

# POPULAR Home Improvement PLANS & TECHNIQUES



From the editors of

**Woodworking**  
CANADIAN  
& HOME IMPROVEMENT

Content is copyright protected and provided for personal use only - not for resale.  
For reprints please contact the Publisher.



rbrown@canadianwoodworking.com

## Popular Home Improvement Plans & Techniques

We want to let you know what we at *Canadian Woodworking & Home Improvement Magazine* have been up to. This booklet will give you a taste of the topics we've covered over the years. In each of our regular issues we cover varying topics related to home improvement and woodworking. From projects and techniques to community stories and profiles of Canadian furniture makers, we have something for everyone, at every skill level.

Renovating your home can be a fun, rewarding activity that increases its value and makes it a more enjoyable place to live. Sometimes all you need is an idea, or bit of knowledge about a specific technique for you to be able to have the confidence to start a project, and the ability to follow it through to completion.

If you're someone who enjoys improving your home I strongly encourage you to visit our website – [www.canadianwoodworking.com](http://www.canadianwoodworking.com). You'll find articles on a wide range of home improvement, and woodworking related topics that you can download and read at your leisure. Our complete collection of articles is online; plans, projects, tips and techniques are available 24 hours a day, seven days a week. While you're on our website you will find friendly and helpful support on our woodworking & home improvement forum for your specific questions.

We're excited to have you on board, and we hope you enjoy this collection of articles. We also hope you join us with a subscription, as we have a lot more great home improvement and woodworking related articles coming up.

*Rob Brown*

## 4 Solid Wood Countertops

Solid wood counters have been around since the beginning of time, and for good reason, as this natural material has proven to be durable, resilient and timeless.

## 8 Mill-It-Yourself Handrail

Add beauty and elegance with shop-built stairway hand railing.

## 13 Levelling a Problem Floor

Learn a few tips on how to level a floor before laying a brand new floor.

## 16 Under the Stairs Storage

6 ways to make the best use of space under your stairs.

## 20 Building a Custom Wood Fence

Fencing can have a dramatic impact on the curb appeal of your home, and can also provide a safer area for young children or pets to play in.

## 26 Ramping Up for Access

Make your home accessible with easy-build ramping.

## 31 Door Surrounds

Improve the look of your house with easy to install door surrounds.

## 35 Build Your Deck Once

11 tips for a stronger, longer lasting deck.

## 39 Make a Sliding Door

A sliding door should be considered a piece of art hanging on the wall. It should be nicely made and should always showcase beautiful wood.

## 45 Build a Murphy Bed

Wall beds (also referred to as Murphy beds, after the inventor of the first modern wall bed) provide a convenient, affordable way to extend the usable floor space of any room.



# How to Build Solid Wood Countertops

Solid wood counters have been around since the beginning of time, and for good reason, as this natural material has proven to be durable, resilient and timeless.

BY JASON KLAGER

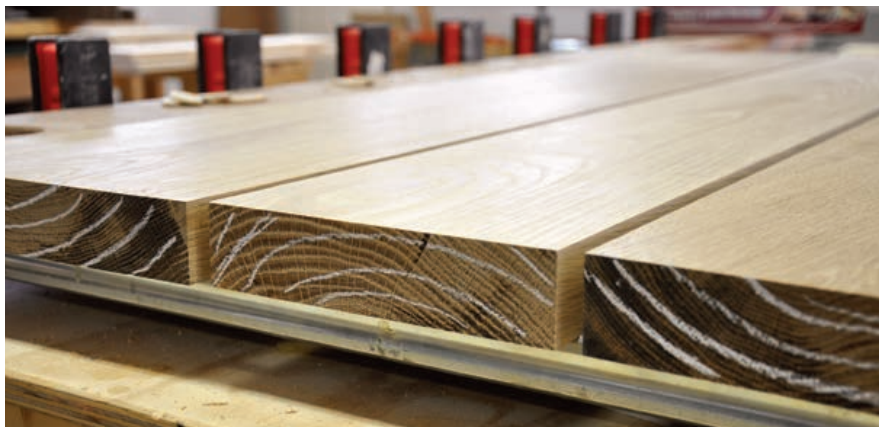
**G**ranite, laminate, Corian, quartz and tile are just a few of the many options available for today's countertops. One option that's sometimes overlooked is solid wood. Hiring out such a countertop is a costly venture, but with a little muscle and knowledge of a few basic woodworking techniques, building it

yourself can become an affordable and enjoyable option.

## Some serious wood

As with any project, the first step is to choose your wood. I decided to use white oak, a hardwood that will stand up to daily activities. The finished counter should be about 1 ½" thick and no less than 1 ¼", which means it's best to start with

Content is copyright protected and provided for personal use only - not for re



**Balanced Construction** – By opposing the direction of the growth rings Klager creates a more stable top. It's sometimes a trade-off between grain graphics and stability, and a judgement call needs to be made.

8/4 stock. Using 8/4 stock makes squaring, removing any cup, bow or wind, less stressful, especially when working with longer lengths. Take the time to find boards free of large defects, such as knots or cracks which may open up over time and create a haven for water and bacteria. Find boards that have a width around 6", as a standard counter should be made up of at least four boards to remain stable. The greater the number of boards you join, the more stable your finished countertop will be. An end-grain butcher block countertop is made by joining several parallel strips that are an inch and a half to two inches wide. This is a very time-consuming but incredibly stable method. Either way you go, be sure to first determine your finished dimensions and add a few inches to both the width and length to accommodate any adjustments later.

With your lumber home, be sure to allow the wood to acclimatize to your shop environment before turning on the machines. When it comes time to mill your boards, leave an extra 1/8" in thickness for levelling. Mill your boards square on all four sides and arrange them on a flat surface, paying attention to colour and grain graphics. Aesthetics always comes first, but when possible, try to alternate the growth rings. With your boards arranged to your liking, mark the position of each

board. You can join the boards off of the jointer, but for a seamless joint use a hand-plane to remove the machine marks left on the edges. Lastly, adding a few biscuits along the edge of the board will help to keep the faces remaining flush during glue-up. Unless you have a very poor edge, joint biscuits don't add any strength to the joint, but they do assist with alignment.

## Time for adhesive

After a dry run, glue the boards together with a waterproof glue such as Titebond III. For larger glue-ups, I prefer using G2 epoxy by System Three Resins, which is a waterproof glue that has an open time of 60 minutes. The leftover epoxy is perfect for filling in small surface cracks or knots. Placing a piece of wax or parchment paper under the glued joint keeps the glue away from your clamps. Once out of the clamps, the glued countertop can either be passed through a drum sander or just hand-sanded to a finish grit of either 180 or 220.

## Fit the countertop

A few things still need to be taken care of before applying a finish. One may be to scribe the counter to a wall and/or fit it into a corner. A corner can be finished with either a butt or mitre joint. Both will move with the seasons, but a butt joint will not open up like a mitre joint will. A

Content is copyright protected and provided for personal use only. Not for reproduction.

For reprints please contact the Publisher.



**Big Glue-Up** – After a dry run, Klager applies the adhesive and brings the boards together for good. A flat, large surface is necessary for laminating the parts of a countertop. Notice how Klager alternates the position of the clamps, above and below the workpiece, for even pressure and less cupping.

mitre will open and close along the joint, whereas the two halves of a butt joint will only slide against each other.

Use a few counter connectors to join sections of counters. When machining the joinery for the connectors, leave a little room for seasonal movement. Installing a few tenons will also help keep the top aligned. If you plan on using dowels, be sure to only use them in one location across the joint, and be sure to allow the rest of the countertop to move. If you're using tenons, glue half of the tenon into one mortise and widen the mortise across from it, allowing the tenon to move freely. When the time comes to connect the two counters, be sure to apply a bead of silicone caulking along the edge of the joining counter. It will move with the joint. After your counter is sized and fitting correctly, make the necessary adjustments to the front overhang before adding an edge profile.

## Sink and faucet openings

The last step may be to cut out an opening for a sink and faucet. Using



**Big Cuts** – A track saw, or a circular saw and a straightedge, are great for making long cuts in heavy panels.

the manufacturer's sink template, outline the position of your sink and cut along the line using a jigsaw. If you are installing an under-mounted sink, this template can be used to make a reverse guide template out of a piece of  $\frac{1}{2}$ " MDF or plywood. Carefully position and clamp the guide template to the top of your counter. Using a plunge router fitted with a guide bushing, rout along the guide using an up-cut spiral bit until you have reached the other side. Take your time to slowly remove the material with only  $\frac{1}{8}$ "– $\frac{1}{4}$ " increments and clean out the shavings after each pass. The MDF cut-away portion from the center of your sink template can be attached in the middle to support both sides of the router. Remember again to add a bead of silicone caulking when installing both the sink and the faucet.

## Finish line

With all my woodworking, I like to use Waterlox Original Tung oil finish. This waterproof, heat-resistant finish is food safe and will easily stand up to daily use on kitchen counters. It is important to finish both sides. Apply at least four coats to the top and three coats to the underside. For a flawless finish, do a light sanding before applying the final coat.



**Sink Opening** – Working with the supplied paper template Klager made an MDF pattern to rout the sink opening. Use a router, equipped with a guide bushing, to make several passes, to complete the job.

## Allow for movement during installation

Take the necessary steps to allow for seasonal movement when the time comes



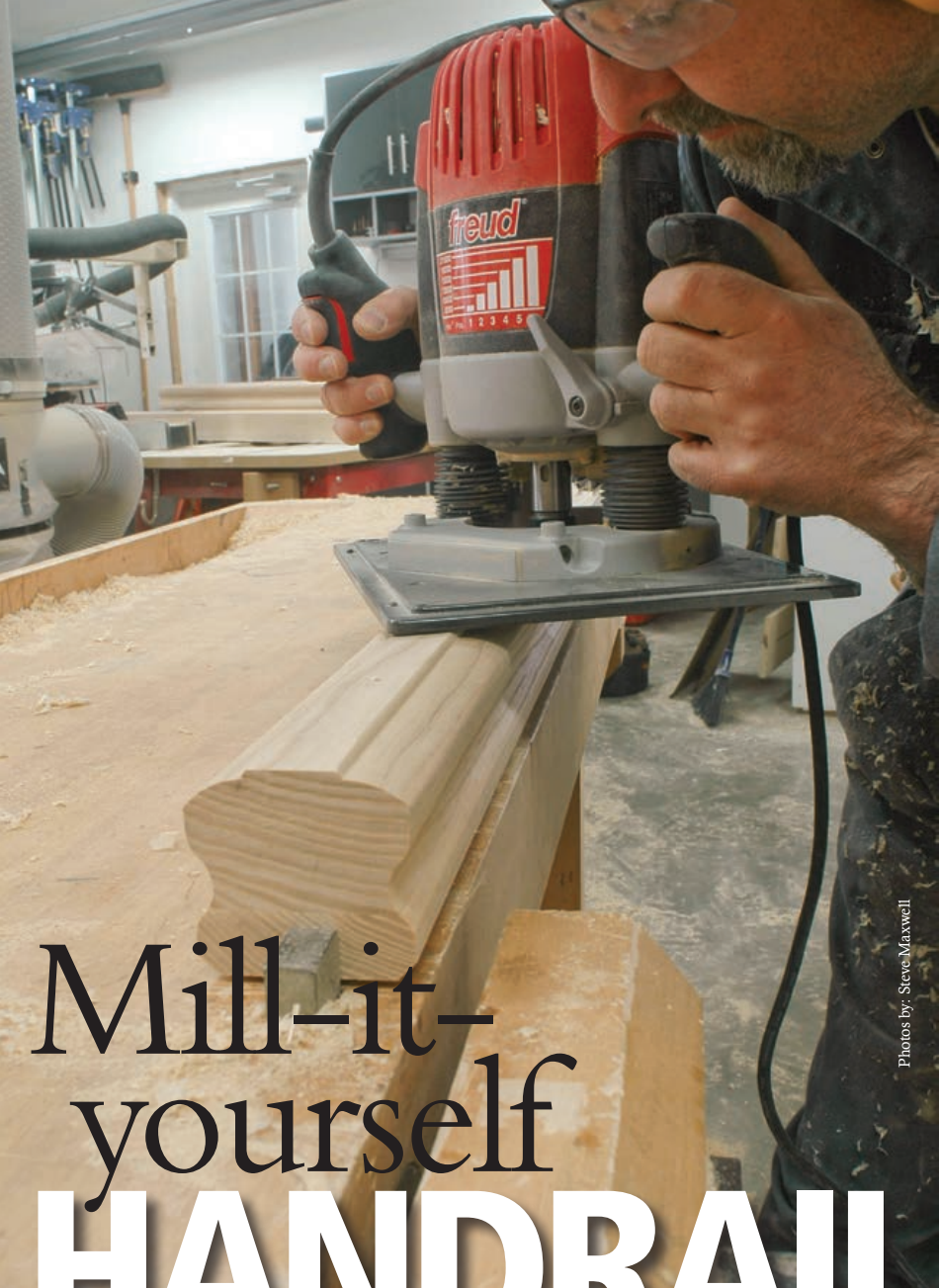
**Come Together** – Counter connectors, available from many different suppliers, are perfect for securing sections of counter to each other. Be sure to account for wood movement when machining the holes and grooves the hardware fits into.

to install the countertop. A standard countertop could move  $\frac{3}{8}$ " seasonally. To accommodate for this, epoxy an oversized washer with a  $\frac{1}{2}$ " center to the underside of the cabinet supports and drill out the center. Attach the counter through this  $\frac{1}{2}$ " hole. This opening will provide enough room for the screw to travel seasonally. A second washer is fitted nicely around the fastening screw's head to prevent it going through the opening. For a  $1\frac{1}{2}$ " thick countertop, the wood screws should be long enough to go through the cabinet supports and into the counter at least  $\frac{3}{4}$ ". Be sure to fasten the counter in several spots. The only screw that doesn't need to travel is the one placed closest to the wall. This will allow all seasonal movement to happen away from the wall.

