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MEASURING
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ISSUE #125
APRIL/MAY 2020

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As every cat knows, a good cat owner needs to treat their cat with great care and make them a customized cat nook.

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BY NICK REAUME

Reduce your heating costs and improve the look of your home by installing new windows yourself.

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COVER STORY

Cover photo by Dahol Otoide

- 34 **Make a River Table Top**
All the rage these days, river table tops can be made with a live edge slab of lumber and some epoxy.

BY PAUL LEMISKI



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editor's letter

River tables are everywhere these days. Many woodworkers, both budding and experienced, have tried their hand at bringing two pieces of live edge material together in a visually pleasing way, pouring a mixture of colourful epoxy into the void between the two pieces of lumber and letting it cure before they machine the final product to size. It's a technique and look that many woodworkers really love. We have Paul Lemiski, a Canadian who has made a lot of river tables in the past few years, discussing the ins and outs of how to build your own in this issue.

If traditional woodworking is more what you're after, Tony Peirce puts the finishing touches on his continuous-arm Windsor chair in this issue. The start of this challenging project was detailed in our Feb/Mar 2020 issue, and now Tony talks about steam bending, adding the spindles, final assembly and how to apply a classic multi-stage finish that adds a lot of character to this period piece. On the whimsical side of things, I show you how I built a colourful cat nook that can be attached to the wall to give your cat a new place to hang out. Cats love small areas, and this nest is sure to be a hit with your feline friend.

A pair of articles on windows is also included in this issue. One article shares some basic window knowledge, so when it comes time to shop for new windows you'll be armed with some knowledge of what's available, making your decision a bit easier. The other article shows you all the steps involved with removing an old window and replacing it with a brand new one. With rising energy prices, and the green movement in full swing, replacing windows makes more sense now than ever. Saving some money installing your own windows is a smart idea anytime.

As always, our regular columns on tools, techniques and wood artists are included. Between them you'll learn a bit about a shoulder plane, read in-depth reviews about three tools new to the market and have a look at some of the beautiful pieces of furniture in a recent exhibition which were all crafted from one large maple tree on Vancouver Island.

— Rob Brown



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letters

Thanks, forum members!

I would like to extend a huge thank you to many of your online woodworking forum members. I have been a member of your online forum for about a year now and the generosity shown to me by forum members of their time and resources has just been amazing. Twice now I have had forum members reach out to me and offer to give me clamps and a can of Johnson's paste wax for free. You members know who you are and you get a special thanks!

The sense of community here has been an absolute joy. Thank-you to all of you.

Redbull1989
Smithville, ON

Topics	Statistics	Last Post
Sticky • Looking for a Woodworking Club, Course or Lumber Supply? Started by Carl Gagne, 03-27-2017, 07:11 PM	1 response 843 views 1 file	
Sticky • Tips from the forum Started by richwoodguy, 03-29-2011, 11:38 PM	45 responses 14,142 views 0 files	
Closed, Sticky • Welcome to the new "Getting Started" forum! Started by Ryan Shovel, 12-17-2010, 02:36 PM	0 responses 4,740 views 2 files	
Edgebanding Router Bit - Is it worth it? Started by amptomcat, Today, 02:37 PM	2 responses 19 views 0 files	
The Tools I Need to Make a Speaker Chamber Started by jacob_jh, Yesterday, 11:46 AM	12 responses 120 views 0 files	
New Benchmark... Stupid Question Started by mskid01, 01-19-2020, 09:39 AM	28 responses 880 views 0 files	
How should I be this unsteady bench? Started by mungie01, 12-26-2019, 01:23 PM	10 responses 357 views 0 files	
ISO Digital Angle Finder, or not Started by Jason Telo, 01-10-2020, 05:51 AM	13 responses 186 views 0 files	
 plywood bench - finishing advice needed Started by mungie01, 01-18-2020, 06:52 PM	4 responses 85 views 0 files	
Design software recommendations? Started by busman, 05-10-2019, 04:25 PM	8 responses 293 views 0 files	
Euro hinge types Started by helen_goodwin, 01-08-2020, 03:27 PM	10 responses 237 views 0 files	
Staining help? Started by vivaldi, 01-10-2020, 10:48 AM	3 responses 86 views 0 files	
 plywood or hardwood for a project Started by mskid01, 01-05-2020, 06:35 PM	5 responses 170 views 0 files	

Subscription Draw Winners

Harry H. Belleville, ON has won a Portable Clamping Workstation from King Canada.



Dennis E. Orleans, ON has won a \$250 gift card from Lee Valley.



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Inspiring Media acquires *Canadian Woodworking & Home Improvement*

Now in its 21st year, *Canadian Woodworking and Home Improvement* is building for the future with investment from a new owner. Paul and Linda Fulcher of Sawdust Media Inc. have been publishing the magazine from their home in Burford, Ontario since 1999. Under their care the brand has grown to become Canada's #1 DIY resource, with 20,000 print circulation and a website with more than 600,000 monthly page views for home owners actively involved in maintaining and improving their home and furnishings.

Going forward, Sawdust Media Inc. will be directed by Inspiring Media Inc., based in Niagara on the Lake, Ontario. Michael Fox, president of Inspiring Media, will become the publisher of *Canadian Woodworking and Home Improvement*. Paul and Linda will continue to be involved in assuring the magazine's continued success, with Paul as Director of Sales/Associate Publisher and Linda advising on business matters. Carl Duguay and Rob Brown will continue on as web editor and print editor, respectively.

Paul says, "When Linda and I first took on *Canadian Woodworking*, we sought out and attended workshops led by Michael, because he was the leader in the industry - and we have looked up to him ever since. Now we look forward to working with him to grow the brand."

Sawdust Media, under the leadership of Michael Fox, is committed to maintaining the company's high level of content. Over the coming year there will be new initiatives with an increased emphasis on skill building, in-depth product reviews, and an expansion of the company's social media presence.

Michael says, "I've watched Paul and Linda grow their publication over the past twenty years, and am truly excited to now be able to contribute directly to its growing success."



About Sawdust Media

Sawdust Media has been publishing *Canadian Woodworking & Home Improvement* magazine since 1999. What began as a print publication has evolved into Canada's most active community of woodworkers and DIYers. Today, the *Canadian Woodworking & Home Improvement* family of media includes:

- Print and digital magazines
- Canada's largest woodworking and DIY online forum
- Monthly ShopNEWS and ShopTOOLS newsletters
- Growing on-line library
- Archive of subscriber-only videos
- Wide social media presence

About Michael Fox/Inspiring Media

Based in Niagara on the Lake, ON, Inspiring Media provides communications and marketing support for growing businesses. Michael started out as a journalist, and built a 30-year career in publishing, culminating his corporate career in 2012 as Senior Vice President for Circulation & Development of Rogers Publishing. Michael was also the publisher of *Garden Making* magazine from 2008 to 2018. He is a past director and chair of Magazines Canada, the national association for magazine media.

For more information contact:

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Best Build

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Canadian Quotes –
Kenton Jeske



Forum Thread

Check out these home improvement threads and many others at forum.canadianwoodworking.com

- **Condensation on upstairs walls** – Condensation on interior walls can look bad on the inside, but the real problem is what's going on behind the drywall. Read about what some forum members are recommending for a solution.
- **How to stop a dripping faucet?** – What starts as a small annoyance can end up wasting a lot of water, money or both. Especially if you're on a well. Our members have good ideas on how to stop the dripping.

Got a question? Join our forum so you can ask our skilled and experienced members any home improvement question you like. It's free, and is just a click away.

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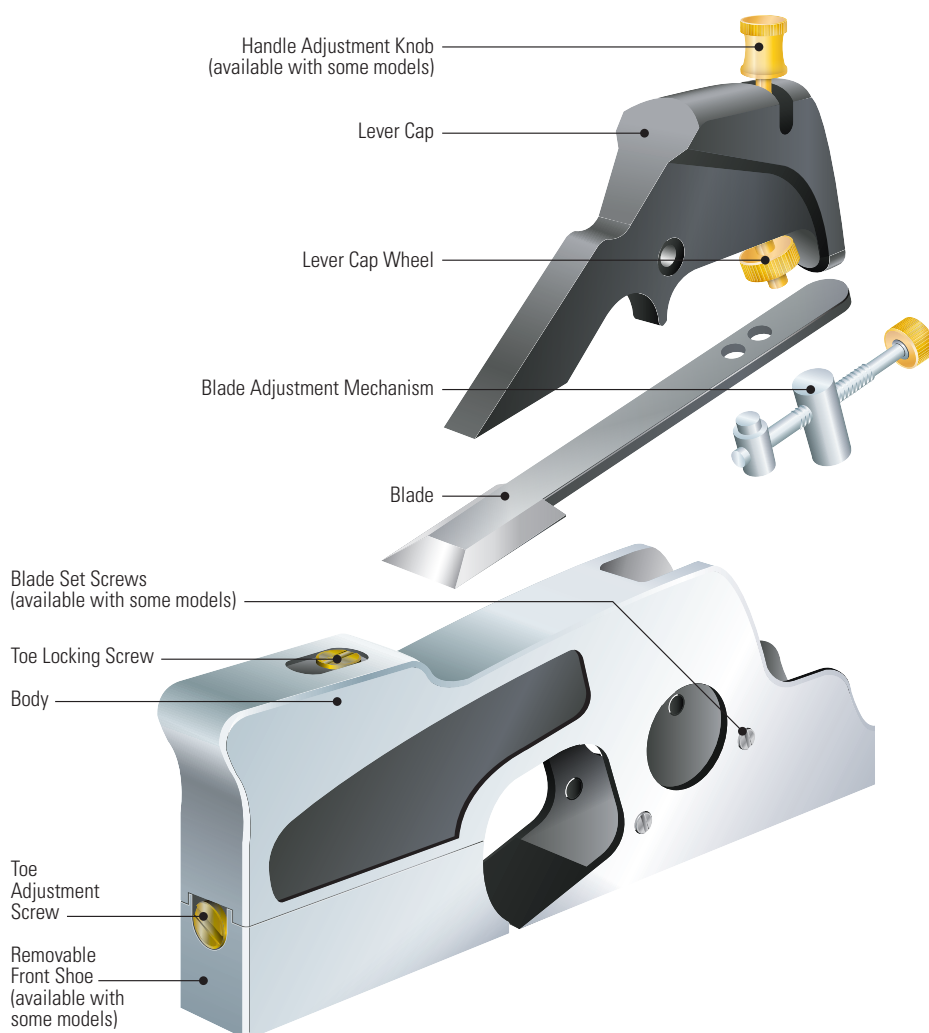
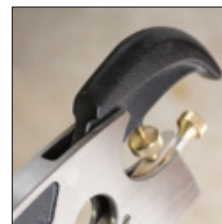
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Shoulder Planes



Tenons are traditionally cut by hand, and their two surfaces are imperfect. To smooth tenon faces, and ensure a perfect fit into the mortise, a shoulder plane was used. Because the blade of a shoulder plane extended to the outer faces of the shoulder plane's sides, they cut the full width of the plane. This allows woodworkers to get into the corner of a joint like a tenon. A shoulder plane can also help fine-tune rabbets, grooves, dados and the shoulders of some of these joints. There are typically three sizes of shoulder planes; small, medium and large. The main difference is in the overall width of the plane. A narrow shoulder plane can fit into more joints than a large shoulder plane, but it's more unstable, and more passes are required to trim the entire cheek of a tenon. Some companies even produce miniature shoulder planes. The low bed angle of a shoulder plane allows it to slice more cleanly into end grain.

Common Widths: about 1/2" (small), about 3/4" (medium), 1-1/4" (large); 1/4" (miniature)
Price: \$150 (small) - \$280 (large); \$50 (miniature)

Get the Most Out of Your Shoulder Plane

One or Two Hands

Depending on the task, a shoulder plane can be used with one hand or two. It mainly comes down to comfort and the type of pass you're making.

Multiple Passes

If your shoulder plane isn't wide enough to dress the entire width of a joint, start against the shoulder of the joint and make multiple passes, overlapping each pass slightly.

Slightly Oversized

It's okay if a blade extends ever so slightly beyond both side faces of a shoulder plane, as this ensures the blade will cut into both corners of the joint.

Square Corners

Because a shoulder plane's sole is machined perfectly perpendicular to its sides, you can more easily create square joints.

What Size?

While every woodworker has different requirements, the medium-sized shoulder plane is likely going to be the best choice for most.

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Top**10** Underrated Tools

Some tools do a lot, and we all know it. Others do a lot, but I sometimes get the sense that some woodworkers don't know it. Here's a list of what one woodworker thinks many other woodworkers could benefit from having in their workshop.

BY ROB BROWN

1 Track Saw — Whether it's breaking out rough lumber and sheet goods, assisting with a host of home improvement tasks or making many furniture making tasks easier and more accurate, a track saw can accurately and easily do so many things.

2 Mechanical Pencil — Constantly sharp, a mechanical pencil marks an even, thin line to assist you with accuracy. Though they don't replace a standard wood pencil, I use mine for at least 95% of the marks I make.

3 Sharpening Stones — A sharp tool is a safe tool, and sharpening revolves around a good set of honing stones. Thousands of dollars of quality hand tools are useless without a sharp edge, so take the time to learn and practice the craft of honing an edge.

4 Belt Sander — Everyone has a random orbit sander and a hand sanding block, and these two approaches to sanding take care of a lot of sanding tasks, though I find a belt sander comes in really handy before I reach for my ROS. When the wood is rough, and some serious smoothing is needed, using a belt sander is a cost-effective approach for a small shop.

5 Apron — I put on my shop apron right after I turn the lights on; that's how important it is to me. Sure, it helps keep the dust off me, and protects me and my clothing from lots of minor bumps and spills, but the main advantage is not having to constantly search for the items (pencil, tape measure, 6" rule, utility knife, chalk) I keep in it.



6 Dust Respirator — Shop safety is of critical importance to me, but many woodworkers and DIYers overlook a simple respirator to protect their lungs from the carcinogenic fine dust we almost all create in dangerous levels. A second mask for vapors should also be used if you do any spray finishing.

7 12" Thickness Planer — We're a spoiled bunch, and we don't even realize it. Not long ago, dressing boards to thickness took a fair bit of time, and a decent amount of skill. Today, with the advent of affordable thickness planers, we all have the ability to remove large amounts of wood with speed and accuracy, all for a low price. You should thank your planer the next time you see it.

8 The Internet — We use the Internet for so many things, and we shouldn't forget about it the moment we head into the shop. So many technical questions can be answered by either surfing the web or asking a question on a woodworking forum. As with everything we read on the Internet, we have to be sure to get a second opinion if something doesn't seem right, but most people are helpful if you ask the right question.

