Build A Sculptured Rocker

with charles brock

Tortoise & Chair Publications
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This book is part of the *Build Sculptured Furniture* instructional bundle series. This book is a companion piece to the *Build A Sculptured Rocker with Charles Brock* DVD, full-size patterns and online support.

dedication

This book and video are dedicated to Sheila, Emily, Steve, Keri and Ava. Thanks for your love and support!

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contact

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Build A Sculptured Rocker with Charles Brock
To be sold only as a Bundle of Companion Components:

Build A Sculptured Rocker with Charles Brock DVD
Build A Sculptured Rocker with Charles Brock Book
Build A Sculptured Rocker with Charles Brock Full-Size Patterns

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WARNING!

Woodworking can be very dangerous. It is your responsibility to take the proper precautions and to use appropriate judgment.

1 Never work in the shop while tired, sleepy or under the influence.
2 Use all guards that come with power tools when possible. Guards have been removed in the DVD and in the book for visual clarity.
3 Wood dust is a known carcinogen and can cause allergic reactions.
4 Appropriate shop glasses should be worn at all times.
5 Read the manuals that come with your tools and follow their directions.
6 Read the book and view the entire video before performing any of the tasks demonstrated or described.
7 Never perform a task seen in this video or described in the book that makes you feel uncomfortable.
8 Never wear loose clothing or jewelry while woodworking.

chapter one

The Inspiration for Making A Sculpted Rocker

Do you remember when you first saw a Sam Maloof rocking chair? I think the experience is one of those watershed moments, especially if you are a fine woodworker. I knew I wanted to see one, touch one and build one before time took away the opportunity. The rocker I saw became a dream and a favorite on my "bucket list" of woodworking projects.

figure 1.1

As my skills grew, I finally decided to tackle the functional art of chairs. My journey led me to Michael Dunbar's school in New Hampshire to study the art of Windsor chairmaking. I was immediately hooked on the hand tools and shaping process but wanted to pursue chairs that were more art than replication. I designed and built some dining room chairs and explored some lines that were interesting, but what I really wanted to do was build a rocker like Maloof's.

There were several things that stood in the way of even starting this project. All of those flowing lines would be a problem, because nothing is square. What about the rocker's geometry? It has to rock, support the sitter and look like it's always in motion. A 1983 edition of Fine Woodworking had an article by Maloof with pictures of his contemporary rocker, which I studied until I wore a hole in the magazine. Sam's article was a narrative describing how he builds his rocker. It didn't give me enough information or confidence, I needed more! It makes perfect sense to me, now that I am experienced.

My journey led me to build a Hal Taylor chair. It is a fine, comfortable and brilliantly designed rocker. Though, it still was not the chair with the reverse curve on the rockers, or deep sculpted seat with a proud pommel and the flowing arms. Hal's wonderful chair got me started. My dream was to build a more organic looking chair. Maloof had inspired me to build a rocker that looks like it is always in motion.

A workshop weekend with Sam Maloof taught me a lot about Sam and how an artist works. Thank goodness I got to see and touch his rocker. That knocked two items off my "bucket list." When the security guard wasn't looking my fingers caressed every inch of that chair. It was a great experience!

The bottom line on the weekend was I didn't really get what I needed in details to build the rocker from Sam. I realized that my rocker would develop through diligence and thoughtful work, just like Sam's developed. I continued developing my skills and ideas through many rockers and commissions until I built the rocker that is the subject of this material. This chair is more similar to Sam's chair but is still my own in so many ways.

I've concluded that I will never make Sam's chair and shouldn't nor couldn't. I am hopeful the journey helps me find an organic, flowing rocker that becomes my own. Each rocker is a step on that delightful journey.

chapter two

Making Your Sculptured Rocker A Reality

figure 2.1

As a teacher and woodworker my goal is to help you with your dream to build a sculptured rocker (Figure 2.1). My purpose is to give you the knowledge and confidence to build your own chair by utilizing the four companion parts of the instructional bundle. Utilizing these instructional materials you should be able to:

1 *Select and order wood for your chair project.*
2 *Cooper and sculpt a seat*
3 *Band saw and shape the front legs.*
4 *Band saw and duplicate the back legs.*
5 *Cut and assemble the signature seat to leg joinery.*
6 *Band saw and fit the arms, headrest and spindles.*
7 *Laminate the rockers.*
8 *Assemble the rocker with the proper glues, screws and plugs.*

When you reach this point you should be able to shape and carve your rocker to taste, creating a sculptured rocker with a final touch of your own artistry.

your bundle consists of

Full-Size Patterns
Book
Instructional DVD/Video
Online Support

All of these components work together facilitating your successful completion of the chair.

making the patterns

The patterns must be transferred to a thicker material to be used for tracing on to your stock. I use various materials depending on the way the particular pattern needs to be used. Use the list below to make your choice:

The back leg side profile should be made out of 1/4" to 3/4" hardwood plywood. This is especially important if you intend to trim your back leg with a copy bit at the router table. The extra thickness will give you plenty of bearing surface to support the pilot bearing.

The remainder of the patterns can be made from 1/8" hardwood plywood making them lightweight and flexible.

The following tools can make this process easier and are ordered by priority:

An oscillating spindle sander for inside curves

Sanding Block (100 grit paper)

A stationary belt sander with an articulating table set to 90 degrees

Rasps and files (both curved and flat surfaces)

Microplanes (both curved and flat surfaces)

gluing the paper patterns to the material

Gluing the paper patterns to the plywood or other material can be tricky. A good spray adhesive made for paper will generally work well. Cut off a scrap from the pattern paper and test glue the paper to the plywood or pattern material. Test for open-time, adhesion, ability to make adjustments if necessary and general fitness for the task. Do not begin until you are satisfied with the results. After the paper patterns are mounted the inside surfaces must be sanded smooth to make tracing easy.

the pattern making sequence

Rough cut the paper patterns leaving a 3/8" to 1/2" of an inch outside the line.

Glue the pattern to your choice of plywood or other material.

Band saw to the line before sanding the line smooth or until it just disappears.

Write any important measurements or other useful information such as rough stock sizing, right hand or left hand on the pattern. A date or style name can be very helpful in establishing benchmarks.

using the book

Although the video is worth a thousand words in this case, everything could not be included in the DVD. So I decided to write a book as its companion to further explain the process. The book includes details you will need: special measurements, hints, tool lists and my notes on each part of the process. I have also included a checklist for assembly and glue-up.

using the DVD

The DVD is vital to the successful completion of the chair. Many woodworkers are strong visual learners because fine woodworking is a visual art. The best strategy would be to watch the entire video to get an overview of the project. Then watch "The Seat" and read the chapter. Treating each chair part, as a project and assembling them together following the assembly schedule should make the project a success.

the relationship between experience and success

I have tried not to suggest this project is suitable for a specific level of woodworker accomplishment. Anyone who practices a set of skills must push themselves towards a higher level of accomplishment. This is not a project for a beginner, and no woodworker I know classifies themselves as intermediate. You will know soon enough if this is within your ability to build. If the vocabulary and skills are new to you, study and complete other projects while you practice the skill sets. Soon you well be ready to begin your own chair.

figure 2.2

selecting wood for your rocker

Your choice of a primary wood is one of the most important decisions you will make short of the chair's actual design. Like everything it is about choices. Your choice should meet the standards of suitability for function and appearance. Some wood species just do not make good functional choices. Most softwoods and some hardwoods lack density and strength. Chair parts would have to be made more massive to withstand the rigors of stress. This is a chair of lines not mass so these woods do not meet the standards for function or appearance.

The signature wood used by Sam Maloof was walnut (figures 2.3). It exceeds the function as well as the appearance standards. It is strong and stable once it is properly dried and it works well with both hand and power tools. Walnut also takes a wonderful deep polish, as well as a beautiful oil and wax finish. There are many domestic walnut varieties to choose from such as Claro (a hybrid from California and Oregon,) English and black walnuts as well as some exotics. They can exhibit tremendous color ranges in their grain from black to all shades of brown to cream with juxtaposing shades of red, orange, yellow and even green. Dramatic figure can be found exhibiting swirling grain patterns, curl, crotches, feathers and combinations of all of these elements. Exotic walnuts are available in some U.S. locations, to provide more choices.

There are also drying choices such as air versus kiln.

Another consideration is steaming (evens out color with sapwood,) and using sapwood to your advantage. Air dried walnut is more of a red brown versus kiln dried which has a more purplish gray when fresh cut by shop tools. Other great choices are curly maple, figured cherry, white or brown oak, mesquite, rosewood and zircote.

The rocker requires 40 to 50 board feet of 8/4 stock. A cut sheet can be made from part specifications in each chapter. My recommendation is to purchase 8/4 stock in 6 – 10 inch widths. Most parts require 2 to 4 foot lengths.

With that in mind buy 6 to 10 foot lengths. It is a little harder to find, but 10/4 stock is best for the headrest (crest rail) and the arms. The extra half inch allows a deeper headrest radius and more of a sweep in the arms from joint to joint. You can laminate stock to accomplish this objective as shown in the video, but solid stock provides more continuity of grain and color.

I take my patterns to each board and look for the best matches for each part based on size, figure and grain orientation. I do not want short grain situations in the legs or any part that will be under stress from the sitter. My recommendation is to purchase 8/4 lumber in 6 – 10 inch widths. Most parts require 2 to 4 foot lengths. With that in mind buy 6 to 10 foot lengths. It is great if you are blessed with a source for 8/4 stock in the rough that mills down to a full 2 inches.

If your 8/4 lumber has been surfaced to 1 13/16" by a helpful dealer do not despair. You can build an outstanding chair with stock as thin as 1 ¾ of an inch.

Another way to purchase your stock is in the form of a slab. Usually slabs are cross-sections of the tree. They have live edges (see figure 2.5) sometimes with pieces of bark still clinging to them. You will usually find crotches where limbs grew out of the trunk, and swirling grain throughout the slab. I have used slabs as long as 17 feet long X 6 feet wide and 10/4 thick. The good news is you have great choices for laying out parts with your patterns that take advantage of the grain and figure.