Wood is timeless, inspiring and comforting to have around us daily. With a little bit of work, it can also become the perfect surface to make your morning cup of joe.

Content is copyright protected and provided for personal use only - not for re

For reprints please contact the Publisher.



Photos by: Steve Maxwell

# Mill-it- yourself **HANDRAIL**

Add beauty and elegance with shop-built stairway hand railing.

Content is copyright protected and provided for personal use only - not for re



BY STEVE MAXWELL

Great as it is to build cabinets, tables and shelves, woodworking skills offer more than this. Your workshop know-how can also be used to create valuable, wood-related, built-in features for your home – features that add beauty and elegance in ways that would otherwise cost big bucks. Stairway hand railings are a case in point. Few woodworkers realize how simple it is to make spectacular shop-milled railings in traditional profiles using ordinary workshop skills and a router. You don't even need a shaper. If you've got a need for hand railing, milling it yourself might just be the most satisfying – and cheapest – way to get what you need while making the most of your woodworking skills.

Milling a handrail involves preparing blanks, adjusting router bit height, routing finger grooves, routing a bottom profile and routing a top profile. Don't worry if all this is new to you. You'll feel like a pro in no time.

## Prepare Railing Blanks

Traditional handrail profiles require wooden blanks that typically measure

somewhat less than 3" x 3" in cross section. The exact size depends on the router bits you choose, but regardless of the profile, aim to begin with rough blanks that are at least ¼" wider and thicker than required. This allows room for jointing, planing and sawing to create square corners, flat surfaces and an accurate final size. You've got to have accurate blanks if you expect precise handrails that are easy to install. It's unlikely you'll find lumber thick enough to make a full size handrail without lamination, but that's okay. Gluing together a couple of layers of wood goes a long way to prevent warping and cracking of the finished railing.

Start by sawing your wood to rough width. I cut both 1" and 2" thick pieces of ash to 3 ¼" wide for the railing featured here. Joint one face of each piece, then an adjoining edge before dry-fitting parts together. If the joints don't look tight, run the troublesome piece of wood over the jointer again. As you work, prepare enough wood for an extra length of hand railing or two. Besides giving you another shot at installing the railing correctly if you mess up, an extra railing blank also gives you something to work on as you're tweaking router bit height later on.



**Many clamps** – Don't be afraid of using too many clamps for this glue-up... in this case more is better.

Content is copyright protected and provided for personal use only - not for re

For reprints please contact the Publisher.



**Apply the glue** – Using a roller will ensure that every inch of the surface gets covered with glue.

I find it best if you arrange the 2" thick material on top of the handrail profile, with the thinner wood underneath. This locates the joint line somewhere around the bottom of the finger groove, where it'll be virtually invisible if you've created a gap-free glue line. When it comes time to apply glue, don't just squirt out squiggly beads of the stuff. There are two reasons why you need to do better.

Besides the fact that you need an absolutely reliable glue joint with no dry areas, beads of glue can actually hold large joints like this apart, even under clamping pressure. That's why I use a small roller to apply a thin but even coat of glue on both halves of each railing blank. Just pour a line of glue onto one board directly from the jug, and then spread it around with the roller. It's fast and easy.

When it comes time to clamp up the railing sandwich, I find wooden hand screws work best. Apply clamps to the ends of each pair of blanks and then use clamps if necessary to align bowed parts in the middle before adding more clamps across the entire length of the blank. Let the assembly sit for one full day before removing clamps and heading back to the jointer. Gluing operations have probably introduced some kind of bow or twist to the wood, and now's the time to correct this.

Joint one face, then an adjoining edge, before ripping the blank to width on your table saw and planing to final thickness. It's essential that the completed blank have absolutely square corners and be of a consistent size along the entire length. Take all the time you need to get machine settings correct beforehand. I find a steel engineer's square an essential tool for tweaking the position of jointer and table saw fences so they're perfectly square.

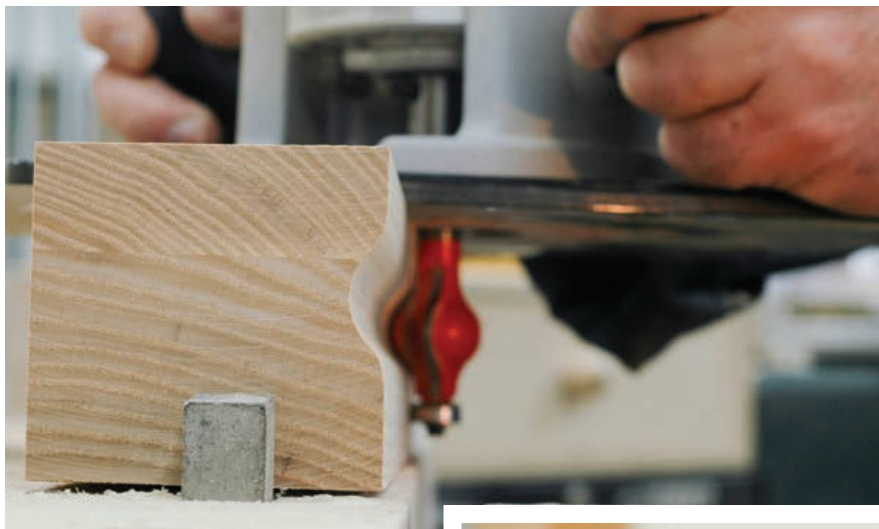
## Tweaking Router Bit Height

Most handrail profiles are made with two main router bits that create adjoining profiles, one mills a curved recess to accommodate fingertips, and another makes the rounded, top edge of the



**Joint the blank** – When working with such long blanks on the jointer, ensure that you keep the work against the fence the whole time.

Content is copyright protected and provided for personal use only - not for reproduction



**Finger groove** – You can test various router bit heights to achieve different looks.

railing in two passes – one on each side. A third bit (usually a 45° chamfer or ½" radius round-over bit) performs the more minor role of easing the bottom corner of the hand rail.

It's one thing to have the router bits you need to create a handrail, but you still need to exercise a certain amount of creativity. Adjusting router bit height is the reason why. Depending on how far the bits stick out beyond the router base, you can create substantially different handrail profiles.

Start by taking your best guess of where you'd like the top profile and finger grooves to be located on the blank. Adjust router bit height accordingly. You may also need to reduce the width or thickness of the blanks a little using your thickness planer.

Take short, trial passes along one end of the extra handrail blank you prepared. If you've got a couple of routers in your shop, put one bit in each. This way once you've homed in on ideal router bit height you won't have to remove the bit for any reason to complete other operations. I used a 2 ¼ HP router to mill finger grooves in the handrail you see here. The same size router could be used



to rout the top profile, though I opted to use a 3 ¼ HP model.

## Routing the Railing

Clamp your railing to the workbench, bottom side up; with the finger grooves arranged one on each side. Next, run a chamfer or round over profile, also along the bottom edge of the railing. Next you'll need to flip the blank over and rout the top profile, but before you do — a word of caution.

Routing the first round-over pass accurately will be easy because the top of the railing is still flat and able to support the router. Routing the second pass is riskier. That's because the router will have a tendency to rock back and forth because it doesn't have much of a flat surface on which to rest. If you're concerned,

Content is copyright protected and provided for personal use only - not for reprints.

For reprints, please contact the Publisher.



**Routing the top profile** – This bit will give the rail its decorative appearance.

sidestep the wobbly router problem by placing a second hand rail blank (or previously completed handrail) on the far side of the blank you're working on. Place the second rail close enough to the first that it provides an additional support surface for the router as you push it along. It's especially important to prevent your router from rocking since any unwanted movement translates into a wavy handrail surface. If you do run into a bit of trouble,

don't panic. It's surprising how much waviness you can smooth out using a piece of 60 grit sandpaper wrapped around your fingers. Finish up with 80, 120 and 180 grit sandpaper and you're ready for installation and finishing.

Milling your own handrail looks difficult to the rest of the world, but if you're a woodworker, it's just another one of those amazing things you get to do in the shop.



**Ease the underside** – This step can be done with a chamfer bit or a 1/2" round-over bit for slightly different esthetics.



Content is copyright protected and provided for personal use only - not for re



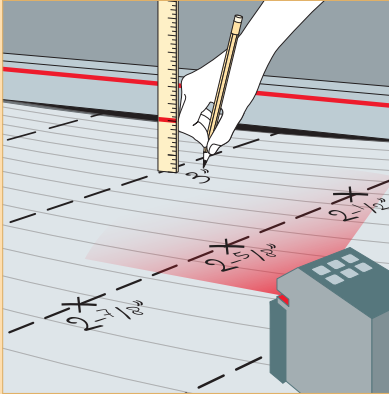
# Levelling a PROBLEM FLOOR

From carpenters to floor installers to homeowners, nobody likes an uneven floor. Learn a few tips on how to level a floor before laying a brand new floor. Once the job is complete you'll be thankful you spent the extra time.

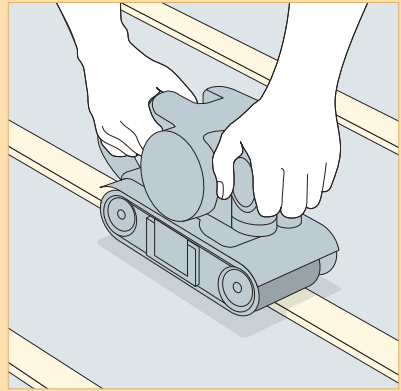
BY MATT DUNKIN

**T**ime, gravity and structural deficiencies can wreak havoc on residential floors. If you're contemplating laying a new floor and need to shim some low spots, or gutting a bathroom or kitchen in preparation for new fixtures or cabinetry, you are presented with an opportunity to correct the problem as part of the scope of work and improve the results of subsequent projects.

Content is copyright protected and provided for personal use only - not for resale. For reprints, please contact the Publisher.



**Find the High Spot** — With a laser level turned on and a ruler in one hand, go around the room and mark the distance between the laser line and the floor on the sub-floor. The smallest measurement is the one you should aim to level the rest of the floor to.



**Remove Any High Spots** — A belt sander, equipped with a coarse belt, will remove any high spots on the furring strips.

## Identifying the Cause

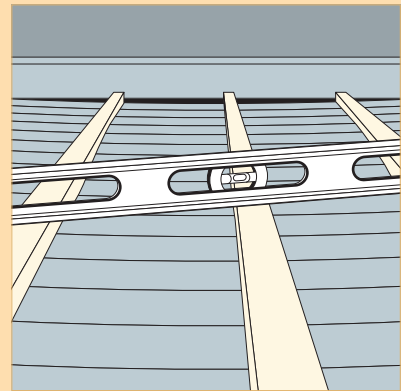
If a floor has sagged or dropped, it's important to figure out why. Identify and correct the underlying problem, whether it's due to undersized framing, rot, a sinking basement post, or offset load paths between floors. Ultimately, if a structure has sagged and a floor has fallen, it needs to be supported to stop further sag and then the uneven or out-of-level area needs to be shimmed to correct it, over top of the existing sub-floor.