9 Reading Material — Like the Internet, books and magazines can answer just about any question you have, as well as a bunch you didn't even know you had. Compared to even 50 years ago, there is an astonishing array of woodworking and home improvement titles available, and you can regularly refer to them down the road.

10 Fellow Woodworkers — If they have the knowledge, I find other woodworkers and DIYers enjoy sharing tips with others who have questions about materials, techniques, design and the like. There are times when we have really specific questions that can only be answered by someone who knows the intricacies of the subject.



ROB BROWN

rbrown@canadianwoodworking.com



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RELATED ARTICLES: *Assembly Tips (Oct/Nov 2018), Lumber Breakout Tips (Dec/Jan 2018)*



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Kenton Jeske

...on enjoying other people's work, quitting your day job and why design trumps material.

BY ROB BROWN



How long have you been building furniture?

I've been building furniture for 10 years, the last 3.5 years under my own name.

What sort of furniture do you specialize in?

I think transitional, a term I just heard, might describe my work. I use traditional elements with flowing lines and sculptural design.

Figured wood or straight grain?

I have no preference between figured or straight grained wood, but look to use each to their strengths in purpose and design aesthetic.

Inherited Vintage Stanley Sweetheart or fresh-out-of-the-box Veritas?

I've enjoyed tuned up old planes from others, but just have no time to do so myself...the robustness of the modern hand tool is pretty enviable and I love that many can be used straight out of the box.

Flowing curves or geometric shapes?

My work to date mostly consists of flowing curves and I enjoy their feel, but geometric shapes are introducing themselves and they seem to have a home in my portfolio as well.

Favourite wood?

My favourite wood the past few years is Cherry and it suits the work I have been doing superbly.

Least favourite wood?

I'm not a fan of hickory, and neither is my jointer.



Photos by Cory Johnn (Lead Photo by Mike Regehr)

Kenton Jeske, 36, www.kentonjeskewoodworker.ca

Location & size of studio –

Edmonton, Alberta, 650 sq ft

Education –

Northern Alberta Institute of Technology (N.A.I.T) – Millwork & Carpentry Certificate

quotes

My shop, like so many of us out there, is a converted home garage. At 650 sq ft it is as big as I need/enjoy. I have done 10' dining tables in there without having to disrupt the placement of machines or my setup, so it's all about a minimalist collection of tools and machinery. I have reorganized the shop nearly a dozen times over ten years and probably will again very soon. There's always another square inch to recover!



One of my favourite tasks is carving out seats. I use a scorp, travisher and spoke-shave to sculpt the seats and it's the best time ever.



One piece of design advice I would offer to anyone, including one I remind myself of, is to enjoy yourself.



Nearly all of my work comes through word of mouth. The Alberta Craft Council galleries in Edmonton and Calgary show and sell select pieces, and those few dear souls that find me online fill out the rest of my sales.



Canadian designer Stephen Harris has inspired me. His imbuya dining chairs and table for Alexander Wandich are stunning.

Two American makers that I really enjoy following on Instagram are Evan Berding and Dean Pulver.



I love other people's work because it isn't mine, nor would I have thought of it. I like David Haig's signature rocking chair, or Yuri Kobayashi's Sui table, any of Dean Pulvers' chairs...the list goes on, one last one...literally any piece from Adrian McCurdy.



The initial and arguably most significant influences on my work have come from the trifecta of Maloof, Nakashima and Esherick. As I progress it's Krenov to David Ebner, Gary Knox Bennett to John Makepeace and lots in between.



Design comes first for me, the material second. The material is not overly precious to me. I don't need to sit with it for long to see how to use it. I think I use it well and to its appropriate benefit both structurally and aesthetically, always learning and watching.



I do look forward to getting past the design specs and into the shop. I am not a slave to the specs, but they take care to keep me on track.



Bell Chamber Table – Crafted for Louis Vuitton in Edmonton, this piece was originally designed with three arcing legs for a private client, but when Louis Vuitton requested that design for their boutique store here in Edmonton, Jeske adapted the earlier design to more closely resemble the dome of a bell chamber.

Being a woodworker is my identity. That will prove to be a problem one day, but for now I have all my eggs in that basket, for better or worse.



My most ardently stressed piece of advice to aspiring woodworkers is don't quit your day job; you'll need it! If your drive and passion and skill are going to take you somewhere then eventually you will be spit out of all other options. Until then the struggle is; the craft is calling and how will you respond.



I'm probably most proud of the work I have done with my Borderline pieces. The Borderline pieces consist, thus far, of a bench, button stool and step stool. They feature a stepped boundary line that divides the painted surface and the finely finished natural wood. That borderline is a detail that requires exactitude at the joints.



Craft is a process not a destination. We learn by doing and doing requires repetition.



ROB BROWN

rbrown@canadianwoodworking.com



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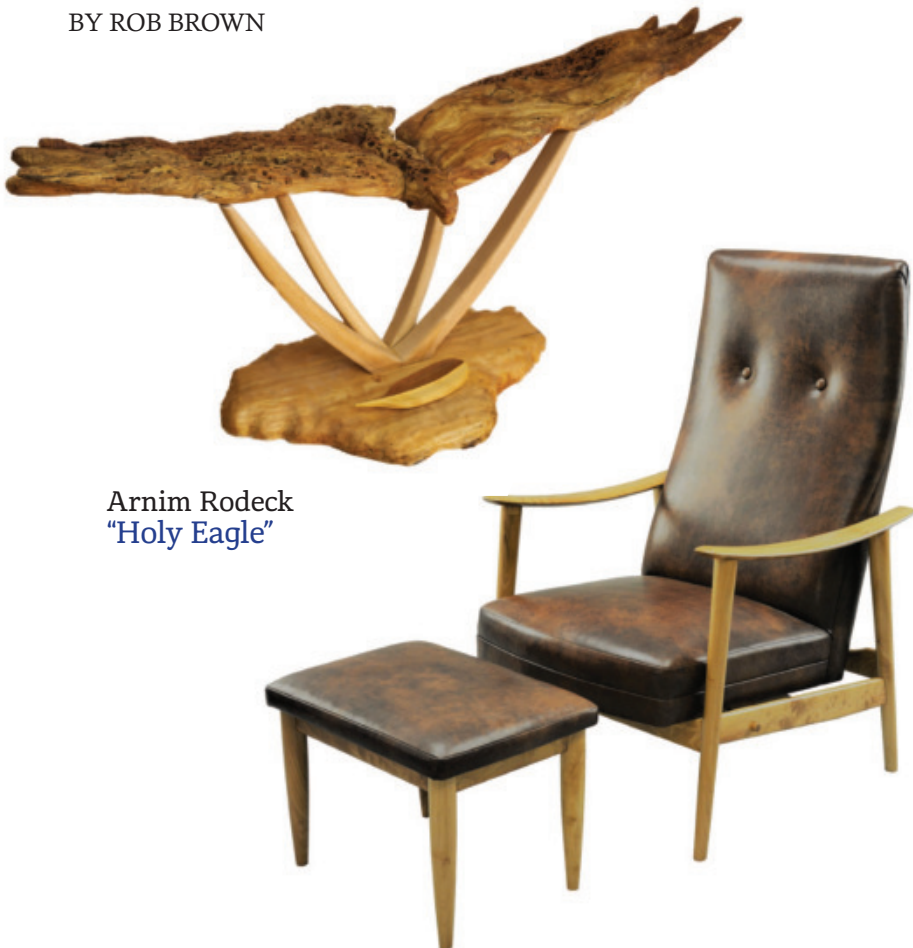
RELATED ARTICLES: Konrad Sauer (Aug/Sept 2015), Jacques Breau (June/July 2015)

OneTree

2019 Exhibition

After a lot of success with the oneTree 2015 and oneTree 2017 exhibitions, oneTree 2019 proved to be an even bigger success. Over 70 wood artists came together to design and build pieces of furniture, woodwork and art from a single 200-year old tree that was recently felled. Here's a look at just a few of the pieces that were showcased at the Robert Bateman Centre in Victoria, B.C.

BY ROB BROWN



Arnim Rodeck
"Holy Eagle"



Dallas Gara
Sculpted Maple Rocking Chair



Geoff Burton
Breakfast in Bed

Curtis Neufeld
Milino Lounger



Jacob Humphrey
Pacifica Humidor

Jesse Toso
Mariel #2



Marc deMontigny
Island Living

Steve Doreen
West Coast
Guitar

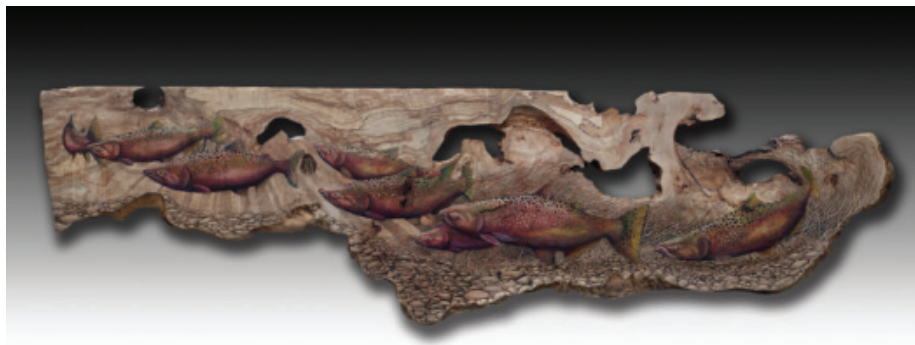


Randy Mugford
Alaria Console





Steve Neil
The Polygon
Cabinet



Sue Pyper
Coming Home



Wyatt Wilkie
Lyre Mandolin



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ROB BROWN

rbrown@canadianwoodworking.com

Build a NOOK FOR YOUR CAT

Photos by Rob Brown. Illustration by Len Churchill

Cats love lounging in cozy, warm places around your home. Rather than have an ugly cardboard box laying around, build this nook for your cat that even doubles as a piece of wall art.

BY ROB BROWN

Cats and kids both love small spaces. We've always got at least a few cardboard boxes around the house for our two cats, which I'm always tripping over. I thought a better solution would be to make something that was not only fixed to the wall, but something that looked interesting. A cat nook was the perfect combination of human safety and cat friendly; the fact that I could finish it with bright colours was strictly a bonus.

Rather than a square, which would have been a lot easier to build, I opted for the less common pentagon. It's a shape you rarely see, and one I was drawn to right away. I used 5/8" Baltic birch plywood for the boxes, and added solid maple edging to the front of the boxes. You could even experiment with making many more pentagonal boxes, or building other flat roosts or vertical polls and steps for your cats to climb.

Our cats are small at about 8 lb each. They fit in the boxes without too much extra room, but a medium or large cat may have trouble. Adding an inch or two to each of the side panels of each box might be a smart move on your part.

Cut the parts to size

I ripped a couple of strips of plywood to 11-1/2" wide × about 45" long, then squared one end and crosscut five parts from each strip. If you're making a larger box you'll have to start with larger initial pieces.

With all of the pieces identical, you can set up your table saw to bevel the mating edges of the parts. I wrote an entire article on the process of doing this operation in a previous issue. Check out the



Bevelling the Edges – There are a number of ways to bevel sheet good edges, but Brown likes this method best, as it will bevel any edge with only one setup.



All Wrapped Up – With the masking tape holding the parts together, and glue applied to the joints, Brown wraps the parts together and tapes the final edge tight.

'Online Info' box at the end of this article for where you can find that article. This technique allows you to bevel each side of these parts with only one setup, making a consistent joint. The bevel will have to be cut at a 36° angle to end up with a pentagon.

Wrap it up

Once all of the parts are bevelled, sand the inner faces of the parts, then lay them side-by-side and face down on a flat surface.

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Mitre the Headers – The solid wood headers that surround the outside of each box can be mitred at the table saw.

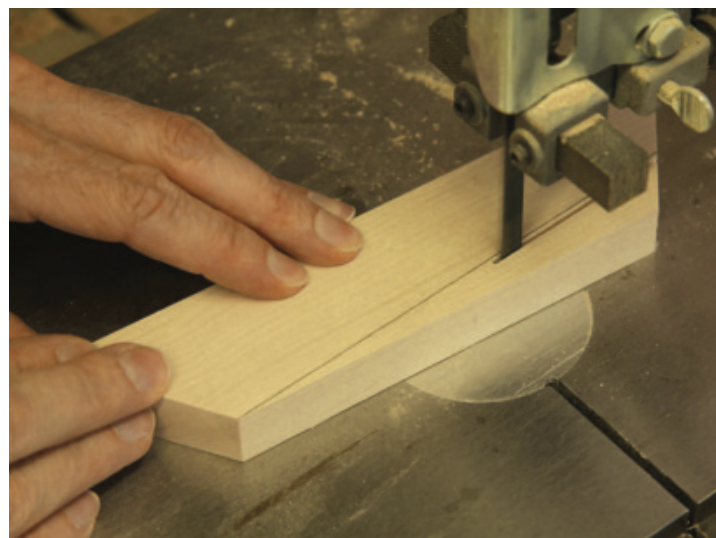


Angled Headers – The inside edges of the transitional headers have to be cut on an angle so both of their ends line up with the mating headers. Here, Brown marks the location of one end so he can use a straight edge to connect that point to the inner edge on the other end of the header.

Align their edges so the points of the bevels are ever so slightly touching each other, stretch masking tape across the joints, and wrap the five parts together to check the fit. Unwrap the parts, leaving the tape in place. Apply glue to the joints and wrap the parts together one final time, before applying masking tape across the final joint. Check the assembly is glued up evenly and allow it to dry. Repeat for the remaining pentagonal boxes, if you're making more than one.

Solid headers

I ripped two lengths of solid maple to rough width and dressed them to 3/4" thick to make the solid wood headers. It would have been easier to keep all the headers straight on both sides, but I opted for 1" wide strips on the top edges of the opening, and 1-3/4" wide strips on the bottom edges of the opening. The tricky part was the pieces that transitioned between the top and bottom were tapered to meet evenly with both mating pieces. I thought this might help stop my cats from falling out of the nook, and it might also look good.



Trim the Waste – With the line drawn, a bandsaw can remove the waste, before using a hand plane to smooth and adjust the edge so it lines up perfectly.



