

Make a Muskoka rocking chair from composite wood

Give this cottage classic a twist with new materials and a base that rocks

By Ryan Shervill



Photo by Roger Yip

When I started talking about this chair project, it seemed simple enough: build a unique Muskoka chair. Then the idea grew, and what I ended up with was something extraordinary. It's a rocking Muskoka chair that folds and is made from [composite wood](#)! How's that for an imaginative project design?

With all the parts that make up this project, and the requirement for accuracy, it's a good idea to use template routing to produce the parts. You not only get perfectly matched parts, but the templates can be used over and over to build more chairs. As friends and neighbours start requesting chairs of their own, the initial time invested in making the templates really pays off. Use the plans as reference when building the project.

[Download the template here.](#)

Instructions

Template Time

Because it's best to make all the parts from templates, I haven't provided a traditional materials list. However, you can use the Materials List for gathering what you need.

To start, you need to make all the templates. Take your time, since accurate parts are key. I like to use a sheet of 1/4"-thick hardboard for this process, and mark out a grid of 1" squares to aid in drawing the shapes. Hardboard cuts and shapes easily, and at 1/4" thick, it's perfect for guiding the travel of a bearing-guided flush-trim bit for pattern routing.

Use the drawings to draw each template, as well as any hole locations. While you are at it, write technical notes (for example, "drill 3/4" hole on inside face") right on the template. These notes make things easier if you decide to build more chairs later. Cut the templates slightly oversize with a jigsaw or bandsaw, and then sand up to the layout lines. Finish by marking and drilling any required holes.

Once your templates are all cut, it's time to put them to use. With your boards lying flat, position the templates on top to get the most yield from your lumber. Use 5/8" brad nails to fasten the templates securely to your stock, then rough-cut the chair parts. Cut as many of the straight parts as you can to width and length on the tablesaw, cutting curved areas with a jigsaw. As you work, stay a safe distance away from the template edges-about 1/16".

Now comes the fun part: routing your wood. If you're using composite to build your chair, as I did, a standard flush-trim bit won't work well. The composites involved just don't react well to standard straight-edged bits. For this project, I decided to try Freud's 1/2" up-cut spiral flush-trim bit, and it worked very well. The solid-carbide bit held its edge, and the spiral geometry of the cutter sheared the composite material instead of chopping it away like traditional bits do. The shearing action also helps hold the stock tightly to the table. Adjust the height of your bit so the bearing rides along the template only, while the cutting edge contacts just the wood that extends beyond the template's edges.

Digging Some Holes

There are three types of holes you need to drill. There are 3/4"-diameter x 9/16"-deep holes to accept the rotary hinges, 7/8"-diameter countersunk holes for the flat washers and nuts on the ends of the torsion rod assemblies, and

5/16"-diameter through-holes to accommodate the threaded rod inside the copper pipe. Lay out the holes accurately—they're critical for a smooth folding action. A drillpress is best, but for holes that can't be bored on this machine, clamp these pieces vertically in a bench vise and bore the holes carefully with a handheld drill. Other parts that require special precision:

Pivot Arms: Drill the two 3/4"-diameter x 9/16"-deep holes on the inside faces as indicated on the template, and then drill the remaining 7/8"-diameter hole to a depth of 3/16" on the same face. Turn the piece over, and drill a second 7/8"-diameter hole on the opposite side, boring this one 7/16" deep. Finally, switch to a 5/16"-diameter bit and drill through the piece completely, centring the bit in all the 7/8" holes. During assembly, the 3/4" holes will accept the rotary hinges. The 7/8" and 5/16" holes are used by the copper pipe and threaded rod of the torsion assemblies.

Front Legs: There are two 3/4"-diameter x 9/16"-deep holes in each leg, drilled in opposite faces. Position the template on an inside face and drill the hole located at the mid-point of the leg. Reposition the template on the opposite side and drill the hole at the top of the leg. You'll also need to notch the bottom ends of both legs.

Arm Braces: These require two 3/4"-diameter x 9/16"-deep holes each. Drill these holes on the inside faces only.

Mid/Bottom Backrest Crosspieces: These require a 3/4"-diameter x 9/16"-deep hole drilled in both ends of each piece. Mark the centre of an end by drawing lines from corner to corner and use a handheld drill to add the holes.

Main Beams: These each receive two 3/4"-diameter x 9/16"-deep holes on their outside faces.

Rockers: You need two 7/8"-diameter x 7/16"-deep holes on the outside faces of each rocker. The forward holes also require a 7/8"-diameter x 3/16"-deep countersunk hole on their inset faces. Finally, continue through the centre of the 7/8" holes with a 5/16"-diameter bit.

No Time to Rest



With the shaped pieces done, it's time to make the seat slats, backrest slats, rear vertical support and the front caps. Since all of these parts have straight edges, they don't need templates.

You will need six pieces for the regular seat slats, each one $2\frac{1}{4}$ " wide x 20" long. The easiest way to make the slats is to cross cut three pieces of decking lumber to length, then rip the pieces to width. The seven vertical slats for the backrest start as $2\frac{1}{2}$ " x 31" pieces, but taper down to $1\frac{7}{8}$ " wide at the base, creating a fan shape on the backrest.