## Levelling

If you've got a defined space like a bathroom, a shower stall or a kitchen and you want to level the floor, your best tool will be a laser level. Figure out which way the floor framing is running, and chalk or draw lines overtop of the existing floor joists. Then shoot measurements from the height of the laser line to the sub-floor and you can write the measurements on the sub-floor with a permanent marker. The smallest number will be your high point, and you can subtract this height from each measurement.

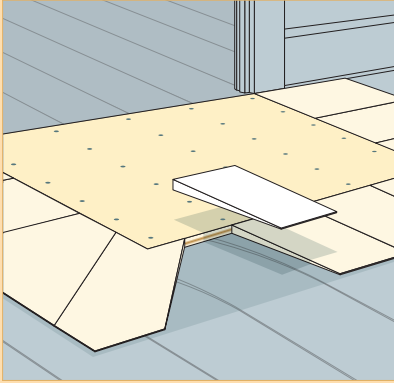
to determine the thickness of the furring strips you'll need to cut.

If, along the length of one joist, the difference in height from the laser line is consistent, you can rip a consistent 2× furring strip with your table saw. If it changes, however, you will need to rip a tapered furring strip off a straight piece of wood using a circular saw and following a

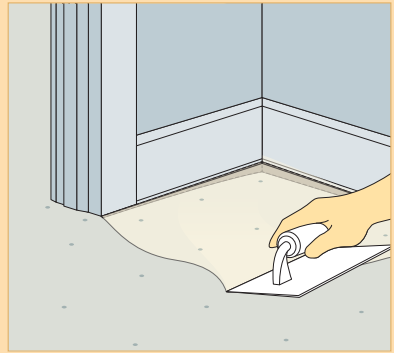


**All Level Now?** — With the furring strips in place, use a level to check everything is level. There may be high or low spots that still need evening out.

Content is copyright protected and provided for personal use only - not for resale



**Raising a Large Area** — To level large areas to the high spots of the floor you can cut a piece of plywood to fit the low area, then feather out the difference with cedar shims.



**Raising a Small Area** — If the low area is fairly small you can raise it with a series of overlapping cedar shims. Self-levelling compound can also be used for small areas.

line drawn between several measurements along the length to mimic the subtle curve of the floor, taking care that the saw doesn't bind and kick back when ripping.

Once you have ripped the furring strips you can lay them down with construction adhesive beneath, screw them into the existing framing below, and then check them with a straight-edge or with the laser level again. Any fine-tuning at this point could be accomplished by adding a shim beneath the furring strip to raise the height if there is a low spot, or by employing a belt sander with coarse sandpaper if it's too high.

Once you're happy with the results, a new sub-floor can be laid overtop and fastened into the furring strips with more construction adhesive in between to stop squeaks. The result will be a level sub-floor to lay your finish floor on.

## Evening Out the Low Spots

In areas where there's too much drop to level the floor, the better option is to make it less uneven by shimming the low spots. If it's a small area adjacent to a load-bearing wall, or where there is an isolated dip, it can be shimmed or filled with self-levelling compound.

Self-levelling compound however can crack over time so I would use it over a plywood sub-floor instead of over tongue-and-groove boards to limit the movement beneath the compound

If it's a larger area, a different approach should be taken. I recommend defining it by drawing the edge of the low spot on the floor, then cutting a section of  $\frac{1}{4}$ " or  $\frac{3}{8}$ " plywood to the shape of the low spot, stepped back the approximate length of a shim, and then using wide cedar shim shingles to feather out from there.

In extreme cases you may need to use more than one layer of plywood to reach a desirable height. Once I have a layer of plywood and shingles cut and arranged, I check it with a straightedge. I'm looking not for level here, but for an even blend into the rest of the floor. I go back and use construction adhesive beneath the shims and plywood, and then fasten the shims with a narrow crown stapler into the sub-floor, and screw the plywood to the sub-floor. Once the low spot has been evened out, a new sub-floor surface of  $\frac{3}{8}$ " or  $\frac{1}{2}$ " plywood can be screwed down overtop the entire floor area, creating an even base for finish flooring. Time and patience will yield results that will greatly improve the safety and aesthetics of the floor.

Content is copyright protected and provided for personal use only - not for reproduction

For reprints please contact the Publisher.



# Under the Stairs STORAGE

6 ways to make the best use of space under your stairs.

BY CARL DUGUAY

Regardless of the project you undertake, it's always a good idea to take the time to plan what you intend to do. Sketching out the project, ensuring that your measurements are correct, preparing a materials list and purchasing any necessary hardware before you start will help make the job go easier – and fend off frustration down the road.

The key to making efficient use of the space under your stairs, as it is for any home improvement project, is preparation. Taking the time to plan things out before your begin will save you time and money, and make the job go easier. Remember: good planning makes for great home improvements.

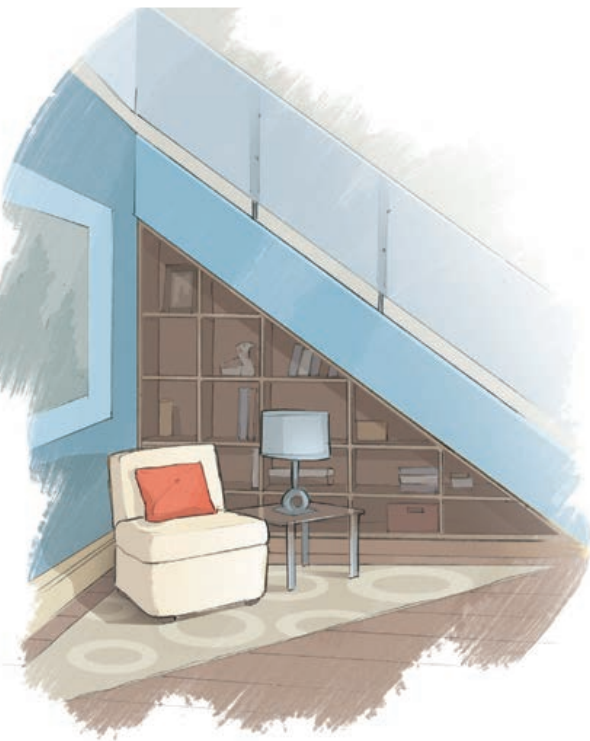
## Why Bother with a Permit?

Building permits aren't all about enriching the coffers of local government. While they do serve to ensure that homeowners pay their fair share of the tax burden, they also make certain that any structural, electrical or plumbing modifications to your house are done according to accepted standards. If you later sell your house, most real estate agencies will require you to sign a disclosure form, stating whether you have undertaken any unpermitted work. Don't be surprised if prospective buyers request that the unpermitted work be inspected by a contractor, at your expense. Real estate agents also caution that unpermitted work, no matter how impressive, doesn't necessarily add market value to the house – but it does raise indecision and apprehension on the part of buyers. And, if the unpermitted work is the cause of fire or water damage, you may run into problems with your insurance company when processing a claim.

Illustrations by Mike Del Rizzo

Content is copyright protected and provided for personal use only - not for





# Shelving

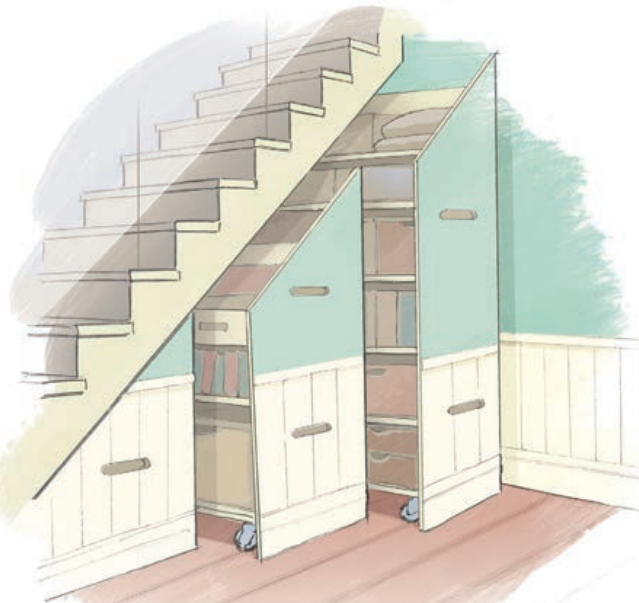
Skill Level: **easy**

Installing basic open shelving under the stairs is an easy and straightforward project that can likely be completed over a weekend – a bit longer perhaps if you need to remove drywall and framing. You can build shelving to hold everything from books to toys to your favourite beverages, and the shelving can be either removable or built in. You can build rectangular shelving or, for a more finished look, bevel the tops of the shelves so they complement the angle of the stairs.

# Rolling Cabinets

Skill Level:  
**intermediate**

An advantage of movable, or rolling, cabinets is that they enable you to use the full depth of the stairwell. The front panel can be built to suit the room. Be sure to use a high quality set of casters, as each cabinet will be heavy when fully loaded. This option works best if your floor is fairly flat and even as any bumps or slope will cause problems when it comes time to roll out the cabinet.



Content is copyright protected and provided for personal use only - not for reprints.

For reprints, please contact the Publisher.

# Closed Cabinets

Skill Level: intermediate

Cabinets are an option for those who don't like the look of open shelving. They can provide a much more finished look than open shelving, particularly when located on a main floor rather than the basement.

Install any combination of doors and drawers that best fits your needs and complements the design of your home. The plywood framework can be installed underneath the stairs, then the doors or drawers can be made to fit. Although it's not impossible, it is more difficult to install a large bank of drawers than it is to opt for doors.



# Built-In Appliances

Skill Level: intermediate

In many homes, laundry appliances are located in the basement. This can pose a problem if you have difficulty walking up and down stairs; or it can simply be a nuisance in large households where laundry is a daily chore. As for the half-bathroom option (next page), you'll need to have some plumbing and electrical work done. If you have never done either type of work before, now is not the time to give it a go – hire a professional.



Content is copyright protected and provided for personal use only - not for re

# Office/ Study Room

Skill Level: advanced

Increasingly, people are working from home, either on an occasional basis or full-time. Even if no one in your house works from home, it's nice to have a quiet place to pay bills, check your email or browse the Canadian Woodworking forum. Children and young adults can also benefit from having access to a dedicated study room rather than the kitchen table or too-small bedroom. For either use, you'll likely want at least one electrical outlet and a wall or ceiling light. Rather than a conventional door, which requires ample space to swing into or out of a room, consider installing pocket doors – they are ideal for small spaces and are no more difficult to install than a swing door.



# Half Bathroom

Skill Level: advanced

Having an extra bathroom, especially for families with children, can be a godsend.

You won't be able to fit a full-size bathroom under the stairs, but it is ideal for a half-bathroom (or powder room), consisting of a sink and toilet. This, of course, means that some plumbing and electrical work will be required. The issue with toilets is their somewhat extensive plumbing requirements. An alternative to the conventional toilet is an 'up-flush' toilet, like the Sanicompact 48 ([www.saniflo.ca](http://www.saniflo.ca)). While more expensive to purchase up-front, they are easier and less costly to install, as they require only a cold water intake and a 1" diameter discharge pipe.



Content is copyright protected and provided for personal use only. Not for

For reprints, please contact the Publisher.



# Building a Custom Wood Fence

Fencing can have a dramatic impact on the curb appeal of your home, and can also provide a safer area for young children or pets to play in.

BY CARL DUGUAY

**W**ood fencing remains very popular, with prefabricated treated panels and 4" by 4" pressure-treated posts the most common choice of materials. This is because they are relatively quick to install and cost less than other types of fencing, though they do require more maintenance. Even though there is some choice in the style of prefab fencing, it still has a bland, uniform look that really doesn't enhance the appearance of a house.

Content is copyright protected and provided for personal use only. Not for re

If you are willing to invest marginally more money and time, then consider building a custom wooden fence. A custom fence will look significantly better than a prefab fence, it will enhance your property value, and last for decades. While it will require somewhat more maintenance than a prefab fence, it will age much more gracefully.

Most DIYers will likely have all the tools they need to do the job. Those tools you don't have, such as a post-hole digger, cement mixer, or air compressor, are reasonably economical to rent. Like most

woodworking projects, you'll want to divide your fencing job into a few basic steps: design, materials, foundation, finishing and installation.

The fence shown in this article was built by Robert Turner ([gardentamers@shaw.ca](mailto:gardentamers@shaw.ca)), who specializes in building custom patios, fences, and gazebos.

## Design Options

When selecting a design, bear in mind that your fence serves both a functional and an aesthetic purpose. As with any woodworking project, balancing the two will take some thoughtful consideration. You'll find a lot of fencing ideas looking around your neighbourhood, scanning the internet, and consulting fence design books. Robert recommends "Ultimate Guide to Fences, Arbors and Trellises" (ISBN: 1580113907), which provides a range of design ideas plus a wealth of information on construction techniques.