The bad news unfortunately is cost. I have paid almost $80 per board foot for some outstanding air dried slabs. They work well with hand tools, and have great color. You will have more knots, splits and other problems to work around. Tinted epoxies and modern glues will cure most problems. I like to work with 10/4 thick slabs because it gives me enough room to work around problem areas. My recommendation is to use slabs after you become more experienced.

In addition to my primary stock, ebony makes a great looking plug to cover and enhance screw holes as part of the design. Now let's make a seat!

figure 2.4

chapter three

Assembling and Coopering the Seat

figure 3.1

The seat, or more romantically "the saddle," is where you begin to craft your chair. It invites the sitter with its exciting contours and is the proud recipient of the visible joinery that flows into the front and back legs (Figure 3.1). The seat is the same in the low back and rocker with the exception of the spindle mortises.

The first question here is whether you want to cooper the seat with five boards or make a flat panel seat. The coopered seat (see Figure 3.2) provides a more concave appearance which is even more inviting to the sitter. It also lowers the pommel by almost 3/8", which allows it to stand proud without getting in the way of the sitter. The flat panel seat (see figure 3.1) is much easier. My first few chairs had flat panel seats and were well received.

Most observers will not even know about the coopered seat option. Build the flat panel the same as the coopered seat, but do not bevel any board edges. The finished seat panel should be 20" wide x 22" long and ideally 2" thick no matter which type of seat construction you choose. If you choose to make a wider seat than 20 inches, the major change will be in the width of the headrest and the possibly the spacing of the spindle mortises on the headrest.

Using the seat pattern is simple. Find the center of the seat blank and mark a center line. Line up and draw the center using the pattern and the outside boundaries of the bowl by marking one side and flipping it over to mark the other side of the blank. Take measurements to identify and mark the locations for the spindle mortises. Use dividers to lay them out to your satisfaction.

steps in assembling and preparing a seat blank

1 Mill five boards 4 1/4" x 22" x 2" and organize for appearance. Placing seat boards with different grain together (juxtapositional diversity) can be as wonderful as the flow of similar grain patterns and color. Your boards must be four square before you continue!

2 Label the seat boards 1 through 5. Use chalk or white art pencils so the marking will pop-out. Also, mark the boards to be beveled. I exaggerate the bevel when marking them to make sure I place the bevels where I want them.

3 Decide whether to cut the bevels on a table saw or on a jointer. Set the table saw blade or jointer fence (Figure 3.2) to three degrees using a sliding bevel and a Bevel Boss or it's equivalent (Figure 3.3).

4 Cut three degrees off of each edge of board 3 as shown in the video. If you use the jointer, make marks across the edge of the board and stop jointing when you have removed all the marks using light cuts. I like the jointer because I would still need to joint the surfaces after I cut them on the table saw.

5 Bevel the outside edges of boards 2 and 4.

6 Put a clamp on them to make sure the joints are tight and you have produced the required concave appearance or "Smile." Boards 1 and 5 should be in the same flat plane.

7 Find the center of the coopered seat panel and rip and joint an equal amount of material from boards 1 and 5 to arrive at the 20" seat width.

8 Make reference or witness marks that can be used to align the boards throughout the project. A centerline from the pommel to the back of the seat and a line across the width of the seat about two inches from the back of the seat. This line should line up in the heat of gluing-up without fail.

figure 3.2

figure 3.3

9 You have choices to make for reinforcement. If you have a horizontal boring machine or a ShopSmith you've got it made. A Festool Domino (as shown in the video) works great, but is expensive. Biscuit joiners are used much the same way as the Domino but more biscuits are necessary for strength. Freud makes a Dowel Jointer that works in much the same way as a biscuit or Domino.

10 Place 3 Dominoes (# 8x40 mm) in each joint ½" from the boards bottom starting 5" from the back of the seat and spacing them 6" apart. Five biscuits (#20) or 3 dowels (3/8 or ½") will do the job nicely, too. If you are using the domino, dowel jointer or biscuits practice on some scraps with bevels. Boards 2 and 4 require you to flip them over and set the fence to their obtuse angle (Figure 3.4). Adjust the depth from the fence until you place the domino (10mm) or biscuit to match up precisely with the mortises or slots on boards 1 and 5. Your choice of reinforcement will also make it possible to glue-up the panel, especially if it is coopered. Gluing up the beveled panels without reinforcement will result in problems. After dry fitting, you are ready to start cutting the joinery.

Note: Do not glue up yet as you will ruin your opportunity to cut the seat joinery!

11 Lay out the back (2 1/2" wide x 3" long x 2" thick) (Figure 3.5) and front (1/4" X 1 3/4" long x 2" thick) (Figure 3.6) notches on boards 1 and 5. The front notch starts 18 inches from the back of the seat board. Mark all lines with a marking knife or gauge. Highlight the cut lines in white (on walnut) for better visibility.

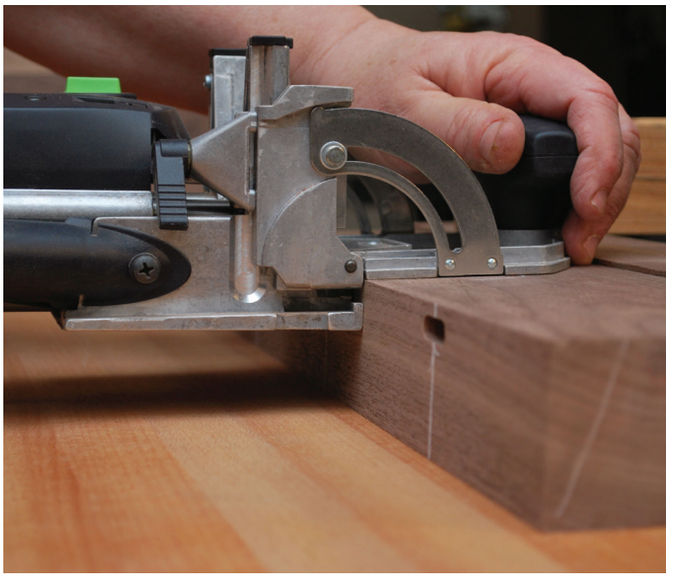


figure 3.4

figure 3.5

figure 3.6

Using a cross-cut sled, or miter gauge with a tall fence, cut the back notch by first clamping the board on end and making a rip cut 2 7/8" along the cut line (Figure 3.7). I leave this cut short of 3" so the cross-cut at 2 1/2" will take the piece out. I kerf out the front notches using a crosscut sled on the table saw as shown in the video.

12 Trim the kerf lines from the front leg notches with a router plane, shoulder plane or chisel.

13 The notches must be rabbeted with a 1/2" radius router bit. Rabbeting the top and bottom of each notch at the same depth with a plunge router will leave a tenon (Figure 3.8) at each notch location. I shoot for 1 inch and mark them out as shown in the video. You may choose a different size tenon. The rabbeting bit and round-over bit used must have matching diameters. The tool list in the appendix contains a rabbet and round-over bit combination that matches.

Note: Be careful of tear-out! As the rabbet bit finishes the cut, short grain situations can cause chip out. Most chip out will occur in areas that will be rounded over but a sacrificial block clamped on to the area can prevent this from happening. You may also add on a quarter of an inch and rip it off before glue-up. I usually pull out short of the end of the cut (as shown in the video) when rabbeting the back notches because these areas are waste. You may have trouble balancing the router during the rabbeting of the rear notches. Clamp another seat board to the board you are routing to give your router more bearing surface.

