or a set of six), I hope you will not only think it is as beautiful as I think it is, but also know that you have a small but important piece of western design history in your home.

DAVID HILL
davidbrucehill@hotmail.com



Jig for drilling 15º holes



Trim leg tenon to fit

BY THE EDITORS

Brushes

Selecting the right brush, and properly maintaining it, will ensure you get the best finish possible.

Applying a finish is often mentioned as an afterthought in woodworking articles. This is no surprise, as finishing is not the most exciting part of woodworking. As well, there are dozens of finishes available, and just as many ways to apply them.

Brushing on a finish is not a difficult proposition, but choosing the right brush for the finish being used; correctly loading the brush and then applying the material in an efficient manner will go a long way in helping to achieve a perfect result. Quality brushes represent a sizeable investment, and properly cleaning them will protect your investment and keep them in fine form for many years.

It's All in the Bristle

There are three parts to a brush – the bristles, the ferrule, and the handle. You judge a brush on the quality of finish it gives, and it's the bristles, along with your brushing technique, that has the greatest impact on the finish.

Just as finishes have evolved over the years, so have brushes. One thing remains clear - cheap bargain brushes are great for staining a fence or shed, but they are of little use in the shop. Cheap brushes will begin to fall apart with the first use, and will shed bristles that stick to the finish. Save yourself the aggravation of repairing these finish problems by using a quality brush from the start.

Natural bristle brushes are the best choice for oil-based finishes, shellac and lacquer. Each of these finishes requires the maintenance of a wet edge as you work. A natural bristle brush will carry more finish than its synthetic counterparts, allowing you to work with fewer trips to the can to reload. Natural bristles have flagged ends – a split at the end of each individual hair. This enables the brush to hold more finish, and release it with minimal brush marks. While quick drying finishes reduce the chance of foreign matter getting trapped on a still tacky surface, the need to maintain a wet edge calls for a properly loaded brush and the proper application technique. The main drawback to the natural bristle brush is that they wear faster and the bristles tend to break more often than the synthetic variety. Picking stray bristles out of a fast drying finish can put a strain on your sanity. Natural bristle brushes are not suitable for water-based finishes, which can soften the bristles causing the brush to lose its shape and form, making it harder to maintain precise control as you work. Most natural bristles are made from hog hair (China bristles), and come in various weights and stiffness – white bristles tend to be coarser than black bristles. Hog hairs have naturally split ends, which enables them to carry more finish. They also taper from the base to the tip, which makes the hair strong yet gives it a lot of spring, enabling the brush to maintain its shape in use. Higher quality brushes, like the Gramercy, toolsforwoodworking.com, are made from ox hair, which is a finer more pliable bristle than boar hair. These brushes leave a virtually brush-mark free surface.

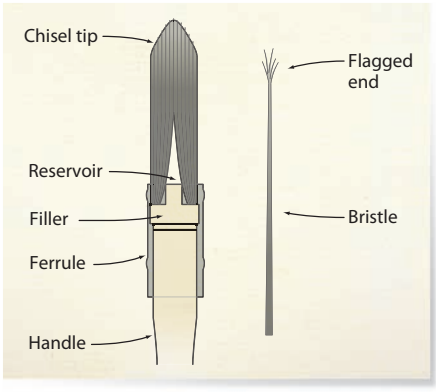


Illustration by: www.JamesProvost.com

Synthetic bristle brushes have come a long way in recent years. The first polyester and nylon brushes, developed to apply the new generation of water-based finishes, had a tendency to leave obvious brush marks in the finish. Manufacturers have come up with new blends of synthetic bristles that have largely resolved these issues. Two of the most common synthetics are polyester and nylon. Polyester bristles hold and release more finish than other synthetics, while nylon bristles wear longer, making polyester/nylon blends, like the Simms Vintage Pro, excellent choices for general purpose finishing. There are also polyester/bristle blends, such as the Dynamic Flowline Stubby Pro, getpainting.com, that offer the advantages of both natural and manmade filaments. Manufacturers sometimes whip the hair in a process called flagging, which splits the bristle ends into finer filaments. While this makes for finer bristles, they tend to be weaker. As well, synthetic bristles are not as absorbent as natural bristles. However, they are less expensive. The finest synthetic fibres, like Chinex and Taklon, are particularly good for applying water-based, oil-based, and shellac finishes. However, unlike natural bristles, they don't hold as much finish, and require more frequent refilling.

If you look at the tip of a brush you'll see that it's cut either flush across the end, or in a chisel shape. A chisel tip will give you much better performance.

Ferrules are typically made of plated steel or stainless steel. Where available choose stainless steel – it won't rust and contaminate a finish, particularly if you use water-based finishes. Plated ferrules can peel and the seams can rust. Inside the ferrule is a filler piece that serves two purposes. It helps to secure the bristles to the handle, and serves to create a reservoir in which finish can accumulate.

Handles are made of wood or a composite, plastic. Of greater importance than the material, is how comfortable and well balanced it is in use. The brushes we have used come in 4" to 8" lengths (measured from the end of the ferrule). Longer brushes are great for house painting, but we prefer a 5" length for applying finishes. For use in tight areas such as the insides of assembled cabinets, choose a 4" (stubby) brush.

Finishing Tip

The most efficient way to finish a project with a brush is to break it down into the smallest components possible, and, where possible, apply the finish before assembly. Fully assembled projects present difficult areas to finish such as inside corners where finish can pool and vertical surfaces that can run and drip and sag. Use an easy to remove masking tape, such as Scotch-Blue #2090, to cover areas that will receive glue.

China brushes in different thicknesses

Polyester, China and Ox hair

Select the Right Brush for the Task at Hand

Brushes come in various widths, lengths and configurations. When finishing large surfaces such as a tabletop, a 2" or 3" wide brush is a good choice. For smaller panels, frames, edge work, and legs, a use a narrower 1 ½" to 2" brush. When house painting a long, thick handle is useful, but for finishing furniture or cabinetry, a shorter handle is usually more manageable. Bristles that are cut square across the bottom of the

brush are ideal for large flat areas but they offer little control in corners and tight areas. In this case it is better to choose a sash brush, such as the Simms Vintage Pro, tssimms.com, which has the ends of the bristles cut at an angle across its width. This allows finer control in corners and tight spaces, with the wrist remaining at a more natural angle resulting in less fatigue during use.

To apply a finish to a small area or something with a great deal of detail, such as fretwork, look to one of the small specialty brushes from an art supply house, such as opusframing.com or currys.com. These small brushes excel at working in small areas, and the fine bristles allow the finish to flow onto the work easily with virtually no visible marks. Though they are small, these brushes can often cost as much, or more, than their larger cousins.

Foam pads are the final option and are best left to the application of paints or first coats which will be levelled with sanding afterwards. Unlike a regular bristle brush where the finish flows out naturally from the bristles, the finish is removed from a foam pad by squeezing it out. This makes it almost impossible to achieve a smooth even finish. Using this type of pad on pieces with many edges or carved elements almost always results in drips and runs. Lacquer, and some solvents, will actually dissolve the foam or the glue that holds it onto the handle, so test a sample before starting on a project.

The ferrule

Proper Technique Will Pay Dividends

Using a brush to apply a finish to a piece of wood is very much like driving a car, for the best results you need to take into account the feedback you are getting from the process and incorporate it into your method. For the best results you want a brush that has been loaded with the correct amount of finish for the surface at hand and you'll want to apply it to the surface in a manner that avoids any potential problems.

The proper loading of finish onto a brush is critical to a perfect result. A large thirsty surface such as a tabletop has the capacity to absorb finish at a faster rate than a smaller object such as a carving or a piece of trim. If you are too stingy with the finish in this case you will find it difficult to maintain a wet edge and the result will be noticeably streaky with brush marks where the finish was unable to flow and blend together. Applying too much finish to a carved or contoured piece will result in runs and sags that can be very difficult to correct. A good brush will provide some feedback to the user, much like a decent performance car will transmit road feel to the driver. Pay attention to the feel of the brush as you apply the finish and you will soon learn to identify the various conditions. Apply too much finish and the brush will feel as though you are pushing a puddle of liquid and if you don't apply enough it will feel as though it is dragging on a dry surface; learn to identify these conditions and adjust your brush loading accordingly. These conditions will change with different woods and finishes but by watching these signs, experience will soon show you the correct load for each situation.

Talkon brushes

Dipping the brush into the finish up to the ferule will overload the brush and allow finish to drip as you move the brush across the project to your start point. Only dip the bottom ⅓ to ½ of the brush into the finish and allow the finish to wick into the brush. Before moving the brush to the project, adjust the amount of the load by pressing the brush against the sides of the container. We've all painted a house and dragged the side of the brush across the edge of the paint can to adjust the load. This will work with house paint but it will cause problems in the shop. As the brush is moved across the edge, small air bubbles are introduced into the finish as it runs down the edge of the container and these will cause problems later; they often remain suspended in the finish as it dries, leaving a rough, cratered surface. By pressing the excess finish out against the side of the container, this problem can be avoided.

The Enviro-Brush

The Dynamic Enviro-Brush comes as a two-part system; the handle and the replaceable refills. The bristles come as a separate unit that is attached to the handle using a clip. The removable end is easier to clean, and when it is worn or damaged beyond repair you simply buy a new refill to replace the old one while re-using the handle.

Polyester bristles

Polyester/nylon blend

Ox hair and China (hog) bristles

USE THE RIGHT SOLVENT	
Finish	**Solvent**
Oil-based	Paint thinner, naphtha
Water-based	Water
Shellac	Isopropyl alcohol
Lacquer	Lacquer thinner

A common mistake many woodworkers make when applying a finish to a panel is to start brushing at one edge and then work the finished area toward the other edge. This technique creates a long wet edge that can be difficult to sustain. By placing the brush at the edge of the panel and then brushing onto the surface you will leave a lot of finish right at the edge of the panel. It's difficult to use a brush to mop up this sagging finish; usually the best course is to wipe up the excess finish with a rag and reapply the right amount of finish properly. When applying a finish to a panel, land the loaded brush on the front edge of the panel, just in from the edge and move the brush to the far edge. After completing that stroke, return to the landing point and brush back from the starting point to the unfinished edge of the panel. As you get to any edge, the brush should just glide off the top without moving down the edge of the panel. After completing the first pass, go back and work the finish toward the edge parallel to the stroke by pulling the finish gently up to it.

Suspend brush to clean

Wrap and hang brush to dry

For a frame and panel it's best to begin by staining the corners first, and then move onto the panel. Follow up with the stiles and rails, and finish the edges last.

Well Maintained Brushes Last

Before you begin applying a finish, there are a few things you can do to make cleanup easier. Begin by dipping the brush into some compatible solvent as recommended by the manufacturer of the finish. This will wet the brush, making it easier to clean afterwards. If you are using both oil and water-based finishes in your shop, be sure to have dedicated brushes for each type as some of the resins will be left behind after cleaning, leading to cross contamination. When loading the brush, try to keep the finish out of the area at the top of the brush covered by the metal ferrule. Once the finish has gotten into this area it is especially hard to clean. If you have areas to finish where you must use the brush in an upside down orientation, do these areas first. There won't be as much finish in the brush to run down into the ferrule and up the inverted handle.

After the finish has been applied, it is time for everyone's favourite activity, cleaning the brushes. I would venture to say that like me, most woodworkers have at one time or another chosen to throw out a cheap brush rather than clean it properly. But when you have invested in some high quality brushes you'll want to devote the time needed to keep them in top form. Although natural bristle brushes are the traditional choice for oil-based finishes they are not as easily cleaned as their synthetic counterparts.

If you are applying an oil-based finish, clean the brush with the proper solvent as soon as the last coat is complete. If you are applying a finish that will require several coats of the same product then the brush can be wrapped tightly in plastic, or hung in a container in solvent overnight; in the morning simply press the excess solvent out of the brush on the side of the container and continue working. Don't allow the brush to contact the bottom of the container, as the weight of the brush will deform the bristles. You may have to drill a new hole in the brush handle so that it hangs above the bottom of the container. Leaving a brush in the solvent indefinitely without a complete cleaning will cause the finish left in the brush to react with the solvent and gum up the brush. The initial cleaning can be done with used solvent, but the last wash should use clean or filtered solvent. After all the finish has been removed from the brush with a solvent wash, clean the brush with a citrus-based cleaner and water to remove the final traces of solvent from the brush.