For this project, Robert based his design on a 1930s-era fence he saw in a nearby community. Most homeowners will be happy to give you permission to take photos and measurements directly off their fence, as Robert did.

In order to reduce costs, Robert and his client decided to build the new fence along the front and side of the property that faced the street, and retain the old fence that extended along the back, secluded portion of the property.

Don't neglect to consult with any neighbours with whom you share property lines. Good fences don't necessarily make good neighbours, unless they know what you intend to do. And remember to find out if you require a municipal building permit, and whether there are height and setback restrictions you may need to follow.

Once you've settled on a design, it's time to mark out where the posts will go (typically 8 to 10 feet apart), and any gates. Sketch the fence layout and calculate the linear feet of rails and stiles that you'll need, and the number of posts. Because of the fence length, Robert opted to use 6 x 6 posts for a sturdier look, and selected 4" wide rails and 2" wide stiles for the panels. Now is a good time to call the necessary

# To Build a Fence

Here is what you need to build a fence. Much of the larger equipment (compressor, nailer and auger) can be rented from your local building supply center.

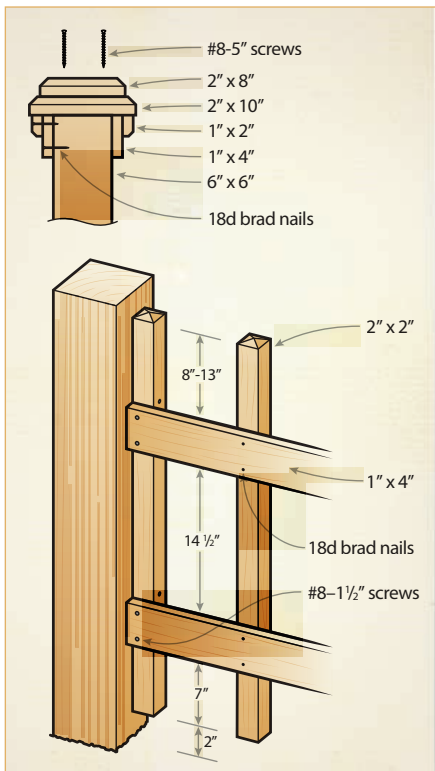
- Lumber
- Post-hole digger, power-driven auger, or shovel and pick
- 4' box beam level or post level
- Circular saw, mitre-saw, or table-saw
- Drill or impact driver
- 18g nailer, compressor, and brad nails
- Gloves
- Hammer
- Twine
- Fast set concrete (1 bag per 2' post hole)
- Portable cement mixer (if you have a lot of post-holes to fill)
- Galvanized screws
- Wood preservative
- Your choice of finish

utilities companies to make sure the location of your holes don't interfere with anything.

## Finish First

By far the most common wood fencing material is PT (pressure-treated) lumber, primarily because of its resistance to decay and moderate cost compared to the two other popular materials, cedar and redwood. As you know, all lumber will begin to check due to moisture build-up and freeze/thaw cycles in winter, and turn a grayish colour due to the effects of ultraviolet light. So, you'll likely want to apply some kind of water repellent with a UV inhibitor on the lumber.

There are quite a few products to choose from, including paint, stains, varnishes and non-film forming finishes. The finish you use will depend on the material you choose. If you plan to paint the fence, as Robert did, then cedar and pine are good choices (cedar for the posts and pine for all the other components). Both of these woods also stain well. Robert chose to apply two coats of Dulux Weatherguard

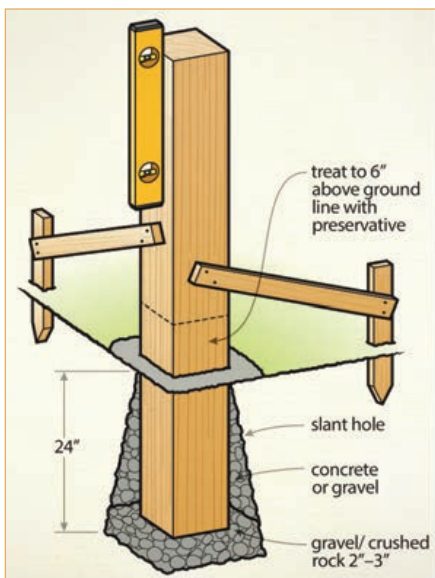


Maximum, a 100 percent acrylic paint with a high solids content and a fungicide additive that helps retard the growth of mildew. You can also paint PT lumber, but the results are likely to be less satisfactory. You'll need to clean the PT lumber with an appropriate cleaner (one that contains sodium hypochlorite, metasilicate or carbonate) and then use an acrylic latex primer followed by a topcoat.

Companies like Sikken and Penofin make reliable penetrating finishes. If



**Preserve the Strength** – Apply wood preservative to the wood that will be 6" above ground level to help keep the structural backbone of your fence good and strong for years.



**A Single Stile** – With the posts installed, attach a vertical stile to the side of each post. The rails will then be installed to the stiles. All the stiles and rails are painted before installation to protect them against decay.

Content is copyright protected and provided for personal use only - not for reproduction



**A Few Tricks** – Use spacers to keep the stiles spaced evenly across the rails. Also notice the properly supported board on the ground, providing a helping hand during installation. The ground board will assist with keeping all the stiles at the same height.

you want to leave the wood natural, then consider a product like Lifetime Wood Treatment ([valhalco.com](http://valhalco.com)), an organic, environmentally friendly preservative.

When applying a finish, it's important to ensure adequate coverage on all exposed surfaces. Robert chose to apply the paint before assembling the fence, finding it easier to cover all four sides and both ends without having to deal with bugs and leaves sticking to the paint or waiting for a cloudy day. Begin by cutting all your stock to finished length and make any decorative or bevel cuts on the stiles. Don't forget to cut the pieces for your post caps as well. Depending on how accurately you planted the posts, you may have to trim some of the rails shorter, so you'll want to have some paint and a brush on hand during assembly.

As an alternative to using real wood, you might want to consider the use of a synthetic lumber, such as Altwood ([www.syntalproducts.com](http://www.syntalproducts.com)) which does not require finishing, is maintenance-free, and lasts a lifetime. It can be worked just like real wood, but is, however, significantly more expensive.

## A Solid Foundation Makes a Level Fence

Probably the most critical part of your fencing project is installing the posts. These need to be plumb and consistently spaced, so take time to measure and position the posts accurately.

Digging post-holes is hard work. For a 4- to 6-foot high fence, they need to be 24" deep. You can dig the holes a little wider at the bottom than at the top to help lock in the concrete or gravel. If your soil is sandy and relatively rock-free and you have a strong back, you can dig them with a pick and shovel. Otherwise, rent a post-hole digger or hire a landscaping company to dig the holes for you.

It will be a lot easier if you have someone help you install the posts. Set the end and corner posts, and any posts supporting a gate in concrete. Make sure you use a wood preservative to treat the section of the post that will be underground, particularly if it's not pressure-treated lumber. All the other posts can be set in gravel. You'll also want to lay about 3" of gravel or crushed rock in the bottom of the holes for the posts to stand on - to help drain away water.

Content is copyright protected and provided for personal use only - not for reproduction.

For reprints, please contact the Publisher.



**Lots of Cuts** – Once the rails have been attached to the initial stiles, you can prepare the rest of the stiles for installation. Notice the mitre cuts on the top of each waiting stile. This adds an element of style, and sheds rain.

Use a simple bracing system to support the posts before you pour the concrete or gravel. You'll need about one bag of pre-mixed concrete per 2' deep hole. Run the concrete a couple of inches above ground, sloping it away from the posts to facilitate water run-off. If you have a lot of posts to set, don't try to do them all at the same time

– spread it out over two or three days.

Once you have installed the first end post, install the other end post, or corner post if there is one in between the end posts. Then install the next corner post, or the end post. Now you can string a cord just above ground level between these posts to aid you in laying out the locations of the intermediate posts. Let all the posts settle for several days before you install the rest of the fence.



**Outdoor Style** – There are many options when it comes to post caps, and each adds a certain look. Do some research about what look you want, then create the exact look you're after from a mixture of square stock, mouldings, etc.



**Choose Your Fastener** – Brad nails can be used to install many parts of a fence, but screws are best for areas that require higher strength.

Content is copyright protected and provided for personal use only - not for resale



## Now Comes the Easy Part

Installing the rails and stiles is the easy part. For this fence, Robert began by attaching a stile onto each of two facing posts with 3" galvanized screws, keeping the ends of the stiles about 2" above ground level. This keeps the ends of the stiles dry and makes it easier to trim grass around the base of the fence. These first two stiles serve as braces to hold the rails. Robert then attached the rails onto the stiles using 1 1/2" galvanized screws. Finally, he nailed the remaining stiles onto the rails using an 18 gauge brad nailer. For even spacing, he used a spacer block between stiles. Rather than nail the stiles in place, you could screw them onto the rails. The first four stiles on either side of each post are cut 1 1/2" shorter than each other to give a curved appearance towards the top of the fence. Rather than leaving the tops of the stiles flat, Robert beveled them on the mitre saw.

The trim for the post caps, which Robert cut on the table saw, is nailed in place. Then the top two plates for the caps are attached using four 5" galvanized screws. The



**Focal Point** – An arch gate is a great way to add a focal point to a fence, and direct visitors toward the entrance gate.

framing for the front gate is made up of 2 x 8 stock, and uses the same decorative trim as found on the post cap.

So there you go. Building a custom fence really isn't that complicated. It does take more time than installing a pre-fab fence, and it will cost you marginally more, but the results will be much more impressive – and you'll be the envy of the neighbourhood for both your DIY prowess and design acumen.



**Don't Skimp Now** – After all the work you've put into your fence project, you'll surely want to use high-quality, smooth-acting hardware for gates and doors.

Content is copyright protected and provided for personal use only - not for re

For reprints, please contact the Publisher.



# Ramping Up for Access

Make your home accessible with easy-build ramping.

BY MATT DUNKIN

**Y**ou'll encounter a significant but invisible barrier even before you cross the threshold of most Canadian homes: the difference in elevation between the sidewalk or driveway and the main floor of the house. Stairs are the typical means to gain access to those elevated floor levels, and spatially they are quite economical, gaining the fastest ratio of rise to run. Stairs, however, don't work for everyone. A visit from someone for whom those stairs are a nearly insurmountable obstacle – perhaps a friend or relative in a wheelchair, or an elderly person who no longer has the stamina to do much climbing, even a parent lugging a child in a stroller – will soon illustrate the unforgiving nature of stairs for those carrying heavy loads or who have mobility issues. Access ramps offer a means to bridge the height difference and enable those on wheels or on foot to gradually

raise themselves up that crucial distance to the ground floor.

A significant and growing percentage of the Canadian population experiences mobility issues. Statistics Canada estimates that nearly 2.5 million Canadians over the age of 15 have “difficulty walking, climbing stairs, or moving from one room to another.” Given an aging population of baby boomers, that number will continue to increase in the coming years. As of 2010, seniors made up just over 14 percent of the Canadian population, whereas projections predict a massive acceleration in which seniors represent over 25 percent of the population by 2056. That demographic shift, combined with a tendency for seniors to remain living at home longer instead of moving into health-care settings, means that adaptations to their houses, like adding access ramps, will become increasingly common and necessary in the future.