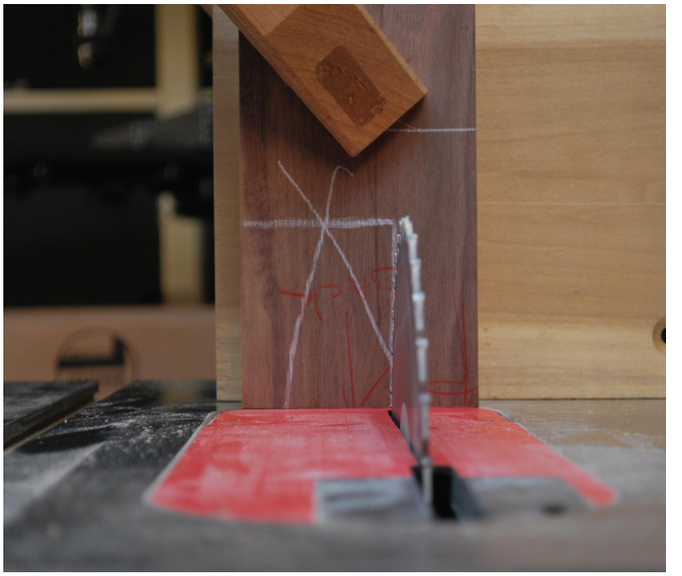


figure 3.7

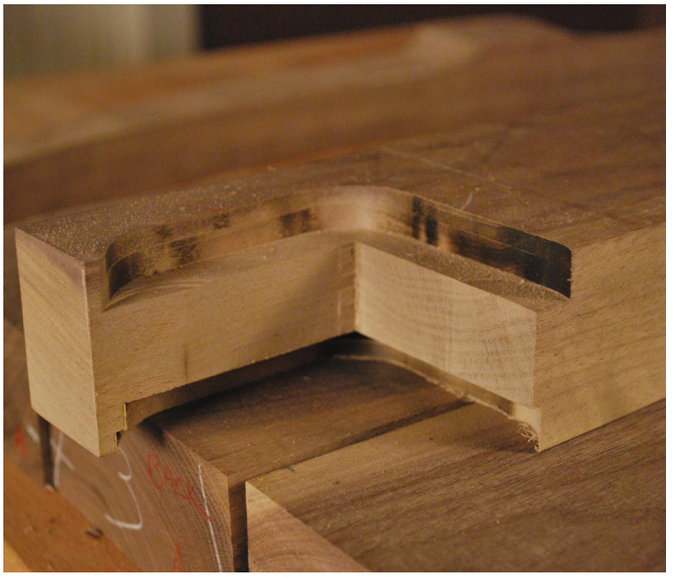


figure 3.8

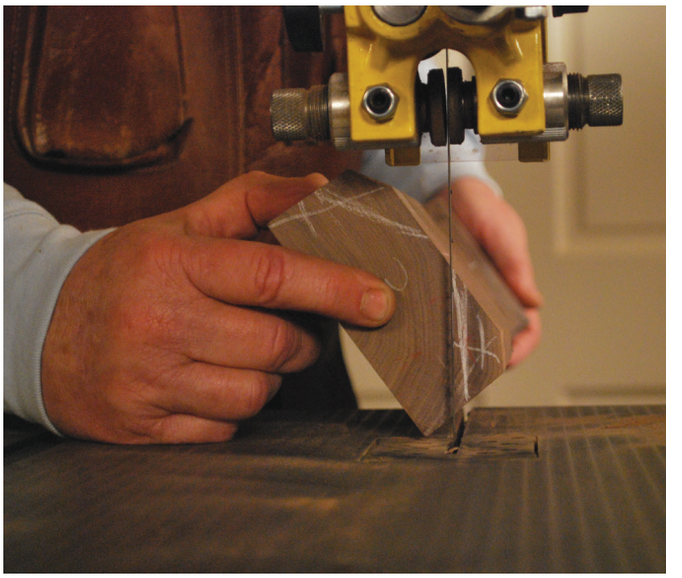


figure 3.9

15 Lay your pattern on top of the seat blank and draw the centerline first followed by the boundary lines for sculpting your seat's bowl. Mark a centerline on the back and bottom of the seat blank now for reference later.

No glue yet because now you are going to save yourself a lot of dust and work by sawing out seat waste with your band saw (as shown in the video).

16 Start with board 3 by making all 4 band saw cuts (Figure 3.9). Then lay 2 and 4 next to 3 in left to right sequence. The trick is to swap 2 with 4 to trace along their edge using the edge of board 3 as a template. This will give you a flat cut on boards 2 and 4 instead of cutting with the 3-degree bevel down. Do not start your band saw cut at the back of the bowl line on 2 and 4. Start your cut even with the most forward marked edge of the back of the seat bowl. Then use 2 and 4 to trace the inside edge of 1 and 5.

Ideally you should have an inch of thickness in the deepest part of the bowl. About 2/3 of the way to the front, it should be approximately 1 1/4" thick with a quick taper toward the front of the seat.

17 Use a grinder to remove excess seat material around the pommel on #3, the back of the seat bowl line on 2 & 4 (Figure 3.10) and the material on the inside edge of boards 1 & 5. Don't be a hero and remove too much. When its glued up you will have a chance to smooth and even everything out.

18 Glue-up the seat panel. Titebond III works well. Use plenty of clamps and check that all witness marks line-up. The rule is to plan well and work quickly! The clamping jig (Figure 3.11) is very helpful because it allows clamping the centerboard down and applying pressure to the outside of 1 and 5 without lifting their edges.

figure 3.11

carving a seat

This part of the project is exciting, interesting, rigorous, and can be bad for your health! Please use dust collection and wear an appropriate air filtration device. Please do not have any loose hanging clothing that the grinder can snatch. I have a t-shirt that shows what it can do!

1 Use a grinder with 24 grit paper or a donut shaped, coarse carbide grinding wheel. Start removing stock from the boundary lines first on boards 1 and 5 by working from the line toward the middle with a rolling motion. Make a simple depth gauge for checking depth and symmetry (see Appendix for specs). Cross grain strokes are better for rough shaping while light strokes with the grain can smooth surfaces.

2 Finish carving the seat bowl, front and underside to taste using tools such as the ones in (figure 3.12). Sand all finished areas of the seat to 400 grit.

figure 3.10

GOUGES	POWER CARVING BURRS	FLAP SANDING WHEELS	SCRAPERS
Gouges are great for cross grain work such as defining the concave area of the seat, and the edge of the seat's bowl.	Burrs, especially the larger coarse and extra coarse carbide bullnose profiles can be used to advantage to efficiently shape concave areas of the seat.	(80 & 120 grit) These aid the process of shaping the seat's curves but with more control. The Guinevere round inflatable sander with a 60 grit-sanding sleeve mounted in a flex-shaft die grinder is my favorite for smoothing the seat radii.	In particular, gooseneck, convex and concave scrapers smooth the high spots. Used correctly scrapers cut instead of abrade leaving an almost finished surface.

figure 3.12

chapter four

Crafting A Set of Chair Legs

front legs

My chair's front legs (see figure 4.1) are very consistent with the Sam Maloof design. They contain the exposed bridal joint and offset turnings leading to dowel joints at each end of the leg. You may decide to experiment with different shapes of front legs. As long as you are faithful to the joinery and especially the measurement from the bottom of the seat to the rocker you can be the artist. Glue on adders (laminate), turn, carve, round-over and bandsaw new curves to achieve your vision. Try not to change the geometry of the chair in critical areas.

I accomplish the offset turning by treating the seat to the leg joinery area as an offset itself and preparing the upper and lower portions of the leg for normal spindle turning. A true offset turning takes too long.

Note: Legs should be marked "R" (right) and "L" (left). Right and left orientation is based on the right and left of a person seated. For example; A seated person's right hand would be touching the right arm which is supported by the right legs and right rocker.

figure 4.1

steps for crafting a front leg

1 Prepare stock (2@ 2”X 2 13/16”W X 19 1/2”L) for both legs. Make sure it is four square. The width is a sixteenth wider than the patterns published dimension. The purpose is to have enough width to fine tune each leg’s entry into the rabbeted notches on the seat (as shown in the video). Fine tune the leg with a very fine cut using the jointer.

2 Begin laying out the seat to leg joinery. Mark each leg right and left after fitting them to a seat notch. Measure 7 inches from the top and place a mark with a awl. Cut a line across the width of the board with a marking knife (see Figure 4.2). Measure the thickness of the tenon with fractional dial calipers and use them to make an indentation. Lay out this line on all four sides of the board with a square. Mark one face as the inside of the leg.

3 Measure the depth of your seat notch using the dial calipers (see figure 4.3). If you are using a 1/2” rabbet or slot bit (distance from the pilot bearing to the outside edge of the cutter) it should be 1/2”. Set a marking gauge for this depth and mark the board for kerfing out on the inside face and its two adjoining edges. Highlight these lines with a colored pencil.

4 Using an accurate cross-cut sled start with the table saw blade lower than 1/2” (Measured in #3). Slowly raise the blade until it cuts to the depth line. Now make multiple passes until the material between the between the cut lines has been removed leaving a dado (see figure 4.4) approximately 1” wide by 1/2” deep (your measurement may slightly vary). Test fit the dado on the actual seat tenon. Repeat taking light cuts and until it fits. When I make additional cuts, I make them toward the bottom of the leg.