Cleaning up after applying a water-based finish is a much easier proposition. Work the bristles back and forth under warm water to remove the excess finish and then add a little dish soap to the brush and work it through completely and then rinse the bristles thoroughly.

With the brushes clean, shake out the excess moisture by swinging it downward at the end of your arm several times and wrap the bristles in kraft paper or newspaper held in place with an elastic band. This will allow the bristles to dry, and keep them in good shape for the next job as well as keeping the shop dust from getting into your next finish.

THE EDITORS

BY ALLAN CUSWORTH

Laminated Ring Stand

A ring stand is the perfect gift idea for that special lady who needs a place to put her rings on a nightstand or dresser when retiring for the evening.

This project is an opportunity to make a ring stand in which two pieces of contrasting coloured wood are laminated together, providing interesting colour variation as well as a strong design. The project combines spindle turning by making the ring post between lathe centers, and face turning by using a chuck to make a base for the spindle to fit into. I made two ring stands for this article to demonstrate different designs, wood colours and features. For the bases I used big leaf maple with black walnut for the posts.

You can add decorative design features as desired. These could include any number of beads, coves, grooves, burned-in rings, or any other variations on the ring post or base. The turner's imagination can run wild here; just be careful not to make it too complicated. Often, a simple design is more graceful and appealing than a complex one. The turner must also be aware that the outside diameter of the ring post cannot be larger than the inside diameter of the rings that will be placed on it.

Make the Post First

Locate and dimple the centers on the ends of a 1 ¼" x 6" billet and place it on the lathe between centers. Using a spindle roughing gouge, rough turn it round. The outside diameter is not critical at this point; just remove the corners. Do not destroy the center mark at the headstock end; it will be needed later for centering the piece after attaching it to the base.

Starting approximately ½" in from the tail stock-end, turn an exact ½" diameter by ½" long tenon. You can use a ½" open end wrench as a caliper. I used a Bedan scraper, but a 3⁄16" parting tool or a small scraper will work. Using a narrow 1⁄16" parting tool, part off the post at the tailstock end leaving a ½" long tenon for mounting it to the base later.

Next Turn the Base

The base will be turned in two steps. First, the disk will be mounted on a woodworm screw in a four jaw chuck, and then reverse mounted on a 50mm (2") jaw in expansion mode. The dimensions described here are for a SuperNova™ chuck and may have to be modified if your chuck is different. A ½" deep hole will be needed for the ½" tenon we just made on the ring post to attach to the base. Therefore the hole drilled to mount the base on the woodworm screw in the chuck cannot be deeper than ½".

To make sure the woodworm screw doesn't penetrate too far, make a ¼" x 3" diameter spacer disk to place on the woodworm screw to reduce its protrusion to ½". This assumes that the woodworm screw threads protrude ¾" from the jaws' face. The base disk is small, so the shallower mounting will be sufficient if you take light cuts.

Locate and dimple the center of the top side of the 4" x 1 ½" base disk blank. Using a drill press with the drill set at exactly 90º to the table, drill a 5⁄16" x ½" deep hole for mounting it on the woodworm screw. The diameter must be the size required for the woodworm screw for your four jaw chuck. I use green painter's masking tape as a depth stop marker on my drill bit. A little flap of tape left on the drill bit will brush the shavings away as you reach the required depth.

With the woodworm screw in your four jaw chuck, place the spacer disk firmly against the chuck jaws. Then mount the base disk firmly against the spacer. True up the face of the disk; and turn the outside diameter to a little bit larger than 3 ¾". A little bit of extra wood is needed here to true up the finished outside diameter later. This face surface will be the finished bottom of the ring stand. Make the bottom slightly concave to prevent the ring stand from rocking when

you place it on a table. It will not be easy to re-chuck the piece when it is completed so you need to be careful when making these cuts. For re-mounting the base cut a 3/16" deep mortise into the base to fit the jaws of your chuck when they're almost closed. I made mine 2 ¼" diameter to fit the SuperNova™ chuck. It's surprising how little depth you really need to hold the piece in place when you take light cuts.

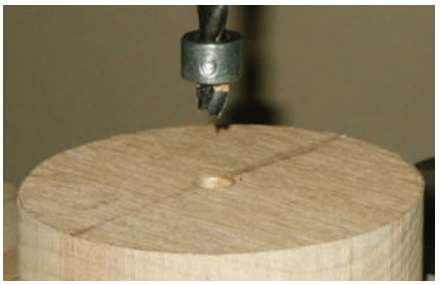
Sand the bottom side of the base to as fine a grit as recommended for the finish you are going to apply. Don't forget to run the grits from the coarsest to the finest while increasing the grit size no more than 50% each time you change grits. Apply the finish to this side of the base; you will not be able to sand and finish the bottom later. I use wipe-on polyurethane and friction-dry it with a paper towel so I can move on with the next step.

Reverse the piece onto the chuck jaws in expansion mode. Be careful not to over tighten the chuck or you may split the wood. I place a piece of paper towel between the jaws and the wood to minimize bruising the mortise. Remember, this part is finished. The lathe speed may be increased a little here to get a smoother cut. Take light cuts to

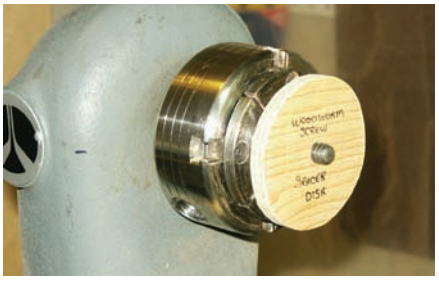
Post blank mounted

Post blank rounded off

Use ½" open end wrench as caliper to size tenon



Woodworm screw hole drilled on drill press



Spacer disk mounted on lathe

Base disk blank mounted on lathe

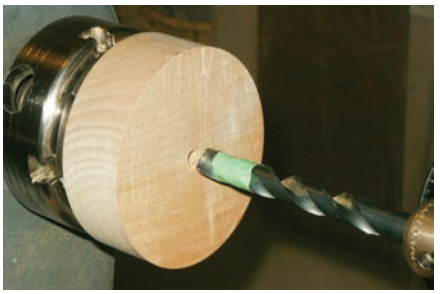
Laying out mortise with dividers

Mortise cut out

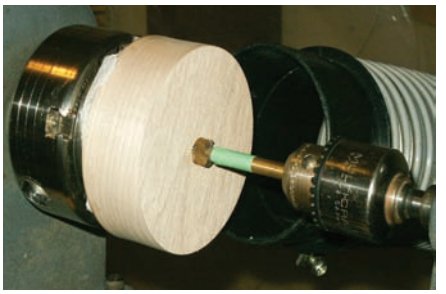
true up the top surface of the base, and turn the outside diameter to its finished size of 3 ¾". I take the sharp edge off the top corner for safety reasons.

Using as a guide the woodworm screw mounting hole made earlier, drill a ½" mortise hole to attach the ring post to the base. To do this, place a piece of painter's masking tape on a ½" standard twist drill bit to indicate the ½" depth and place it in a Jacobs chuck in the tailstock of the lathe. Using a very slow lathe speed advance the tailstock quill to the ½" depth. Move very slowly as you don't have a center mark for the bit to use as a guide.

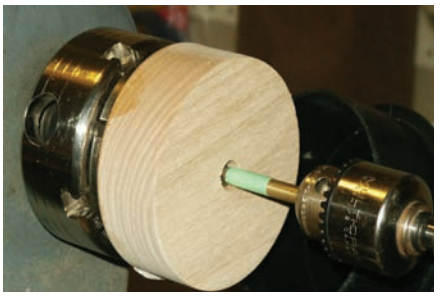
Since the twist drill leaves a tapered bottom you will have to switch to a ½" Forstner bit to finish drilling the flat bottom. Pull the bit out and check the depth of the hole using the



Pre-drill hole with standard twist drill bit



Then finish hole with Forstner bit



Hole for ring post tenon drilled

Ring post glued in and tailstock brought up to clamp

Top of base and post shaped to desired finished profile

Completed project on lathe

tenon on the ring post made earlier to make sure the post will glue into the base tightly. Do not over drill or you will limit the glue surface for the ring post and substantially weaken the finished piece.

Assemble the Ring Stand

Glue the post into the base. Use reasonably quick setting glue, like yellow Titebond II, or thick CA glue to fill any possible gap there may be. Titebond II will set up enough to work within about an hour, or so. However, I like to leave it overnight if I have time. If time is important, use thick CA glue, but remember CA glue dries brittle whereas Titebond II has some flexibility that may be a benefit to counter the different wood expansion rates when joining pieces with different grain directions.

Put the live center back in the tailstock and bring it up to apply some pressure to the glue joint. Use the center mark left on the post when you first rounded it off to center the tailstock. Now it's time to go for lunch, or take a long coffee break, or leave it for the night, while the glue sets.

Finish Turning the Ring Stand

With the tailstock left in place to support the piece, shape the top of the base and the ring post to the desired finished profile. You can either feature, or blend in the glue joint where the post meets the base. Some designs have a concave tray added at the base of the post for placing earrings or other pieces of jewellery that won't fit over the post. Add any decorative designs to the project at this time.

If you want to make some darkened grooves on the base or post you can burn them in with a burning wire. To do that I use a burning wire made from an old guitar string. I fasten the ends of the wire to pieces of dowel since the wire will conduct heat very quick and burn my fingers. A faster lathe speed is required to create friction. Do not apply too much pressure when working at the tip or the piece may move off center in the chuck. Let the wire do the work.

Check that the chuck jaws are tightly engaged in the mortise recess of the base. Do not over tighten. Remove the tailstock so the top of the post can be completed. Carefully finish turning the tip, or finial of the post to the desired profile.

Sand the project to as fine a grit as recommended for the finish you are going to apply. Apply your favourite finish on the project. I like to use at least three coats of wipe-on polyurethane to the get a nice shine.

SUPPLY CHECKLIST

MATERIALS

1" to 1¼" square x 6" long billet for the post, 4" dia. x 1½" disc for the base

TOOLS/SUPPLIES

Spur center, four jaw chuck, wood-worm screw, tailstock live center, Jacobs chuck, spindle roughing gouge, ½" spindle gouge, ¾" skew, small scraper or a Bedan, narrow 1/16" parting tool, 5/16" drill bit, ½" bowl gouge, 3/16" parting tool, ½" open end wrench, calipers, ½" twist drill bit, ½" Forstner bit, masking tape, Titebond II glue, sanding cloth, finish of choice, and paper towels

A padding lacquer could be used if a speedy finish is required but it is not as durable.

All that is left to do now is sign and date your finished ring stand, and you have a wonderful gift that will be treasured for a long, long time.

ALLAN CUSWORTH
acusworth@telus.net

Oscillating Spindle Sanders

Whether sanding curves or straightening edges, look to the oscillating spindle sander for a smooth performance.

If you build furniture, you are already familiar with the most useful sander in your arsenal, the random orbit sander. It quickly smoothes out any surface you may have...as long as it is flat. When it comes to sanding curves you need a different tool - an oscillating spindle sander (OSS).

An OSS is a very basic machine that consists of a tabletop with a sanding drum protruding through a hole in the top. The drum is covered with an abrasive sleeve, and as well as rotating, it moves up and down (oscillates). The oscillation ensures that a larger surface area of the sleeve is used, with the result that the abrasive will not become clogged as quickly. The oscillation also eliminates the chance that unevenness in the abrasive will cause a consistent scratch pattern along the length of the work piece. We shop tested four models commonly available through Canadian retailers. They ranged in price from a low of $139 for the Triton to a top end of $299 for the Craftex.

All of these sanders have a cast iron top, except the King, which uses heavy-duty aluminum. The tops on all four models were flat, with no measurable gaps. All but the Delta have a square or rectangular table top. We particularly liked the large 14" x 20" top on the King. The smaller top on the Triton made it somewhat less convenient when sanding long, wide stock. The use of plastic for the base and housing on the King and the Triton make them, at around 30 pounds, the lightest in the group, a plus when you must move them regularly in a small shop. While we found that none of these machines wandered in use (rubber feet hold them firmly in place on the bench) it is still a good idea to bolt them to a work bench, or onto a sheet of ply which can be firmly clamped to a work bench. Optionally consider mounting them on a rolling cabinet to save your back, something you'll definitely want to consider with the 65 pound Craftex.