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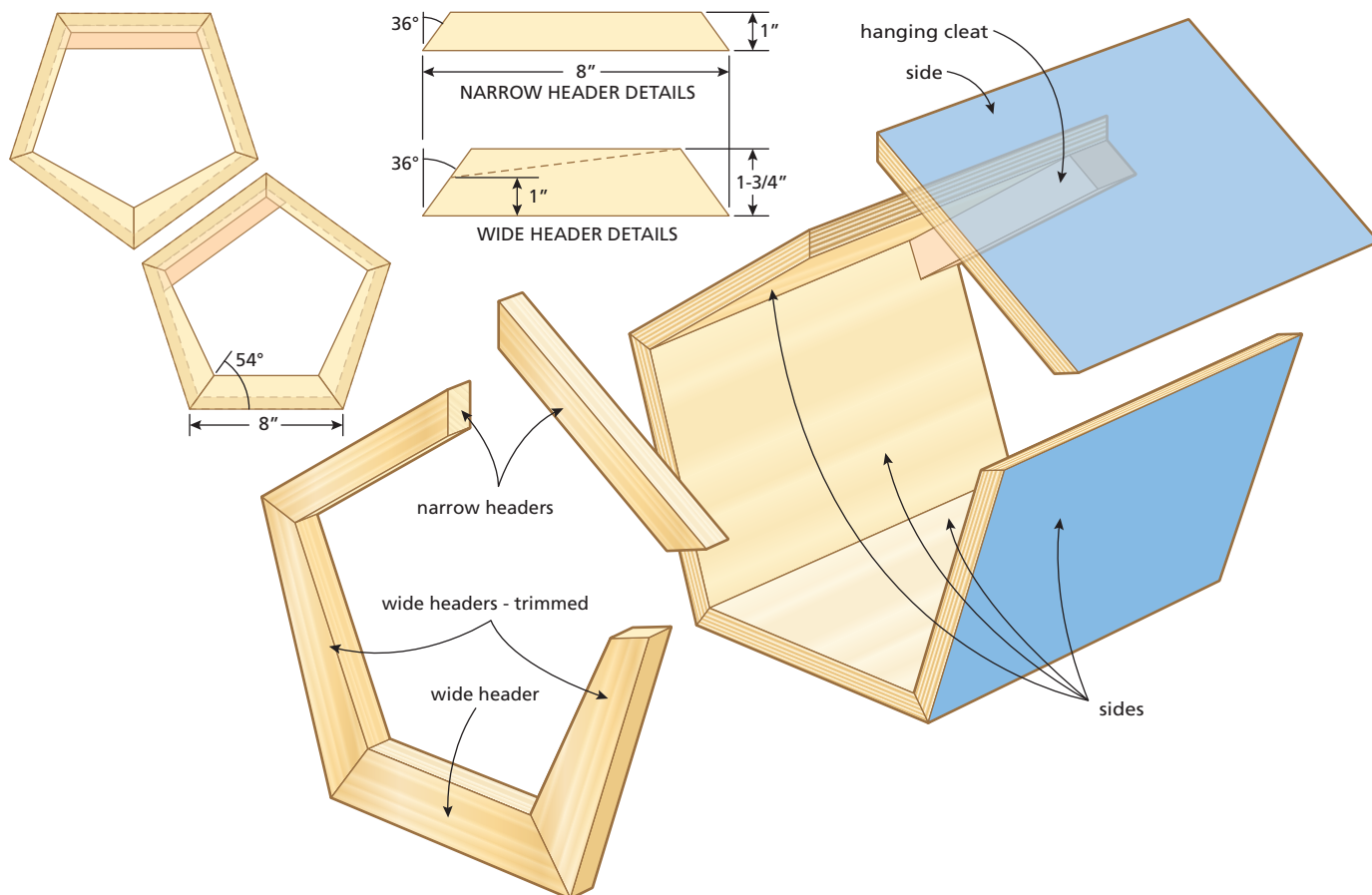
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With the two lengths ripped to 1-3/4" wide I started on the lower pieces. I cut those joints to 36°, numbered them, and clamped them in place temporarily so I could butt the mating parts against the first part. I ripped the upper parts to their finished width of 1" before mitering them. I marked the transitional pieces on an angle, removed the waste on a bandsaw and hand planed them so their inside edges met nicely with the mating parts.

During the process of cutting the angles on the header ends I had

to shim a few of the parts to make their angles meet better. I guess I didn't glue up the pentagons perfectly even. I made all the angled cuts with a mitre gauge on my table saw. With a thin strip of wood placed between the workpiece and the mitre gauge I could adjust the angle of the workpiece slightly and fine-tune the cut.

With all of the parts cut and still clamped in place I unclamped one part, applied some glue to the joint and clamped it back in place, before moving on to the other parts. I aimed for

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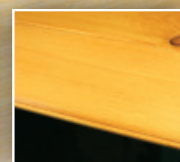
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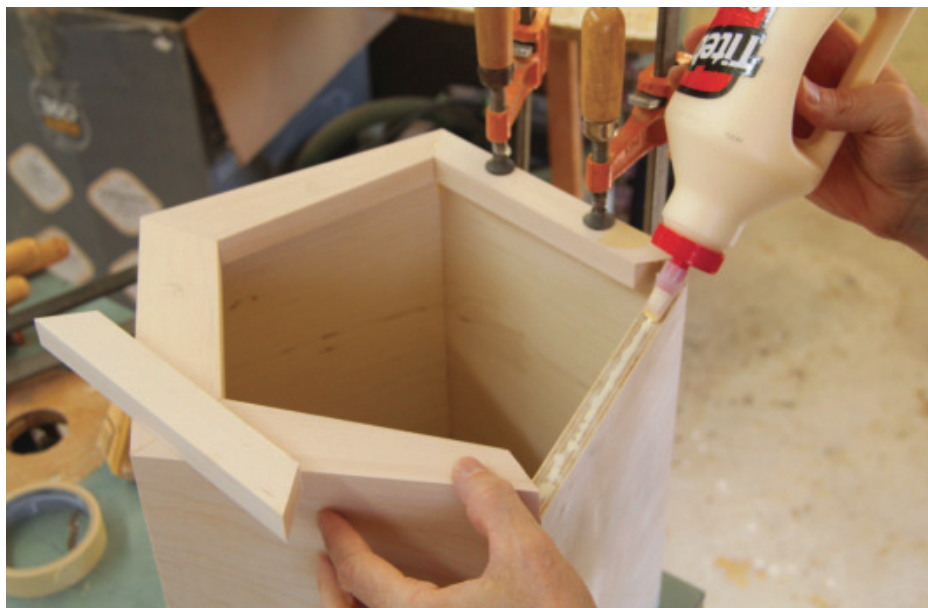


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Materials List

Part	Qty	T	W	L	Material
Sides	10	5/8	11-1/2	8	Baltic birch plywood
Narrow Header	5	3/4	1	To Fit	Maple
Wider Header	5	3/4	1-3/4	To Fit	Maple
Hanging Cleat	2	3/4	1	To Fit	Maple



Glue Them Down – Once all the parts are cut to size you can glue and clamp them in place.

a flush fit around the exterior perimeter of the boxes, but erred on the side of leaving a small amount of overhang that could be trimmed and sanded off to create a flush joint.

Flush it up

Once the glue had dried I used a router with a flush trim bit to remove the small amount of overhang a few of the pieces had. I then sanded the parts flush and

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Smooth Faces – A random orbit sander takes care of sanding the outer surfaces of the boxes.



Add a Bold Colour – Final colour choice is a personal preference, but Brown opted for something bold and fun. It will also turn out to be a bit of an art piece in his home.



Chamfer the Edges – To create a smooth, clean transition between the painted surface and the header's raw wood, Brown takes a few passes with his block plane. Any overspray was removed at this point.

smoothed all of the surfaces. I added a bit of filler to any small voids in the plywood so the colourful finishes would have a smooth surface to coat.

Add some colour

I left the outer perimeter edges of the solid wood headers crisp and square until after the spray paint was applied. This allowed me to not worry about any small amounts of paint that got onto the face of the headers, as I could use a block plane to bevel the edges and create a clean transition.

With the box positioned with the solid wood headers downward on a flat surface, and newsprint underneath the box, I sprayed the outer faces. I used a piece of scrap to reduce any overspray at the top of the box. I used two light coats of Rustoleum's Painter's Touch Ultra Coverage 2X to give the outer surface a bold look, and the coverage was excellent.

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Steel City Portable Edgebander Kit

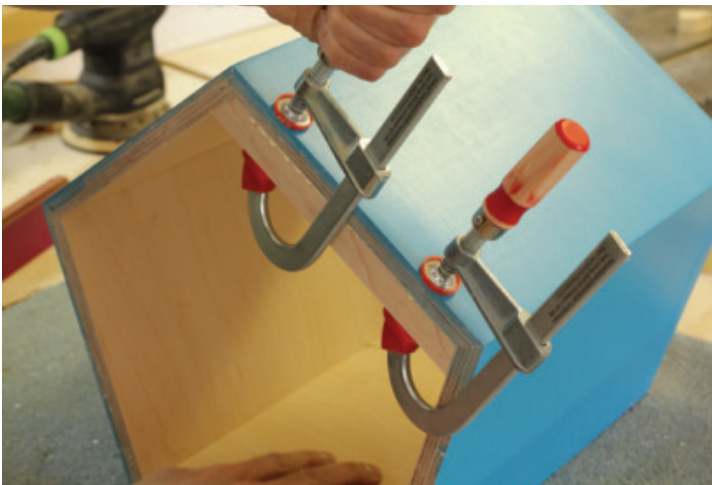
Sponsored: Applying edging to straight and curved edges has always been a challenge, but Steel City have introduced a portable 110V edgebander (#60-410) that does just about everything a small production shop could ever need. It will even apply edging to edges bevelled from 75° to 90°. Variable feed speed, digital temperature control, quick heat-up time and virtual weightless operation allows this edgebander to easily be operated by a single operator. Its portability even allows it to be transported to the jobsite with ease. The complete set includes portable edge bander, edge trimmer, end cut-off guillotine, vacuum clamping set, glue and carry cases. Visit SteelCityMachines.ca for more information.



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Hanging Cleat – The hanging cleat should be glued to one of the sides so the assembly can be hung on the wall once it's done.

Once the finish was dry I chamfered the outer edges of the headers to reduce any sharpness, as well as create a clean transition between the coloured surface and the natural maple.

Hanging cleat

At this stage I had to make sure the two parts of my cat nook were rotated the correct way, with the thicker headers towards the bottom of each section. This helped me figure out where the hanging cleats should go.

In order to fix this cat nook to the wall I glued on two solid maple cleats to the inner, rear surface of each box. I mitred the ends to fit nicely between the sides. I glued one cleat to the top of the upper box, but glued the second cleat to the edge that would end up directly below the first cleat so two screw clearance holes would be aligned directly above and below each other, and with one wall stud.

Apply a second finish

I used a water-based spray polyurethane to coat the inner surfaces of each box, as well as the solid wood headers.

Installation

With the cleats dry I determined where the screw clearance holes needed to go in order to fix the two halves of this project together. I drilled the screw clearance holes in the lower piece so they would be much less visible. I then brought the two halves together and drove home four screws to hold the two halves together.

I used a framing square to locate a pair of holes, one in each hanging cleat. I put one edge of the square against the top edge of the nook, as it was going to be horizontal when the cat nook was in place on the wall.

Unless you have other structures to allow your cats to access this nook, it will have to be placed fairly close to the ground so they can get into it.

All that was left now was to locate a stud, use a few long screws to secure the cat nook to the wall, and get my cats comfortable with getting into the nook. It strangely took a little while, but after a few cat treats were put into the back of each opening they acted accordingly and hopped in.



Clear Coat – Brown applied a couple of clear coats to the inner surfaces of the boxes, as well as the solid headers.



ROB BROWN

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HOW TO REPLACE AN OLD WINDOW

Upgrading an old window can be a great way to improve the look of your home, and help keep heating and cooling bills down.



Rough and Worn – An old, weathered window not only looks awful, it allows water and cold air to enter your home. Sometimes it's just a matter of some fresh paint, but often it's a situation where replacing your windows is the only option.

BY NICK REAUME

For this project, we had two identical window openings with old Pearson-style sliding windows that needed upgrading. The first step was to decide on what they would be replaced with, and we settled on a basic white vinyl framed window from North Star.

The next step, and perhaps the most critical step, was to order the correct size of window. As a full-time builder and renovator, I have seen many times how costly it can be when a mistake is made at this stage. In our case, the new window size was determined by the existing J-trim of the exterior siding that bordered the old window frame. We did not want to change the siding detail at all, so the windows were measured such that the new brick mould would fit nicely inside the existing J-trim. Additionally, some



Get it Out – Removing any screws, and using a reciprocating saw to cut through any nails, is a good place to start when it comes to removing a window.

newer windows had already been installed on other parts of the house, so we also wanted to match the detail of these other windows. To accomplish this, we simply subtracted 1/4" from the height and width of the J-trim opening and ordered the windows based on the outside dimensions of the brick mould. This gave us 1/8" all the way around the perimeter of the window. This is not necessarily the most common method to size new windows, but it was the most effective for this installation.

Out with the old

Once the new windows arrived, it was time for demolition. There are several types of windows out there, so different amounts and methods of demolition may be required depending on what you are starting with and how the new window is being finished. In our case, the entire window frame needed to be



Pesky Nails – Ensure all nails and other debris that may cause the new window to not sit properly in the opening are removed. Now is also a good time to check for any rotten framing members, and replace them.

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A Foot to Stand On – Shims under the two outer corners of the window, as well as shims under the center of a larger window, will start to level the window in the opening.



Remove a Strip – The new window very likely has a removeable strip of vinyl that can now come out (left). Screws can be driven behind this strip, then it can be put back into position to hide any screw heads (right).



removed so we would have a large enough rough opening.

First, the individual panes of glass were removed (as is the style of older Pearson-style sliding windows). Next, the wood frame was removed by using a reciprocating saw to cut the nails between the window frame and the rough opening framing. Note that in some cases it may be possible to simply back out the screws that hold the window frame in place, but being an older window,

our frame was fastened in with hand nails. It may also be necessary to cut the window frame itself in one or more spots with a reciprocating saw to be able to remove one side of the frame at a time.

When all of the necessary wood and nails were removed, the rough opening was thoroughly cleaned with a shop vac along all sides.

In with the new

With the openings prepared, we were ready to install the new windows. These windows were not particularly large or heavy so they were easily managed by two people. Remove the screens from the windows and set them aside somewhere safe. Lift the window into place and have one person remain outside (to prevent it from falling out), and the other person should head inside to fasten it in place.

An important note about the installation here is that because we opted to have a window with brick mould, there was very little ability to plumb the window in the vertical plane of the wall. It is important that your wall is plumb if this type of installation is used. Also, by using brick mould in this way, it's impossible for your window to tip inwards too far because the brick mould will contact the surface of the wall and not fall all the way through the rough opening. This can be helpful if both people are needed to lift the window without needing someone inside to catch it (assuming it was measured right).



Another Removable Strip – It may be possible to remove a wide strip across the lower section of the new window in order to hide a few screws behind it. If you're careful taking it off nobody will ever know it was ever removed.