There are a number of important...  
Content is copyright protected and provided for personal use only - not for re



**Think Long-Term** – While handrails are not required on this low ramp, they make for a more comfortable and safer user experience. Two details to improve upon in this photo are: deck screws should be ACQ approved and posts should be 4 x 4s to resist lateral loading.

theoretical and practical guidelines that you'll need to consider in designing and building a safe and effective physical access ramp for your home. We'll take a look at building code requirements for private residential settings that regulate the construction of physical access ramps, design and material considerations, and some nuts-and-bolts advice about how to construct them. I'll be referring predominantly to the Ontario Building Code, which is informed by the National Building Code of Canada, and is quite

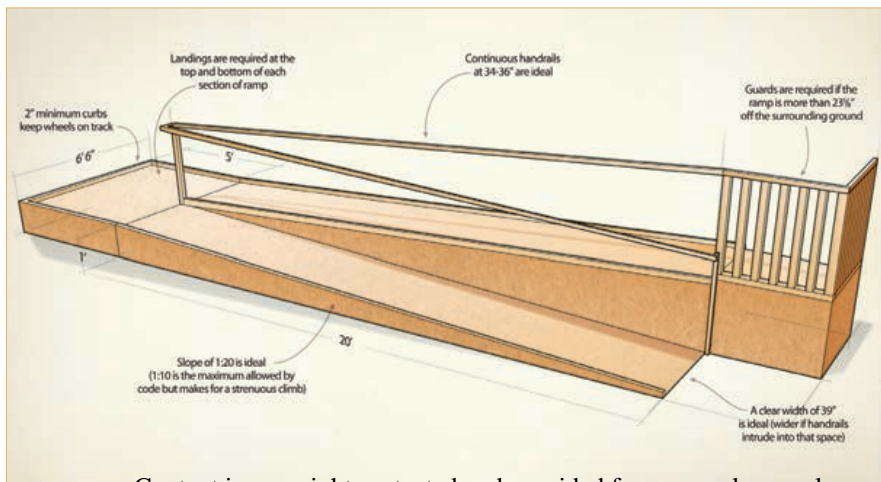


**Well Thought Out** – This ramp, instead of abruptly terminating at a level landing, gently curves at the ramp top and along the top rail. The ramp was intentionally included into the larger framework of the design of this home.

similar to codes in other provinces. In most cases, I would recommend you build to exceed code requirements to avoid designing and constructing a ramp that is uncomfortable or challenging to use.

## Ramp Slope

Building codes specify that the slope of a ramp accessing a private dwelling be no steeper than 1:10; that is, for every inch of rise there must be at least 10 inches of run. That number signifies the outer limit of what is recommended and while helpful,



Content is copyright protected and provided for personal use only – not for re

For reprints please contact the Publisher.

won't lead you to create a user-friendly ramp. A case in point is a ramp at PEI's Brackley Beach built by Parks Canada, which rises an unrealistic 18 feet over 250 feet of length. As a YouTube video about the Brackley Beach ramp illustrates, if a ramp is too steep or too long it will become itself a nearly insurmountable barrier to those with mobility issues ([www.youtube.com/watch?v=AHL2twJoJuk](http://www.youtube.com/watch?v=AHL2twJoJuk)). A more effective and forgiving slope lies in the realm of 1:16 or even a more gently sloping 1:20.

## Length & Width & Height

If you're planning to build a ramp, the first practical consideration you'll come up against is that you'll need a lot of space to make it happen. To gain access to a front door or porch that is 30" off the ground at a slope of 1:20, you'll need a staggering 50 feet of ramp length, which for most yards is a significant amount of real estate, especially when you add in landings for change in direction. Therefore, rising any more than 30" is usually not practical. Single stretches of ramp should be no longer than 20 feet so that the user will not become exhausted while walking



**Details are Important** – Small details like leaving minimal spacing between decking (less than ¼") will make for a much more wheelchair-friendly ramp. A screw makes a good spacer.

or wheeling between landings. As for the width of access ramps, code minimums for residential settings will specify a minimum clear width of 34", although, practically, 39" will make for a better ramp that won't feel cramped. If handrails intrude into the width of the ramp space, you'll have to make it wider to maintain the clear width you're aiming for.



**Low Maintenance** – Durable materials such as the composite decking on this access ramp will ensure a long life and require very little maintenance.

Content is copyright protected and provided for personal use only - not for re

## Landings

Landings allow for breaks between ramp sections and are necessary to allow a wheelchair to pivot at a turn and a person to rest before continuing on to the next slope. They are required at the top and bottom of every ramp with a slope of 1 in 50 according to code, and if there is a situation where there is a door or opening partway along a ramp, it will be necessary to have a landing that extends 11 ¾" on either side of the opening. Practical landing dimensions will be different depending on whether a scooter or a wheelchair will be turning on them. Wheelchairs can pivot on a 60"x 60" landing while a scooter with a longer turning radius will need 83"x 83".

## Barriers, Handrails & Railings

Just as with stairs, a railing, or guard is required by code if the height of the ramp is more than 23 5/8" higher than the surrounding grade level. Guards over this height must prevent against the passage of a spherical object 4" in diameter (that is, a young child's head). Curb barriers keep a wheelchair's wheels from slipping off the side of a ramp and, while not a code requirement, are recommended especially on low ramps when a guard is not required. They should be at least 2" high in order to be effective. A handrail is required on at least one side of a ramp if it's less than 43" wide, and both sides if wider. Handrails should be maximum 2" wide otherwise they are hard to easily grasp and there should be at least 2" of space between a handrail and an adjacent wall. Handrails by code must be 31–38" above the surface of the ramp, but will be most effective at a height of 34–36".

## Landscape vs. Built

It's quite possible to landscape an access ramp directly into a yard with concrete or smooth stones, especially if the required rise is only a few inches. Otherwise, you'll have to get creative and build something out of wood, deciding first on a shape to fit your yard. Straight ramps are the



**Transitions** – Unlike the example in this photo (above), the transition onto the bottom of the ramp should be smooth as possible, following the slope of the ramp. Carefully poured concrete, or in this case (below), a precisely fitted piece of plywood, will smooth the transition from ground to ramp.



simplest, but most higher ramps will need to be switch-backed, L-shaped, or U-shaped to negotiate obstacles and fit into your yard space.

## Built-in or Removable?

If you choose to construct an access ramp, you can build it so that it becomes a permanent addition to your home, or so that it can be removable. Removable ramps are only as reliable as the surfaces they are placed upon, however.

especially as the seasons change. A ramp placed on concrete deck blocks resting on grass will be affected by freeze and thaw cycles and could make for some unruly and unsafe transitions onto and off the ramp. A ramp that is built over-top of a stable existing walkway with stairs could be sufficient to withstand seasonal changes. However, if you're starting from scratch, it is best to construct a permanent ramp on a proper foundation that goes below frost depth.

## Materials

When choosing materials for building your access ramp, you'll follow the same thought process as if you were building stairs or a deck, so you'll need to use materials that are resistant to decay. For framing wood, you'll likely choose pressure-treated lumber, but for decking and railings you can use pressure-treated wood, cedar, or composites depending on what your preferred finish will be. If you're using pressure-treated wood, you'll need to make sure your fasteners are galvanized nails or ACQ-treated deck screws so that they will resist corrosion. You may want to add texture to your ramp with outdoor carpet, a textured paint, or even roughly sanding the decking boards to provide more traction for feet or wheels. Typically, materials that are durable and low-maintenance suit ramps and their owners, as elaborate staining or finishing is often challenging for those with mobility issues.

## Construction

Construction of ramps will need to be in accordance with your site conditions, local building codes and municipal bylaws. In many parts of the country, you'll need to set concrete footings to a depth of at least four feet to avoid frost damage. Galvanized metal 4 x 4 post saddles set into the concrete will anchor the bottoms of structural posts. Ramps will be constructed with the framing joists or "stringers" running parallel to the direction of travel, and decking running perpendicular to the framing. Tight spacing on the decking will make for a

smoother ride (max. ¼"), and in some cases a treated plywood may be necessary for an easier climb in a wheel chair. Four-by-four posts that will support handrails and guards should be tied into the framing to be more solid and surrounded by blocking to support where the decking will meet the posts. Three-inch treated deck screws will allow you to connect your framing safely and even remove it in future if necessary.

For spacing between posts and joists and required lumber sizing, consult your local building codes, treating the landings and guards as you would an exterior deck.

One of the areas that is critical to get the details right is in the transitions onto and off the ramp. At the bottom of the ramp, there should be a gentle transition onto the ramp, with no tripping hazard or bump to have to climb before rolling upwards. This may mean ripping a very smooth transition strip that follows the slope of the ramp, or even using a metal plate if required. You may need to sink the ramp's framing members below grade, which is not ideal for preventing decay in the wood you're using. If you need to do this, excavate the area and fill it with crushed stone, which will provide good drainage and foil the attempts of frost to heave the ramp upwards. At the top of the ramp, the transition must be equally smooth, with no awkward place for a tire to get slowed down just as a person in a wheelchair may be starting to tire.

## Parting Thoughts

If you're going to go to the trouble of constructing an access ramp, it's not a place you will want to cut corners or opt for the minimum dimensions. As its builder and designer, it's a great idea to borrow a wheelchair and try a couple of existing ramps out before you even start designing. You can get a sense of what works spatially and what materials will provide the most user-friendly experience. That knowledge, coupled with the limitations of your site, will allow you to craft a ramp that will create a welcoming and barrier-free access to your home.

Content is copyright protected and provided for personal use only - not for reproduction



surrounds was the best way to get a sense of what my options were. While old banks, courthouses and office buildings usually have beautiful, elaborate entrances, I found the most appropriate examples were on homes in the older areas of town. By driving or walking around these old neighbourhoods you will see a wide array of beautiful surrounds and be able to get a good visual idea of some different options. Remember to keep in mind the scale and style of your own home when doing this and keep the design compatible. If you find a design you really like and are unsure of the specific dimensions, I suggest you knock on the door and ask the homeowner if you could take a few photographs and make a sketch with some key measurements. They'll likely enjoy the compliment.

Overall proportion and size are the main elements to consider in the design process. What looks good on another house in your neighbourhood might not look great on your home. If you're really unsure about the overall size, make a full-scale model. Take a sheet of 1/8" masonite, cut it to fit around your door, trim to the outside dimensions, draw some details on the masonite with a heavy marker and put it in place. Any size or proportion issues should be visible at this stage, and you'll be able to fine tune the design so that it looks right.

### Some Background

According to classical architecture, the basic design of a

# Door Surrounds

Improve the look of your house with easy to install door surrounds.

### Take a Walk

Like most projects - all projects, come to think of it - a bit of planning will help keep you on track, and material waste to a minimum. Since the front door is often the

focal point of a home, it's not a bad idea to do a little research into the different styles of door surrounds before making your final choice. I found that looking at different types of door

Content is copyright protected and provided for personal use only - not for reproduction

For reprints please contact the Publisher.

door surround, or entrance way, has fluted columns on either side of the door supporting a group of architectural elements (the entablature), over the top of the doorway. The entablature is further broken down into three sections: the architrave, the frieze and the cornice. The architrave (or top trim) is the lowest section and sits directly on top of the columns. It usually consists of simple mouldings. The frieze (or head board) is the middle section and is often kept fairly flat but may have some carving or relief applied to it. The cornice (or crown) is the top section and contains the projecting part of the entablature. This is where the term 'cornice moulding' comes from. It's not overly important to pay close attention to this formula, but hopefully with a bit of background information. If you are a woodworker with an average skill set, you'll find this is an easy weekend project that will not only add curb appeal to your home, but enhance its market value. And it doesn't have to break the bank - the materials cost under \$100. you can start to pick out different types of architecture and understand a bit about the process of designing a surround for your door.

## Original Door Frame

The step-by-step details of my installation may not include everything you want or need for your surround. You may have to make some changes to complete your design.

## Material Selection

As with all outdoor projects, you can't go wrong with cedar. It has excellent decay resistance and takes stain and finish very well. Woods like Black Cherry and White Oak are also quite decay resistant and will look great painted or stained. However, no matter what kind of wood or finish you use, you will need to maintain the finish on a regular basis to protect the wood from rotting.

To cover large flat areas, exterior plywood is a good choice - it's very stable and easy to work with. When attaching the surround to the frame of your home, make sure you use galvanized nails and

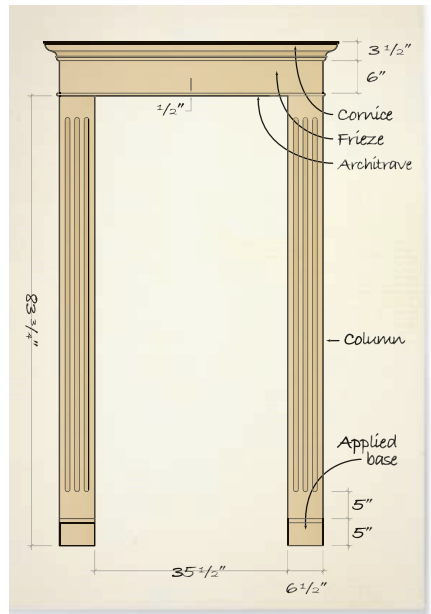


Old trim

exterior screws.

There will be fewer problems down the road with mineral streaking, and there will be less chance of these fasteners coming loose due to corrosion.

For this surround I used 7/8" lumber for



the columns, frieze and applied base, and 1/2" stock for the architrave. Rather than mill the cornice I purchased a length of crown moulding from my local building supply centre.