The sanding drums are installed onto a metal shaft that penetrates the top. The shafts on all the sanders were aligned 90º to the tabletops. All models have a ½" shaft that accept 5" (4 ½" nominal) drums, except the Craftex which has a ½" shaft and takes 6" (5 ½" nominal) drums. The Delta and King come with ¾", 1", 1 ½", 2" and 3" diameter drums. The Triton includes these five sizes plus a ½" sleeve, which doesn't use its own drum; it simply slips over the metal shaft. The Craftex comes with three drums sizes – ¼", ⅝" and 2". The ¼" drum comes with a separate shaft.

An abrasive sleeve slips over the drum and is held in place by a retaining nut or bolt. When changing the size of the drum, you'll also need to adjust the size of the opening in the tabletop as well to keep the gap as small as possible. This is done by means of metal or plastic (ABS) inserts, which come in various sizes to accommodate the different drums. The inserts act like the throat plate on your table saw to keep material from getting caught between the edge of the table and the edge of the drum. Sanding sleeves are generally available in 50, 80, 120 and 150 grits. All the sanders have on-board drum and insert storage.

On the Craftex the top tilts up to 45º to accommodate sanding at other than 90º. To accommodate the tilting top, the inserts that fit around the drums come in two forms, a regular circular version that is used when the spindle is at 90º and one with elongated holes for use when the table is tilted.

All of these machines provide a connection port for a dust collector or vacuum system and with these ports varying in size from 1 ½" to 2 ¼" you will likely need to fit an adaptor depending on the system you use. The Delta has a dust collection bag that fits over the dust port to capture the dust ejected by the internal fan. However it doesn't collect much of the fine dust. The Triton comes with a 1 ½" to 4" adapter that makes it a snap to connect to a standard dust collection system. The 2 ¼" dust port on the King was the easiest for us to hook up to a shop vacuum – the others required us to search around the shop for suitable adapters.

Spindle sanders are quieter than other shop machinery, operating from a low of 65.1dB (no load) on the Delta to a high of 87dB on the Triton. We found that all the sanders worked well regardless of motor size, which ranged from a low of 2.4 amps on the King to a robust 7.5 on the Craftex. On any of these sanders, except the Craftex, you can inadvertently stop the oscillating movement of the drum by pressing stock too forcefully against the drum. Bear in mind that you let the machine do the work here, steady pressure is all you need.

The stroke on these machines (the distance that the drum oscillates), varies from ⅝" on the King and Triton sanders, to 1" on the Craftex. Having a longer stroke not only means that more of the sanding abrasive is used, it also helps reduce heat build up and thus diminishes the risk of getting burn marks on your stock. Not an issue of you are sanding a couple of small pieces, but helpful when sanding a quantity of wide, long stock.

Right Technique

An OSS can handle curved parts with ease and is the natural choice when fairing a curve or sanding a curved edge. These sanders ship with an assortment of drum diameters to suit the most common sizes of curves you'll be working with. When you are sanding, always select the largest drum that will accommodate the smallest curve on your work piece. Whether you are sanding the edge of a plywood pattern or the edge of a final project component,

This Just In

We didn't have time to review the General 15-220, but it has a number of notable features that make it worth considering. It has a 1/2 HP, 7.5A motor, precision ground 14 ½" x 14 ½" cast iron table, five spindle assemblies (¼", ½", ⅝" 1 ½" and 2"), and 2" dust port (with a 2" to 4" adapter), all in an 81 lb package. Best of all, the 15-220 comes with a tilting table. 2 year warranty. $479. general.ca

				
Model	**Triton TCH450SPS**	**Delta SA350K**	**King KC700C**	**Craftex B2322**
Price	$139	$269	$199	$299
Amps	3.5	3.5	2.4	7.5
OPM	58	60	58	74
dB level	87	65.1	79.4	74.6
Stroke (inches)	⅝	⅞	⅝	1
Table material	Cast iron	Cast iron	Aluminum	Cast iron
Table size (inches)	14 ½ x 11 ⅜	18	14 x 20	14 ½ x 14 ½
Table tilt (degrees)	No	No	No	0-45
Drum sizes	½, ¾, 1, 1½, 2, 3	¾, 1, 1½, 2, 3	¾, 1, 1½, 2, 3	¼, ⅝, 2
Insert material	ABS	Metal	Metal	ABS
Dust port (inches)	1½*	1½	2¼	2
Weight (lbs/kg)	32.1/14.6	45/20.4	29/13.2	65.3/29.6
Warranty (yrs)	3	5	2	2
www	tritonwoodworking.com	deltaportercable.com	kingcanada.com	busybeetools.com

OPM: Oscillations per minute.

No load dB level is measured one foot from the machine.

All models have a 1½" spindle except Craftex (⅝")

* Includes 1½" to 1¼" and 1½" to 4" adapters

bringing the work to the drum requires the right technique for a smooth result. For best results it is best to take long, flowing, light passes; bring the material to the edge of the drum as you move it side to side and run it along the edge in a skimming motion and then pull it away at the end. Repeat this until you have sanded to the line or refined the shape to your needs. Trying to sand away the entire waste portion up to the line in one go by moving the material slowly over the drum will result in an uneven surface showing scalloped edges where the wood has assumed the shape of the drum's curve because of uneven feed pressure and speed.

Extend Abrasive Life

As the abrasive sleeves are used they will begin to load up with the material that is being sanded. The oscillations will extend the life of the abrasive but the sleeves will eventually clog. Fine abrasive sleeves will clog quickly with most woods while certain woods such as pine will clog even rough abrasive sleeves. When this happens you can clean the sleeve using a crepe block which is essentially a large rubber eraser. When the crepe block is applied to the rotating drum, the rubber is sanded off the block and the process warms up the edge of the crepe block. The material embedded in the sanding sleeve bonds to the warm, somewhat sticky bits of the block as it is sanded down, and is quickly removed from the abrasive sleeve.

If you find most of your work involves thinner stock and only wears on one end of the sleeve, when that end is worn, remove the sleeve and reinstall it upside down to use the abrasive on the other end. If the center of the sleeves consistently remains unused, consider making a spare top out of MDF to raise the work piece higher on the sleeve. Embed some rare earth magnets in the underside to hold it fast to the cast iron top.

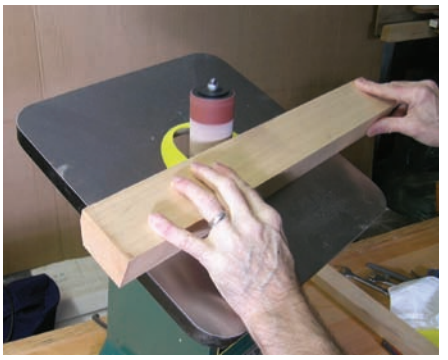
Straighten Stock

With the addition of a simple jig made from a piece of wood you can use your spindle sander to sand straight edges or to straighten an uneven edge on a board. Prepare a piece of lumber to be flat and square and then use a hole saw to cut a hole 1" larger than the sanding drum into the midpoint of the board along its length. Offset the hole to one side so there is an opening in the edge of the board so the surface of the drum can sit just slightly proud of the edge. Run the edge of the material back and forth over the slightly exposed drum until the edge has been sanded straight and smooth. Gluing a piece of laminate to the surface of the out feed side will more closely approximate the function of a jointer but this is not necessary for the jig to function adequately.

We used these four sanders over a one-month period in the shop. The Triton, at just under $140, is the price leader. Features we like include its cast iron top, inclusion of a ½" drum size, particularly convenient for sanding tight curves, light weight, and three year warranty. Its main drawback is a small tabletop. As well, the oblong shape of the top makes it less convenient when sanding larger stock. The King is the lightest unit - easy to move from storage to tabletop with minimal back strain. It also has the largest table, made of precision cast aluminum, so you don't have to worry about rust. The spindle is offset, which makes for a lot of usable tabletop. And, its 2 ¼" dust port is the only one that accepted our vacuum hose without having to search around for an adapter. The Delta is a solid, heavy unit that features a round cast iron tabletop and removable drum trays. Quiet tools always get us smiling, and we liked its low, 65.1 dB rating. A five year warranty is a nice bonus as well. While we feel that either of these three will easily meet the needs of the DIYer or weekend woodworker, we gravitated toward the King, because of the large table, light weight and steel insert rings. However, if you do a lot of contour sanding, then we recommend the Craftex. Its main advantages are the tilting tabletop and the longer drum sizes. It's the only one that comes with a ¼" drum as well. Its faster speed (74 oscillations per minute) and longer stroke (1") gave the best finish among these sanders.

THE EDITORS

Wider table for long stock

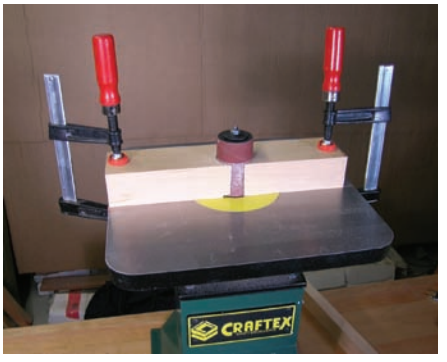


Tilt sanding

Sanding curved pieces

Removable trays

On board drum storage



Flush sanding

BY CARL DUGUAY

Red Alder

(Alnus rubra)

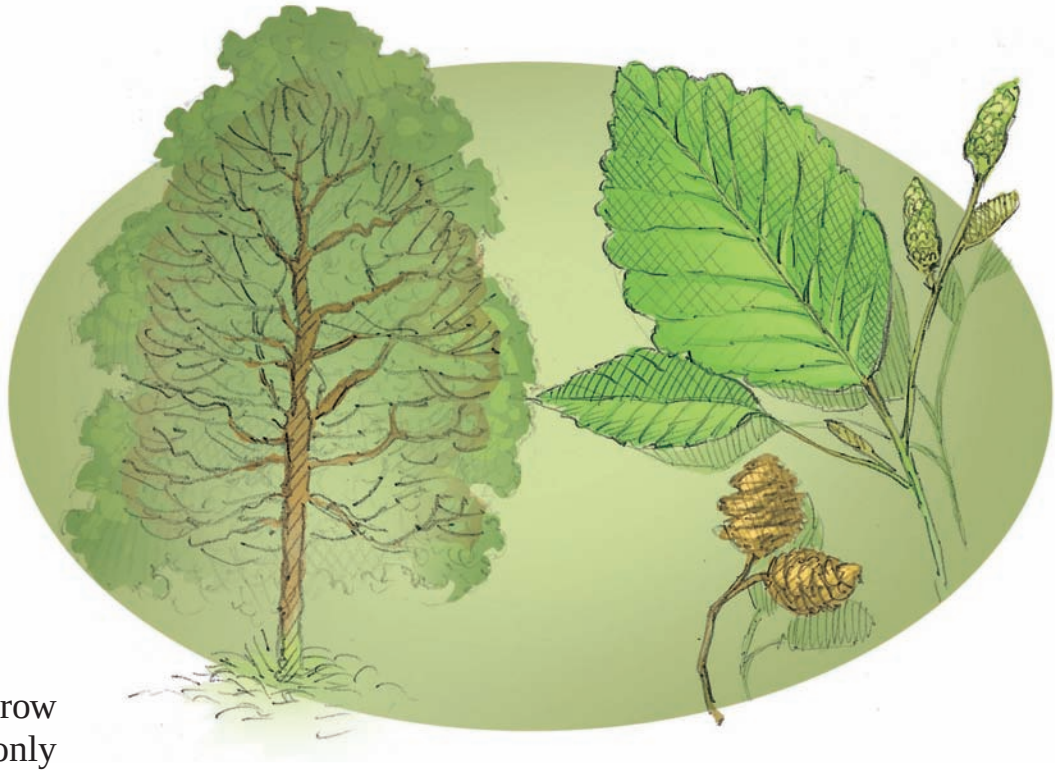


Illustration by: Mike Del Rizzo

Five species of alder grow in Canada. However, only the red alder (a.k.a. western alder) reaches tree size.

Red alder (Western red alder) grows exclusively along the west coast of British Columbia, and is typically one of the first trees to colonize burnt-over or cut-over areas. A rapidly growing tree, it has a short life span of around 60 years. The tree reaches heights of about 80 feet and diameters of up to 2 feet. Alder trees and shrubs belong to the same family as birch trees (Betulaceae).

Characteristics

When first milled, red alder has a whitish colour, and on exposure to air, turns light brown with a yellow or reddish tinge. There is not much differentiation between the sapwood and heartwood. The wood is fairly straight-grained with a uniform texture.