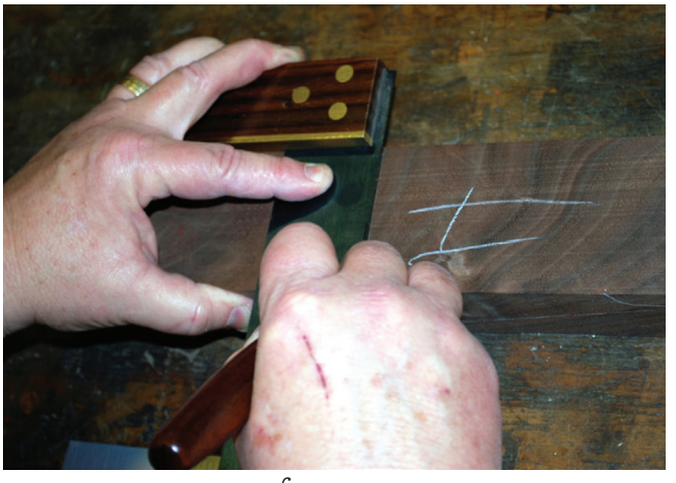


figure 4.2

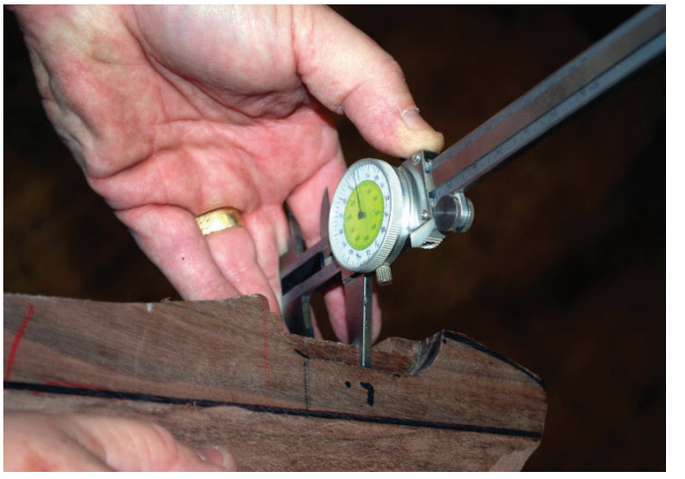


figure 4.3

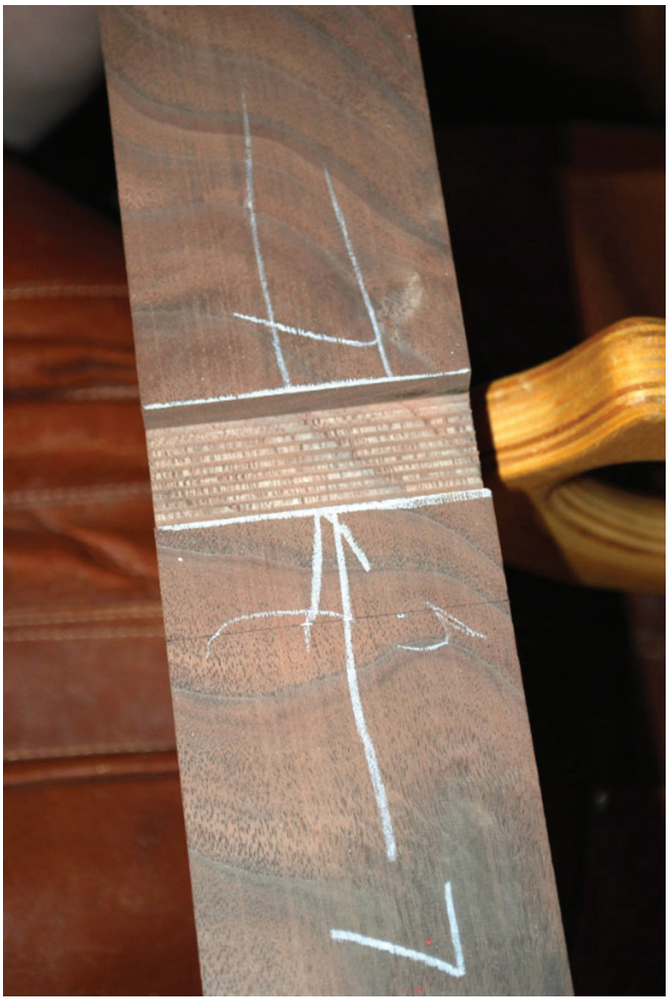


figure 4.4

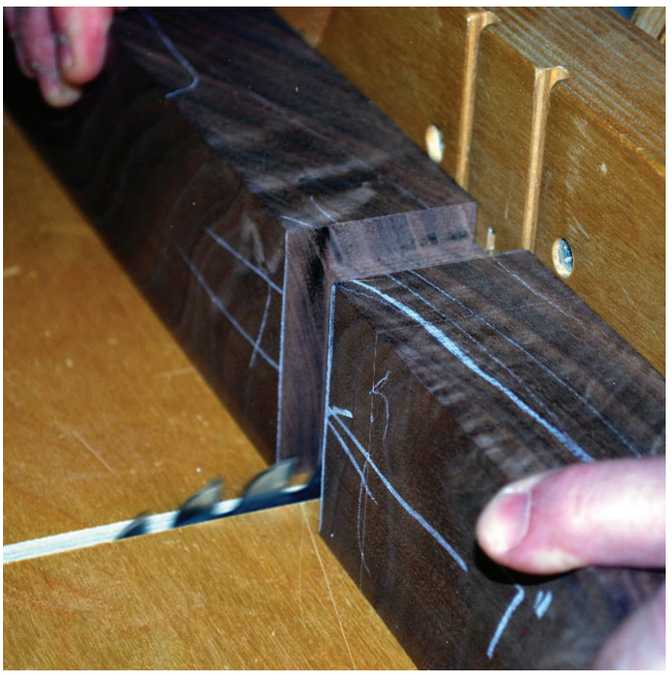


figure 4.5

5 Kerf out the other two adjoining faces (see figure 4.5). Make sure all dadoes line up.

6 Set up your router table with a 3/4" radius round-over bit as discussed previously. Mark the edges of the board to be rounded. The round-over bit must make a complete round-over. To do this effectively, the height of the router bit must be raised so the outside of the cutter is even with the router table top. The pilot bearing must be neutralized by lining up perfectly with the fence. This will guarantee that the bit will round-over completely without making a bead.

7 Make a test fit. In all probability, you will need to trim the depth of the dadoes and cleanup the kerf lines. Do this with a router plane or a trim plane. If the radiuses don't match up try a sanding block with 100 grit paper to improve that roundover. The shiny areas after a test fit denote burnishing due to over compression of fibers. These areas can be relieved with the sanding block or a file. When the joint fits flush with slight pressure, congratulations! While the leg is in position use an awl to scribe the seat top and bottom on the leg.

8 Find and cut a center line all the way around the leg with a marking gauge. Trace the front leg side profile pattern onto your leg stock. Bandsaw to the pattern line, except in the seat joint area. Saw the seat joint radiuses just shy of the seat joint area by 1/8 - 1/4". You will fair these surfaces level with the seat top and bottom later. There is no need to clean up the saw marks.

9 If you follow this step correctly you will be left with a leg that is ready for spindle turning. Mark a line 1/4" all the way around the leg, measured from the inside and scored on each edge, top and bottom. Bandsaw on this line again staying clear of the seat joint area the same as with the other cuts.

10 Now you're going to find your centers for turning the leg (see figure 4.6) . The center point is 7/8" of an inch measured from the outside face of the leg on the center line (scribed earlier) and punched on the top and bottom with an awl. Draw a 1 1/4" diameter circle with a compass at each end of the leg. Using this point set your lathe spur drive on one end and the tailstock drive on the other. Tighten the leg between centers. Using a roughing gouge, taper each end of the leg down to the 1 1/4" dimension.

Note: If your stock is less than 2" thick you must work out the side profile dimensions for the leg.

11 A 1/2" X 1 1/4" hole must be drilled (see figure 4.7) in each end of the leg so that it can be joined to the arm and rocker. The best way to do this is to leave it on the lathe and insert a 1/2 " brad point bit in a lathe drill chuck. The correct way to do this is to place the chuck into the tailstock and advance the bit into a slowly spinning leg. I like to accomplish this task the other way. I place the chuck in the headstock and advance the leg into a spinning bit by extending the tailstock guill until I am 1 1/4"deep. I have infinite control over my speed with my lathe which could make a difference in your choice. Try it the correct way first. Flip it over and do the other end.

12 If you enjoyed making the front leg but did not make two, you must now make another one.

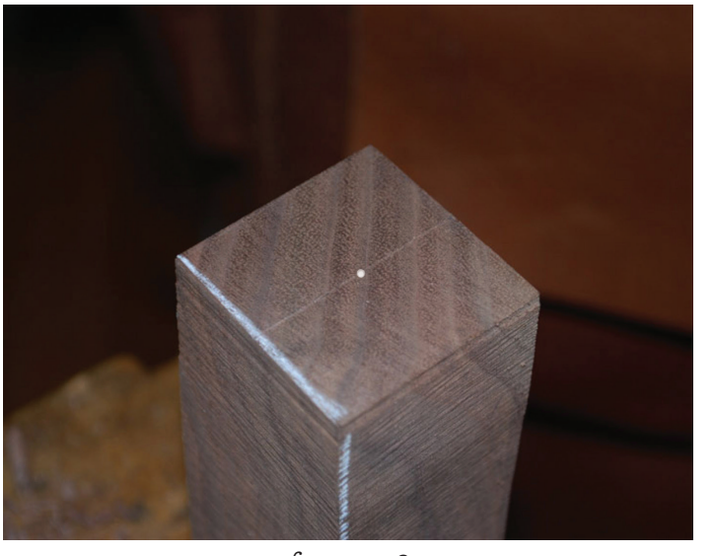


figure 4.6

figure 4.7

back legs

The back legs for my rocker (see figure 4.8) have slightly different profiles than Maloof's rocker. The side profile has a slight forward bend at the top to provide more headrest support. The front profile of the back leg provides a sweep into the headrest cut into the back leg. Maloof's back leg is more square because Maloof's headrest is designed with the radius sweeping into the back leg.

The back leg features seat to leg joinery inspired by Maloof, but not executed with special router bits. This design is more flexible because the angle can be changed to suit the design of the chair. Build your first chair using the back leg pattern. When you design your second chair you can experiment with different lines, thicknesses and shapes. You can also add-on or laminate wood to the legs to provide areas for bandsawing new designs without destroying the rocker's working geometry.

figure 4.9

figure 4.8

steps for crafting the back legs

1 Prepare stock 2" thick X 6" wide X 48" long. More width and length would give you more options. Nest these pieces when possible to conserve stock. The thickness range would be from 1 3/4" to an ideal 2".

2 The ideal stock for a back leg will have grain that follows the sweeping lines of the leg, especially the lower leg. Using the pattern, trace the leg with chalk on the stock in several positions. Weigh your decision against the waste of a valuable resource. It may be possible to nest the legs close together which saves material and keeps color and grain compatible. Every decision is a compromise. Once you decide, trace them with a marker and cut them out with your bandsaw leaving the line. Attach the plywood or MDF leg pattern to the leg with turner's double stick tape leaving the areas to be trimmed proud of the pattern.

3 A router table with a 2" trim bit with a pilot bearing (see figure 4.9) can help you make duplicate legs quickly. If your bit doesn't have a shear cut you may experience trouble with grain reversals causing chipping. An alternative method to the router table is to clamp them side by side and shape them with hand tools. Whichever method you choose, make sure the seat stem surface and the arm stem surface form parallel lines.

4 Decide on a right and left leg and mark them (see figure 4.10). Sometimes a small knot or other problem can be placed in an area that will become waste if used for a right leg instead of a left.

5 Cut the front profile on the inside of each back leg with your bandsaw. Lay them out as shown in the video. Make sure to stay clear of the seat joint areas on each leg. Remember that you are making opposite legs. Special attention should be given to matching up the points where the back leg sweeps into the headrest. Use relief cuts to help cut the radii, although the quality of the bandsaw cuts at the radii is not terribly important at this point as long as you don't take off too much.

6 Choose stock for the adder blocks (one per chair). Prepare them 3/4" X 3" X 5". If you can match color and grain orientation, it will be a plus. Glue them to the inside of each back leg on a nonstick surface. I use my router tables' melamine top (figure 4.11). This allows for clamping the back leg seat stem surface down with the adder block glued and clamped to the inside. Make sure both surfaces are flat on the table. If the surface is not nonstick use wax paper under the leg and adder.