## Vertical Columns First

There are two vertical fluted columns on either side of the door. The height of the columns should be the same as the

Content is copyright protected and provided for personal use only - not for re

For reprints please contact the Publisher.



distance from the underside of the door opening to the ground.

On a router table set up a vertical panel raising bit to produce the three column flutes. You could also use a dish cutting or straight bit. When fluting columns I like to machine at least three flutes per column and usually mill an odd number of flutes for balance. To facilitate routing, draw lines on the backs of the columns to show where the flutes start and stop, along with lines on the router table fence that show where the bit is cutting. Before routing use a dado blade to remove some of the material. It's best to take slow passes to finish the flutes. Using the dado blades to remove much of the material makes for a safer, smoother cut on the router table. Begin by machining the middle flute of each column, then move the fence and machine the flutes on either side. Stop routing the fluting 4" from the top of each column and 10" from the bottom. An applied base enhances the bottom of the columns. For these I milled stock 5" high and 1/4" narrower than the vertical columns, and then routed a bevel on the top and front edge of both pieces. You can vary the height to suit the look you want to achieve.

## Then the Entablature

To determine the length of the frieze, add the width of the door opening, the width of each of the columns, and two 1/2" reveals. For my surround it came to 49 1/2". For the architrave, mill a 1/2" thick by 1 1/4" wide-half-round moulding. When attached to the bottom of the frieze it provides a simple transition between the columns and the upper section. Cut the architrave 3/4" longer than the center section and then machine the same half-round profile on both ends. Once cut to its final width, spread waterproof glue, such as Elmer's E741 (elmers.com) on the face and clamp it to the bottom edge of the frieze.

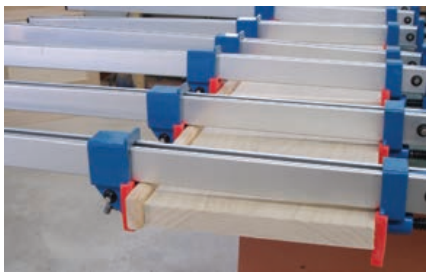
Mitre the ends of the cornice piece. Cut a small return for either end, and attach the returns to the center piece with glue and nails. It's important to make sure the width between the two returns is exactly the same length as the frieze, so they will fit together. Once the cornice is dry, attach



Rounding over architrave end



Vertical panel raising bit



Gluing architrave to frieze

it to the top of the frieze. To do this, drill a few holes through the frieze and glue and screw the cornice through the back of it. Because my house has a ledge directly above the surround, water will not be able to get in behind it. If you have no coverage above your surround, as is often the case, you should put a piece of flashing above the cornice just to keep the rain and snow from accumulating and rotting the wood.

## Finish Before Assembly

Before installing the surround, sand the surfaces, more to give the paint some tooth to adhere to than anything else. To give the wood some extra protection from the elements, prime and paint all surfaces of each



Cornice showing return

piece before installing them. This way even if rain gets behind the surround there will be some protection against rot.

## Installation

Once the paint has thoroughly dried, you can begin installation. Use exterior screws in countersunk holes and attach the columns to either side of the door. Make sure to sink the screws into something solid, like a stud, the door frame or some plywood sheathing – although it's best if you can attach the columns to all three. It's a good idea to keep a  $\frac{1}{2}$ " reveal between each column and the inside edge of the door opening, and use a temporary spacer to ensure that the columns are  $\frac{1}{2}$ " off the ground. This way any water sitting on the ground will not migrate up the wooden column, and start the rotting process. This also means that when you're ready to install the upper section it will sit  $\frac{1}{2}$ " above the door opening, giving a  $\frac{1}{2}$ " reveal around all three sides of the door. While installing the columns, double check to make sure the outside dimension between the columns will end up matching that of the frieze so everything lines up when complete.

The process takes a bit longer if you are attaching the surround to brick. You will have to put a column in place and then drill pilot holes through the piece and into the brick with a masonry bit. Do one hole to start with, making sure the part is positioned properly before moving on.

to the other holes. Once all the holes are drilled, countersink them so plugs can be added later. You will have to use a proper masonry screw, found in most hardware stores. Staff can also advise you on what size bit to use for pre-drilling.

With the two columns in place, attach the top section in the same way – screws through countersunk holes. The base can be added in the same manner. It, like the columns, should be  $\frac{1}{2}$ " off the ground. Once everything is attached to the house, plug all the countersunk holes with waterproof glue and wooden plugs. When dry, trim them with a chisel and sand them flush. Fill any nail holes as well as any gaps between each of the parts with some exterior caulking. It's important to keep cracks filled to reduce the chance of water damage. As is always the case with exterior projects, water is your biggest enemy, so take the time to protect against it. I use Mono acrylic exterior caulking (rustoleum.com) to fill any large gaps between the surround and the house. If a gap is more than about  $\frac{3}{8}$ " I would cut a filler block to fit the gap and secure it with some caulk.

Once everything has been secured to the house and the gaps and cracks have been filled the only thing left to do is add a final coat or two of paint. Since you're painting outdoors make sure to follow the manufacturer's recommendations. Don't paint if the surface is in direct sunlight, the outdoor temperature is going to drop below  $10^{\circ}$  Celsius until the finish has cured, or when rain is forecasted – which leaves a pretty small window of opportunity for us Canadians! Over the years you should keep a close eye on the state of the paint. If it starts to flake, the best thing to do is to scrape the loose paint off, re-caulk and paint again.

Now that you've completed the job, stand back and take a good look at the improvements made to your home. If you're like me, this is where you start to think... "I guess the front door could use a new coat of paint." or "Maybe it's time to make a couple of planter boxes for below the windows." A woodworker's job is never truly done.

Content is copyright protected and provided for personal use only - not for re

# Build it ONCE



11 tips for a stronger, longer lasting deck.

BY RYAN SHERVILL

## 1 Concrete footings:

Deeper is better: Your local building department will know the minimum footing depth required in your area. I suggest adding at least one extra foot of depth beyond the minimum to ensure you are below the frost line and avoid frost heaving. You will need a little more concrete, but going beyond the minimum is cheap insurance.

Bell-bottoms are in style! Even if not specified in your local code, it is a good idea to do a “bell footing” on the bottom of your forms. By making the footing wider at the bottom, you reduce the chances of frost heave even further, and the larger footprint means the weight of the deck is spread over a larger area, which reduces ground pressure at the bottom of the hole. Manufacturers have

made this easy with the introduction of plastic bell footings that attach to the bottom of cardboard tube forms. You just slip the footing onto the bottom of your tube and drive a couple of screws to hold it in place. You then place the entire assembly into the hole, backfill around your tube and pour your concrete.

## 2 Block footings:

Some free-floating decks are built on deck blocks rather than footings. It's important to note that even though these blocks look like they just sit on the ground, there is a considerable amount of work you need to do to the ground under the blocks before placing them if you want them to stay put. Frost and settling are the two biggest enemies when it comes to block footings, so minimize the chances of either affecting your hard work by following these steps. To start with, dig a hole at least twice the diameter of the deck

Content is copyright protected and provided for personal use only - not for resale

For reprints, please contact the Publisher.



**Dig Deep** – A deeper hole and bell footings on the bottom of your forms provide a rock solid foundation.

**Block Footings** – Dig properly sized holes and fill them in with care to give block footings a stable hold.

block and a minimum of 1' deep wherever a block will be placed. Fill that hole within 4" of the top with granular A gravel, compacting it with a tamper as you fill the hole. Top the compacted A gravel with a good layer of limestone screenings or decomposed granite, again compacting as you go, and bring this packed material slightly proud of the surrounding ground.

### 3 Beams:

The beams are truly the backbone of your deck; don't be afraid to "overdo it" when building them. While your local code will dictate both the minimum lumber size and number of plies you must use, I prefer to go "up one" on either the number of plies (three layers instead of two) or the lumber dimension (2x10s rather than 2x8s), depending on the situation. Some people suggest putting plywood spacers between layers to aid drainage, but I prefer to laminate my lumber tight together and then cap it with a triple layer of 30lb roofing felt to prevent water from entering the laminations to begin with.

### 4 Ledgers:

The ledger (the board that attaches to the house) is where 90 percent of deck failure occurs. The reason failure occurs here is due to water sitting against the house and causing premature rot. You will read

all kinds of articles about proper flashing, etc. for attaching your ledger board, but for my own decks, I prefer not to attach the ledger to the house at all.

Ledgers are most often attached to the house because it's easy and inexpensive. The house structure is already there. Why not use it? The truth is that if you are willing to put in the time and money, there is a better way to do it. On houses where it is feasible, I will dig down to the existing house footings and set 6x6 or 8x8 pressure-treated posts directly on the footings, cut them to length and notch them to accept a double or triple 2x10 beam spaced 1½ to 2" from the house,



**Please ... Overdo it** – When laying the beams Shervill recommends to either increase the width of each beam or the quantity of beams to provide a solid platform to build on.

Content is copyright protected and provided for personal use only - not for re



**Ledgers Need Some Space to Breathe** – Do your best to keep the ledgers slightly away from your home so rot will be less likely.



**Hurricane Force** – Forget toe-nailing altogether and stick to these handy little helpers.

## Nails or screws?

I frame with hot dipped galvanized nails. Unlike “decking screws” which seem to be popular with some, galvanized nails last years and years without rusting. I will occasionally use 3 ½" #10 coated screws if the situation warrants it (a joint that needs to be drawn together for example). As a rule, however, nails are better.

## Attaching Joists to the Beam

Toe nailing is a no-no. The standard method of securing the joists in place on top of the beam is to “toe nail” them by driving a nail down through the side of the joist at a steep angle

so it exits the bottom and enters the beam. While this is fast and easy, it opens a cavity for water to enter the joists and also pierces the waterproof cap we put on the beam earlier. I prefer to use small galvanized metal plates called “hurricane ties” to attach the joists. These little plates are inexpensive (less than 50 cents) and allow you to attach the joists to the beam by nailing to the side of the joist and the face of the beam, cutting the chances of water penetration significantly.

and then capped with more 30lb felt. This beam now serves as the ledger to which the joists are secured. On houses where the footings are too deep for this to be feasible, extra concrete footings are poured beside the wall and the posts are rested on those. If required by code, the entire assembly is then bolted to the house with ½" galvanized threaded rod, nuts and washers passed through both the double ledger and posts. By building this way, the entire deck load is passed to ground rather than to bolts fastened to the house structure, and because the “back” of the deck is 2" from the rim joist of the house, water collection and penetration are never an issue.

## 5 Framing:

**Materials:** Most codes call for 2x8" joists on 24" centers as a minimum. This is another area where it pays to over build. Given the choice, I will frame on 12" centers and use 2x10" pressure-treated lumber. Overkill? Maybe, but the difference in cost is actually not that much and the resulting solid deck will resist flex much more effectively, keeping your fasteners tight longer. Also add blocking to the center of your span. Blocking is easy, inexpensive, and will greatly increase the rigidity of your deck as the joists are prevented from twisting

## 8 End cuts and Copper Chromate

Whenever you cut pressure treated lumber, you expose fresh wood that has not been treated with preservative, opening up a place for rot to begin. This is obvious as there won't be the tell-tale green colour on the faces of the fresh cuts. Fortunately, this is a quick and easy fix: Add your own preservative to your cut areas. Also labelled as “end cut preservative”, this is a chemical made expressly for the purpose listed above. Pour some into a can, brush it liberally on the cut areas and allow it to dry ... too easy.

## 9 Waterproof your Deck Framing

Most people will spray a waterproofer on their wooden deck boards to prevent premature damage, but the deck boards aren't where the rot is most likely to occur.

Content is copyright protected and provided for personal use only - not for republication

For reprints, please contact the Publisher.

Before I begin laying deck boards, I like to spray the bare framing down with a quality waterproofer, ensuring that it gets into every crack, crevice, seam and nail hole. This is another one of those steps that costs a little more, but think of it as added insurance. Remember, we only want to build this once!

## 10 Choosing Decking Materials

The decking is the area people spend the most time and money on. After all, it's the part people see! What many fail to realize, though, is that the decking needs to become part of the overall deck system to get the longest life, and just "looking great" isn't enough. Here are some tips to get the maximum life span out of your decking:

It sounds simple, but choose the best decking you can afford. Remember, your decking isn't only the part that you walk on; it's also the first line of protection for your framing. My first choice for decking is a PVC product sold under the name Azek, available through special order at Lowe's or [www.azek.com](http://www.azek.com). Unlike composites, Azek does not contain wood fibre, it works like wood, is relatively light, and is very hard. Also, because it is essentially pure plastic, it allows me to attach the deck boards from the top down with stainless steel deck screws (my preferred method) without fear of damage due to water collecting in the screw holes.