Working Properties

Red alder machines beautifully and is very easy to work with hand tools. Once dry it is fairly dimensionally stable. It sands, nails, screws and glues well, and takes stain, paint and finishes like nobody's business. You can stain it to achieve a reasonable facsimile of walnut, mahogany or cherry.

Physical Properties

Red alder is one of those 'soft' hardwoods. It has low bending strength, low shock resistance, moderate stiffness and good steam bending qualities. It has a specific gravity of .41 at 12% moisture content and a weight of around 30 lbs/cu ft.

Uses

First Nations people used the bark to make a red dye, and the Fender guitar company used red alder in the body of its first Stratocaster guitar. Producers of smoked fish and meats also like alder for the subtle and unique flavour it imparts. It is a popular wood with luthiers. For the woodworker, red alder is used in furniture, kitchen cabinetry, millwork, turnings, carvings and kitchen utensils. It makes an excellent secondary wood for use as interior frame-work, drawer parts, dust panels and back panels.

Alder is relatively inexpensive, running about $4.75 for 4/4 select and better stock. Occasionally spalted and bird's eye alder is available for a premium.

Red Alder

Shrinkage

Moisture Content	0%	6%	20%
Tangential	7.3	5.8	2.4
Radial	4.4	3.5	1.5
Volumetric	12.6	10.1	4.2

BY ROB BROWN

Wood Movement

Understanding the interrelationship between wood and moisture is a fundamental prerequisite for every woodworker.

When a piece of lumber is cut from a tree it is referred to as 'green'. At this point the wood is very wet and is completely unsuitable for making furniture. It needs to be dried – by air or kiln – to approximately 10% moisture content. However, there is no such thing as the perfect moisture content. Each situation is different. The moisture content of wood that can be used for making furniture depends on a number of factors. Two of the main considerations are whether the furniture will be used indoors or out, and what the local humidity levels are throughout the year. Because wood is affected by fluctuating atmospheric humidity levels, it will shrink and swell in a continuous quest to strike a balance with the amount of moisture in the air. That's why woodworkers need to understand a few basic rules about wood and moisture, and how they relate to one another.

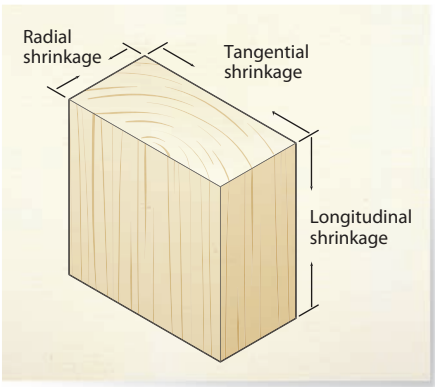


Illustration by: www.JamesProvost.com

Whether the wood you bought at the lumber yard was dry or not, by the time you transport it to you workshop, its moisture content has already changed.

Moisture Content and Relative Humidity

Without getting too scientific, we need to understand two phrases – Moisture Content (MC) and Relative Humidity (RH). You've likely heard about MC before, but like many woodworkers, you may have just hoped the lumber yard did their job properly and that those lovely pieces of wood you bought were 'dry'. In his seminal book, *Identifying Wood*, R. Bruce Hoadley, defines MC as "the ratio of the weight of water in a given piece of wood to the weight of the wood when it is completely dry". In simple terms, the MC of a piece of wood is a measure of how much water is in it. The Weather Network defines RH as "a percentage of water vapour per area at a specific temperature". Essentially, it's how much water vapour is in the air. The MC of a piece of wood is in some way always striving to balance itself with the RH. The tricky part is that relative humidity is always changing. So, whether the wood you bought at the lumber yard was dry or not, by the time you transport it to your workshop, its moisture content has already changed.

All Wood Starts Green

The cellular structure of wood is very similar to a bunch of drinking straws grouped together. Have a close look at the end grain of a porous wood like ash or oak and you can clearly see where these tiny cells have been severed. In a fresh piece of green wood water completely fills the cell cavities (the inside of the drinking straws) as well as the cell walls (the area between the drinking straws). The MC of green wood typically ranges from 35% to over

As woodworkers, we need to have an idea of how much wood will move, and in what direction that movement will take place.

150%, depending on the species. As the wood dries, water from the cell cavities is the first to evaporate. When all the water is removed from within the cell cavities the wood reaches its fibre saturation point (FSP). At this point no shrinkage has occurred to the board, and the MC will be between 25% and 35%. Although we are on our way to having usable lumber, there's still a lot more drying that needs to occur.

Striving For Balance

Up until now there has been less water vapour in the air than in the wood, therefore, the wood is drying out. This trend is still likely to continue for some time. How long depends on the atmospheric conditions in the immediate area. After all the water has been removed from the cell cavities, the water will start to leave the cell walls in the wood's quest for balance with the RH in the surrounding air. As drying continues, cell walls get smaller and the wood starts to shrink – something of particular interest to woodworkers. Eventually a balance is reached and moisture movement stops. This is the equilibrium moisture content (EMC) of a piece of wood, and this is what wood has been searching for ever since it was cut from the tree.

In typical Canadian fashion the weather will change dramatically throughout the year and the EMC will no longer be achieved. The wood will either lose or gain water in search of EMC once again. An appropriate moisture content for most species is usually between 7% and 11%, but can be slightly higher if the wood will be used for an outdoor project. Moisture content will also fluctuate depending on the local RH levels. Moisture content values during the humid summer months in southern Ontario will be much different than the dry winter conditions inside a home in the Yukon.

At this stage it's important that we should get one thing clear. Wood is almost always doing one of two things – losing moisture or gaining moisture – as it searches for EMC. If the surrounding air has more water vapour than the wood, the wood will gain moisture to reach a state of equilibrium. If the surrounding air has less water vapour than the wood, the wood will lose moisture to the surrounding air. This exchange is almost always happening, whether the wood is green or has been kiln dried. Once in a while, and only for short periods of time, wood will not be accepting or losing moisture. This only happens when the moisture content of the wood has reached EMC in accordance with the relative humidity of the surrounding atmosphere.

A starting point is to air dry lumber one year for each one inch of thickness.

Applying a finish to wood, no matter how thick and durable, will not create a true barrier between wood and moisture.

Shrinkage Rates For Some Common Domestic and Imported Woods	% Radial Shrinkage	% Tangential Shrinkage	Tangential/ Radial
Domestic Hardwoods			
Alder, Red	4.4	7.3	1.7
Ash, White	4.9	7.8	1.6
Beech, American	5.5	11w.9	2.2
Birch, Yellow	7.3	9.5	1.3
Butternut	3.4	6.4	1.9
Cherry, Black	3.7	7.1	1.9
Elm, American	4.2	9.5	2.3
Maple, Bigleaf	3.7	7.1	1.9
Maple, Silver	3	7.2	2.4
Maple, Sugar	4.8	9.9	2.1
Oak, Red	4	8.6	2.2
Oak, White	5.6	10.5	1.9
Poplar	4.6	8.2	1.8
Walnut, Black	5.5	7.8	1.4
Domestic Softwoods			
Cedar, Eastern Red	3.1	4.7	1.5
Cedar, Western Red	2.4	5	2.1
Douglas Fir	4.8	7.6	1.6
Hemlock, Eastern	3	6.8	2.3
Hemlock, Western	4.2	7.8	1.9
Pine, Eastern White	2.1	6.1	2.9
Pine, Western White	4.1	7.4	1.8
Redwood	2.2	4.9	2.2
Spruce, Black	4.1	6.8	1.7
Imported			
Afrormosia	3	6.4	2.1
Bubinga	5.8	8.4	1.4
Ebony	5.5	6.5	1.2
Jarrah	4.6	6.6	1.4
Ipe	6.6	8	1.2
Mahogany, African	2.5	4.5	1.8
Mahogany, True	3	4.1	1.4
Rosewood, Indian	2.7	5.8	2.1
Sapele	4.6	7.4	1.6

Kiln Versus Air Dried Wood

Wood can be kiln dried or air dried to achieve EMC. With the use of a kiln, drying time is rapid, and the lumber will be closely monitored to reduce the chance of splitting or other defects. Air dried wood will take much longer to reach EMC. Just how long depends on factors like local weather conditions, thickness of the lumber, species, storage and stacking conditions. A starting point is to air dry lumber one year for each one inch of thickness; however, careful monitoring throughout the drying cycle is absolutely necessary.

It's not a matter of controlling the wood and stopping the wood movement. That's a battle you will almost always lose. It's more important, and practical, to accept wood movement and engineer a piece of furniture that can handle the seasonal variation in relative humidity.

Shrinking and Swelling

As a piece of wood dries below the FSP it starts to shrink. Even when wood has been dried to a moisture content of 8% it will still shrink and swell with fluctuating relative humidity levels. As woodworkers, we need to have an idea of how much wood will move and in what direction that movement will take place. With a firm grasp of these two details we can engineer a piece of furniture that will allow the wood to move with changes in relative humidity, yet not cause the piece of furniture to fall apart because of internal forces created by the wood movement.

There are three planes of a piece of wood - tangential, radial and longitudinal. These three planes reference the circular growth rings that are visible on the end grain of a piece of wood. The tangential plane (parallel to the growth rings) has the highest amount of movement when wood is dried from green to kiln-dried – on average 8% of total shrinkage. Movement in the radial plane (perpendicular to the growth rings) is about half that – about 4% on average – of the tangential plane. Movement in the longitudinal plane (parallel to the grain) is by far the least – less than 0.1%. For practical reasons, woodworkers can assume there is no movement in this plane. Although each species is different, these are ballpark figures that you should be familiar with when making furniture. You might find it interesting to note how some species are quite different than others. For instance, the tangential shrinkage of beech is 11.9% while for redwood it is 4.9%. Both are far from the 8% average. We've included a list of the average shrinkage rates of a number of commonly used furniture woods. You can find a more complete listing in Hoadley's *Understanding Wood*. Lee Valley, leevalley.com, also has a very convenient *Wood Movement Reference Guide* that lists wood movement rates for 73 domestic and imported wood species.

Practically speaking, there are a few things we can take from this. The most important point is that wood will shrink about twice as much parallel to the growth rings as it does perpendicular to the growth rings, while essentially not moving at all longitudinally. A typical flat-sawn board measuring 96" x 12" x 1" will move about 1/16" in its width over the course of the year, with only negligible movement in the other two planes. I say "the course of a year" because a year typically represents a wide fluctuation of relative humidity – in the summer a piece of wood will swell, in the winter it will shrink. If that board had the same dimensions but was quarter-sawn, there would only be about 1/32" variation in the boards' width over the course of a year.

Building Furniture That Lasts

The dimensional variation of a piece of wood cannot easily be stopped. It's not a matter of controlling the wood and stopping the wood movement. That's a battle you will almost always lose. It's more important, and practical, to accept wood movement and engineer a piece of furniture that can handle the seasonal variation in relative humidity. We have all seen what will happen to a large tabletop that has been securely fastened to the surrounding apron, with no freedom to move. After a few years the tabletop will develop weak spots and crack, or maybe pull the joint apart between the aprons and the legs. That's why there are fasteners specifically designed for securing a table top to its base that allow the top to shrink and swell with changes in relative humidity. Another great example is the frame-and-panel door. If a standard interior door was made of solid wood it would expand by about ¼" over the span of a year, making the door stick shut during the summer. By using a narrow frame around the exterior and placing the floating panel inside the frame (without glue, of course) you allow the panel to expand and contract within the frame, eliminating a drastic change to the overall dimensions of the door.

Wood will shrink about twice as much parallel to the growth rings as it does perpendicular to the growth rings.

Applying a finish to wood, no matter how thick and durable, will not create a true barrier between wood and moisture. Although it will slow transfer of moisture; a finish will never stop it completely. This is the main reason you should always apply a finish to both sides of a tabletop or large panel. It not only slows moisture transfer, but it ensures even transfer between the top surface and underside of the wood panel, keeping it balanced.

Plywood is the one exception to the rule. Even though it is made from solid wood it's a very stable product. The different plys of wood are oriented at 90º to one another and glued together. This technique essentially locks the solid wood in place, eliminating all but the most trivial amount of wood movement. There are limits to this technique, but the proper use of cross-bands, adhesives and balanced panel construction will go a long way to making a stable solid wood panel.

One of the most important first steps in familiarizing yourself with how moisture affects wood is to start using a moisture meter. They are reasonably priced, considering their important role in determining the moisture content of the wood you're about to use. They also allow you to familiarize yourself with annual humidity fluctuations in your area.