7 The purpose of this step is taper the adder block that is glued to the back leg to six degrees (see figure 4.12). If you hold a leg up to the back leg notch in the seat you will see the proper orientation for the back leg. Clamp the six degree taper jig to the back leg making sure that the rip cut on the adder block will give your leg the correct orientation. Use spring clamps to secure (must be tight) the leg to the jig and push the assembly against the fence and through the blade very carefully leaving a tapered but full length adder block. Do the same with the other leg. Do not move the fence. Flip the six degree jig around 180 degrees and attach the other back leg to the jig. Pay attention to the orientation, the other leg must have the opposite orientation or the rocker just won't look right.

figure 4.10

8 Square the two adjunct surfaces made by the tapered adder block and the front of the back leg seat stem. Carefully use a jointer (fine cuts) or a handplane or both until each one of the two faces is perfectly square. Make sure each adder block is the same thickness along its taper.

9 Lay out the dadoes for kerfing as shown in the video. Pick a leg and measure up 9 ¾" from the middle of the bottom of the leg to the middle of the tapered adder block (see figure 4.13) and make a mark. Using a marking knife and a square, line the mark up with the square and cut the lower line of the dado. Mark it on both seat joint surfaces always using the square edge. Measure the corresponding seat tenon with the fractional dial calipers and use the caliper to mark a point up the leg. It should be 1" if you made a 1" tenon. Transfer this line to the adjoining leg surface as well.

10 Match up the two legs side by side and make your first mark and cut line using the bottom line for a reference. Measure the tenon and finish marking out the surfaces of the second leg for the dadoes.
Mark the depth of each rabbet (should be 1/2" inch).

11 Set up the cross cut sled for kerfing with a support block clamped to the upper leg. Make sure the adjoining faces of the leg's seat joint area are held flush against the fence (Figure 4.14). I find that a zero clearance kerf across the bottom of the sled makes it much easier to line up my cut. First slowly raise your blade until you have nicked the bottom of the ½" depth of cut line.

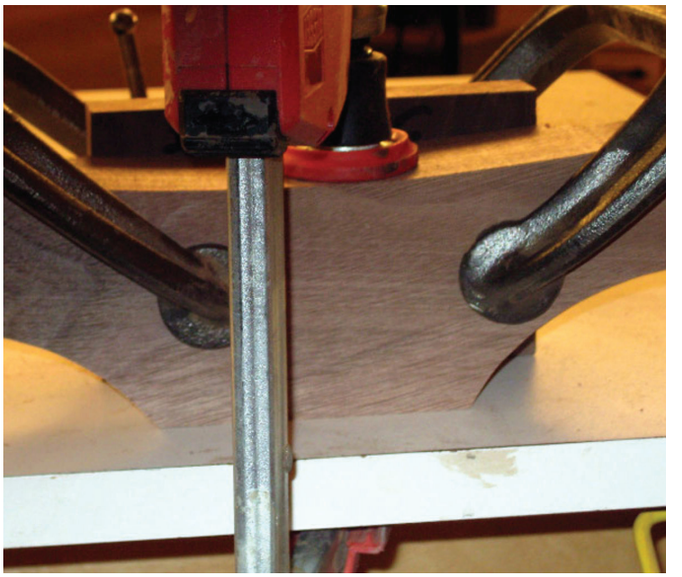


figure 4.11

figure 4.12

figure 4.13

Highlight all the cut lines with a colored pencil to make them easy to see. Kerf out the dadoes on both adjoining surfaces until you have removed stock to each cut line.

12 Try a trial fit of the leg dado on the seat's tenon (see figure 4.15). If it's too tight carefully widen the dado with another fine cut (I prefer making widening cuts always toward the bottom of the leg). Sometimes I will shade the surface of the dado I want to trim with a colored pencil. Then I will line it up for a light cut, and check to see if I removed the shaded area. Also use a lead pencil on mating surfaces to see where it smears when fitting the pieces together. This along with shiny spots can help you to identify areas needing tweaking. Once I have reached the top cut line on the back leg, I take off the rest on the lower leg end of the dado. Dadoes on both surfaces must be consistent.

13 Round-over the square side of the seat joint area on the back leg. If you still have the router table set up from rounding over the front leg joints successfully, don't touch it!

14 Use your router plane or tenon trimming plane to fit for depth. A sanding block can be used to tweak the roundover until the back leg fits flush on the seat joint with slight pressure. When they both fit, you can breathe (see figure 4.16)!

15 Use an awl or a pencil to lightly trace the top and bottom edge of the seat onto the assembled legs.

16 Mark the positions for your screws on the outside of each leg. The video shows me pre-drilling at the drill press with the Miller Dowel bit, but usually I clamp the legs on (no glue yet!) and pre-drill after marking each entry point with an awl punch. The Miller bit cuts precisely with great control. It doesn't have a tendency to run on entry, but can burn the wood if the rpm is too high. Now slowly drive the Spax #10X3" screws with a cordless drill. These screws really cut a thread in the hardwood that makes it possible to take the chair and put it back together a number of times and still pull the joint tight each time.

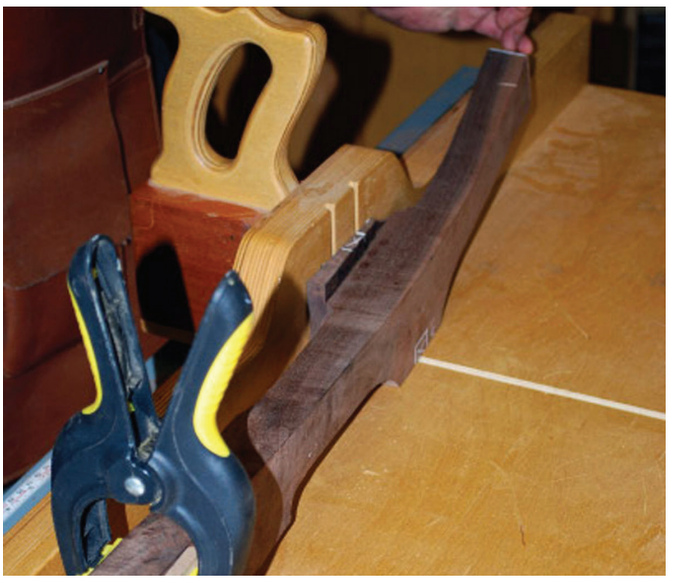


figure 4.14

figure 4.15

17 While you have the legs and seat screwed together, take advantage of the opportunity to mark the sides, front edge (pattern) and back (use the headrest radius pattern) seat profiles.

18 Bandsaw the radii at the seat to back leg joint of each leg. Stay about 1/16" to 1/8" above the line that was scribed earlier. The radii can be drawn by tracing the edge of a CD. Use the flat areas of the seat joint surfaces as bearing points when you bandsaw them (as shown in the video).

19 Let's finish up the back legs by cutting 9 degrees off the front and back of the leg in the headrest area. Tilt your bandsaw table to 9 degrees to allow the front and back of the leg to sweep into the headrest radii (as shown in the video).

20 Bandsaw 6 degrees off the bottom of each leg so the back leg will sit flat on the rocker.

21 Use the pattern to lay out the ears or horns. Cut them on the bandsaw.

22 You should be able to leg up your chair now (see figure 4.17). No glue yet! If you glue it up now a curse will come over you causing great mental anguish. Let's make some arms!

figure 4.16

figure 4.17

chapter five

Crafting the Arms

The arm of my sculptured rocker is one of its most beautiful features. A gentle curve from the arm joint stem down to the front leg provides comfortable support for the sitter and lines that move the observer's eye (see figures 5.1, 5.2). Each craftsman's arm design is their signature and there are many design opportunities between the two joints. Some craftsmen add on wood (laminate) to provide more material to work in a deeper arm sweep. Opportunities also can be made by laminating stock to the side of the arm stem and side of the arm blank. Work toward your own signature arm design!

Note: The "Patterns" tab on the Rocker's Studio membership section of my website contains alternative arm patterns. Please consult and compare to choose the one best suited for your rocker.

figure 5.1

figure 5.2

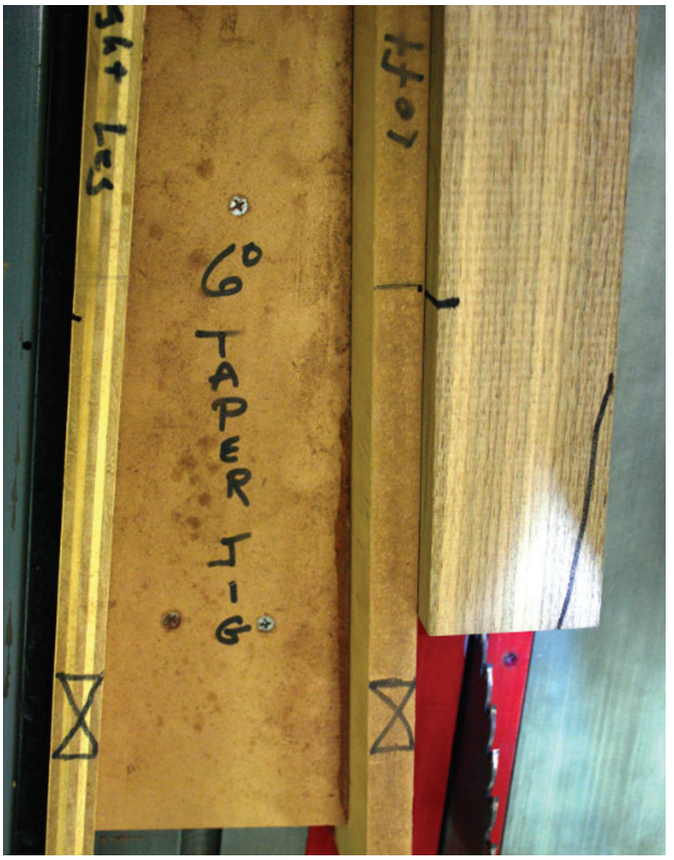


figure 5.3

figure 5.4

steps for crafting & fitting an arm

1 Prepare two pieces of stock 10/4 thick X 4 1/2" wide X 19 1/2" long. There is a little extra width and length to provide for making the cuts to join the arm to the legs.