Start with shims

The most common way of fastening a window in place is by using shims and screws. Normally cedar shims are just fine, but in some cases composite shims may be required. Start by shimming underneath the bottom of the window. Our windows were small enough that shims were only needed in each bottom corner, but larger windows may need a support shim in one or more spots along the bottom. Shim the bottom corners until the sill is level and the gap between the window frame and rough opening is the same across the top and bottom. If you are working with a rough opening that is out of square, or out of level, this may not be possible and you will have to get these measurements as close as you can. In most installations, this gap is nominally 1/2". The window is usually ordered such that the frame is 1" smaller than the rough opening in both directions, leaving you with 1/2" on each side, but the perfect rough opening does not always exist.

Next, place shims along the bottom left and right hand side of the window, again, trying to achieve the same size gap on each side. Push shims until they are snug and don't fall out, but do not force shims in too much as they can distort the window frame. Continue to place shims in the upper left and right hand corners, again trying to maintain equal spacing on both sides.

For the windows in this installation, shims were not needed across the top. On larger windows, when the top is likely to



Add Some Foam – Proper window foam will go a long way to keeping cold air out, and will also assist with keeping the window positioned where it is. Once cured, it's surprisingly strong.



First Line of Defense – A quality exterior-grade caulking will last a long time, and is the first line of defense in keeping the elements out of your home.

sag under its own weight, it may be necessary to fasten the window frame to the wood framing and you therefore will need to shim at these points to prevent the window frame from being bowed.

When the shims have all been installed, double check that the window is plumb, level and straight. The longer a window dimension is, the more easily it can be bowed. It might read level from corner to corner, but have a sag in the middle that needs correcting. Always use the longest level possible for any given side for best accuracy.

Screws are next

To fasten the window frame to the rough opening, it is usually necessary to temporarily remove a piece of the vinyl frame to get a screw in a position where the head will not be visible. In some cases, this is not possible and the screw must be counter-sunk through the frame and a proper size plug is used afterwards to fill the hole. This is often the case for casement windows.

For our installation however, two small vinyl plates in the upper two corners were easily removed and a yellow 3", #8 Robertson screw was used in each upper corner. Just before the screws are driven, have the person on the outside apply firm pressure to the window frame so that the brick mould is making solid contact with the wall surface. Do not over tighten the screws when installing. With shims holding everything in place it is unlikely that

any part of the window will distort, but you only to drive them until they are snug.

The same screws were used in the bottom corners as well, but a longer vertical piece of the vinyl frame needed to be removed in order to access the bottom corners of the window frame and drive a screw. In total, four screws were used to fasten each window in place. Once more, the window was checked for plumb, level and straight, and we confirmed the spacing between the frame and the rough opening all the way around. I also made sure the window operated properly. Note that this method may not work on all vinyl windows, or for other window frames made from different materials (i.e. wood or fibreglass). Contact the window manufacturer for installation questions about your particular window.

Expanding foam

At this point, it's appropriate to apply expanding foam around the outside of the window. I generally like to foam across the bottom first, then both sides, and the top last. Use window and door approved spray foam. Other types of expanding foam, such as big gap/crack filler, can expand too much and bend the window frame. Close and lock the window before applying any foam and leave the window this way until the foam is fully cured. When foaming, hold the nozzle close the brick mould, if there is enough room for it, so the foam expands all the way to the brick mould and you do not trap pockets of air.

The last detail of the installation to perform on the inside is to cut the shims and cured foam back flush with the window frame. The foam normally cures in a couple of hours, but sometimes it's necessary to leave it overnight. If it's still a little tacky when you try to cut it, just wait a little longer. There is no need to rush it and your knife blade will thank you.

Move to the outside

For completing the installation on the outside, it was simply necessary to apply a high quality caulking between the brick mould and the existing J-trim of the exterior siding. For this project, the type of caulking used was Supra by Mulco, which is available in a large assortment of colours.

NICK REAUME

reaume.nick@gmail.com



Nick is a licensed carpenter in Peterborough, Ontario and specializes in additions and renovations. He lives with wife and soon to be two children in a house with ongoing and incomplete renovations, in typical carpenter fashion.

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Reviews

Our staff writers review new tools and products on the market that are ideally suited to the woodworker and DIY'er.

Trend Air Stealth Respirator

Trend protects your lungs

Veritas Flushing Chisels

Veritas is flush with answers

Bessey EHK Trigger Clamps

Bessey's beast of a trigger clamp



(Photo by Trend)

Trend Air Stealth Respirator

I've been an ardent dust respirator user ever since I realized how hazardous wood dust can be. I've heard the complaints, mainly that they're uncomfortable and hot, but to me the upside is far greater than any downside. Sure, it would be more comfortable to not wear one, but I can honestly say I got used to a respirator fairly quickly, and have never looked back. And considering the protection they provide for my lungs, I think it's a no-brainer.

The Trend Air Stealth half mask respirator has been comfortable for me to wear for extended periods of time. The straps which



Adjustable

Strap – The strap holding the mask on the user's face is easily adjustable, though a keeper tab on the mask keeps it from adjusting on its own.

Three Air Valves –

Two air intake valves are located towards the center of the respirator, while the exhaust valve is at the bottom and points downward, virtually eliminating safety glass fogging.



hold it in place (one over the upper back portion of my head, and one with clasps that fits around the back of my neck) are fully adjustable, so you can get just the right amount of pressure.

Like any mask, it ever so slightly obscures a small amount of sight at the very bottom of my field of view. The only time I find this annoying is when I'm having trouble putting my pencil back into the dedicated upper pocket of my shop apron, and have to take a closer look.

The N100 filters remove virtually all (99.97% filter efficiency to 0.3 microns) of the wood dust before it reaches your lungs. The

filters can easily be replaced, ensuring long-term protection. I also never experienced a lack of oxygen while using the respirator, even when working at high intensities.

Wearing a respirator does take a bit of time to get used to, but if you decide you want to protect your lungs with a respirator, I think Trend's Air Stealth is a great option. After all, your lungs are for life, and you don't want wood dust harming them.

Trend Air Stealth Respirator

MSRP: \$42

Website: www.Trend-USA.com

Tester: Rob Brown

Veritas Flushing Chisels

There is something about making things flush. It's one of my favourite things to do in woodworking. While talking with a good friend about this, he remarked "that something" was a finality to a job, a pat on the back for the satisfaction of finishing.

The Veritas Flushing Chisels are made from PM-V11, Veritas' own steel alloy, and are available in four widths (1/2", 3/4", 1", 1-1/2"). I find the 1-1/2" chisel the most useful. They can be bought individually with a handle or as a set with one handle interchangeable between them. A single handle will do the trick as it's easily interchangeable between the different sizes. To keep everything together and safe, a tool roll specifically made for these chisels is also available. The blades are light but strong and are 1/8" thick with an overall length of just under 12" including the handle.

It took almost no time to get the blades sharp enough to put to work. A quick honing for the back on a 8000x stone, and since I'm not a fan of micro bevels, I sharpened the bevel working from 1000x through to 4000x and finally 8000x on Japanese water stones. Some manufacturers have come a long way in giving us a tool that is almost ready to work. This preparation would have taken at least half a day or more a number of years ago, however, I was up and running after only about 10 minutes. The overall feel of the chisel is very comfortable. They also look great. They're well balanced and you always feel like you are in control, especially with a good sharpening.

One of the first tasks I tried was flushing a dowel used to pin a mortise and tenon. Normally I would use a block plane for this, however, sometimes the blade would dig in and leave small marks. The flushing chisel worked really well here, even when I took deeper cuts. I've dedicated the thinnest of the chisels to flushing drill and screw holes in MDF. I make a lot of patterns using the man-made material and when you remove screws you have raised edges around the hole. If these aren't flushed then pieces won't sit flat against each other.

One other job I found these chisels excel in, is the traditional Japanese technique of Kumiko. I would normally use a 2" bevel-edge chisel and it would work fine. However, I find using the 1-1/2" flushing chisel much more comfortable as it is not as heavy and works really well at shaving the required angles using the jigs. The 25° bevel handles the end-grain in soft basswood with no issues.

Based on pattern maker's chisels, I think the widest and the



(Photo by Lee Valley)



A Nice Home – An available tool roll keeps properly-honed edges safe, and the chisels organized for their next use.



Flush it Up – Der-Garabedian enjoyed using the chisels for tasks like flushing up the pin that helps hold a mortise and tenon joint together.

narrowest will be of use to most woodworkers. These chisels act like pairing chisels, where smooth and controlled cuts are not an issue so long as you have a sharp edge. These are not your daily use bench chisels, but when you need to make things flush both cleanly and efficiently, you will definitely want to break them out.

Veritas Flushing Chisels

MSRP: \$289 (Four pc. set with handle; chisels can be purchased separately)

Website: www.LeeValley.com

Tester: Steven Der-Garabedian



(Photo by Bessey)

Bessey EHK Trigger Clamps

I love clamps. Even with a wall of likely 300 clamps I still dream of one day having enough of clamps to stop wanting more.

Most one-handed clamps are fairly weak and flimsy. Bessey's EHK series trigger clamps are not your average one-handed clamp. With three strengths (EHKM=100 lb. of clamping force, EHKL=300 lb. and EHKXL= 600 lb.) the EHKXL models are stronger than anything I've used before, and work flawlessly in many woodworking and DIY situations. I immediately noticed the bar is robust and stiff during use. The fit and finish is fantastic, and there are no sharp or rough points on the bar to scrape me during use. Even the handles are non-slip and comfortable to use.

The clamping action and rapid adjustment are both very smooth. And once you have the two clamping heads positioned where required you will notice the two hard rubber pads are oversized to disperse pressure.

The end clamping head is easily and quickly removed and repositioned to the opposite end of the bar with the press of a thumb. This will immediately turn the clamp into a spreading tool. Although I very rarely need this option, it's nice to know that in a clamping 'situation', when things go sideways, you can quickly reverse the clamping direction and dismantle an assembly.

I spent a lot of time using the EHKXL series clamps. I'm also impressed with Bessey's EHKL one-handed clamps. With a slightly narrower and thinner bar, marginally smaller clamping heads and a lower rated pressure of 300 lb. these at first seemed relatively tiny



Smooth and Strong – Quickly adjusting the clamping heads is easy and smooth once the trigger release is pulled. Also notice the clamping head pad, and how the addition of an extra tab on the back of it provides a larger, stable clamping surface.

to me. It wasn't until I used some of my older one-handed clamps that I realized that not only they weren't that small, but they were better than all of the other versions I've ever owned. They have all the great attributes of the larger versions, and are a joy to use in many different situations. In fact, if extreme strength in a one-handed clamp wasn't needed, these will be my go-to option from now on.

Bessey's EHK trigger clamps don't stop me from considering more clamp purchases, but they absolutely fill my desire for any more one-handed clamps. These are great clamps that work wonderfully in my shop.

Trend Bessey EHK Trigger Clamps

MSRP:

300 lb × 6" = \$24.49

300 lb × 36" = \$43.72

600 lb × 6" = \$35.00

600 lb × 50" = \$58.31

Website: www.Bessey.de/en-US

Tester: Rob Brown



Quick Switch – Once the button is depressed the end jaw can be removed and repositioned at the other end of the clamp bar. This quickly turns the clamp into a spreader, which is very handy.



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George Vondriska
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Measuring Tools



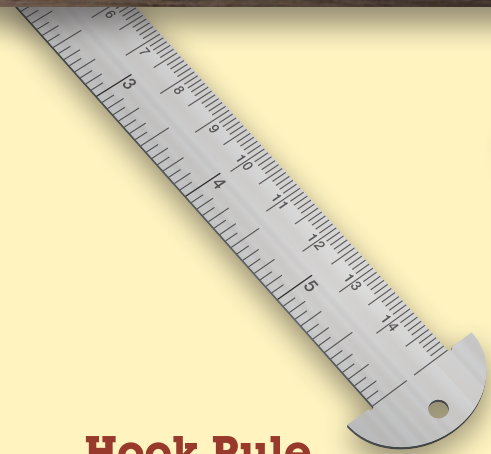
Tape Measure

Ranging in lengths from about 3' to over 25', a tape measure is the most popular measuring tool in a woodworking shop and DIYers tool box. Can measure inside and outside distances, as the hook on a tape measure automatically adjusts by the thickness of the hook to maintain accuracy. Available in metric, Imperial and a combination of both.



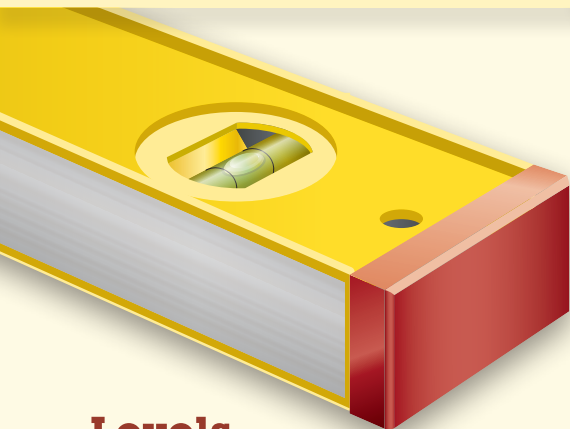
Rule

Generally used to measure the distance between two points, or to draw a line of a certain distance. Some rules are short enough to fit into an apron pocket (6"), while others are meant to be hung up (12" to 24"). Some rules have gradations on the ends, adding to their versatility. Available in metric, Imperial and a combination of both.



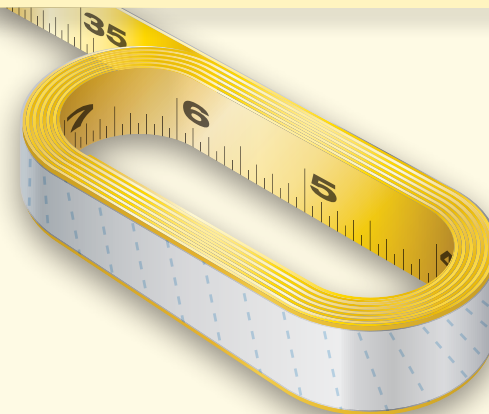
Hook Rule

Similar to a standard rule, but with a hook on either side of the rule's edge. This hook can be used to align the rule with the edge of a workpiece so the measurement is more accurate. Isn't a replacement for a standard rule, but is a great compliment. Many are available with metric measurements on one side and Imperial measurements on the other.



Levels

Though not often used for furniture making, a level is critical when doing most home improvement work. Different lengths are available, and having one short level and one longer level on hand is advisable.



Steel Jig Tapes

Mainly for use with jigs and fixtures, these tapes add an extra element of simplicity and accuracy to your work. The most common usage is on a shop-made mitre saw fence, though router tables, drill press tables and a wide variety of jigs could benefit from one of these tapes.