**Slap on the Preservative** – When you cut pressure-treated lumber, you expose untreated areas of wood (left). By applying a healthy coat of preservative (right) you will slow rot dramatically.



If you are set on using wooden decking, consider some of the alternative woods available (such as Ipe) before placing your order. Some of these new woods last for years with little maintenance and can be a great choice. If you choose to go with the "old standby" choices of either pressure-treated lumber or cedar, strongly consider going with lumber that is a full 1.5" thick as opposed to the 5/4 radiused-edge decking that has become so popular. Two-by lumber is generally higher quality, is definitely stronger and, in my experience, far outlasts the thinner decking.

## 11 Fastening Deck Boards

There are all kinds of hidden fastening systems now available, but I still prefer driving quality stainless screws down through the tops of the boards and into the joists. Why? Because by having access to the screws, individual boards can be removed easily should they become damaged or if access to the underside of the deck is required. One extra tip: if you took my advice during the framing stage and framed on 12" centers, you can attach your boards by driving screws into every-other joist with no loss of strength. Screws driven on 24" centers look great, and doing it this way reduces not only the number of fasteners required but also the number of pockets that water can collect in.

## 12 Let it Breathe

It's best to leave the sides of the deck open to allow air to circulate. Letting air get under the deck will help remove moisture and prevent rot throughout the entire structure. This will also allow access to space under the deck for storage.

That's it! With a little extra work and a small investment in better materials, you can build a deck that not only looks great but will be around to enjoy for a long time.

Content is copyright protected and provided for personal use only - not for

BY RYAN INMAN

Choose the style and scale based on your preferences and intended site. Here's an option – if the wall size permits, why not make the sliding door bigger than the entryway itself, perhaps much bigger.

But before we get crazy, a word of warning: this project entails a heavy dose of hand-planing; doors just have an extensive surface area by nature. Depending on your chosen wood, potentially difficult hand-planing of figured wood is involved. And depending on your design, there's potentially lots of parts to keep track of.

A sliding door can be a great alternative to a swing door; they are excellent space savers. I made this door for a pantry, but they are a feature in any space. Making one is an opportunity to practice lots of fundamentals, but with oversize parts.

I planned this project much the same as all my projects: some doodles in my sketch-pad, much deep thought, much staring at the lumber rack, some waiting around for inspiration to kick in, a rough mock-up (mainly to get a handle on the joinery involved), a full-scale drawing on Google SketchUp. All of it was worth doing, as I wanted to be sure I got this right the first time.

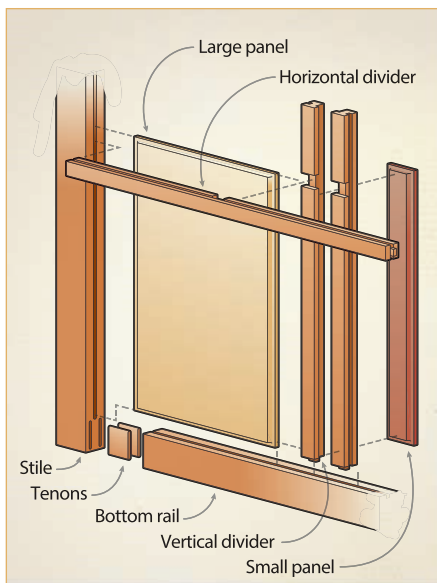
## Milling the parts

I chose a behemoth 12/4 black walnut board because it had straight grain running along its edge and it was much straighter than anything in the 8/4 bin. To make the milling more manageable, I started by flattening the edge of the plank on my jointer, leaving the faces rough. I then ran this flat edge against my bandsaw fence, making the parts slightly oversize. Once I had my frame parts roughed out, I then milled them on the jointer and planer and crosscut the rails and stiles to final length. This

Content is copyright protected and provided for personal use only. This is not for sale. For reprints, please contact the Publisher.

# Make a Sliding Door

A sliding door should be considered a piece of art hanging on the wall. It should be nicely made and should always showcase beautiful wood.



**Sledding it** – A planer sled does a half-decent job of flattening pieces that are too large for a jointer.

I started by cross-cutting the arbutus slab into four slightly oversized pieces. I built a planer sled to flatten a face of the pieces. With one flat face I ran the pieces through the planer without the sled. I then jointed one edge of all four pieces, ripped the opposite edge to oversize width on the bandsaw and lightly passed the fresh edge on the jointer to clean it up.

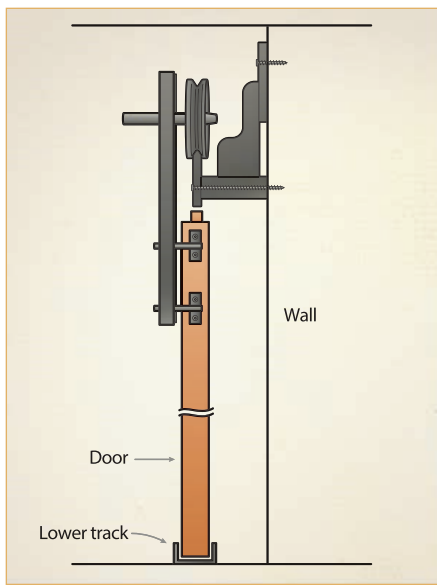
I re-sawed the four pieces on the bandsaw, giving me eight book-matched panels. At this point I left the machine room and started the re-flattening and surface preparation using hand planes. Re-flattening on the planer sled would have been an option, but given the figured grain I was dealing with I didn't want to risk tear-out on the show sides. Once I had re-flattened the bandsawn surfaces by hand, I sent the panels through the planer to re-flatten the opposite side. It's a good idea to clamp a thin sheet of plywood to the planer table to avoid marring the hand-planned surfaces.

## Hand Work

It's important to label the parts and keep track of how the panels were sitting inside



**Booking it** – The Arbutus pieces are re-sawn on the bandsaw with a high fence.



approach saved wood and was safer and easier. After crosscutting, I shot the ends of the rails with a sharp low-angle jack plane and shooting board to get them perfectly square. The panel divider frame can also be milled at this point, but cross-cut oversize for now.

Content is copyright protected and provided for personal use only - not for reproduction



## Materials List

Part	Qty	T	W	L
Stile	2	1 1/2	2 7/8	81 3/4
Rail	2	1 1/2	2 7/8	25 5/8
Horizontal Dividers	3	1	1	26 1/8
Vertical Dividers	2	1	1	82 1/4
Large Panel	8	3/4	11 1/2	19 3/8
Small Panel	4	3/4	2	19 3/8
Tenons	8	3/16	2.00	to fit



**Get into the Groove** – Two fences are better than one. Rigging your plunge router with a fence on both sides keeps you going in a straight line.

the plank, so you know how to assemble them. Before you know it, there will be lots of panels floating around the shop. In this case, I wanted the panels to be in plank sequence and book-matched. I thought I had done pretty well here, but the bottom left panel still somehow managed to get installed upside down (but I'm over it).

Of course, it is best practice to let the wood rest and acclimatize for a week or more after the initial milling before milling to final dimension.

### Grooves

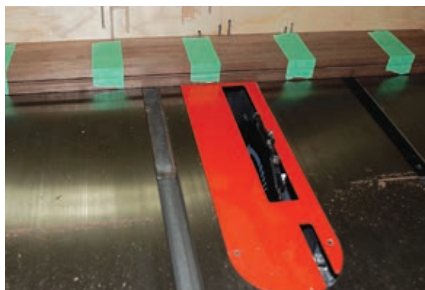
Now it's time to cut the grooves into the door rails and stiles, and also the thinner divider frame pieces. I used a plunge router with a 1/4" straight bit for these. The grooves are about 5/16" deep.

### Mortise and Tenon Joints

I joined the frame rails and stiles with double 3/16" mortise and floating tenons, being careful when laying out not to



**Double it Up** – I use a horizontal mortiser with an XYZ table to cut my mortises. Notice the shop-made spacer underneath the workpiece for consistently spaced mortises across pieces. Once the loose tenons are fit, they can be glued into the rail mortises.



**Stack 'em Up** – Consistency is everything. Fitting is easier if the relevant dados are the same size. Gang up the three horizontal pieces and cut to layout lines. Do the same for the two long vertical divider frame pieces.

Content is copyright protected and provided for personal use only - not for reproduction

For reprints, please contact the Publisher.



**Sneak up on it** – Set the depth of cut just shy of half the thickness of the divider frame pieces, then clean up the bottom of the dados by hand. With this set-up, the file is kept flat (two at once with a spacer in-between). This should produce a reasonably flush fit before hand-planing the faces, and the grooves for the panels must line up nicely

interfere with the groove that will house the panels. Generally speaking, mortise and tenon joints don't get their strength from their thickness, so a  $\frac{3}{16}$ " thick tenon is ample. Mortise and tenon joints get their strength from glue surface area, which I have more than enough of here. This is why I like to double up thin mortise and tenons, and also maximize the width of the joinery. I make my mortises  $\frac{3}{4}$ " deep. The strength of the joint is also dictated by how well they fit. I mill my tenons so they are just starting to enter the mortise, and then use sandpaper stuck on a flat surface to fit them to the mortise. I know the fit is right when there's no slop, but I can take them in and out by hand. This also means you won't have a fight on your hands during glue-up.

Mortises should be cut after milling the walnut, but before hand-planing, to keep everything consistent. When cutting double-mortises, I mill a spacer equal to the mortise thickness plus the distance between the mortises. One mortise is cut with the spacer, the other without; this keeps the distance between the mortises consistent across all pieces. With the spacer method, the height of the mortiser table is not adjusted for each cut (which would inevitably introduce differences into the mortise spacing), and any snipe in the workpiece cannot throw a wrench into your spacing. Be sure

to machine the mortises in the bottom and top rails so the rails sit slightly proud of the stiles. This way you can simply plane the face grain of the rails flush with the end grain of the stiles.

## Half Lap Joints

I followed Gary Rogawski's method for cutting and fitting the half laps between the divider frame members. This is a great way to avoid gaps in a half-lap joint. Instead of trying to cut the dados to the exact width, the dados are cut slightly undersize (about  $\frac{1}{32}$ " less than the width of the pieces before any hand-planing), then the edges of the two pieces are hand-planed to fit. The face sides are also hand-planed once the edges are sized.

Next, cut the tenons on the end of each of the dividers. I used a tablesaw to remove most of the waste, then fine-tuned the joint with hand tools.

## Panel Fitting

The panels can be cross-cut to final length and width. Measure carefully for each, and allow some breathing room for the panel. Again, labelling and keeping track of which panel goes where is critical.

To fit the panel to the groove, I reduced the outside edges on both sides of the panels to make a tongue. To do this I use a router table and a router bit that I've had modified by my local sharpening shop. It's a rabbet bit with the 90 degree corner ground into a small radius. This allows me to cut the rabbet so that the panel is just starting to fit into the frame, then I can clean up and ease it home using a sanding block (with the matching radius). Again, the off-cut with the groove is useful for test fitting. You're aiming for a snug but relaxed fit (so you're not fighting assembly), with no gaps. I left myself with a fair bit of sanding to do here, so probably should have taken off a bit more at the router table. Alternatively, you could try using Lee Valley Tools bit #16J66.51, perhaps in combination with a shoulder plane.

Because the show side is already a hand-planed finish, try using a marking gauge to scribe the face, to reduce possible tear-out from routing, particularly across grain. You

Content is copyright protected and provided for personal use only. Not for re

could use a test board on your final pass to set the marking gauge. I didn't do this, so was left with a few more passes with my hand plane.

When routing across grain, it's typical to have a small blow-out at the end of the cut, particularly if the long-grain edge has already been profiled, preventing you from supporting those fibres. You can get around this in two ways. You can use a supporting block to make the end-grain passes and make all the end-grain passes first, followed by all the long-grain passes. Because I was making multiple passes, changing the bit height and fence with each, I opted to make the end-grain pass and then the long-grain pass for each table setting. In the one or two instances where the long-grain pass didn't clear the tear-out, I moved the fence a touch (same bit height) and made another pass down the long-grain to remove it.

To allow assembly of the two center panels, which are completely captured by the half-lapped divider frame, I converted the grooves on the back of the center horizontal divider into rabbets by removing material from one side of the groove. I did this on the router table.