Start by cutting all of the pieces to width and length, then use a tapering jig on the tablesaw or a hand plane to cut the taper. The curve at the top of the backrest is actually cut after the chair is assembled, so leave all of the verticals at full length for now.

When cutting the slats, you'll end up with one sharp edge and one factory-rounded edge. Duplicate the rounded edge by putting a bearing-guided $\frac{1}{4}$ " roundover bit in a table-mounted router and raising it just enough to take the sharp

corner off of the boards. Use the same set-up to ease any other sharp corners on the other chair components as well.

Finish up by cutting the arm braces to the dimensions in the drawing from a piece of scrap, and saw a full-width piece of decking to 11" for the backrest vertical support.

Don't Get Puzzled

With 34 pieces all cut and sitting in a pile, it looks like you have the world's biggest jigsaw puzzle to put together. Thankfully, once you get started putting everything together, it gets much easier to visualize the final assembly.

There are two key components that make this chair work. The first is the use of 3/4"-diameter Roto-Hinges. These unique hinges are essentially two pieces of hardwood and a small washer on a central shaft. The configuration of these hinges allows the two halves to rotate independently of each other, and they're a great piece of hardware to use anytime you need something to pivot. I did find some of the hinges to be a little loose for this chair, but they were easily tightened by placing the flared end of the metal shaft against my metal vise and tapping the other end with a hammer.

The other unique components are two torsion-rod assemblies that hold the base together. I made these assemblies using standard 3/4" copper pipe, 5/16" threaded rod, 5/16" washers and lock nuts. The copper is braced between two components and a threaded rod is passed through the components and the pipe. As the nuts are tightened on the rod, the tension tries to compress the pipe. The result is a very rigid support between the components.

To make the two torsion bars required for the base of the chair, cut one piece of 3/4"-diameter copper pipe to 18 1/4" long for the rear bar, and a piece of 5/16"-diameter threaded rod 22" long to go inside. For the front bar, cut another piece of copper pipe to 22 1/4" that will receive a 24" length of the 5/16"-diameter threaded rod.

Bringing all the components together is much easier with an extra set of hands, but a couple of bar clamps you can use with one hand will do if you are working solo. Start by inserting a 5/16"-diameter washer into each of the inside countersunk holes in the front of the rockers, and then insert the copper pipe and threaded rod between them. With the washers in place, you should have about 1/8" of depth left in the inside countersinks to give the pipe ends a place to register. The threaded rod should protrude through the sides of the rockers and into the 7/16"-diameter countersinks on the outside of each rocker. Place another washer over each end of the protruding rod, and thread a lock nut on each end. With help (or a pair of strategically placed locking pliers), tighten the nuts on each side until the tension makes the assembly rigid. Don't be too gentle when tightening—the tighter, the better.

With the forward bar in place, it's time to assemble the two main beams and secure the seat slats between them. Orient the main beams so the holes are on the outside, and attach the seat slats with 2" deck screws driven through predrilled and countersunk holes.

Next, join the mid- and lower back crosspieces with the rear vertical support, again using 2" deck screws in predrilled holes, with four Roto-Hinges glued in the ends of the crosspieces.

If you're using composite for your chair, as I did, regular wood glue won't hold the hinges. The best approach I found involves roughening the inside of the holes with 100-grit sandpaper before swabbing a layer of polyurethane glue inside. Give the hinges a wipe with a damp rag before insertion to ensure there's enough moisture present for the glue to cure.

The last preassembly step involves joining the front legs to the arm braces with more Roto-Hinges. Use the top hole of the leg and the forward hole in the arm support, then set them aside to cure fully before beginning final assembly.

With the seat base, arm components and rocker assemblies done, it's time to bring the whole thing together. In the final assembly, the order in which the parts come together is very important. Going out of sequence will result in having to disassemble the joints and starting over.

Final Assembly



1. Apply glue to the remaining hinge holes, insert roto-hinges and begin assembly by bringing together the front legs with the main beam. Join the rear ends of the arm braces with the ends of the mid-backrest crosspiece.
2. Bring the pivot arms together around the main beams, ensuring the bottom backrest crosspiece is attached to the pivot arms' top holes. The rear torsion rod and its washers sit between the pivot arms' bottom holes.
3. Feed the threaded rod through the torsion rod/pivot arm assembly, place washers over the ends of the rod and then tighten the nuts firmly. Ensure there's 1" of extra rod sticking out the side of each pivot arm.
4. Spread apart the back portion of the rocker assembly and slide it over the protruding rod ends, allowing the rod ends to enter the 5/16"- diameter predrilled holes at the rear of the rockers.
5. Secure the rockers to the chair with more washers and lock nuts, but do not overtighten these nuts. They need to be just loose enough for the rockers to pivot on the rods.

6. Attach the arms and backrest slats with 13/4"-long deck screws, ensuring the bottoms of the slats are in a straight line. If desired, you can attach the arms from the bottom by drilling three countersunk holes in the undersides of the arm braces and then driving the screws up into the armrests.