2 Cut a 6 degree taper off of the front 4" bottom of the arm blank. I like to use the 6 degree taper jig. Clamp the arm blank to the jig with clamps (clamps not shown in picture) and use either the bandsaw or table saw (see figure 5.3: shows orientation). Just push the assembly through the blade using the fence as a guide. Make sure to make some reference marks on the jig and arms so each arm's taper will be congruent. The problem with the table saw is the depth of cut. If you decide to use the table saw make sure your cut is oriented to the side where the arm joins the leg. Remember you will have a right and a left arm. Go ahead and mark them.

3 If you need to clean up the saw marks with a plane do it now.

4 Assemble the legs to the seat with screws only! Place the arm in position as shown in the video and mark the joint by swinging the arm to the inside of the back leg arm stem Use the front of the stem to scribe a line on the side of the arm (see figure 5.4).

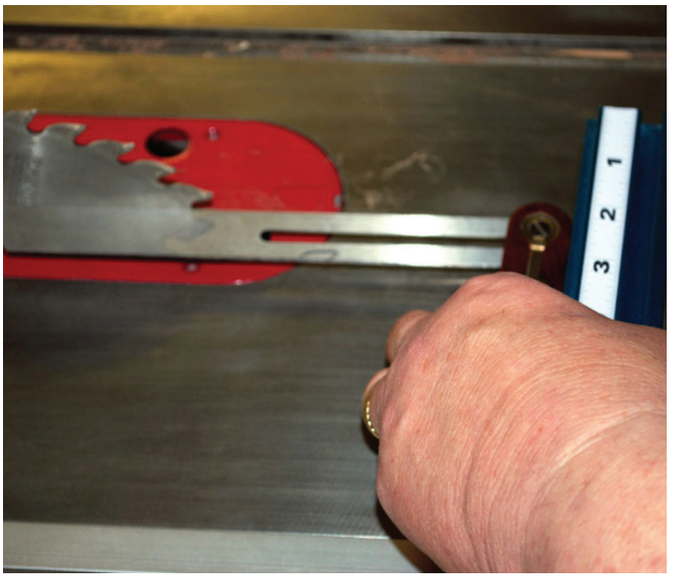


figure 5.5

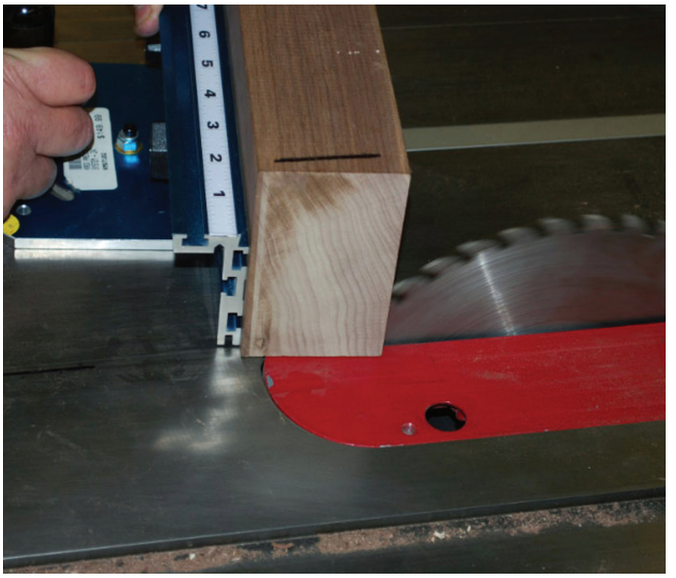


figure 5.6

figure 5.7

5 Set a sliding bevel to the line drawn in step 4. Use the bevel at the table saw to set your miter gauge to make the cut on the line (see figures 5.5, 5.6). The saw will not cut through the full 5" of width. Set the blade to cut through the edge of the arm that will butt into the stem. The rest of the material will be waste. Work with this joint until you get it to butt up flush. Sometimes it can be pesky!

6 Clamp the fitted arm blank in place and make your witness marks at both joints. Make sure the inside edge of the arm blank lines up with the inside edge of the back leg arm stem. Unclamp the arm. Place a 1/2" dowel center finder in the top of the front leg (see figure 5.7). Place the arm blank in position so the witness marks and the butt joint line up. Push down (or give a whack with a mallet) to make a mark on the bottom of the arm.

7 Using a Dowel-It and a 1/2" brad point drill bit in an electric drill, set the Dowel-It on top of the tapered area of the arm. Line up the brad point and drill a 1/2"X 1 1/4" deep hole for a 1/2" dowel.

8 I generally buy a 1/2" oak dowel and hammer it through my Lie-Nielsen Dowel Plate at least twice to size it. I use a V gouge to carve at least 4 flutes the length of each dowel at 12, 3, 6 and 9 o'clock (Figure 5.8). I slightly crown each end of the dowel so there will be room for glue (No glue yet!)

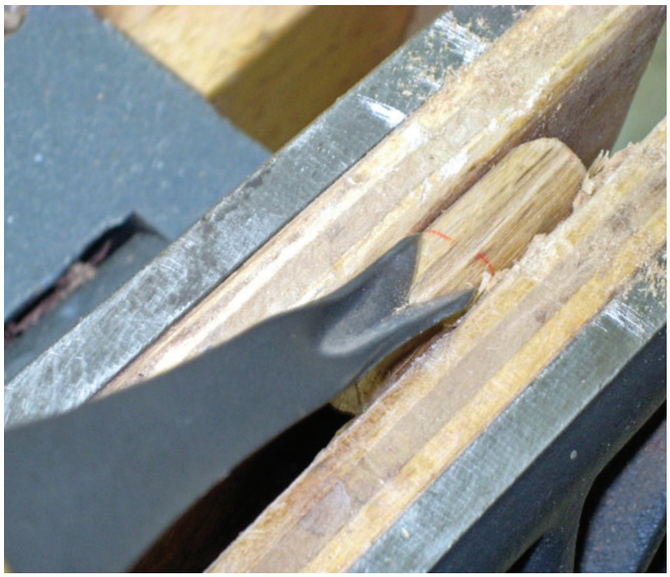


figure 5.8

figure 5.9

figure 5.10

9 Line up the top arm profile pattern on the bottom of the arm. Leave as much as 1/2" from the inside edge to the top of the arm location (as shown in the video). Trace it on the blank and cut to the line using the bandsaw (see figure 5.9).

10 Line up the side arm profile pattern with the front leg and back leg stem locations (see figure 5.10). If you would like to change the sweep of the arm this is the time to make adjustments in the pattern. Cut the profile using your bandsaw. Make very controlled slicing cuts when shaping your arm at the bandsaw. Support the stock with both hands to keep the blade from binding.

11 Look at the pictures of my arm or your own design and start carving (see figure 5.12). Do not fair the actual joints at the front leg and back leg just yet. Wait until after it is glued up.

12 Clamp the arm to the front leg. I use a jig in the video that immobilizes the arm at the arm to back leg joint. A clamp from the front of the arm to the back leg gives the arm full support. Mark a point on the back of the back leg to pre-drill for a screw. I like to site the drill along a line sinking the hole and screw in a spot where I hopefully won't hit the screw as I fair in the joint. You might draw a few lines on the side of the back leg to help you sight the line. Use the Miller dowel bit and finally a Spax #10 x 3" screw to pull the joint tight. (Remember, no glue yet!)

chapter six

Sculpting the Headrest

figure 6.1

The headrest (also known as the crestrail) of a the sculptured rocker is not only a place on which to lay your head, it is a focal point drawing the eye toward the center of the chair. It needs a balance between being thick enough, but not enough mass to take away from the chair's lines. Some rockers have headrests that are too massive. Some rockers are designed without the ears or horns. I personally think they keep the headrest from giving the rocker a top heavy look (see figure 6.1). The headrest is one of those places to show off a great piece of stock.

Look for stock that has a grain pattern that flows in the "U" shaped profile of the headrest. The combination of the coopered seat paired with a sweeping headrest makes a dramatic statement. It pulls the observer's eye to your rocker and makes a nice invitation to try it out. The angle of the headrest's placement relative to the seat and back legs and the shape of the spindles determine the sit of the chair. Opportunities exist to make your chair an even more comfortable one by working with these variables.

steps for crafting and fitting a headrest

1 Prepare your stock 10/4" thick x 7" width x 22" length. If you have 8/4 stock or less, do not despair. Prepare the stock leaving all the thickness possible. Laminate the front radius cut-off onto the back to provide the extra depth.

2 Decide on the top and bottom/ front and back of the headrest and mark them. Mark a line across the bottom of the front of the headrest 1" from the bottom edge. Miter each side of the headrest using the 6 degree jig at the table saw with the cross cut sled (see figure 6.2). Mark the direction of your miters to limit confusion. The goal is to remove the correct amount on each side until the headrest fits between the back legs (the 1" from the bottom line should line up with the sweep of the back legs into the headrest). A couple of spring clamps on the back legs will help you test the fit. Put a clamp on it when you are close. Stage a small celebration when it finally fits!

3 Find the center of the headrest and mark it all the way around. Use the pattern and lay out the front and back radii and bandsaw them carefully (see figure 6.3). The smoother the inside radius cut the easier it will be to use the inside edge to lay out positions for the spindle mortises. If your stock is not thick enough cut the front radius then laminate the piece onto the back side as shown in the video. Trace the back radius and cut it. This is a resaw type cut. Make sure you have a tuned bandsaw with enough power and an appropriate blade for the cut.