## Hand-planing

Now it's time to catch up with any surfaces that haven't been hand-planed and edges that haven't been softened. The mortise and tenon joints will need final fitting as well. It's also a good time to drill the door frame for the handle. Given the scale of the surfaces, I typically started things off with my low-angle jack plane, then polish them with my smoother. I also sanded the panels with 400 and 600 grit sandpaper because the Arbutus was figured and the grain was a little 'spikey' in places.

## Assembly

With all parts ready and separated, it's a good time to pre-finish everything with your chosen finish. Then it's time to dry fit the rails and stiles, set a diagonal stick, and start gluing up and sliding everything together.

First I glued up a stile with two rails, with the second stile in place but not glued. I then threw a couple of clamps on and made sure I was square. While that dries



**Flush-up** – Flush up the face of the joint with a block plane to eliminate any discrepancies introduced from hand-planing the individual faces.



**Quick and Easy** – The tiny live tenons on the divider frame are roughed out on the tablesaw, then cleaned up with a chisel and file to fit the groove. Before making the live tenons, cross-cut the divider frame pieces to final length (including the live tenons) by dry fitting the door frame and using measuring sticks.



**Bringing it Home** – Use a block plane to shape the edge of a sanding block to match the radius of the router bit.

Content is copyright protected and provided for personal use only - not for reproduction

For reprints, please contact the Publisher.



**Shoot It** – Flushing the top and bottom of the door calls for a rather large shooting board. The one end of the door rests on a shop-rigged adjustable sawhorse and the other end on the bench with a spacer.

the panels and divider frame can be assembled, but nothing is glued here. The panels float in the divider frame. The panels and divider frame assembly can then be slid into the door frame once it is out of the clamps (best to have a relaxed fit between the panel tongue and the frame groove; I had to tap the panel assembly down carefully with a mallet). With the panel assembly in place, it's time for the final glue-up of the second stile onto the top and bottom rails.

## Finishing

Using my low-angle jack plane, I flushed the top and bottom edges of the door. This was straightforward, especially as the joinery was cut so as to make the rails slightly proud of the end-grain of the stiles, as explained above.

The door is now ready for the rest of the finish coats and the hardware installation. I used to rub out between coats with Lee Valley's 0000 steel-wool, but have recently been using their new Siawool with good results. It doesn't leave steel debris behind, which can get into the wood pores and cause problems with some finishes.

I made my own exposed sliding door track, hanger hardware and floor guide. For those sensible folks who want to stick to woodworking, there are a few companies out there making exposed sliding door hardware, but be warned, based on my enquiries they can be expensive. You could look into

[www.kncrowder.com](http://www.kncrowder.com), [www.richelieu.com](http://www.richelieu.com) systems and [www.draftseal.com](http://www.draftseal.com) (who carry Kristrak products). Kristrak also makes ceiling mounted or concealed-type systems that are more affordable and could probably be adapted to your particular site.

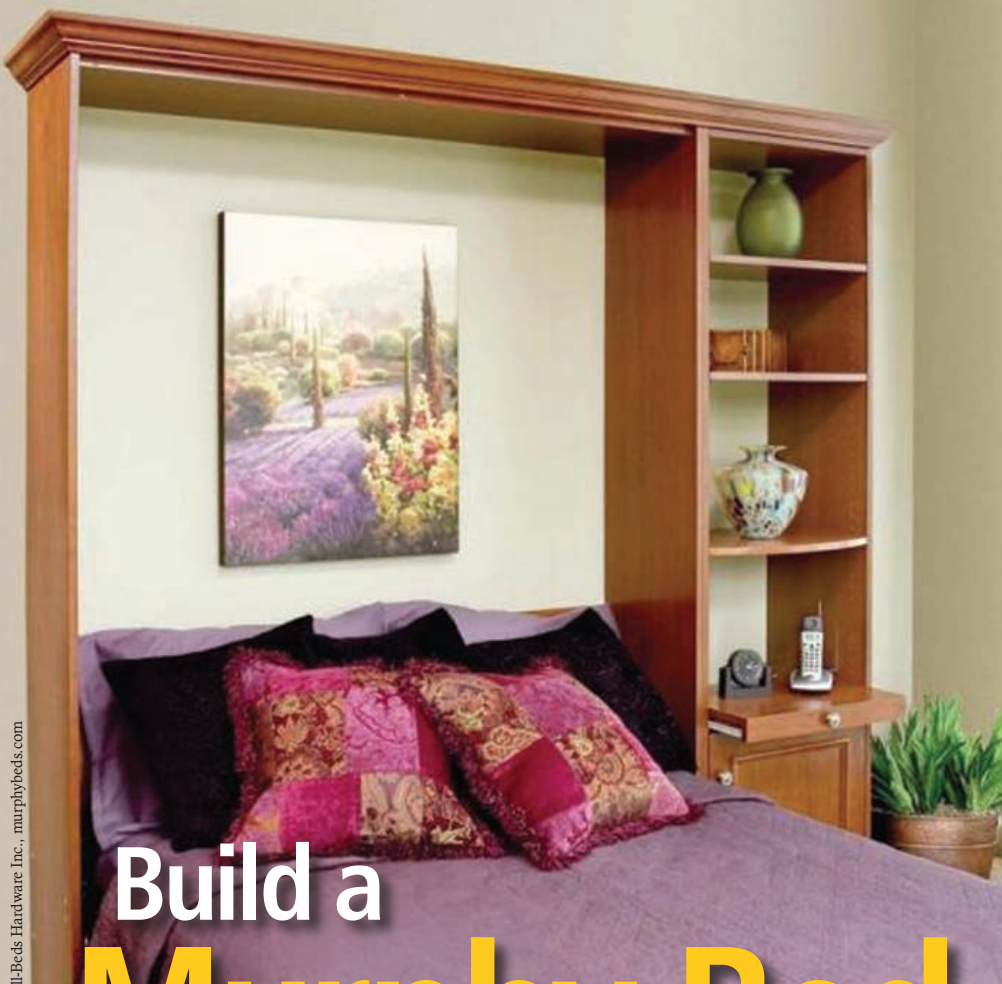
For those interested in making their own hardware, it's important to design a system that has door stops at both ends (to prevent the door sliding off the track), an anti-lift bar (to prevent the door lifting off the track), a floor guide (to prevent the door pulling away from the wall in use), and sturdy brackets to hang the track. I used garage door pulleys available from Home Depot (SKU7113, they come with bearings), and fabricated the rest of the parts from flat bar and round bar. I kept the anti-lift simple and attached two small removable wooden blocks to the top edge of the door. You could also try your hand at making wooden sliding hardware or simply use hinges to mount the door.



**Get Creative** – Making your own sliding door hardware is fun and the possibilities are limitless. Notice the small wood block screwed to the top of the door. It stops the door from being lifted off the track when in use, and can be removed if you want to take the door off the track.

Content is copyright protected and provided for personal use only - not for re

Illustration by James Provost; Lead photo courtesy of Murphy Wall-Beds Hardware Inc., murphybeds.com



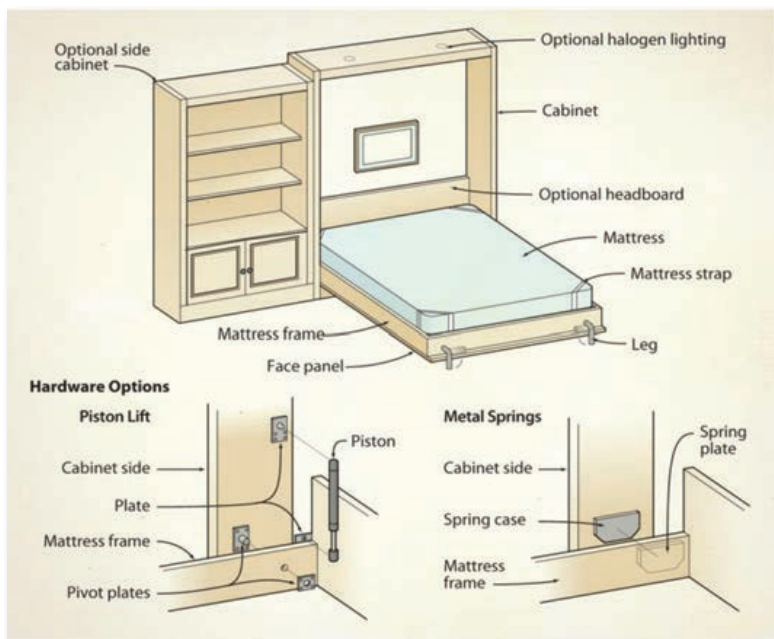
# Build a Murphy Bed

Maybe the kids have flown the coop and you want to use the bedroom as an arts room, but don't want to lose the bed. Or perhaps you've started a home-based business, and really need to turn the guest room into an office – but still need to accommodate Aunt Edna's bi-annual visits. What's the creative home handyperson to do?

beds, after the inventor of the first modern wall bed) provide a convenient, affordable way to extend the usable floor space of any room. As the name implies, a wall bed is just that – a bed that is stored against a wall. Placing a bed, horizontally or vertically, into a cabinet and securing the cabinet against the wall is not too complicated. If you've ever built a hutch, corner cabinet or similar large scale piece of

Wall beds (also referred to as Murphy beds) are copyright protected and provided for personal use only - not for resale.

For reprinting, please contact the Publisher.



furniture, then you likely have the skills to build a wall bed.

Essentially it involves building a frame (to hold the mattress), building a cabinet, into which the frame and mattress fit, and attaching a set of legs to the box. The legs typically fold up against the side or end of the frame, or in more elaborate cabinets, are integrated into the face panel. A pair of metal springs or a piston lift enable you to easily and safely lower or raise the bed frame into the box. A latch holds the mattress frame securely in the cabinet in the closed position, and mattress straps keep the mattress taut against the mattress frame. Fitting the hardware to the mattress frame and the sides of the cabinet is likely the most time consuming part of the project.

The cabinetry that surrounds the bed can be as simple or ornate as you would like. The least expensive option, and perhaps the option of last resort, is to build the entire wall bed out of melamine. A more attractive option is to use a combination of AA grade plywood and solid wood to match the other furnishing in the room.

You can add side options (bookshelves, or other cabinetry) or incorporate halogen lighting into the top of the cabinet frame. The side options can be added at a later date. While you could build separate doors for the cabinet for a more formal look, typically the face panel on the mattress frame serves as the door to the cabinet. The face panel can be something as simple as a sheet of plywood, or as elaborate as a frame and panel affair.

You can mount a single, double (full) or queen sized mattress into a wall bed, and have the bed open horizontally or vertically. If you need to purchase a mattress do so at the start of the project, so you can verify the dimensions of the frame and cabinet. Cabinets are typically 16" to 18" deep, and approximately 88" (7' 4") high. Note that wall beds don't use box springs – the mattress frame usually incorporates a plywood base or wooden slats on which the mattress rests. As well, pillows are typically stored in a closet or chest of drawers, and not on the mattress when it is closed.

Some companies such as [murphybeds.com](http://murphybeds.com) sell complete wall bed kits (without

Content is copyright protected and provided for personal use only - not for re



the mattress). Expect to pay upwards of \$2,000 for a basic melamine bed system with a wood tone finish. Hardware kits, which include the spring mechanism and legs and start at about \$350 are also available at [murphybeds.com](http://murphybeds.com) or [leevalley.com](http://leevalley.com). A piston lift kit is slightly less expensive. If the kit you select doesn't come with a wall bed plan, then it's a good idea to purchase a plan, [leevalley.com](http://leevalley.com). The plans will give you the construction details required to build a

basic bed, and you can easily customize the design to suit your specific needs.

If there is a wall bed retailer in your locality, visit the store to get a better idea of how they are constructed. Before building, purchase a plan and spend some time reviewing it. And give yourself time – building a wall bed is not a weekend project, but then again, it is well within the scope of any woodworker with intermediate level skills.

Content is copyright protected and provided for personal use only - not for reprints.

For reprints please contact the Publisher.

Want more Home Improvement projects and techniques like the ones in this booklet?



Then join the most popular and fastest growing woodworking forum in Canada.

Registration is free and easy, and you'll be connected 24/7 to hobby and professional woodworkers from across Canada.

Whether you're building fine furniture, turning, scroll sawing, or trying to solve a pesky home improvement problem, the forum is the place to ask questions, join in discussions or browse extensive archives and tutorials.

There is even a special area for new woodworkers who want answers to the very basic questions every new woodworker faces.

Other areas deal with designing your work shop, using power and hand tools, and a swap meet where you can buy and sell woodworking-related items.

**JOIN TODAY - IT'S FREE!**

[www.CanadianWoodworking.com](http://www.CanadianWoodworking.com)

For reprints please contact the Publisher.

Woodworking