Learning about the structure of wood, and how it's affected by water vapour, will open your eyes to the different challenges inherent to this wonderful, living material we enjoy working with. Only after you understand how and why solid wood expands and contracts can you take your woodworking to the next level.

ROB BROWN
rob@equinoxinteriors.ca

productnews BY THE EDITORS

Metabo SXE450

The Metabo SXE450, metabo.ca is a dual orbit random orbit sander with a six hole, six inch Velcro-faced backing pad. You can quickly switch between a ⅛" orbit for fine finishing, and a ¼" orbit for quick stock removal. Stock removal is exceptionally fast, and when using the ⅛" orbit, swirl marks are barely noticeable. Variospeed™ electronics, controlled via a thumbwheel, and powered by a 3.4 amp motor, provide infinitely variable speed changes from 8,400 to 22,000 orbits per minute (no load). Additionally, there is a patented 'TurboBoost' switch that delivers extra power on demand for heavy duty sanding applications. The integral dust collection system uses a high efficiency, washable Intec filter, which we found somewhat better than most other dust systems. Better yet, a vacuum hose can also be attached to the 1 9/16" o.d. dust port. You can quickly remove the front handle to get into tight spots. The die-cast aluminum bearing housing and dust-proof bearings will give years of reliable service. At 5.75 pounds this is somewhat of a heavy sander, but its efficient design, coupled with a low vibration level, makes it easy to use for extended periods of time. An excellent professional quality tool. #600129420, $269

DX60 and NX60 Block Planes

The new Veritas DX60 and NX60 block planes, leevalley.com, are just as likely to attract attention as will their new dovetail saw. The planes are identical, except that the DX has a ductile iron body finished with a durable powder-coat polymer paint, while the NX has a unique 'nickel-resist ductile iron' body – the nickel is actually alloyed into the iron, making it rust resistant. At 1 ¾" x 7" (including the adjuster knob) these new block planes are 9/32" narrower than the Veritas Low-Angle block plane (#05P22.01/.51), and about the same length, and they share the same bed angle (12º) and Norris-style adjuster mechanism. In place of the slot screws on either side of the plane body that are used to adjust the blade, the new planes have hex screws. The A2 blades, at 5/64", are somewhat thicker, and have a 23º primary bevel with a 25º secondary bevel ground at the tip (as opposed to a single 25º primary bevel). One of the nice enhancements is a set-screw that limits the backward travel of the toe, effectively preventing it from hitting the tip of the blade, yet allowing for the narrowest of openings. What really distinguishes these new planes (apart from the radical new streamlined look) are the high tolerance levels. According to Lee Valley, "the sole and sides are flat and square to within +0.000" and -0.0015" over the entire surface... and the back of the blade is lapped flat within + or -0.0002" in the working area of the blade." While quite comfortable in use, these planes definitely have a different heft and feel than the Veritas Low-Angle plane. We anticipated that they would perform flawlessly whether planing with or against the grain, and we were not disappointed. We really like these enhancements, and at a $40 premium for the DX60, find it reasonably priced for a purchase that will last a lifetime. The $155 premium for the NX60 is a little more difficult to digest on a woodworkers income, but....they're so damn nice. #05P70.01 (DX60), $189, #05P70.11 (NX60), $299.

Varathane Nano Defence

Made from a patented Aluminum Oxide formula, Varathane Nano Defence, rustoleum.ca, is the strongest, most durable floor finish on the market. It's three to four times more resistant to scratches and scuffs than conventional floor finishes – providing ultimate protection from everyday foot traffic. Varathane Nano Defence is over twice as durable as traditional wood finishes and extremely fast-drying. This water-based finish is crystal clear, virtually odourless and provides for easy, water clean up. Suggested Retail Price. $74.99 - $79.99.

BY MICHAEL KAMPEN

Jointing & Surfacing

Milling wide long stock on a six or eight inch jointer can be a real challenge. Here's where you can rely on the versatility of your router.

For most projects my 8" Delta jointer is quite adequate. I typically begin by cutting stock into more manageable pieces on the bandsaw. Then I proceed to joint and plane the stock to the specific dimensions I require.

Several years ago, when faced with the need to joint several pieces of wide stock, a quick enquiry to my wife confirmed my suspicions that a 12" jointer was not likely in my immediate future; so another method was called for. Ripping the boards, jointing them, and then re-gluing the pieces would leave visible glue lines in the final panel, which I didn't want. For a single piece of wood of limited length I might have opted to use hand planes. However, with over 30 board feet of lumber to mill, I decided that a less strenuous method was called for.

There is not a single project that leaves my shop that doesn't see the router at some point, so it seemed the logical tool to consider for surfacing the boards. My first surfacing jig was very basic - essentially a set of rails that fastened to the dog holes in my workbench and a sled that rode on top of the rails. I've made several improvements to this jig, and the one that I currently rely on is easy to use and very reliable (see "Shopjig" on page 42). While its main purpose is to surface wide stock, this jig is also useful when routing dados and making mouldings. And, it works equally well with either a plunge or fixed base router for surfacing. However, for routing dados you will need to use a plunge router.

A router is an ideal tool to surface wide stock. All that you require is a method to fix the stock in place and a way to pass the router over the stock at a constant height. You can use either a spiral Onsrud or a mortising bit, and if the jig was designed properly and carefully constructed, the final surface should be straight and flat. For a super smooth surface you'll want to finish up with some light sanding or a card scraper.

Choose your bit carefully though. I do not recommend using any bits with a ¼"

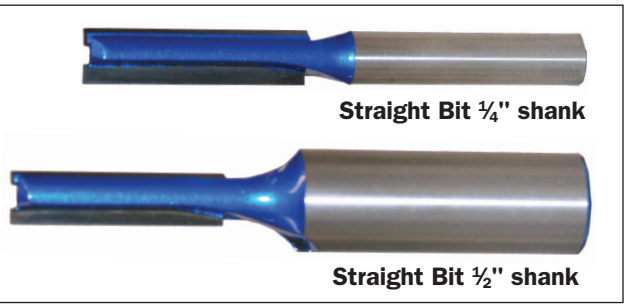
shank for surfacing. The extra material in ½" shank bits make them much more rigid and able to resist breaking should you encounter a knot as you work your way across the surface of the board. When using a router in contact with a piece of wood, the cutting edge of the bit is at a distance from its place of support, namely, the collet. With the router mounted on the surfacing jig, there is additional space required under the router for the irregularities of the stock as well as the space between the underside of the router mounting plate and the top of the stock, which is determined by the thickness of the stock. This moves the cutting edge even further from the collet, adding additional stress to the bit shaft.

Surfacing

The method I use is based on the jig shown on page 42, but the basic procedures are the same no matter what your jig looks like. Begin by fastening your stock in place on the bed of the jig, it must be held securely while the router is in use or you will damage the wood and your bit. The side clamping bars on the jig will hold most rough-sawn wood without any problem, but if you have some very irregular wood, you may need to place some support under it using wedges. With the wood set in place, determine where the lowest spot is on the stock. The amount of material you can remove per pass will depend on the type of bit you are using, how sharp the bit is and the species of wood you are working with. If in doubt, begin with a light test cut first, and then increase the depth. As the bit is moved through the wood, the cutting occurs at the side of the bit and the orientation of the carbide to the wood will determine the ease with which the bit will cut. A mortising bit with straight sides and a ½" shank is a solid bit that will do an adequate job in most cases. Choosing a mortising bit with the carbide set at an angle to the cut will produce a smooth cut on the side wall, while an up-cut spiral bit will produce the best bottom surface. Solid carbide bits will stay sharp much longer than high-speed steel bits, but they are also much more rigid. This makes them susceptible to snapping off when subjected to excess stress. Because of this I don't recommend using anything less than a ⅜" diameter bit. Once you get into the ½" and larger sizes, solid carbide spiral bits tend to get quite expensive. To surface end grain, such as on a cutting board, use a spiral up-cut bit as it will keep the end grain under tension as it cuts, resulting in a smooth surface without any torn grain and fuzz.

To avoid having accidental contact between the bit and any metal in the clamping arrangement, use a set-up block to set the maximum cut depth for your router bit. With the depth of the cut adjusted, set the router carriage at one end of the stock and use clamps to lock it in place. Slide the router across the width of the surface and return it to the start position between the stock and the clamp bar. Be sure to have the clamp bar located in the areas inaccessible to the bit along the outside edges, or set up some stop blocks to keep the bit from cutting into the face of the clamp bar if possible. Because the propel nuts are located on the inside edge of the clamp bar they will destroy the bit

½" shanks are less likely to break than ¼" shanks



Use a mortising bit for surfacing and a spiral bit for jointing edges

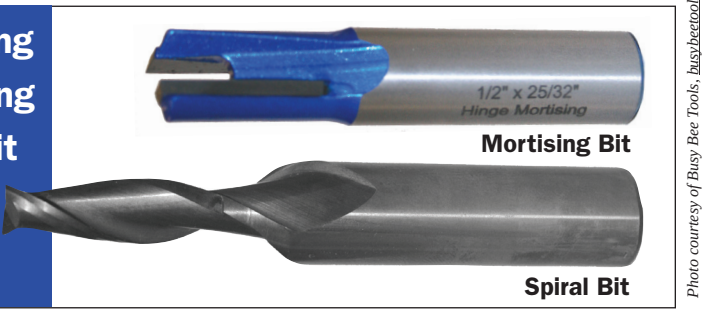


Photo courtesy of Busy Bee Tools, busybeetools.com

should there be any accidental contact. If needed, use some thin plywood shims under the stock to raise the cut above this height.

When working on boards wider than your jointer and narrower than your thickness planer, you only need to surface one side of the board. With the first side brought into line it is a simple matter of running the stock through the thickness planer until you have arrived at the desired thickness. However, if the board is wider than the cutting width of your planer, then simply flip the stock over and use the surfacing jig to flatten the other side.

Jointing

If you don't have a jointer, or if a board is too wide to safely mill on a jointer, then you can joint the edges either on the router table or with a hand-held router.

To joint an edge on the router table you will need a fence that features two sacrificial faces like the one featured in my last shop jig article (see "Ultimate Router Fence", Feb/Mar '09, Issue #58). By removing the out-feed fence and placing a shim behind it, the out-feed side is offset from the in-feed side in the same way the out-feed table on the jointer is offset from the in-feed table. If you are using a simple one-piece fence made from shop scraps, gluing a piece of laminate to the out-feed side will accomplish the same thing but the fence will now only be useable for jointing. For the best results when jointing the edge, use a solid ⅜" carbide spiral bit. A spiral bit reduces the angle the cutting edge meets the wood, much like a spiral cutter head on a jointer, and will result in a smoother cut on figured wood. Set the cutting edge of the bit level with the surface of the out-feed fence. Make multiple passes until the entire edge has been jointed.

If you don't have a router table, or if you are working with a long board, then using a hand-held router may be a better option. To joint using a hand-held router you will need a guide for the router that is perfectly straight, as this is the edge that will be reproduced on the edge of the stock. The straight edge must be securely fastened to a flat face on the stock to be jointed before you begin. I use a length of Baltic birch plywood ripped on the table saw. Depending on the width of the board you are jointing, you can either use a piloted or non-piloted bit. If the board you are jointing is very wide, then there will be enough room between the edge of the guide and edge of the board to run the base of the router on the stock being jointed, in which case the edge of the router will run along the guide and you will not need a piloted bit. Be sure to keep the router in a consistent orientation for a straight edge. If the stock you are jointing is not very wide, then you will need to run the router base on the surface of the guide and use a piloted bit to follow the edge of the guide.