Digital Inclinometer

Allows you to measure the relative angle between two flat surfaces. Generally used for fine tuning machine setup to ensure initial accuracy, but is also great for accurately setting circular saw blade angles for precise cuts. Place the inclinometer on the main surface and zero it, then move it to the second surface to read the angle.

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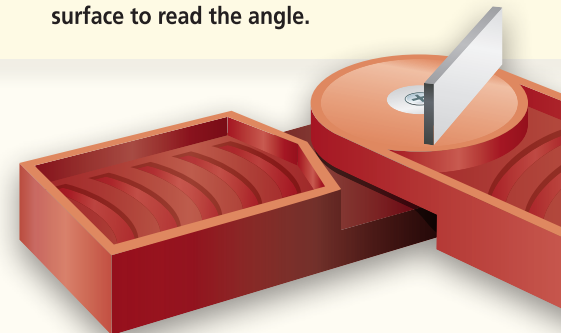
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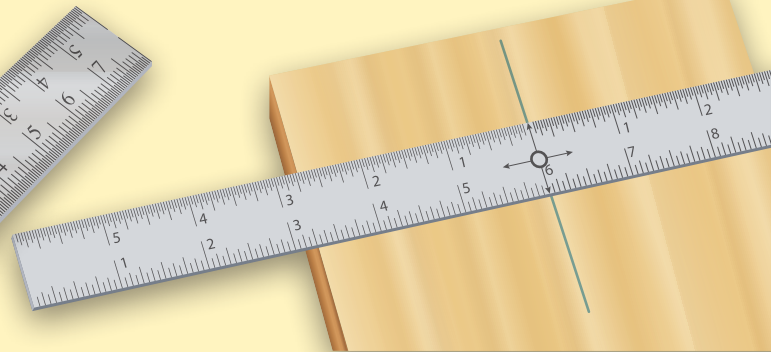
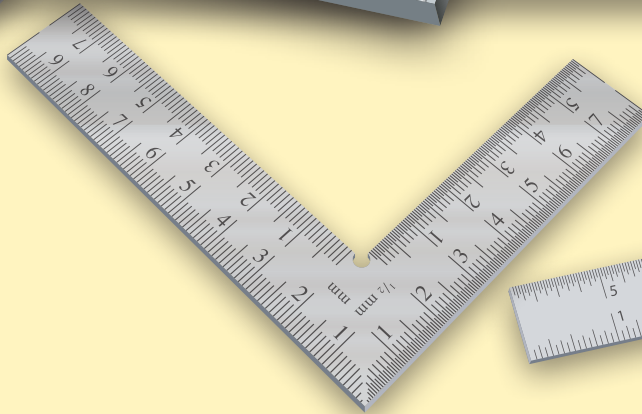
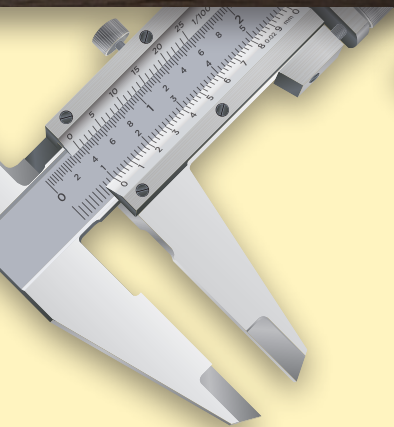
Angle Fix

For copying angles, generally to transfer that angle while using a mitre saw. As you adjust the angle of the arms a metal surface automatically bisects the angle, giving you something to reference off of.



From the editors of

CANADIAN Woodworking & HOME IMPROVEMENT



Vernier Calipers

Used when extreme accuracy is necessary. Available in pocket-sized or regular-sized formats, they measure inside distances, outside distances and have a depth gauge to measure cavity depths as well. Metric, Imperial and combination options available, as well as standard, dial or digital readout options.

6" Pocket Square

A multi-functional tool, these squares allow you to measure inside and outside distances, while also checking for square. Great for both general woodworking tasks and machine setup, due to the inherent level of accuracy. Available graduated in metric and Imperial.

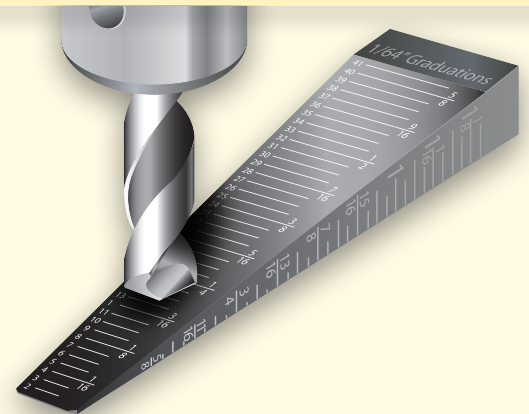
Center Point / Center-Finding Rules

Though they work slightly differently, they both do the same thing; allow you to quickly and accurately find the center of a board.



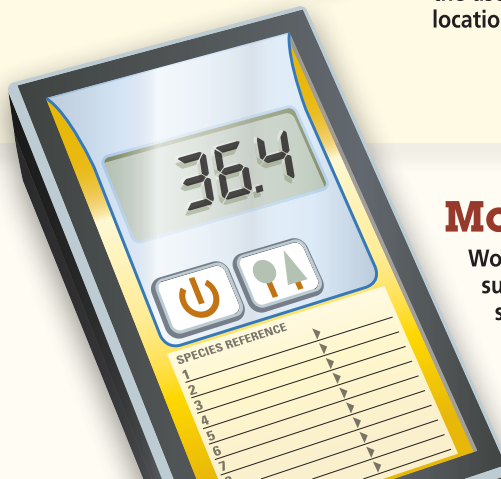
Inside / Outside Calipers

Mainly used while turning, these calipers will collectively measure virtually all inside and outside dimensions of a workpiece. You could also transfer dimensions to different workpieces. A small nut typically adjusts the opening of the tips.



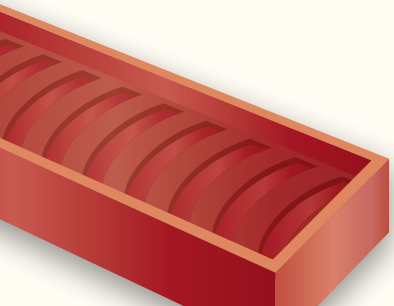
Tapered Gauges

When accuracy is paramount, a taper gauge might be the answer. By stretching a metric or Imperial scale over a longer distance a higher level of accuracy is available to the user. For setting router and drill bits, as well as fence locations.



Moisture Meter

Working with properly dried wood is critical to successful furniture making. A moisture meter will save the day when it comes to ensuring your solid wood is ready to work.



How to Create a **RIVER** **TABLE TOP**

River tables are all the rage these days, and for good reason. With lots of live edge lumber options, and a wide array of epoxy colours available, there are infinite options for how your river table top can look.

BY PAUL LEMISKI

With the flood gates open, pardon the pun, epoxy “river tables” are not only fun to create, but as a full-time woodworker, they’re also in demand from my clients right now. Maybe you’ve seen the viral videos of people pouring blue goo between two pieces of wood ending up with a beautiful table. I will cover all of the steps involved, so you can make one of these beautiful tops for yourself.

How big?

I’m usually working for a client so the size is already determined, but perhaps you’re building this with a size range in mind. Either way, we need some lumber. Using some cheap sheet goods I like to make a frame of the size of table I’d like to create to help me view the wood’s grain characteristics properly. I lay the lumber out how I like, then place the frame over the lumber, so I can visualize as close as possible what the end result will be. Covering up the unwanted wood makes this step a lot easier to get right.

Check your wood

With a good idea of what the general size of the future table top will be you can play around with the material you have to see if you can make it work. Sometimes, even though you want a top of a certain dimension, the material you have on hand doesn’t lend itself to that. Just ensure you can indeed obtain the solid wood parts needed before going ahead with the construction of your form.

Build the form

I like the KISS method, so let’s keep this simple. I like to use 3/4” particle board, and cover the surfaces that will touch epoxy with Tuck Tape sheathing tape, so the epoxy doesn’t stick to the form. The form is joined together with screws and latex caulking so it’s strong and will hold the liquid epoxy during the pour.

First, cut the bottom to size. I like to build the form about 1/2” wider and longer than the finished size of the river table top. This will give you some material to trim off after the epoxy has cured.



Cover it in Tape – Tuck Tape, a construction-grade adhesive tape, is applied to the inner surfaces of the form before the form is assembled. It will stop the epoxy from adhering to the form as it cures.



Seal the Joints – Because the joints all need to contain liquid epoxy, they need to be watertight. A healthy bead of caulking will help with this.



Mark the Lumber – Most lumber will need to be trimmed to size. Mark it with a straight edge, being sure the lumber will look good when matched with any other pieces you’re using, and will be sized appropriately.



Frame It – Lemiski will sometimes make a very simple frame the size he wants the table to finish at. He can then arrange the lumber on the ground or bench, put the frame on top of the lumber to get a good view of what the arrangement will look like, then trace the cut lines onto the lumber. This step can also take place before the form is built.

Trim it to Size – Carefully cutting the lumber to dimension will help you use less epoxy. The more curves there are in the edges of the lumber, the more volume the epoxy will have to fill.

Tape off the entire surface of the interior side of the bottom with the Tuck Tape.

Dealing with how to attach the sides to the base is personal preference. Because I make many of these table tops I keep a selection of form bottoms on hand so I don't waste time and material. If a piece is large enough to use as a bottom, I go ahead and cut the sides to fit on top of the bottom before securing them in place with screws and caulking. If I was just making one river table top, I would likely cut the bottom to size and attach the sides to the 3/4" wide edges of the bottom.

Next, cut your side pieces to length and width. You'll need them to be taller than the thickness of your lumber so epoxy doesn't overflow. Completely tape off these pieces, being careful to fully overlap



Minor Adjustments – Sometimes the lumber you're working with isn't perfect. Marking the material where it needs to be removed will allow you to coax a more pleasing design from the material you have on hand.



Shape the Wood – Often the wood you have will work nicely, but that's not always the case. Some rough machining will go a long way to providing you with a visually pleasing 'river' of epoxy. Here, Lemiski is using an angle grinder to remove some material.



Place it Inside – With the form complete, and the material cut to size, fit the material into the form to ensure it fits. Here, a piece of lumber Lemiski wants to use has broke in two, but the wood's fibers will fit together nicely, and a very small amount of epoxy will get into the joint to add some strength



Keep it Down – In order to keep the lumber from floating once the epoxy has been poured into the form Lemiski clamps a piece of wood across the top of the lumber. He also adds a pair of small scrap blocks between the lumber and the clamped piece of wood so the epoxy doesn't adhere that piece to the table top.

the seams and lay the tape down nice and smooth. Any bumps in the tape now can make more work later on. Place a bead of latex caulking along the edge and screw the pieces in place. I like to be liberal with the sealer as this form needs to be water tight. You could pour about one hour after you seal the form, but I suggest waiting overnight just to be sure.

Prepare the solid wood

Depending on where you get your lumber, it may be surfaced flat or it may still be in rough form. Either way, you want to have your lumber surfaced flat and cut to size to be able to fit into the mould.

Epoxy Sources

Slow-setting epoxy can be purchased at many locations across Canada. Although it's possible to use fast-setting epoxy to make river tables with very small gaps, we're leaving it out of the sources, as that wasn't the focus of this article. The techniques to make a river table with fast-setting epoxy differ from using the slow-setting method discussed here.

A&M – West System Epoxy, EcoPoxy

Atlas – EcoPoxy

Exotic Woods – Epoxy, West Systems, and their own "Exotic Woods Thick Pour Epoxy"

KJP – EcoPoxy

KMS – EcoPoxy

LeeValley – West System Epoxy

Woodchuckers – West System Epoxy, EcoPoxy, Entropy Resins

Woodshed Lumber – West Systems



Photo: EcoPoxy

With the size of the form cavity in mind, draw layout lines onto the lumber. Once you're sure of the locations that you will cut the lumber, trim the parts so they all fit nicely together in the form, with the all-important gap for the epoxy to flow into.

I suggest removing all the bark and loose debris. This can be done by sanding it smooth, or using a wire brush. There's a chance you'll even have to use an angle grinder with a power carving wheel, or some hand tools, to ensure the live edges of the material look natural when brought together. If you happen to have a sand blaster you can fill it with crushed walnut shells. This works incredibly well for very burly edges.

To seal, or not to seal?

If you're going to be doing a pour that is clear or very transparent, it's a good idea to seal any surfaces of the lumber that will be adhered to the epoxy in the final table top. Without doing so bubbles get released from the solid wood during the curing process, and are visible in the final product. When using pigments the seal coat is not really needed, as the micro bubbles won't be visible. I chose not to seal the solid wood because I went with a pigmented epoxy pour. For the table I'm working on here I would have sealed the two long grain live edges before doing the main pour, if I wasn't using pigmented epoxy. You



A Thorough Mix – A drill and a paint mixer does a good job of mixing up the epoxy. It's critical to ensure the epoxy is completely mixed or parts won't dry.



Flood the Form – Once mixed, pour the epoxy into the form and let it flow out. There's no reason to rush at this stage, as epoxy dries very slowly.

can use the same epoxy mix as you will use for the main pour, but since you'll have to wait a fairly long time for that epoxy to harden up enough before you can do the main pour, things get very tricky, timing-wise.

Instead, use a 20-60 pot life epoxy, which will usually harden in 24 hours, but don't wait that long before continuing with the pour. You should do your main casting pour when the sealing epoxy is about half cured, which is typically about 6-10 hours. I often seal first thing in the morning and pour in the evening.

Calculate the volume of epoxy

Finally, let's get the lumber into the form. First make sure the form is level and well supported. Epoxy is heavy and a form that isn't fully supported can sag, leading to more work down the road and a thinner table top. Gently place your pieces in the form, being careful to not bump the edges. Remember, this form must be water tight to work.

Now you need to know how much epoxy to pour. To do this you

have to estimate as close as possible how much volume there is in the empty space between the two slabs. Use the formula $\text{Length (m)} \times \text{Width (m)} \times \text{thickness (mm)} = \text{Litres}$ to figure out the volume of the space. The length and thickness are both easy. It's the width that will need some calculating. My approach is to take many measurements across the gap, then average them out to figure out a distance to plug into the formula. It's a good idea to make a mark every few inches across the length of the gap so you can systematically find the average width. The gap in the table top I'm working on is 1.2192m long $\times$ 0.09398m wide $\times$ 50mm thick which came out to 5.8 liters of epoxy.