7. Attach the top backrest crosspiece 10" above the mid-backrest crosspiece, and mark the arc across the top of the backrest slats. Cut the arc with a jigsaw, then ease the sharp edges with some 120-grit sandpaper wrapped around a sanding block.

8. The last step is to position the front crosser. To do this, unfold the chair, and ensure the front torsion bar is locked firmly into the notches on the front legs. Place the front crosser across the legs and slide it up until it is firmly against the underside of the main beams. Clamp the crosser into position, and secure it by predrilling and driving four more 13/4"-long deck screws.

With your rocking chair all done, it's time to find the perfect place to sit down and show it off. But you won't be sitting for long. Soon enough, you'll have requests for more chairs.

Tools and Materials

Part	Material	Size (T x W x L*)	Qty.
Decking	lumber	5/4" x 6"	48'
Rod	threaded	5/16"-diameter	2 @ 24"
Pipe	copper	3/4"-diameter	2 @ 24"
Lock nuts		5/16"-diameter	6
Washers		7/8" outside diameter	10
Hinges	Roto-Hinges LV #00S01.05		10

* Length indicates grain direction

Plan

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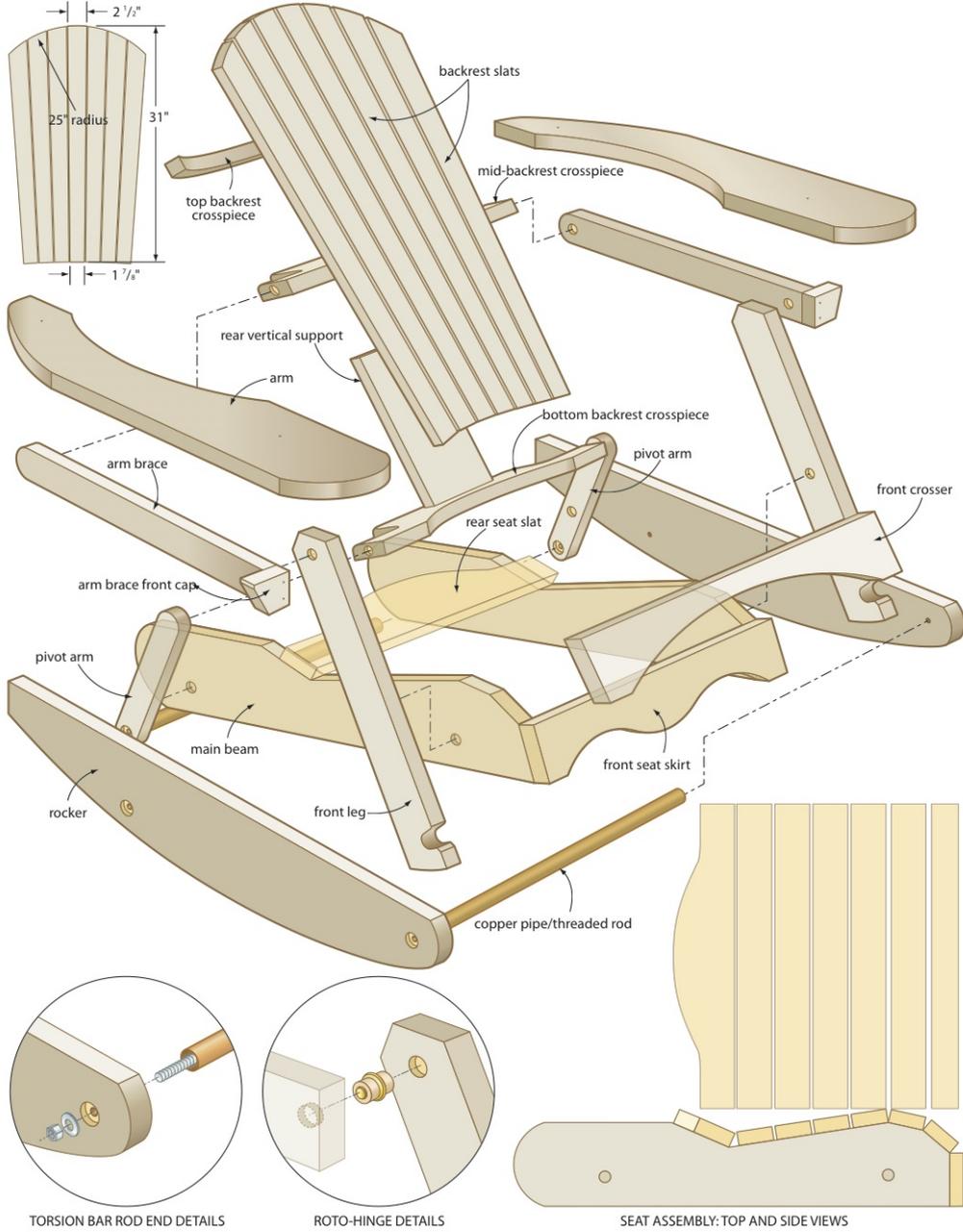


Illustration by Len Churchill