Surfacing and jointing stock with a router and a jig is certainly not as fast and convenient as using dedicated equipment such as a jointer and thickness planer, but if these tools are out of your budget or if you have some extra wide boards to mill, then using a router in combination with a jig is the next best thing. One of the things that surfacing jigs and routers are especially good at is levelling end grain cutting boards – this is simply not possible to do on a jointer, and difficult and time consuming to do with a sander.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

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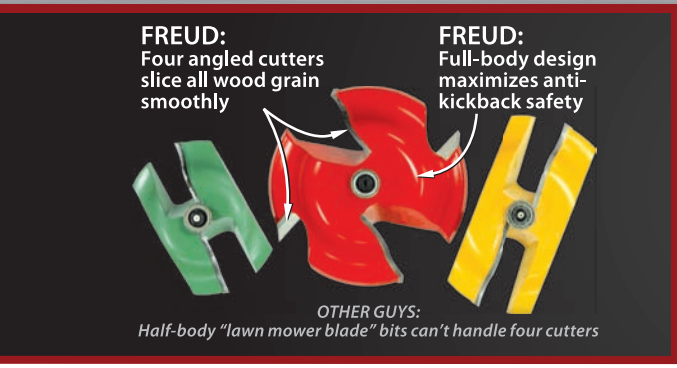

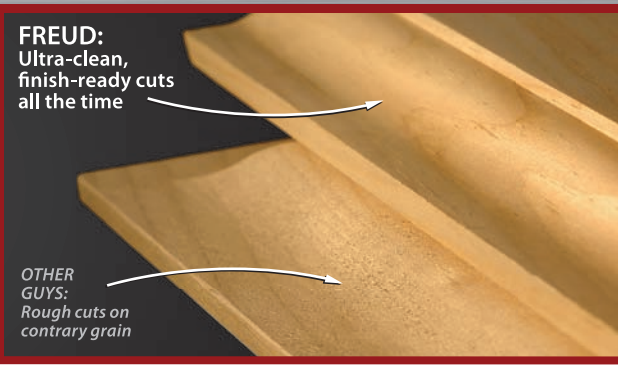

Freud's European-made raised panel router bits cost the same as leading bits from Asia – but that's where all similarities end.

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BY ROB BROWN

Moisture Meters

Use a moisture meter to help you determine the precise moisture level of your lumber.

There are two basic types of meters - pin and pinless. Pin meters have pins, usually about ½" long, that are pressed or driven into the wood to determine what the moisture content of the wood is. Pinless meters are placed on the surface of the wood to obtain a reading. Although they both are accurate, they take readings using different principals and have certain pros and cons.

How They Work?

Moisture conducts electricity very well. Dry wood, on the other hand, is a good insulator. A pin moisture meter uses these two facts to determine how much water is in a piece of wood. It sends an electrical current through the wood sample and measures its resistance to electricity. The lower its resistance, the lower the moisture content of the piece of wood. The meter will then turn that information into an accurate moisture content value. Pinless moisture meters send radio waves into the wood to obtain a moisture reading. When the waves return the meter measures how the waves react to the moisture in the wood.

Both types of meters give you accurate readings only for the area that the meter actually contacts. Since wood isn't a homogeneous material, it's a good idea to do a number of readings from the piece of lumber to determine whether or not the wood has dried evenly.

The moisture content of a piece of wood can theoretically range from 0% to well over 100%. Most moisture meters will only give you accurate readings between about 6% and 25-30% (just below fiber saturation point). For most of us this is acceptable, since an appropriate moisture content for most situations is between 7% and 11%.

Basic Differences

There are pros and cons to both types of meters. One of the main advantages of a moisture meter with a pin is that it can be used on a piece of wood with a rough surface. The pins can be inserted into a board whether it has been dressed or not - unlike pinless meters, which need a fairly smooth surface (a planed/jointed surface is best) to obtain accurate readings. If you're air-drying wood it's much easier to use a meter with pins than to create a smooth surface for a pinless meter.

A major advantage of a pinless meter is the fact that it doesn't leave any unsightly holes in the wood, potentially damaging furniture parts that will eventually be taken from the lumber. While a pin meter takes a reading from a relatively small area, the scan area of a pinless meter is much larger, typically 1 ½" x 2 ½".

How To Use a Moisture Meter

Each make of moisture meter is slightly different. Read and understand the meter you have purchased before making any conclusions. Practice on a number of different pieces of wood to get a good idea of how they work. To get some widely varying moisture values, test different types of wood: a 4 x 4 post that you know is very wet and a piece of wood that has been sitting around for ages in a dry location. Avoid taking readings close to the ends of boards. The end grain will allow moisture transfer to take place faster than the rest of the board, causing readings that are not typical of the entire board.

Electrophysics MT270

The MT270, measuring 1 ⅞" x 3 ⅛" x 4 ⅜", features ½" pins and an analog dial with a 4% to 30% scale. It comes with a cork-like pin protector, a set of spare pins, calibration/battery checker, two 16" leads and a manual containing a species correction chart. The calibration/battery checker is simply a small round plastic 'cup' with two metal screws protruding from one side. The cup has an effective moisture content of 16%. Touching the meter pins against the screws enables you to simultaneously test the battery and calibrate the meter. The leads have alligator clips on either ends, enabling you to take readings on stock of any thickness via nails or screws inserted into the stock. The analog dial is easy to read, and you can take readings in approximate ½º increments; not as precise as a digital readout, but reliable enough for most tasks. This 'pin and read' meter is easy to use, and particularly suited for rough stock, or milled stock that is oversized, so that when you do the final milling the pin holes will be largely removed. I found it quite easy to push the pins to a full ½" depth in softwood. On oak, hard maple and ash I could easily push the pins ¼" to ⅜" deep. Inserting them to the full depth was difficult, and best done by pre-drilling with a 3/64" twist drill bit. You'll need to refer to the accompanying manual to correct for the specific gravity variation among different wood species; easy enough to do, but a bit inconvenient. An optional storage case is available. Electrophysics also manufactures pinless meters. $149.99 with a two year warranty, electrophysics.on.ca. Available direct from Electrophysics.

When using a pin meter, insert the pins ¼ of the depth of the board that you are measuring to get an accurate reading. On ¾" stock insert the pins about 3/16" deep. You'll be able to take accurate readings on boards up to 4" thick with ½" long pins by taking readings on both sides of the board, fully inserting the pins. For thicker stock you'll need to drive nails or screws into the stock and use extension leads. Some meters have a hammer attachment that makes pin insertion easier. If you are pushing the meter into the wood with your own strength do your best to apply even, straight pressure to force the pins into the wood without bending them. The pins can be replaced fairly easily, but a new set of pins for each reading will get expensive. The pins should also be inserted parallel to the grain.

Pinless meters are much easier to use. There is a sensor plate on the bottom of the meter. This plate needs to be firmly in contact with the wood surface. Pressing over the center of the meter with about three pounds of pressure will give an accurate reading. You also need to ensure that there is nothing under the board you are measuring; this is especially important for thin stock. You can simply hold the piece above your workbench, or place it over support blocks. Pinless meters can take accurate measurements from ¾" and upward. As with pin meters, take measurements on both sides of thick stock.

Once a reading from the meter has been obtained there are two adjustments you may have to make in order to account for variables. The first variable is temperature. Most meters are calibrated for the industry standard Douglas fir at 20ºC. Your meter will come with a chart to make this adjustment, so keep it handy. Take the reading from your meter and adjust it accordingly. After adjusting for temperature you have to take the species of wood into account. Once again, use the species adjustment table supplied with your meter to account for differences in the specific gravity between species.

It may seem like a lot of hassle: spending your hard earned money, taking the time to learn about your meter, obtaining a reading and then doing the adjustments. But, consider the time and energy that you put into a project. Imagine watching a finished piece of furniture develop weak joints due to gluing problems or expansion forces, and eventually fall apart. Learning a bit about the moisture content of the wood you're working with will go a long way in preventing these problems from happening.

ROB BROWN
rob@equinoxinteriors.ca

Wagner MMC220

The MMC220 pinless meter measures a compact 1" x 2 ¾" x 4 ½" and weighs around six oz. (168 grams). The large LCD screen is very easy to read, and a low battery indicator appears when it's time to re-charge or replace the battery. An automatic shut-off conserves battery life by turning the unit off after one minute of inactivity. To take an effective measurement the scanning plate on the back of the unit has to be firmly in contact with the wood surface. The manual lists the scanning area as 1 ½ x 2 ½ and to a depth of ¾". The ¾" depth of scan doesn't mean that you are limited to using it on 1 ½" stock by taking reading on both sides. I took readings on both sides of 4" lumber that were almost identical to readings taken by the Electrophysics pin meter via leads on embedded screws. There are two steps to using a 'scan-and-read' meter. You begin by setting the meters specific gravity value, via the Species button, for the species of wood you are going to measure. This takes about 60 seconds. Once the setting is made, you only need to change it if you are measuring wood with a different specific gravity. Fortunately the clever people at Wagner have put an erasable pad on the front of the meter where you can jot down the specific gravity for up to 10 species of wood – ample room for me as I regularly use only about six different species. A small booklet that lists settings for most common domestic and imported species fits neatly into the carrying case, which has a handy belt clip. The second step is simply to firmly press the meter onto the surface being measured. As with a pin meter, you really need to take readings at several locations on the work piece, particularly if it's a wide, long piece. The MMC220 is very 'retailer friendly'; you won't be leaving pinhole marks when you check how dry the wood is at your local lumber dealer. Sometimes you need to take readings on lumber that is in a hard to reach place or where the lighting is not very good. Pressing the On/Hold key when taking a reading will freeze the display so you can move the unit without losing the reading. Pressing the key a second time turns the hold feature off. The MMC220 gives very precise readings in .1% increments. I tried it on a wide range of softwood and hardwood; it's very quick to use, and adjusting for species is a cinch. $419 with a one year warranty, moisturemeters.com. Available from leevalley.com.

BY VIC TESOLIN

Preparing Plane Irons

Learn to prepare and maintain your plane irons, as a sharp iron can make the difference between frustration and enjoyment.

Working with hand planes can be an enjoyable and efficient way to woodwork. However, many woodworkers have had difficulties with hand planes and shy away from using them. A lot of these problems can be attributed to dull and poorly prepared plane irons (blades). It's no secret that hand tools require keen edges in order to be used effectively. Unfortunately, there is a lot of information out there about sharpening and honing. The topic of sharpening to woodworkers is like religion in that it causes many heated discussions and disagreements. However, how you go about sharpening is not as important as actually achieving a sharp edge. There are many different techniques and jigs to choose from. What I'm going to do in this article is share with you the techniques I use to sharpen my tools. These techniques are not the only ones to use for sharpening; but they do work well for me. I make my livelihood making furniture and unfortunately I don't get paid to sharpen. Keeping that in mind, my techniques are efficient and effective and allow me to get back to building furniture with a minimum of delay.

Flatten the Back

The first step that I take to prepare an iron is to flatten the back. Depending on the maker of the iron this process can take anywhere from a few minutes to hours. However, most higher end plane makers flatten and polish the backs of their irons. Regardless of the maker, I still go through the process of flattening and polishing just to be sure. Before I get started, I secure a small block of wood to the top of the iron with double-sided tape. Doing this affords me the ability to keep a good grip on the iron while flattening, and keeps my fingers away from the stone. The stones feel smooth to the touch but dragging your fingers across the stone repeatedly will wear away your skin and cause bleeding. Next, I draw lines on the back of the iron with a black marker. These marks will act as wear lines that allow me to gauge my progress and will indicate when the iron is flat. The process starts with a 1000 grit stone that I take the time to flatten beforehand. This process won't work with a stone that is dished or not flat.

Place the leading inch or two of the iron's back flat on the stone, grip the wooden block and begin drawing the iron back and forth along the entire length of the stone. Your other hand will help guide the iron and keep it flat on the stone. After around twenty strokes or so, check your progress. If all of the wear lines are gone, you've lucked out with a flat iron. If not, you must carry on with the exercise. Every

couple of minutes I rotate the stone end-for-end to help prevent uneven wear of the stone. As well, if it is a difficult iron that is taking a lot of flattening, I will periodically re-flatten the stone to ensure that I'm always working with a flat stone. Failing to do this will result in a bellied iron that is very difficult to flatten. Once all of the wear marks have been removed, I move up to a 5000 grit stone. Again, the stone must be flat before starting this step. I repeat the same action on the 5000 grit stone as I did on the 1000. You can mark the iron with the marker again if you like but I find that it is quite apparent where the stone has been cutting on the iron. The spots where the iron is dull are the areas that still need work. At this point, the back of your iron should be nicely polished and you should be able to see your reflection in it like a mirror. At this point I move on to the final, 8000 grit stone, and I repeat the same action as with the other stones. Once you have polished the back with your finest stone, do not use coarser stones on the back of the iron again.