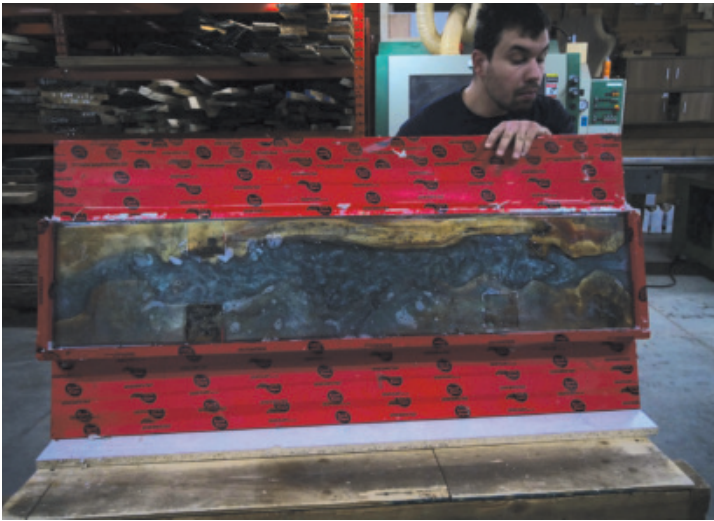
There are two ways of doing the pour. With the first approach you can pour just until the epoxy is level with the top surface. The benefit of doing this is that you will use less epoxy, and there will likely be less machining down the road to create a smooth top surface. The other method is to completely cover the entire surface of the wood about 1/16" thick. It can be beneficial to pour to a height above the top surface of the solid wood because if you

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Dismantle the Form – Once cured, you can start to remove the sides of the form, unscrewing them, and taping them out one at a time.



Machine Normally – Cured epoxy can be thickness planed and cut to size with a circular saw blade, like any regular piece of solid wood.

have lumber that's full of holes and cracks you can get it filled in a single pour. As the lumber is absorbing the epoxy the level will drop. If you are going to add extra epoxy over the lumber make sure to mix extra.

One last critical thing to take care of at this step is to hold the wood down because it floats. Either screw it through the form from underneath, or use some blocks and a thick piece of wood and clamp it down to your worktable.

Mixing the epoxy

Mixing and pouring the epoxy is where the fun starts. There are many types of thick pour epoxy products available. For this pour I'm using an epoxy designed for up to 2" in thickness. Follow the manufacturer's suggested instructions. In general, thick pour epoxy products are designed for different material thicknesses and volumes at 20 to 22° Celsius. Depending on your environment, you

EHK Trigger Clamps

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Sand it Smooth – Whether you're sanding solid wood or epoxy the same rules apply. Smooth, even passes, progressing through the grits, until the surface is ready for a finish. At this point, any air pockets can be roughed up and filled with epoxy to create an even surface for accepting a finish.

may have to have fans blowing, or air conditioning running. When the epoxy is curing I like to see the epoxy stay below 30° Celsius. There is certainly a learning curve when doing thick pour epoxy projects, but with each pour you'll have a little more understanding of exactly how epoxy reacts in your environment. There is certainly a learning curve when doing thick pour epoxy projects.

I mixed up the product in a 5 gallon bucket with a silicone drill mixer at 2:1 ratio by volume. Make sure to mix for 5-10 minutes and scrape the sides and bottom while you mix. To be extra safe you can transfer into a new pail, removing the chance of any unmixed product on the sides or bottom of the container.

Time to pour

Now let's pour. Don't be concerned about the bubbles and there's no need to rush. Thick pour epoxies have a long pot life up to 700 minutes and the low viscosity will let all the bubbles release on their own. Some may suggest to use a torch at this stage to remove surface bubbles, some do not. I've done both. It's pretty satisfying to do it with a torch, but it's also pretty cool to create a time lapse video of the curing process showing the bubble release and the tidal patterns the curing process creates.

Flatten and trim

The time it takes for epoxy to cure can vary from two days to seven days depending on the type of epoxy, volume and environment. Don't rush it at this stage. Once dry, you can remove it from the form. Start by removing the screws and tapping the sides off with a mallet. To remove the bottom, hammer in wedges to start the separation, and finally lift it away from the form. Once the epoxy is cured you can machine it just as you would solid wood. This gives you options to sand it flat with a hand sander, plane it flat using a power planer, surface with a router sled or CNC, or go straight through your drum or wide belt sander. Once I have the piece surfaced flat I trim it to size at the table saw or track saw. At this point you can apply your edge treatment if you would like.



Ease the Edges – Like wood, an accurately machined corner can be sharp. Ease them with abrasive paper to ensure a nice feel and safe usage.

Sanding and finishing

Sanding is done just as you would with a solid wood top, how high of a grit to sand to will be determined with the type of finish used. With a Rubio Monocoat oil finish I sand through to 220 grit, Osmo oil 320 grit, Odies oil 400+ grit. If you are into spray finishing then a 220 grit sand and your typical spraying process will work great. While going through the process you'll come across spots that you'll need to touch up. This can be done with a 5 or 20 minute epoxy, but remember if an epoxy is cured you need to rough up the surface for a good bond. CA glue is also an option because it is so viscous it can flow into spots that are hard to get epoxy into.

At this point your table top is complete, and you can turn your attention to the base. An approach like this can also be used for a kitchen counter top. Use your imagination when it comes to selecting and matching the two live edges and you will be rewarded with an aesthetically pleasing table top that will wow everyone who lays eyes on it.

PAUL LEMISKI
paul@legacylumber.co

Paul is the proud owner of Canadian Woodworks & Legacy Lumber. He creates lumber and furniture from urban salvaged trees and educates students from around the world in person or online.



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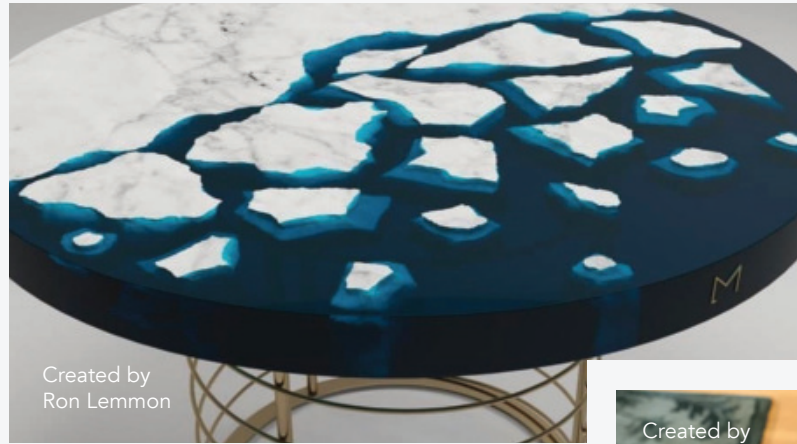
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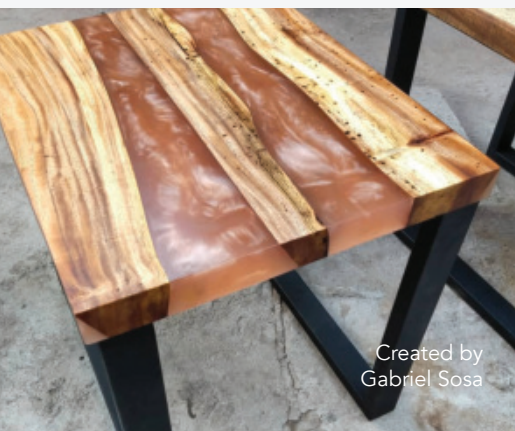
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What will **you** create?

A man with grey hair and glasses, wearing a plaid shirt, is painting a Windsor chair with red paint. The chair has a high, curved back and a wooden seat. The man is using a brush to apply the paint to the seat. The background shows a staircase and a window.

Continuous Arm Windsor Chair

Part Two

An ultimate woodworker's challenge – to make a Windsor chair by hand using traditional chairmaking techniques.



The "Steam Box" – A wallpaper steamer and ABS piping are used to construct a "steam box" for bending.

BY TONY PEIRCE

In our Feb/Mar 2020 issue Peirce detailed how to make the seat, make and install the legs and how to shape the continuous arm.

Steam bending the arm

My steamer is a 4" ABS pipe with a threaded end cap that is connected in the middle to a wallpaper steamer with a 3/4" flexible heat resistant tube. The outlet drains into a bucket of cold water to cool the steam and prevent condensation in my workshop. I've encased it in a wooden box for both insulation and esthetics. The continuous arm bending form is an arc 8-3/4" in radius, which is extended 1-1/4" at each end such that the second bend begins at 10". The form is mounted on the bench and the radius of the second bend is 3", which extends 10" below the bench.

To bend the continuous arm, I place it in the steamer for 30 minutes while the wood becomes "plasticized" as the lignin softens. Using insulated gloves, I then quickly transfer it to the bending form, hammer a wedge in the slot to hold it in place and slowly bend the arm to form the arc or bow. Wooden pegs are used to hold the first bend in place while I begin to slowly make the second bend in a downward direction. The arm rests are then tied off to "hitch posts" that are 1-1/2" high. The arm is then left in the form for two days to dry and harden.



Bending the Arm – The steamed arm is bent, tied off on the form and left to dry on the form for two days.



Gluing up Hand Blocks – Blocks are added and clamped to the outer edges of the arm rest that will be shaped into the hand rest.

The hands

I add 1/2"x 1-1/2" x 6" blocks to the end of the arm to create the hand rest. The outer edge of the arm rest and the blocks are joined, and the blocks are glued and clamped to the arm rest overnight to cure. The following day I rough out the shape of the hand rest with a coping saw and then round over and complete the process using a spokeshave.

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Splitting Spindle Blanks – Oak is rived to form spindle blanks using a froe.



Shaping Spindles – A draw knife is used to rough out the spindles.

Spindles

Wood for the spindles is rived into 1" blanks from a green wood blank 24" long. I use my bench and a froe to facilitate the process, followed by the drawknife to rough out the shape and a spoke-shave to fine tune the taper. A total of nine long spindles (23") and four short (12") spindles are required. Every chair maker developed their own style of spindles. Mine taper from 5/8" at the thick end to 7/16" at 10" and 3/8" at the end. A "go gauge" is used to measure the 5/8" diameter of the thicker end and the 7/16" diameter along the spindle. The short spindles have the same transition but at 5-1/2".

Drilling spindle mortises

Spindle mortises are drilled using a brace and a #9 (9/16") spoon bit. I mark off their positions by "walking" dividers set at 1-5/8" around the spindle platform and mark the mortise centers half way between the platform groove and the edge of the chair. I then lightly draw spindle sight lines on the seat from the center of the spindle mark to the center of the pommel, with the line for each of



Using a Go Gauge – A "go gauge" is used to measure the spindle diameter.

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Spindle Sight Lines – Sighting lines for the spindle mortises are lightly marked on the seat.



Drilling Spindle Mortises – Spindle mortises are drilled with a brace, a #9 spoon bit and a bevel square set at the appropriate angle on the spindle platform.

the eight long spindle mortises on each side of the center spindle being offset progressively by 1/8". Site lines for the short spindles are drawn from the mortise centers to the center edge at the back of the seat. I then drill the spindle mortises 1-1/4" deep at the following angles: center spindle and the two adjacent ones at 10°; the next two on each side at 12°; the following at 14°; and, the short spindle mortises at 14° and 19°. I drill using my bevel square on the spindle platform set at the appropriate angle.

Mounting the arm stumps

The arm stumps are affixed to the seat with a tapered mortise. Using the sight line that is from the center of the mortise to the back of the chair seat center line, a brace and tapered reamer, I ream the holes, taking care to stay true with the line and at the 24° angle drilled earlier. I use winding sticks and a bevel square to



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Aligning Arm Stumps – The arm stumps are aligned using winding sticks and a bevel gauge to ensure they have the same splay and rake. Slight adjustments are made with the tapered reamer until the alignment is correct.



Beading Tool – The beading tool is used to cut a 1/8" bead on each side of the front face of the bow.



Wedging Arm Stumps – Glue is applied to the arm stump mortise, the tenons are split using a chisel and then wedged in place.

check and align the arm stumps. The tenon should protrude around 1/2" from the bottom. Once all the spindle holes have been drilled and the arm stumps aligned, I glue the arm stumps in their mortises. I then turn the chair upside down, clamp it on the bench and then glue and wedge the stumps in place.

Completing the arm

Prior to mounting the arm, I finish shaping the hand rest with a spokeshave, scrape the arm and round over the edge with a rounding tool. The bow has a bead on each side of the face that is made using a beading tool. The beading tool consists of a flat head screw mounted 1/2" from the end of a handle and set so it cuts a 1/8" bead. Holding the handle, and with the bow clamped firmly on the bench, a bead is carved on each side of the bow face up until the transition to the armrest.

Mounting the arm

The arm stump mortises are drilled using a #7 (7/16") spoon bit 2-1/2" from the end of the hand rest. I clamp the hand rests

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on a scrap board firmly to the bench using hand screws. I set the bevel square at the same angle as the arm stumps (24°) and use the point of a second bevel square set in line with the center of the bow to create an imaginary sight line. Once drilled, the hand rests

Drilling Hand Rest Mortises – Mortises for the arm stumps are drilled using a brace and a #7 spoon bit. The hand rests are held in place on scrap wood with hand screws to prevent blow out.

ERIC PEREIRA WINS KING CANADA'S WORKSHOP GIVEAWAY

We are pleased to announce that Eric Pereira from North Gower, Ontario, is the winner of the **King Canada Workshop Giveaway**. The contest was sponsored by **King Canada**, Canada's leading distributor of wood-working machinery, tools, equipment and accessories. Eric is thrilled to upgrade his shop with over \$5000 of King Canada machinery, including a 10" Cabinet Table Saw, 6" x 48" and 9" Disc Sander, 14" Bandsaw with Resaw Guide, 13" Drill Press, and 1200 CFM Dust Collector.





Mounting the Arm – The hand rests are fitted to the arm stumps using a winding stick as a reference to measure from the top of the arm to behind where the arm stump enters the seat platform.

are mounted in a bench vise and reamed using the tapered reamer from the bottom towards the top at the same angle. The arm is then mounted on the arm stumps and, using a winding stick as a guide, I measure the height of the arm on each side from behind the seat post to the top of the arm. I continue to widen the mortises with the reamer until the arm sits at 10-1/2" above the spindle platform. I then find the center of the bow by inserting my straightest spindle in its mortise and visually adjusting it until the bow is symmetrical on each side and mark the center.