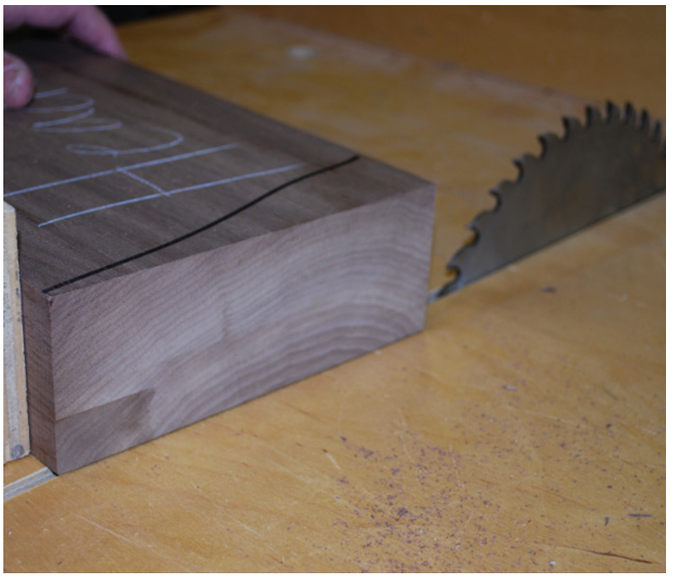


figure 6.2

figure 6.3

figure 6.4

4 Decide on the bottom profile and make a pattern. Make a half pattern (flip it over to duplicate the other side) and line it up with the back leg radius sweep point and the center line at the bottom edge. It can be a gentle curve or a more pronounced French curve like mine. Cut the bottom radius at the bandsaw. Smooth the curves with a large flat rasp or a microplane.

5 Use a wheel type marking gauge, score a line 7/16" deep using the fence on the gauge to ride the radius on the front of the headrest. Find the center point on the bottom of the headrest for the center spindle's mortise. Lay out the six remaining 3/8" x 1 1/4" mortises on the line with dividers or dial calipers 2 7/8" apart (see figure 6.4). Use the flat top of the headrest to stabilize the headrest at the drill press while drilling. If you went ahead and cut the top radius, just use a drill press vice. Clamp the headrest and drill the mortises. Now you can bandsaw the top radius.

6 Clamp the headrest in place (see figure 6.5). Mark the location for the three screws through the back legs into the headrest. Pre-drill the screw holes with the Miller Dowel bit. Reference through the leg and into the center of the headrest curve. Draw some reference lines just like you did when you pre-drilled the arm to back leg joint. This is to be accomplished with great care because a strayed headrest screw can be unhappily discovered while sculpting the headrest. If you keep the screws in the center of the headrest you won't have a problem.

7 Decide the approximate locations of the hard and soft lines of your headrest. Consider how the ears will flow into the headrest. Rough out the headrest as much as possible.

Taking your seat is just around the corner!

figure 6.5

chapter seven

The Spindles

figure 7.1

The sculptured rocker has seven spindles. This is significant in that if it did not have an odd number of spindles there would not be one in the middle. Most great chair designs contain an elements or elements that pull the observers eye to the center of the chair to initiate an invitation to sit. Five spindles would not give enough support unless they were wider. Wider spindles would cause a loss of the organic flowing lines, while nine might be too many (see figure 7.1).

The spindles curves were not haphazardly developed. The originals were designed by sawing a shape that would fit the curvature of the back. Then the woodworker held it up to a person's back and evaluated it for comfort. This pragmatic activity continued until it felt right. Maloof's spindles are flat round, my spindle is crowned round as you will find out.

There are other options for spindle construction and design. Some makers such as Hal Taylor laminate their spindles on a form just like they construct their rockers. They are stronger and usually thinner (front to back). Their strength makes them easier to work with when mounting the headrest because they will bend but don't break as easily as the one piece spindles.

Short grain situations are negated many times by the next laminate strip. Other woods can bring design opportunities to laminated spindles by alternating contrasting species. Some have dropped the shoulders on the spindles as well as the round tenons opting for a more sleek design. Again, develop your own spindle design.

figure 7.2

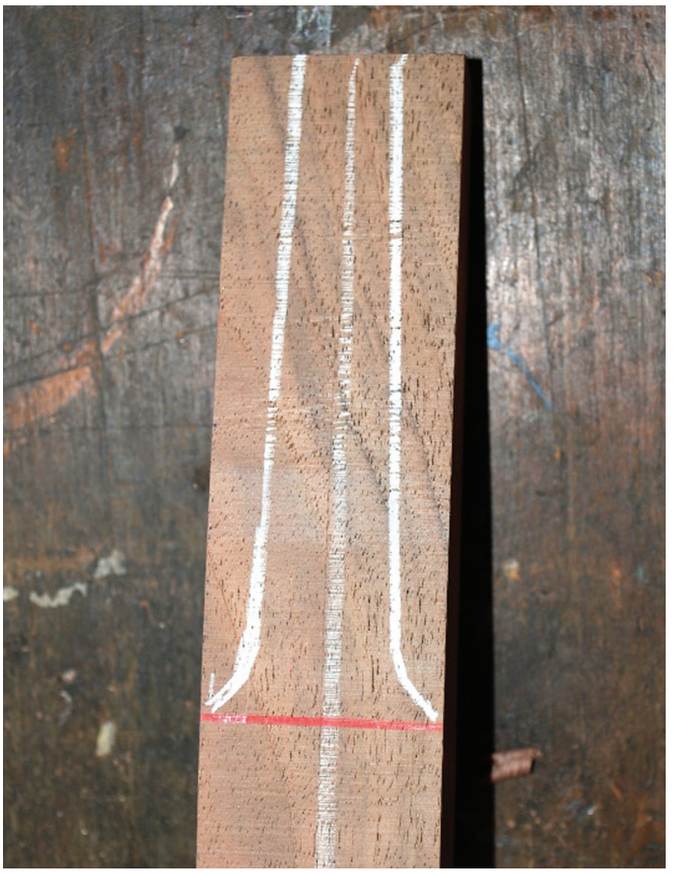


figure 7.3

steps for spindle making

1 Thickness your spindle stock to a range of 1 3/8" to 1 ½". It is a design consideration as much as one of comfort. Thinner spindles will enhance the chair's lines but the thicker spindle (width of the front profile) will yield a wider surface for back support.

2 Using the spindle side profile pattern lay out them out on your stock. There are several considerations to be made. Watch out for short grain situations especially on the ½" and slender 3/8" ends. These areas are the weakest areas of the chair and are prone to break if not selected with great care. Stock with swirling or curly grain can cause cross grain problems. Do not use sapwood in the spindles because it usually lacks the density of hardwood. Try to nest the spindles together as tightly as possible to avoid wasting stock and to take advantage of an optimal grain flow.

3 Bandsaw them to the line and shape them up with hand tools, flush trum at the router table or a stationary belt sander. You need seven spindle blanks that match. I usually make eight to provide for the one that just doesn't work out.

4 Use the front profile pattern to lay out the front of each spindle. In the video I use the jointer fence to provide edge guide support for this activity. Actually, I prefer the table saw fence. Just move it over to the far left wing to get good access. Trace one side and turn everything around and trace the other side (see figure 7.2).

5 Use a marking gauge to find and mark a center line all around the width of each spindle. Highlight the line with a colored pencil. You will need a visual reference throughout the process to achieve a straight symmetrical spindle. Connect the shoulders with a pencil line to highlight their locations during the bandsawing and carving process (see figures 7.3, 7.4).

6 Bandsaw each spindle to the line. I try not to bandsaw into the tight radii of the shoulders. It's too easy to bind the blade in the cut and ruin one. Just cut across the top of the radius and come out just above the shoulder line (see figure 7.5).

7 I like to slightly crown the front of the spindle. This design consideration provides fewer contact points between the spindle and the sitter's back, while extending full length back support. The back of the spindle should be completely rounded. Drop down 1/8" along the edge to make a line which will become a hard line when crowning is completed. Draw another line which will be a boundary for rounding the back of the spindle. This is a line that will taper from about ½" at the bottom shoulder to 3/16" at the top shoulder. While you shape these faces keep the center line pencil marks in tact to help keep each side of the center symmetrical. These surfaces can be shaped with hand tools such as rasps and microplanes or power carving tools with burrs and small sanding drums (see figure 7.6).

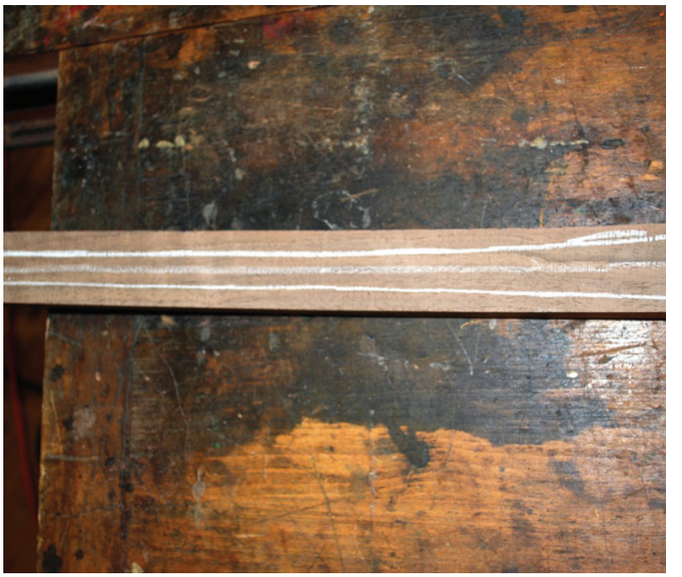


figure 7.4

figure 7.5

figure 7.6

figure 7.7

figure 7.8

figure 7.9

8 Use a flat, long microplane to flatten and smooth the long edges of the spindle above the upper shoulder. Use a short, flat microplane to flatten the edges below the lower shoulder. These shaping tools are great because grain orientation doesn't matter. Use the shape of the tool to your advantage. The small round microplanes are great for shaping those shoulder radii. (see figures 7.7, 7.8).