Hollow Grind a Bevel

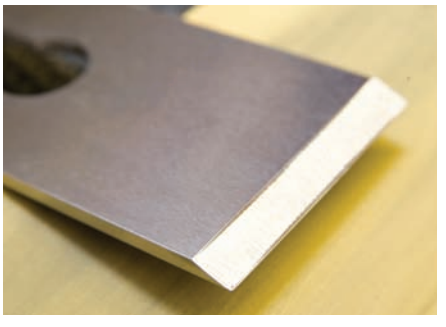
Now that the back of the iron is flat, I remove the block from the iron and head to the grinder to hollow grind the bevel. It's referred to as hollow grinding because the grinding wheel will hollow out the bevel instead of keeping it flat. I use a 6" full speed (3750 rpm) grinder. Some people insist that a half speed grinder (1725 rpm) is necessary to avoid burning the steel. I feel that the grinding wheel and your technique are of more importance than the speed of your grinder. I replaced the grinder's original grinding wheel with a Norton 3X, 46 grit wheel, europeanhandtools.com, leevalley.com. This wheel removes metal quickly and with very little heat build-up. I also removed the original tool rest from the grinder and replaced it with a Veritas Grinder Tool Rest, leevalley.com. This rest allows me to accurately adjust my grinding angle and provides a larger surface on which to rest my irons. It's important to regularly dress grinding wheels with a wheel dresser. I use a Diamond Bar Wheel Dresser that is also available from Lee Valley. This tool allows you to remove any metal build-up (glazing) on the wheel, and is also used to shape the wheel. I usually round the wheel slightly at the edges so that it is high in the center. This makes it easier to judge where the cutting will occur. There are, of course, other set-ups you can use for grinding edge tools. You may end up trying several different systems until you find one that you feel comfortable in using.

Before I begin grinding I coat the entire bevel with a black marker so I can see where the grinder is cutting. With the grinder off, I place the iron on the tool rest and advance the iron until it makes contact with the wheel. I then sight along the side of the iron to see where on the bevel the wheel is touching. I then make adjustments to the tool rest so that the wheel is touching as close as possible to the center of the existing bevel. I generally keep the angle the same as what was shipped by the plane maker. It's very easy to get caught up with angles and numbers when grinding

Grinding the bevel

Honing the back

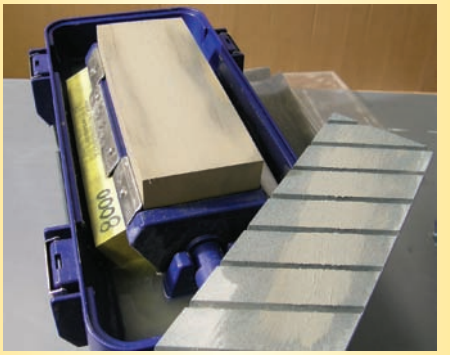
Honing the bevel



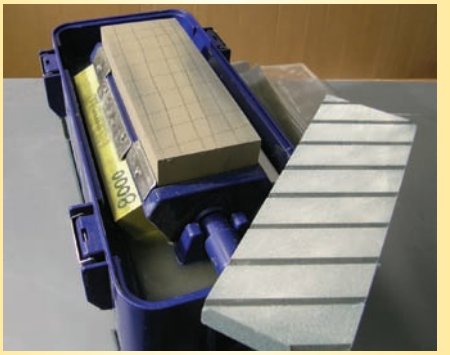
Ready to plane

Flattening Waterstones

Waterstones wear fairly quickly, so it's good practice to regularly check them for flatness. One of the quickest ways to do this is with a Norton flattening stone, europeanhandtools.com, leevalley.com. The stone is made from a coarse silicon carbide, and has diagonal grooves milled across its large 3" x 8" surface to catch any slurry. Begin by drawing a grid of pencil lines across the surface of your waterstone. While doing this place the flattening stone in a container of water. Because it's so porous it will absorb water very quickly. Now simply rub the flattening stone across the surface of the waterstone with firm, even strokes. Check your progress every couple of minutes. As soon as you've removed all the pencil marks you're finished.



Check progress often



Draw pencil marks on the stone

Stop when all marks are removed

irons. If you're off by a degree or two it won't be the end of the world. Once the wheel is touching the center of the bevel, turn the grinder on and slowly advance the iron into the spinning wheel. As soon as I make light contact, I turn the grinder off and inspect the bevel to see how close to the center I actually am. If I'm out of center, then I gently tap the tool rest up or down appropriately to correct its position and try again. When the iron is centered, I'm ready to start grinding the remainder of the bevel. I proceed by moving the tool back and forth along the moving wheel checking my progress every few passes. If I'm grinding a smoothing iron I will introduce a light camber to the blade by subtly moving the tool in an arc to remove more material at the edges. Otherwise I strive to keep the edge square to the side of the iron. I keep light pressure on the back of the iron; just enough to keep the blade on the tool rest so that I don't inadvertently change the grinding angle with excessive pressure. I keep grinding until I remove the black marker from the existing bevel. Take care when you get close to the edge of the iron. This is where burning will occur if you're not careful. You will know when you're close to the edge when the sparks from grinding start coming out on top of the iron.

Hone the Bevel

After a bevel has been ground it's time to hone the iron. I use a 8000 grit stone to hone the bevel because every time the edge is honed, a small amount of the hollow bevel is worn away. I try to remove the *minimum* amount of material when I hone as this will mean less trips to the grinder to reshape the bevel. There may be a slight burr on the back of the iron as a result of grinding. We will remove this in a later step.

I place the iron on the far end of the stone, and then slowly elevate the iron until the toe of the bevel touches the stone. It is quite easy to judge when the toe touches the stone because you will feel a distinct tap. Also, the water or oil you use to lubricate the stone will push out from under the toe when it makes contact. Once the heal and toe are touching, I simply drag the iron towards me on the stone while maintaining contact on the stone. I try not to push the iron away from me on the stone because if the iron digs in it will create a gouge that will have to by removed by flattening the stone. If I'm honing a cambered blade, I will alternate pressure from one side to the other with my fingers. In the case of a straight blade, I keep the pressure equal on both sides. I repeat this action for about a dozen strokes, and then check my progress. I'm looking for the heel and toe to have a consistent polished line along them. Once I have these two polished lines, I flip the iron over and polish the back on the same stone. This action will remove any burr that the grinder has raised.

Checking For Sharpness

To check the iron for sharpness, I attempt to make a paring cut on the end grain of pine or poplar. A sharp iron is required to cut end grain in these woods because they are very soft and the fibres tend to want to bend over instead of being shorn off. Some woodworkers check the sharpness of their irons by licking their arms and shaving a bit of hair off. I am not one of those woodworkers. Just because I am able to shave my face with a dull razor doesn't mean that it will give me the best shave. The same is true with plane irons. Hair is easily cut compared to end grain wood fibres. As well, the hair technique leaves you with all those unsightly bald patches running up your arm. The real test is to place the iron into your plane and take some shavings.

If this seems like a lot of work, you're right. Every one of my many edge tools has had this treatment. It is a necessary task, but your hand skills will greatly improve with sharp edges. The good news is that once the back is flat and the edge is hollow ground, it only takes a few strokes to re-hone the edge. The only time you'll have to head back to the grinder is when the hollow bevel is gone or if you get a large nick in the edge. If you invest this time now your tools will be ready to go and you can focus on the fun stuff… your woodworking.

VIC TESOLIN
www.victesolin.ca

woodworkersgallery

To have your work considered for the Woodworkers Gallery submit photos to editor@canadianwoodworking.com

The mantel, made from solid and veneered European steamed beech, is approximately 10" by 72" with a 13" deep top. The beech was coloured using an aniline dye followed by a gel stain glaze. The finish is several coats of a homemade oil/varnish mix. The marquetry inlay is made of mahogany, curly maple, walnut and pear. The mouldings were all made in Brent's shop with the curved molding across the bottom of the frieze done using bent laminations. This project was Brent's first incorporating marquetry, veneering and bent lamination. You can see more of his work at randallboxes.com.

Mantel by Brent Randall, Mississauga, ON

This pine change table, made for Edward's oldest daughter, measures 33" wide x 28" high x 17" deep. The curved tops on the sides were cut using a router trammel. Fluting in the end panels was accomplished with a handheld router using a combination of ½" straight bit and ¼" cove bit. The top shelf, bottom shelf and sides were brought together using stopped dados. The drawer pulls and runners are also made from pine. The drawers themselves were assembled using locking rabbet joints, which were cut on a table saw and resulted in an amazingly strong joint. To achieve a natural wood look Edward finished the project with four coats of a satin wipe on polyurethane.

Change Table by Edward Smith, Conception Bay, NL

Visit canadianwoodworking.com and join our woodworking forum. That way you'll be able to show your work to the world, and vote for our next featured project.

BY MICHAEL KAMPEN

Milling Table

Use this jig to mill boards too wide to run through your thickness planer.

It's an unavoidable fact of woodworking life that the wonderfully figured board you want to use is just too wide to fit on your jointer. Or perhaps you need to flatten the surface on that end grain cutting board that you have just glued up (don't even think of trying this on a jointer). Build this versatile router based surfacing jig and you'll be able to dress any surface you may come across.

This jig is large enough to accommodate material up to 26" wide and almost three feet long, but you can scale it to suit the sizes of stock you will most likely be using. The material is clamped to the bed of the table and then the router runs back and forth over the surface between the two outside rails. Two sets of rails provide additional clearance to accommodate thicker stock. Adding a couple of extra rail extensions to increase the height will allow you to mill even thicker material.

The Router Base

Begin by preparing a router base plate (A) to fit the router you will be using. The measurements given here fit the Freud FT1700VCE router, freud.ca, that I have dedicated to this jig; adjust your measurements accordingly to fit your router. When sizing the base plate, be sure to provide enough space for the handles and any other protrusions to clear the carriage beams when it is plunged to full depth. To hold the router captive and provide positive guidance I used a Freud 58-100 four-wing slot cutter to rout a shallow groove that allowed the polycarbonate sheet to slide into the T-track. Remove the sub base from your router and use it to mark out the screw holes to mount the new base to the router; you may need longer screws.

The Jig

Begin by cutting the base (B) to size. It won't be needed until later, but cutting it now allows you to use it as a work surface as you proceed. To provide the maximum strength without any wood movement concerns, the two carriage beams (C) that support the router guides are made up of three laminations of ¾" Baltic birch plywood. Cut the blanks for the beam and glue it up. When the glue has set, trim the beams to width and cut them to length. Set up a dado set on the table saw and configure it to cut a groove for the T-track sections; the sections should fit snugly without movement but should not be forced into the dado. Use a drill press to drill clearance holes in the T-track for the shank of the #6 hinge screws and then use a larger drill bit to countersink the head below the surface of the track. Cut the dados and mount the track on the two beams; space the screws every two inches on the guide track to support the weight of the router. The stop block track on top of the beam only requires five screws.

Cut the two carriage ends (D) to size. Use a doweling jig to drill a pair of dowel holes at both ends of each carriage beam and the corresponding holes in the carriage ends. Use the dado set to plough a dado on the outside surface of the ends between the two dowel holes for the UHMW guides. Cut the gussets (E) for the top of the carriage. Assemble the carriage on the base and cut a couple of sacrificial spacers to fit across the interior of each end of the carriage. True up the carriage to be sure the router base plate slides back and forth easily. If it binds, make the grooves ever so slightly wider; do not make them deeper. Using T-bolts, fasten the gussets in place using the ends of the stop block track to keep the carriage square and rigid. Drill and counterbore a hole for a ¼-20 large head bolt through the carriage end and beam, then drill an intersecting hole for a cross dowel and use these to pull the ends together.

The Guide

The router carriage slides back and forth on the T- tracks; the two different track heights provide additional thickness capacity while the UHMW guides make the whole carriage slide easily on the aluminum track. Begin with a 24" piece of UHMW, leevalley.com, item #46J90.16, and use the Freud slot cutter to run a groove to accommodate the UMHW in the track opening. Use a set of calipers to ensure the material left exactly

matches the opening in the track. Move to the table saw and use a blade with flat topped raker teeth to nibble away at the remaining material until the profile matches the inside profile of the track. Raise the blade slightly and make a pass on both sides of the material and check the width of the remaining stock. Repeat this until you have the desired dimension.

With the profile cut on the UHMW, rip the guide strip from the material and cut it into 5" lengths. Drill a pilot hole through a leftover piece of track and then slide the UHMW guides into the track and use the hole in the guide track to center a bit on the UHMW and drill a couple of screw clearance holes through it. Follow this up with a countersink bit to allow the head of the screw to sit below the surface. Set the guides into the dados on the carriage ends and screw them in place. Drill a hole in the center of the dado for the locking T-bolt.