Drilling spindle mortises in the bow

The centers of the spindle mortises are marked on the arm 2-1/2" apart, with the exception of the outer long spindle mortise, which is 3-1/4" from its predecessor. I use a #11 veiner to dimple the arm at just over 2/3 of distance from the back to the front of the bow. This ensures that when drilling the mortises, the bit does not blow



Finding the Bow Center – A spindle is inserted in the center spindle mortise and aligned with the bow to find the "sweet spot" where it appears symmetrically centered in the bow.

out the back of the bow. I drill the center mortise holding the chair in place by stepping on the center stretcher and bracing the back of the bow against my leg. The spindle mortise sight line is from the dimple to the center of the spindle platform mortise. To help brace the bow while I drill, I take off the bow, insert the spindle in the arm, replace the arm on the stumps and push the center spindle into its seat mortise. I always start to drill at 90° relative to the surface of the bow and then "walk" the bit up until it is aligned with the seat mortise.



Drilling the Spindle Mortises – Spindle mortises are drilled in the bow using the seat platform mortises as sight lines.



Spindle Mortise Sight Line – Looking down through the center spindle mortise provides a view of the imaginary sight line used when drilling.



Drilling Outer Long Spindle Mortises – When drilling mortises, the bit must start at 90° relative to the surface of the bow. The drilling angle is then adjusted gradually until it lines up with the spindle platform mortise.



Aligning Short Spindles – The rear short spindles are placed in their mortises and aligned so they are equidistant from where the arm stump protrudes through the arm.

The rear short spindles are seated snugly in their mortises and aligned against the arm rest. Taking care that they are equidistant from the top of the arm stumps, I mark the position of the rear short spindle mortises and drill them out. The front mortises are drilled half way between where the arm stump protrudes and the back short spindle mortises.

Preparing the back for assembly

I disassemble the back once more and scrape the arm, paying particular attention to the bottom of the bow as it becomes inaccessible once all the spindles are in place. Following this I scrape and lightly sand all the spindles, taking care to round the ends over. The spindles are 5/8" in diameter at the bottom and the seat mortises

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were drilled at 9/16". To lock the spindles in the seat mortises, I shave away small grooves in the outer end using a #3 sweep veiner. I test fit each one in their mortises, and when completed I insert it in the bow until all the spindles are snugly in place. At this stage, it's important to examine the spindle platform for any marks that need to be addressed before final assembly.

Final assembly

I squirt glue in each of the seat spindle mortises and spread it out using a glue stick. Glue is applied to the end of the arm stump and the arm is mounted on the stumps. I push each spindle into the top of its mortise, use a 16-ounce hammer to drive the spindles home and clean up any glue squeeze-out with a wet rag. Using the hammer, I tap the bow firmly on each side of the center spindle, gradually adjusting the arc until it is symmetrical. I trim all the spindles and the arm stumps with a coping saw so 1/8" remains protruding. The ends are split with a chisel in the direction across the grain of the bow, wedges made with a draw knife, glue applied to them and they are driven home. I start by wedging the arm stumps, followed by the center spindle and the remaining spindles using a symmetrical approach so the bow doesn't shift. I allow the glue to set overnight before I trim the wedges using a flush cut saw, followed by a #3 sweep veiner. Finally, the bow, arm and hand rests are scraped and sanded lightly, paying particular attention to detail where the spindles and wedges intersect the bow.

Finishing

Historically speaking, Windsor chairs were usually painted with milk paint and a water repellant top coat was applied to the paint. Antique Windsor chairs have multiple layers of paint, and the colours were dependant on what was popular at the time. Milk paint is porous



Arm Assembly – The spindles are all mounted in the arm and bow prior to mounting the arm.

and requires a sealant. There is considerable debate as to what product is best to use as a top coat, including waxes, natural or synthetic oils, the various lacquers, varnishes, water-based sealants, etc. I personally prefer to seal chairs I make with hand rubbed tung oil.

Surface preparation is critical to the finishing process. I lightly spray the chair down with water to raise the grain and, when it is dry I sand the chair using 150 grit sandpaper. The rougher finish provides a surface that the paint can adhere to well. Once I have finished sanding, I make certain to brush away the all the dust from sanding before I begin to paint.

Milk paint powder is mixed in accordance with the manufacturer's directions. I have found that 1/4 cup (60 ml) of milk paint is sufficient to give a chair a coat of paint. I mix the milk paint thoroughly and allow to rest five minutes. I begin the painting process starting with the chair legs. The chair in this article will have an antiqued look that's created by using layered colours, and slightly sanding through the second colour to reveal a bit of the first undercoat. I used a red undercoat and a top coat of black.



Driving Spindles Home – Glue is applied to the mortises, the spindles are aligned with them and they are driven "home" with a hammer.



Painting Legs – The chair is turned upside down on the corner of the bench and the legs are given a first coat of paint.



Tung Oil Applied to Chair – With the black paint lightly distressed, and the entire surface then sanded smooth, tung oil is hand rubbed into the chair legs

Like most chair makers, I do not paint under the chair seat, which both saves on paint and leaves the wood bare for my brand. Milk paint takes very little time to dry to the touch. Once the legs have dried sufficiently, I turn the chair over and give the chair back and seat their first coat. I lightly sand the chair using 220 grit sandpaper and brush any paint dust off before the second coat of paint is applied. I repeat the entire process once more giving the chair a top coat of black milk paint. Once the top coat has dried, I lightly sand the chair once more, dust it off and brand the bottom of the seat.

The final step in finishing the chair is the application of the sealant. At this stage, I rub the first coat of tung oil into the bottom and top components of the chair using a lint free cloth. Care must be taken to saturate the paint and bottom of the chair without leaving any residual puddles or drips. After allowing the oil to penetrate for five minutes, I wipe off the excess oil. Each coat of tung oil is allowed to cure at least 24 hours, following which I lightly sand the surface with 220 grit sandpaper. Before I apply the next coat, I wipe away any dust with a tack cloth dampened with mineral spirits and wait for the chair to dry. This process is repeated until I achieve the desired sheen, which requires a minimum of three coats of tung oil. I am satisfied with the antiquing effect if a slight amount of the first coat of paint will show through, the effect of which is enhanced by the tung oil.



Antiquing – Painted and oiled chair legs showing black on red antiquing.

Tony Peirce has been making Windsor Chairs since 2000. He is an Instructor listed by Windsor Chair Resources and has been featured in the National Post, the Montreal Gazette, the Ottawa Citizen and a Mountain Lake PBS documentary.



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Finishing Isn't an Afterthought

For novice woodworkers, learning about wood finishes and how to apply them is just as important as developing wood processing and joinery skills.

BY CARL DUGUAY

It's probably realistic to think that when people take up the craft of woodworking they quite naturally focus on the front end – what equipment and tools they need to process the lumber, cut the joinery, and assemble their projects. Finishing is likely to be an afterthought.

I've always encouraged new woodworkers to think of finishing as an integral part of the woodworking process, rather than something tacked onto the end. For example, the wood you select for a project will influence the type of finish you choose, and both of these choices will have a distinct impact on what the finished product

will look like. Likewise, the care and attention taken in preparing the wood (and in particular, sanding) will go a long way towards making a more successful finish. And, it's often easier, and more efficient, to apply the finish before assembly, particularly with parts that will be less accessible after everything has been put together.

Practice first

It's doubtful anyone would consider using dovetails on a project without first practicing the technique for some period of time. The same concept applies to finishing. Fortunately, you'll acquire proficiency in applying a quality finish much more quickly than cutting perfect dovetails.

Photos by Rob Brown

When practicing applying a finish, sand a piece of wood as you would when preparing to finish a project. Next, apply the finish to that panel. Apply the finish following the manufacturers instructions, and always allow adequate dry time between coats. If this is also so you can see how a specific finish will look on a specific species of wood, you might want to try out a few different species of wood, as most finishes look different on different species. It might even be a good idea to label all of these panels and keep them in your shop so when you're selecting a species and finish later on you can have a good idea of what the final look will be.

Keep things simple

Novice woodworkers can avoid a great deal of aggravation by trying out several of the more common finishes before committing to their first project. It's the only way to get a real feeling for what it's like to apply different finishes and to gain experience in the various application techniques. I suggest starting with a penetrating oil finish and avoiding film finishes, pore filling, staining, French polishing and spray finishing until you've acquired a basic level of proficiency with the more commonly used finishes.

Hardwax oil finishes, like Rubio Monocoat's RMC Oil Plus 2C (RubioShop.ca) are particularly easy to apply, and they provide excellent surface protection. The Rubio finish is especially practical because it only contains plant oils, waxes, non-aromatic hydrocarbons, lead-free catalytic dryers and organic pigments. It's also VOC (Volatile Organic Compound)-free, and available in over 40 colours.

Getting started in wood finishing isn't overly expensive, and it doesn't require a huge investment in time. Here are the basic tools and accessories I recommend to my students.

Books

The first step in obtaining a great finish is understanding the material you're working with in its various forms – raw wood, sheet goods, and veneers – and the tools and techniques for applying your chosen finish onto this material. Fortunately, you don't have to discover all this yourself. You can benefit from the experience and advice of those who've done the research, made the mistakes, and learned the lessons on the nature of wood, and how best to choose and apply finishes.

By far, the best book I've read on understanding the idiosyncrasies of wood is appropriately titled "Understanding Wood" (R. Bruce Hoadley, ISBN: 978-1561583584). This book contains just about everything you'll ever need to know about the nature of wood, why and how it moves, what effects wood movement is likely to have on what you build, and how to compensate for this unavoidable movement.

There are quite a few finishing books on the market, and all of them will have some useful information. The book that has been my 'go-to' reference for much of the past three decades is Bob Flexner's "Understanding Wood Finishing" (ISBN: 978-1565235489). For about \$25 it's the next best thing to having Bob sitting beside you in the shop. This book provides the clearest, most comprehensive, practical treatment on the subject that you're likely to find.

Personal protection

In woodworking, when an accident happens it typically has an immediate impact. Not so with finishing. Dust, fumes and



Protect Yourself – You only get one set of lungs, so be sure to protect them from damaging fumes. Although it might not be necessary if you're wiping a finish on a small project, it never hurts to keep your lungs as healthy as possible. (Photo by 3M)



Work Smart, Not Hard – Sanding disks are available in many grits, and will help take a lot of the grunt work out of the critical stage of sanding.

chemicals can take years before their insidious effects begin to show. You need to have, and use, a good fitting cartridge respirator. Any of the popular brands that have at least an N95 rating will do. I use a 3M half mask respirator (#7500) with a P95 cartridge (#6001) rated for organic vapour. It's very light weight and comfortable to wear.

Surface preparation

Good surface preparation is a key to obtaining a stellar finish. Milling marks, fine scratches, and thin slivers of dried glue that may be barely visible prior to finishing will stand out like a sore thumb after the finish is applied. The sanding sheets brands that I particularly like are Norton's No-Fil Adalox Aluminum Oxide and the Mirka Royal brand. Both of these



Card Scrapers – A sharp card scraper can make quick work of removing milling marks, and put you on the path of ensuring wood is ready to accept a finish.



Careful of Used Rags – A cost effective way to apply many finishes, oil-soaked rags can spontaneously combust if not disposed of properly.

steatated papers are flexible yet tough, cut quickly, don't clog up too much and are reasonably long lasting. For sanding discs, I almost exclusively use net-back abrasives, like Diablo's SandNet or Mirka's Abranet. The entire surface of these discs is peppered with hundreds of tiny holes making it easy for dust-laden air to pass through. This results in little dust getting into the air you breathe, the discs don't clog up with dust like standard discs, and you get less dust contamination on your work surface

(DiabloTools.com, Mirka.com, NortonAbrasives.com).

For power sanding nothing beats a variable speed random orbital sander (ROS). Use one that comes with a dust bag or that can be connected to a dust extractor. These sanders have an offset drive bearing that causes the sanding pad to move in an elliptical orbit, which reduces scratching against the grain. You can move the sander any direction on the wood: with the grain, diagonal to the grain and even against the grain. I use the Bosch 3727DVS,





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Finishing a Finish – When used with some furniture wax, #0000 steel wood and superfine 3M abrasive pads will go a long way to helping you achieve a finish that's smooth to the touch. Sadly, they won't be a cure-all for a poorly applied finish though.

which takes the more common 5" sanding discs, and also 6" discs, which make quicker work of sanding large panels. There are many great models available in stores though.

For both hand and power sanding the most frequently used grits are 150, 180, 220, and 320. Finer grits are best used for rubbing out fine finishes. It's much more economical to purchase the four basic grit sizes in boxes of 100.

Card scrapers are also a useful and relatively inexpensive tool to have on hand. They're handy for quickly removing mill marks, dealing with minor tear-out, and working on narrow stock where sandpaper would round over edges. You'll eventually need to acquire the tools to maintain a scraper - a single cut file, a bench-stone and a burnisher. For a burnisher you can use a 1/4" steel rod, as long as it's harder than the scraper.

Application gear

Rags are indispensable for wiping on polymerized oil or varnish/mineral spirit finishes, fillers and stains, as well as for cleaning chores. Any cotton fabric will do as long as it's lint-free. I purchase used T-shirts and bed sheets from the local thrift shop. After using a rag you'll want to hang it over the edge of a garbage can until it dries, and then toss it out. Spontaneous combustion is a serious workshop hazard when it comes to dealing with many finishes.

For rubbing out a finish and applying a paste wax you'll need some fine strand (choose the 0000 grade) oil-free steel wool (or a synthetic product like the 3M superfine rubbing pad). It holds up well and is longer lasting than the ordinary steel wool found at building centers and home hardware stores. Rubbing out with steel wool produces a smooth satin sheen. Once you're comfortable with this, you can move on to various rubbing compounds to get a higher sheen.

For applying varnish and water-based finishes two brushes will

suffice - a 2" wide, flagged end, chisel-shaped hog bristle brush for varnish, and an equivalent 2" synthetic brush for water-based. 2" foam brushes are also effective and very reasonably priced for when it's time to lay down water-based finishes. A can of mineral spirits will do for cleaning the varnish brush, and for thinning varnish.

All that's left is to purchase a few different finishes and begin practicing. It's easiest to start with a Hardwax oil or wipe-on oil/varnish finish, and then move on to varnish and water-based finishes. There are a number of good brands on the market, including Rubio, Old Masters, General Finishes, Livos, Minwax, OSMO, Saicos, Target and Varathane, with quart containers being the optimal size for most new woodworkers to purchase.

I think most people will be pleasantly surprised at how quickly they can produce a great finish. As with just about every aspect of wood-working, the key to success is practice.



CARL DUGUAY

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Windows

Whether installing new or replacing old, we provide the basic information to help you make the right choice.

BY CARL DUGUAY

If any of your windows don't open or shut properly, if the panes are cracked, or if the frames, sashes or sills are rotting, then it's probably time to consider replacing them.

Compared to several decades ago, today's windows are significantly better able to control light, heat, sound and fresh air infiltration – increasing indoor comfort and lowering energy costs.

Windows are a long-term investment. On average, they should last three or four decades before needing to be replaced. Replacing

older, single pane windows will likely have the greatest return on investment, particularly during wintertime, by reducing cold air infiltration and reducing heat loss, as well as increasing the resale value of your home.

Selecting the right windows, and deciding whether to replace them yourself or hire an installer, is among other things, a matter of balancing your budget, home décor preferences, skill level and the expected return on your window investment (in terms of energy savings and resale value).

While window replacement by an avid DIYer isn't out of the question, it's certainly not a job for an inexperienced home owner. Done

Photos by Andersen Windows (AndersenWindows.com)



Think Outside of the Box – Rather than opt for common spacing and sizing of windows, one option is to include windows of different sizes or spacing. If done tastefully, and on a home of the right style, there might be a nice visual benefit

wrong it can lead to moisture, water and air infiltration, window movement (and cracking glass), premature rotting of jambs and sills, and issues of moisture condensation on the inside panes. While some installations can be very straightforward – replacing only the sash (the window pane and its supporting frame) – others may involve a full-frame replacement – removing the exterior trim or J-channel, the interior trim and extension jambs and perhaps the sill and apron.

Unless you've undertaken a previous window installation, I suggest you do some background research. No single book covers all of the details, but the two I've found particularly helpful are "Windows and Doors" (ISBN: 978-1561588084) and "The Complete Guide to Windows & Doors" (ISBN: 978-1589230453). Many window manufacturers provide online advice (usually in their "Support" or "Resources" section), and you'll also find a wealth of helpful videos on YouTube.

You can buy windows from major brand manufacturers and from local manufacturers in major cities across the country. You'll find sources online or at EbuyingGuide.net. Most retailers either provide an installation service, or can recommend installers. Either way, if you decide to hire an installer, make sure you get multiple detailed written quotes that include labor and material costs broken out separately.

Window panes

Single pane (aka. single glazed) windows are the least expensive to purchase and install, but they provide little in the way of insulation or sound blocking. While a single pane window might be okay for use on Vancouver Island, it's not the ideal choice for cold season climates – practically the rest of Canada. They're a better choice for garages, sheds and perhaps workshops.

Double pane windows are the most popular choice as they provide much better energy efficiency and sound blocking than single pane. In these windows the two panes of sealed glass are separated by an air space that provides the insulation. These are also referred to as insulating glass or thermal glass.

Triple pane windows have three panes of glass. They're more energy efficient (saving an estimated 2-3% on your annual heating bill), but cost anywhere from 10-15% more to purchase.

It's common for both double and triple pane windows to have

an inert gas (argon or krypton) injected between the panes – it increases the insulating value of the windows. Both are also available with a low-e (low-emissivity) coating – a microscopic layer of metallic oxide applied to the glass, which reduces the amount of infrared and ultraviolet light infiltration, keeping your home cooler in the summer, while reflecting heat back into your home during the winter.

If you're looking to add an additional level of security to your home and help reduce ambient noise, some manufacturers offer safety glass, which comes in two formats. Tempered glass, the least expensive, is made of a single pane heated and then quickly cooled to increase its durability. Laminated glass consists of two or more panes of glass fused together by a layer of plastic, and unlike regular or tempered glass, it won't shatter when broken.

To add a more traditional appearance some manufacturers offer removable grids that you attach over the inside pane. The grids can be removed to facilitate cleaning the panes. Other manufacturers offer both permanent grills and integral blinds that are factory installed between the panes in double-paned windows.

Window styles

There are three main types of windows, categorized by how they open – fixed (or picture), sliding (or gliding), and tilting (or crank). Skylights are typically fixed, while bow and bay windows can be fixed, sliding, or tilting. Most of these styles come in a wide variety of sizes, and in single, double or triple pane.

Fixed (or picture) windows don't open, which makes them suitable where you want light, but not ventilation. They're available with clear, privacy or decorative glass.

Windows that you open vertically are called **sliders** (or gliders). Those that you open horizontally are **single or double hung** (or sash) windows.

Tilting (or crank) windows pivot outwards when opened, and come in three types:

Awning windows pivot on top mounted hinges. A less common version are those that pivot on a bottom hinge – called Hoppers;

Casement windows pivot on left- or right-side mounted hinges;

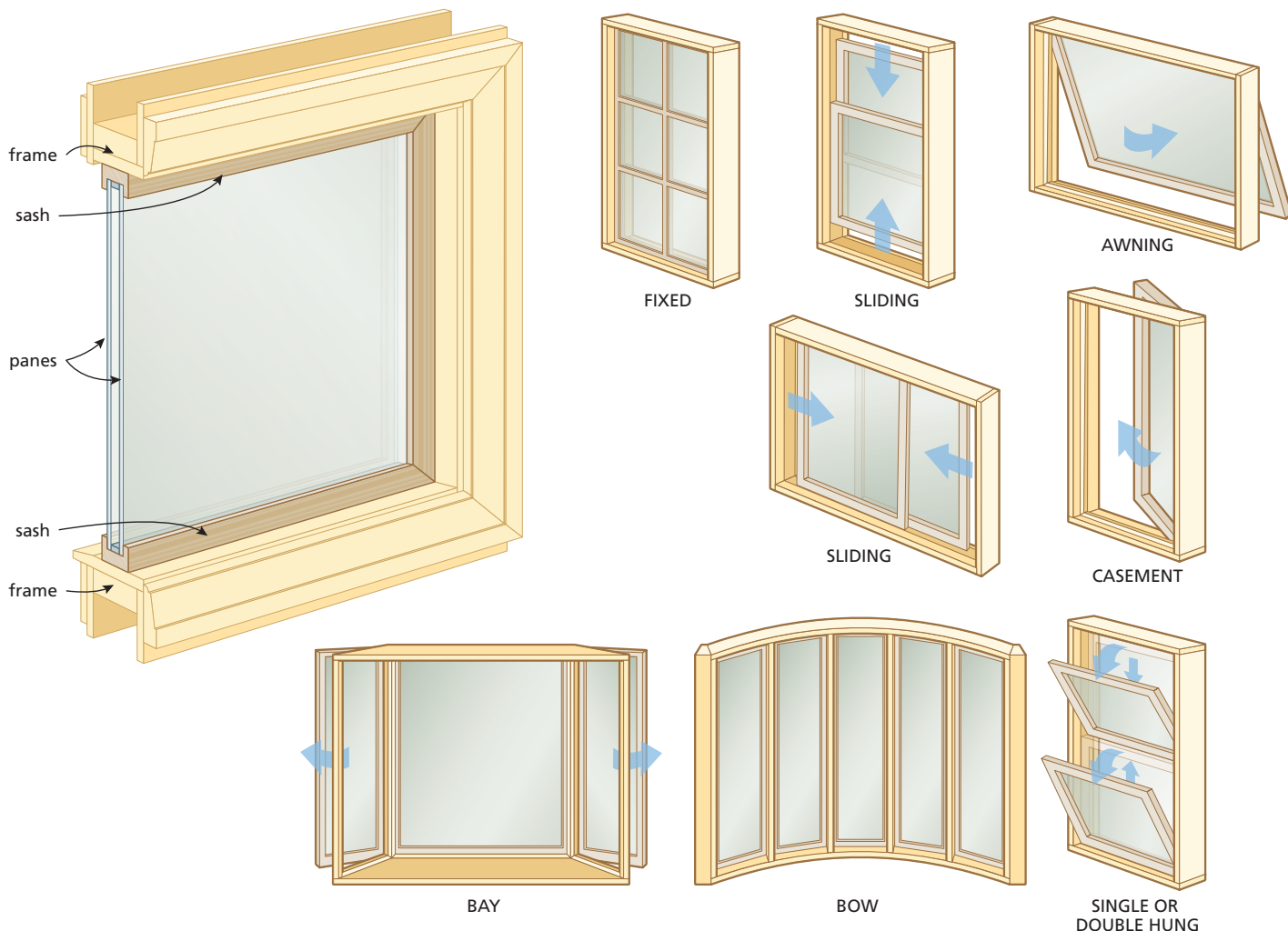
Single or double hung windows with a **tilt feature** pivot inward on side pins.



Sliders – One way a window can open is by sliding. This can happen vertically or horizontally. They are easy to operate and require little maintenance.



Casement – Casement windows are hinged on the outside of the house, and are opened and closed by a handle that is rotated on the inside of the house. They usually open to about 90°.



Bay windows usually have a large central window flanked by two narrow windows, while bow windows typically have four to six uniformly sized windows.

Not all windows are square or rectangular. Many manufacturers can make custom windows in a variety of configurations, including quarter round, camber-top, triangular, and elliptical. Of course, expect to pay a premium for these atypical shapes.

It's a good idea to choose windows that have an 'Energy Star' label. These are windows that meet government standards for energy efficiency based on specific climate zones across the country.

Window frames

There are five types of materials used to frame window panes – vinyl, fiberglass, aluminum, composite and wood. There are also frames comprised of a wood core sheathed in vinyl, fiberglass or aluminum.

Vinyl: The Affordable Choice

By far the most popular choice in windows as it's the least expensive. Available in a range of colours and options of smooth,

textured or faux wood finishes. They can have a hollow core or be filled with foam for extra insulation. Typically last about 30 years.

Cost: \$

Pros: Low cost, energy efficient, UV resistant, easy to install, low maintenance, affordable, won't warp, peel or rot.

Cons: More prone to breakage than other materials. Vinyl contracts and expands with changing temperatures much more than other materials, which reduces its ability to seal. Can warp if exposed to prolonged, intense sunlight. Can't be repainted.

Aluminum: Provides a Contemporary Look

Can either be extruded (more durable) or roll-formed. Choose windows that have a thermal break – an insulating barrier between the inside and outside of the window frame. Last about 30 to 40 years.

Cost: \$\$

Pros: High strength and structural integrity, light weight, low maintenance, reasonably dent resistant, very durable, available in a variety of colours.

Cons: Less insulation value than other materials, prone to condensation, subject to fading in strong sunlight, anodized aluminum can't be repainted, more difficult for DIYers to install.

Fiberglass: Super Strong and Long Lasting

Made of plastic resins and glass fibers. They can have a hollow core or be filled with foam for extra insulation. Available in a variety of colours and textures to mimic wood. Typically last up to 50 years.

Cost: \$\$\$

Pros: Much stronger than vinyl, lower heat conductivity than aluminum, very energy efficient, low maintenance, resists swelling, rotting and warping, fade resistant, can be repainted.

Cons: Repainted windows may peel or fade, more difficult to repair than vinyl, more difficult for DIYers to install.

Composite: The Eco-friendly Choice

Made from wood fiber and plastic resins to mimic the look of wood. Combines the strength of fiberglass and the performance of real wood. Expect them to last at least 40 years.

Cost: \$\$ to \$\$\$\$

Pros: Very energy efficient, less vulnerable to expansion and contraction than vinyl, fiberglass or wood, can be painted or re-stained, low maintenance, won't fade, flake, blister, or peel.

Cons: Relatively new on the market with little long-term performance assessment.

Wood: Classic Appeal

For timeless beauty and appeal it's hard to beat wood. If properly maintained can last the life of your home.

Cost: \$\$\$\$

Pros: Superior visual appeal, durable and long lasting if well maintained, very energy efficient, inside frame can be painted or stained to match interior décor, matching casings usually available.

Cons: Needs more maintenance than other materials, potential for rot, mold or mildew if not properly maintained, higher cost than other types.

Wood Clad: The Compromise Choice

Sheathed in vinyl, fiberglass, or aluminum. Requires a waterproof rubber membrane around the cladding and a sill pan. Expect them to last around 40 years.

Cost: \$\$\$\$

Pros: The clad exterior protects the wood core from the elements and reduces maintenance. The interior wood frame can be stained or painted and may be available in various wood species such as pine, fir, maple and oak.

Cons: More vulnerable to expansion and contraction than solid vinyl, fiberglass or aluminum, more difficult for DIYers to install.



CARL DUGUAY
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Definitions

Here are some additional terms that relate to windows.

R-Value – Measures a window's ability to prevent heat transfer. Energy Star windows have a minimum value of 3. The higher the value the better the window is at reducing heat loss.

U-Value (or U-Factor) – Measures how much heat flows through a material. The lower the value, the better the window insulates. Look for values of around 0.4 or less.

Solar Gain (or Solar Heat Gain Coefficient) – An indicator of how much solar radiation the window will admit into a room. The lower the value, the better the window is at blocking heat.

Wind resistance – A measurement of air leakage (in cubic feet per minute typically at 21.1°C and -17.8°C. The lower the percentage, the better the seal.



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Getting Your Wires Crossed

You know that wire protruding from the wall, that you have no idea what it does? Well, don't snip it off.

BY JAMES JACKSON

Have you ever found a strange wire sticking out of a wall of your home and decided to just go ahead and cut it? Home improvement tip No. don't do that, and here's why.

My wife and I bought our home about seven years ago, but the kitchen has always been poorly organized. It's a galley kitchen in a 950-square-foot home from the early 1950s, meaning it's long and narrow.

It worked fine when it was just my wife and I living there, and it was even manageable after we had our first child, but by the time our second child came along in early 2018 and started sitting in a high chair at the table, it was getting quite cramped.

One Saturday this fall, when my wife was with our oldest daughter at swimming lessons and our youngest was napping, I took it upon myself to switch the table and the fridge around. Under the new alignment, the stove, dishwasher and fridge were all in a row against one wall, while the table was the sole item against the opposite wall.

The switch was an instant improvement. We could all sit around the table at once instead of being crammed in the corner, and the flow of the room was much better.

The switch also brought a strange discovery, however. A thin, brown wire came out of the wall where the fridge once stood. It was about 6' up from the ground, then re-entered the wall just above the baseboard. I could pull it about an inch or two out of the wall before it became tight.

I had no idea what it was for, but it was just a few feet from the old phone jack that we never use and so I figured it was the phone cord that went to the upstairs bedrooms.

I grabbed a pair of kitchen shears and *snip* *snip* the wire was gone.



Fast forward to about 3 a.m. the next morning. I had to make a visit to the bathroom and I noticed the house was much chillier than normal. When I got back to bed, my wife nudged my shoulder and asked me to turn the furnace up a few notches.

I shuffled into the living room and saw the thermostat was indicating the house was just 13° celsius. I turned it up a few notches, but the furnace failed to click on.

Confused, I tried turning on the air conditioner, but it too refused to turn on.

I gave up and went back to bed. "What's wrong?" Becky asked. "I don't know," I replied, frustrated.

About ten minutes later though, it hit me. The wire I'd cut connected the battery-operated thermostat with the furnace, telling it when to switch on and off.

So, a \$500 bill later to replace the wire and relocate it inside the wall, I've learned a valuable lesson – never cut strange wires if you aren't certain what they're for.

JAMES JACKSON
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Illustration by Mike Del Rizzo



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