The Main Table

There are two methods to hold down the material as it is being surfaced. The first is to use toggle clamps affixed to a beam suspended between the two side rails. While this works well, the board must be longer than the surfaced area to accommodate the areas under the beams rendered inaccessible to the router. To eliminate this problem, construct the side clamping hold-downs. Rout three sets of grooves across the width of the milling table to accommodate ¼" T-bolts. Drill corresponding holes into a piece of oak for the clamp bar (F) and counterbore the top side to allow the head of the nut to sit flush with the surface of the oak. Drill a series of holes across the width of the clamp bar and insert T-nuts into the side facing the center of the jig. Using a bench grinder, grind a point on the end of a series of long ¼-20 bolts and thread them into the holes. If you can't find long bolts, cut some ready rod and double nut one end.

To complete the main table, cut the plywood sides (G) and the solid wood backer (H) and laminate them together. Trim them to size and then plough the dados for the three pieces of T-track. Drill and countersink the holes in the track and then mount them in the dados. Confirm the amount of material you will need to remove from the sides to match the width of the base and use a thickness planer for this. Mount the sides to the table base using wood screws; use the carriage as a spacer and some clamps to be sure the sides are the correct distance apart for smooth operation.

Using the Jig

To flatten the surface of a rough board, place it on the milling table and snug the clamping bar up to the material. Use the pointed bolts on either side to firmly clamp the board down. Install a bottom-cleaning bit in the router and move the router back and forth along the width of the stock while progressing from one end of the board to the other.

Because the object is to hold the piece firmly in place for surfacing, material will not slide through the jig very effectively. By making a sacrificial bottom out of a piece of laminate covered MDF, this jig can easily be converted into a fluting jig or used to run any manner of mouldings. Using the stop blocks it can also be used to rout dados, through and stopped, in both sides of a bookshelf.

MICHAEL KAMPEN
mkampen@canadianwoodworking.com

MATERIALS LIST (All measurements in inches)

Part		Qty	T	W	L
A	Router base plate	1	⅜	5⅞	8⅛
B	Base	1	¾	35½	47
C	Carriage beams	2	2 11/16	2⅛	29⅞
D	Carriage ends	2	¾	2 11/16	11⅞
E	Gussets	2	¾	2¾	11⅞
F	Clamp bar	2	⅞	1⅝	47
G	Plywood sides	2	¾	5⅛	47
H	Solid wood backer	2	1⅜	5⅛	47

HARDWARE LIST

Quantity		Lee Valley Catalogue Number
1	¼" track, 4'	12K79.28
1	¼-20 x 1" T-bolts, pkg. of 10	12K79.70
1	¼-20 x 2" T-bolts, pkg. of 10	12K79.72
1	¾" UHMW - 4" x 24"	46J90.14
1	⅜" Polycarbonate sheet	46J86.13
2	Cam clamp mechanism	05J51.01
1	#6 x ¾" D.S. screws	01Z60.06
2	Propel nuts, pkg. of 10	00N23.01
4	Large head bolts	00N15.70
4	Cross dowels	00N18.16

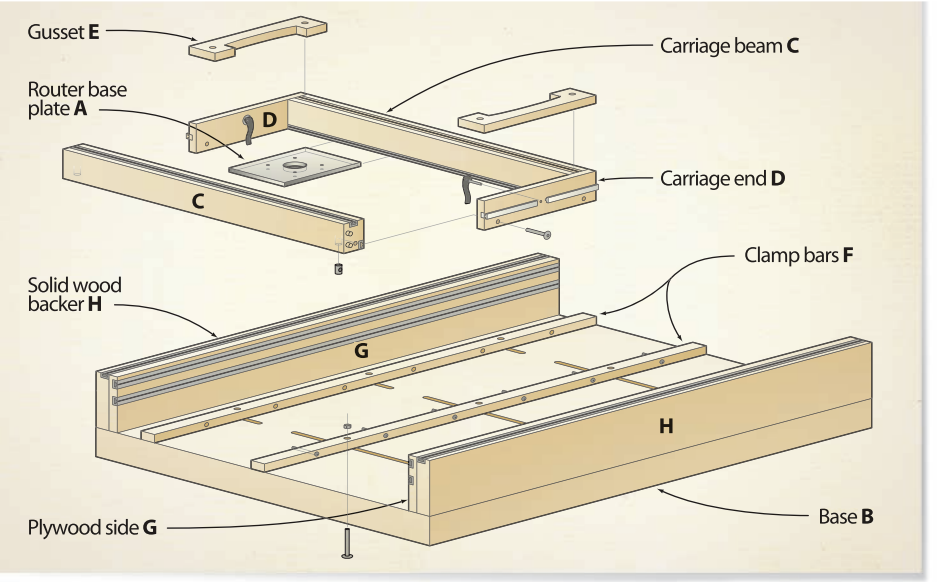


Illustration by: www.JamesProvost.com

COMING EVENTS

KELOWNA WOODWORKING TOOL AND HOBBY SHOW
April 3, 4, 5, 2009
Kelowna Curling Club, Kelowna, BC
www.toolshows.ca

WOOD 09 SASKATCHEWAN WOODWORKER GUILD ANNUAL SHOW
May 30 - June 7, 2009
University of Saskatchewan Campus
Saskatoon, SK
www.saskwoodguild.ca/show.htm

NORMAND OPEN HOUSES
March 27, 28, 29, 2009
Laval, QC
4297 Autoroute des Laurentides

April 24, 25, 26, 2009
Saint-Nicolas, 752, Chemin Olivier

May 22, 23, 24, 2009
Sherbrooke, 4352, Boulevard Industriel

For more woodworking events:
www.Canadian Woodworking.com
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Blitzkrieg To-The-Sea

Illustration by: Mike Del Rizzo

For most people, carving is a solitary pursuit. Time spent alone down in the basement or out in the shop - and at least once - sitting on the couch in the living room watching the woodchips, sawdust and shavings fall to the floor while listening to the soft swish as a razor sharp gouge slices cleanly through a block of butternut or basswood.

For those who belong to a carving club, it's a time for fellowship, talk and laughter. And endless cups of very weak coffee. (Caffeine jitters and sharp carving tools do not mix well.) It is a time for helping each other with a particularly troublesome part of a carving, a time of companionship and encouragement. Occasionally, carving can be a time of intense pain as a gouge or knife slips and slices off a treasured piece of anatomy.

Generally speaking however, it is very rare for carving to be a time of getting into trouble, and yet throughout my career it has become so on several occasions. My troubles with carving began at the ripe old age of eight when I first read '*Paddle-To-The-Sea*', a book written in 1941 by a man with the strangely redundant name of Holling Clancy Holling. The book tells the story of a small wooden canoe carved by a young Indian boy in Northern Ontario and released to journey down through the Great Lakes and on out to the sea.

The book touched me somewhere and I fell in love with the idea of doing the same thing. Making a small wooden canoe, not paddling one out to sea. (From previous columns you may know how well canoes and I get along, so you have an idea how this is going to turn out.)

When I was growing up, my father was a Baptist minister, a career that has little need for tools of any sort. We owned a hammer with a cracked and taped handle, a large slotted screwdriver that was used exclusively for opening paint cans, and an extremely dull and rusty handsaw that nonetheless had such perfect pitch that I could play the first three cords of "Oh Canada" using the bow from my mother's cherished violin. But it's the screwdriver that's important here.

For some reason we had a stack of old, moldy 2 x 4's in the basement from which I planned to carve my very own '*Paddle-To-The-Grand River*', that being the closest water course to our home in Kitchener.

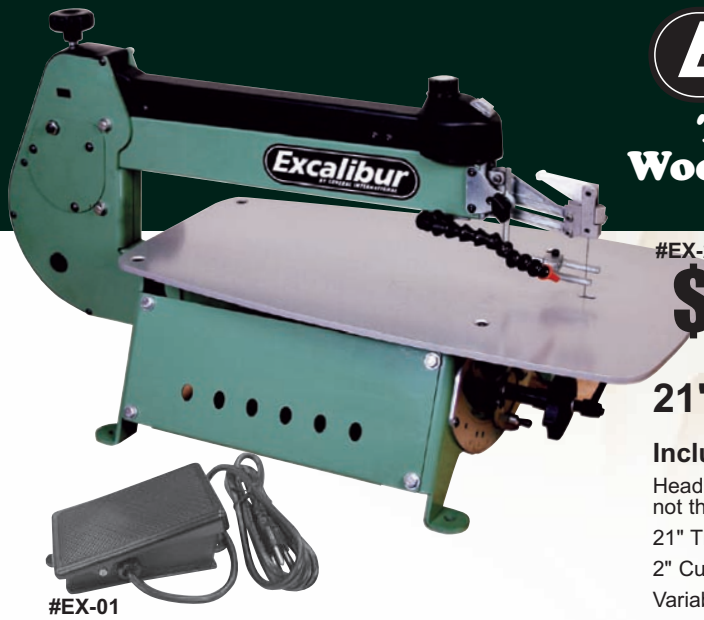
After several hours of unsuccessfully hacking away at a board with the saw, I asked my older brother to stomp on it in order to snap it in half. That worked immensely better and I soon had the beginnings of my little canoe clamped into an old Emmert Patternmaker's vise and was happily hacking away at it with the screwdriver, using the broken hammer as a mallet. Surprisingly, that didn't work very well and I was soon on my way upstairs to liberate the meat tenderizer mallet and my mothers' fabulously expensive and much prized paring knife, custom made specifically to fit her tiny hand. At least it certainly seemed that way considering all the trouble I got into for using it. It's a good thing carving can be accomplished while standing up.

Now that I was well aware that kitchen tools were not to be used for woodworking purposes of any sort, I went in search of anything else that I could use. My father's razor blades (Wilkinson Sword, of course) proved to be disappointingly inadequate for the task of woodcarving and by the look of his face the next morning, weren't really up to shaving either. I maybe shouldn't have returned them to his razor when I finished.

Eventually I discovered that my oldest brother, Jack, possessed a rather large knife (that would be 'Jacks Knife') that he was willing to lend me once he left the house one day without locking his bedroom door. I figured that he shouldn't have left it just lying around in plain sight in his dresser drawer if he didn't want me to use it.

Over the course of the next couple of weeks I diligently hacked away at my little carving, eventually coming up with a reasonable facsimile of what oddly enough appeared to be a Sherman tank. Clearly I needed lessons! I sadly and surreptitiously slipped the now dull and chipped knife back into my brother's room and forever gave up all my hopes and dreams of ever becoming a carver or of sending a stupid little tank on its very own Blitzkrieg-To-The-Sea! (At least until 1967 and Canada's Centennial).

DON WILKINSON
yukoners@rogers.com



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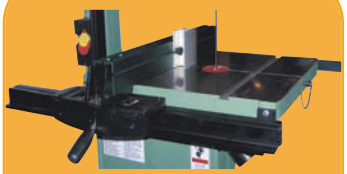

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ART'S TOOL SALES

Art's Tool Sales and Service was started by Art & Alice Van Krimpen in 1981. The main focus was placed on the service of woodworking machinery and power tool repair. Since then the company has grown to become the leader for the major woodworking machinery manufacturers in the Niagara peninsula.

We have two store locations, our main store in St-Catharines and our latest store in the city of Welland. With 10,000 square feet of combined showrooms and a staff of six full time and three part time people, we can provide the professional help anyone needs when purchasing machinery and tooling.

Many customers are referred to us with special needs and hard to find tools, that's why we are often called the house of last resort.

COBOURG Home hardware

We are a family owned hardware business serving the central / eastern Ontario region for over 25 years. Under the ownership of Brad O'Neil we have expanded our product lines. We carry a wide selection of hardware items for do-it-yourselfers as well as for contractors.

We have experienced tremendous growth in our power tool and woodworking machinery departments. With the addition of General/General International line of wood and metal machinery we are able to better serve our customers.

Come and visit our store. Our friendly, knowledgeable staff will be pleased to help you select the right products to suit your needs.

For current promotions, complete product info and a list of dealers near you:

WWW.GENERAL.CA

GENERAL
GENERAL INTERNATIONAL

Time spent on a project is more than the pride you have in your accomplishments, it's about building relationships. For more than 100 years the Home family has been helping Canadians with all of their building project needs. More than 1000 stores from coast to coast to coast carry an exceptional selection of tools and more than 450 stores also carry lumber, building materials and building project plans to ensure your success every step of the way.

Home hardware building centre

Home Owners helping **homeowners**™

Home hardware