9 Clean up the remaining saw, rasp and tool marks with scrapers and fine cut rasps until the results smile at you! Make sure all the shoulder line up and they match.

10 Slightly round the edges of the 1/2" tenon with a rasp or file. Use the Veritas ½" tenon maker to form a ½ X 1 ¼" tenon to fit the seat mortise. A "Go Block" with a ½" X 1 ¼" hole in it will help with forming the tenon the correct length. When you push the tenon into the hole, it will burnish the surface. When the burnished surface reaches 1 1/4" in length, it has arrived! (see figure 7.9).

11 The tenon maker will sometimes catch the grain. When this happens, round the spot with a rasp or file.

12 When you assemble the chair, place each tenon in position and let them stick out behind the headrest next to their targeted mortise. Make a line about 1" up from the targeted entry point for that spindle into the headrest. Cut off the spindle at that point and use the 3/8" tenon maker to form the tenon about 1 ¼" long. Number each spindle on its face and at the ½" end. You now qualify as a member of the "International Order of Spindle Makers!"

chapter

eight Attaching the Spindles and Shaping the Seat

There is much to be done to finish the chair construction and assembly. The seat needs to be bandsawed to shape and mortised to receive the spindles. The headrest needs to be attached to the back legs with screws. The spindles will be fitted into their mortises and the entire assembly will be raised into place (see figure 8.1).

figure 8.1

figure 8.2

steps for attaching the spindles and shaping the seat

1 Identify the seven locations for the ½" x 1 ¼" mortises (holes) in the seat by using the pattern. Rather than marking them by overlaying the pattern, I prefer laying them out by gathering the measurements from the pattern. Make sure each side is symmetrical. If you would like more lateral support move spindles #1 and 7 forward ½" and turn these spindles so that they center on the front of the pommel. Dividers and calipers are very helpful for laying these out and checking their locations.

2 I use a plywood tray to stabilize the seat for drilling at the drill press. It is a simple plywood tray that clamps the seat between two Veritas bench Wonder Pups.

3 Drill all seven mortises with a brad point or Forstner bit at a 90 degree angle to the center seat board. The tray allows the holes to be drilled at 90 degrees to the drill press table top even if you have a coopered seat (If you have a flat panel seat the tray is unnecessary). Start with a hole for spindle #1 (1-7, left to right). Set the depth stop on your drill press to 1 ¼". Because of the slope of the coopered seat, holes #2-6 will not be as deep as #1 and 7. All spindle shoulders should line up. Bandsaw the back and side radii of the seat.

4 Sand the seat edges to remove the saw marks and to finish shaping them before rounding over. An oscillating spindle sander makes quick work of this activity. One way or another, the sides must provide a smooth surface for the router bit's bearing to ride against.

5 I use a 1 1/4" round-over bit at the router table to round-over the bottom of the seat on both sides and the back. Stay ½" to 1" away from the seat to leg joint areas. These will be faired in after the seat and legs are glued up.

6 This chair would be very difficult to build initially if all the spindle mortises were drilled into the seat at different angles. Drilling them at ninety degrees means that the spindles need to be able to lean forward with the headrest so the assembly can be attached to the legs with screws. Two things can be done to facilitate this movement. First slightly ream the front edge of the hole with a reamer (see figure 8.2). You can make one with a scraper blade or use a tapered reamer from your Windsor chair tool collection. Place it in a brace and gently ream the #4 hole from 3 to 9 o'clock. Check the orientation of each spindle and ream so the direction of the lean will be facilitated for each spindle. Be very conservative! To allow each spindle to lean forward relieve the back of the ½" tenon.

7 The previous step will be repeated several times until the properly oriented spindles are inserted in the seat and headrest and the entire assembly leans forward from the rear until it lines up with the holes in the headrest. Screw it all together. No glue yet! Sit down and evaluate the spindle orientation for comfort. Reorient the spindles (if possible) to provide more comfortable support. If short grain situations have been overlooked, a few tenons might snap. It's better to find out now rather than later. This is a time for celebration. I hope your chair is comfortable. Just sit and enjoy!

chapter
nine Shaping Techniques

figure 9.1

figure 9.2

Everyone will discover their own artistry while shaping the rocker. I see the chair as a set of lines first and as a set of surfaces second. If the chair's lines looked good painted black, it will really look good with great surfaces. The lines are both hard and soft lines. Hard lines are found along the top of the headrest and along the outside edge of the arm for example. The hard line along the top of the ears softens as it flows down the back of the leg. Your lines should flow, pulling your eyes and interest all around the chair (see figure 9.1).

The final product should look like it is in motion and not a stabilized mass. This concept has caused me to thin out the seat, headrest and arms. At the same time, the rocker must meet its obligation to support the sitter safely and comfortably. You have some interesting decisions to make. Remember you are the artist! Try to do as much shaping and sanding as possible before gluing up the chair (see Appendix.) The final fairing of joint surfaces should be completed after glue up.

I begin shaping each part of the chair with a large rough cut rasp or its equivalent (see figure 9.2). The surfaces where two parts meet have to be leveled or faired so lines flow monolithically through the joints. It is better to define the broad lines of the chair with larger tools working aggressively.

Make long strokes when shaping larger areas. Random orbital sanders can help with final shaping of surfaces like the headrest radii, etc. A router with a roundover bit can help you radius the outside of the backleg. Often, I will use the router to remove stock quickly so I can finish shaping the surface to my taste.

When the lines have been defined, I clean up the tool marks with finer rasps. Spokeshaves can be advantageous for truing and cleaning cross grain or end grain surfaces. Cabinet scrapers can also provide surprising shaping ability when the burr is properly prepared.

Finally, I like to use smaller, finer rasps, power burrs and sanding drums on my Foredom tool. Then I come back with a scraper to finish my shaping and surface clean-up. At this point it is a hard call as to when you should start sanding. When I start sanding, I am still shaping. I consider this shaping until I reach 100 grit. When I have the entire chair sanded to 100 grit I have finished shaping.

shaping the parts of the rocker

Seat: The front of the seat should be thinned out by rounding over the cut outs on each side of the pommel. This makes the chair's seat more inviting. The pommel needs to be high enough to be seen as a sculptural feature but not so high and sharp as to make the sitter uncomfortable. A prominent pommel limits the sitter's wiggle room. The rocker becomes more of an easy chair with a smaller pommel but the chair loses one of its sculptural features.

figure 9.3

figure 9.4

Whatever you decide, make sure the pommel is straight, centered and in line with the center (#4) spindle. Fare the seat into the legs at all the joints after glue up (see figure 9.3).

Front Legs: Remove excess material around the front leg to seat joint, exposing the leg standing proud but flowing into the seat (see Figure 9.4).

Back Legs: Round over on the back outside and front inside of each leg (see figure 9.5). Shape the concave surfaces inside the ears on the top of each leg. Smooth all the transitions from the back legs to seat joints and the headrest.

Headrest: The back of the headrest needs to be rounded over along its entire surface. A decision needs to be made concerning how the surface will be shaped along the bottom edge of the headrest (see figure 9.6). The front and back of the headrest must transition into the backleg.

Arm: The transitions between both leg joints must be smoothed. Smooth the transition from the arm stem on the back leg into the arm after glue-up. An interesting return radius can be carved into the thickened arm area (see figure 9.8). I trace them onto the back leg and remove the material below the radius of the return with a rasp. I work a rasp below this radius to leave material standing proud. I shape its surface with finer rasps and scrapers. A fine, needle file will cleanup this detail. The pedestal transition between the front leg and the arm must be formed.

figure 9.5

figure 9.6

figure 9.7

figure 9.8

I use my Foredom tool, microplanes (see figure 9.9) and rasps to remove the material and shape the lift on the front of the arm. The inside of the arm at the front leg joint has an interesting little flat that extends down the leg. Most of this shaping has to be done after glue up.

Spindles: The shaping of the spindles is discussed in Chapter 7.

Rockers: As you shape the rockers you can use the different colors of the laminations to artistic advantage. The rocker transitions (see figure 9.10) must be faired into the back and front legs. Shape a foot on the front of each rocker.

Shaping a chair is fascinating work. Do it until it smiles at you!

figure 9.10

chapter ten

The Rockers

figure 10.1

figure 10.2

The carved seat and the rockers' cyma curve are the most stunning features one usually notices about this chair. The curve's purpose is supposed to be to keep a child from being able to tilt the rocker over backwards if it were pushed. Honestly, its value is that it attracts attention to the chair and really makes it flow.

I use six 3/16" plus (as shown in the video) or eight 1/8"plus laminations 1 ½" wide X 50" long for my rockers. The plus (almost 1/16" more) means on the heavy side of that measurement. I always drum sand my laminations to obtain a good glue joint surface.. So I cut them 3/16" or better at the bandsaw. Whatever you choose, the finished thickness of the rocker should be 1". For the transition blocks or stacks, I use five at 1 ½" wide X 6" long. There is nothing magic about the decision on using contrasting laminations. With a walnut rocker, I use a strip of maple (all sapwood) and a strip of ebony. I piece the ebony together because it's hard to find in 50" lengths. Plus it's very expensive.

steps for laminating a rocker

1 Prepare a piece of your primary stock 1 ½" thick X 3 ¼"" wide X 50" length. It must be square on four sides. Prepare your secondary woods as necessary. This should be enough for two rockers and four sets of transitions. Mark the ordered stack with a "V" if you would like to keep them in order to make the rockers appear seamless.

2 If you resaw at the bandsaw, use a good resaw blade on a properly tuned saw. Cut 3/16" X 1 ½" laminations off of the 3 1/4" wide board. Joint the face of the cut board after each cut.

The face against the fence will always be the jointed face. Watch your V! If it's always face up and pointing the same way, things will be good! Take your time and you can get a smooth cut. If you have a good feather board, use it!

3 If you resaw at the table saw, add at least another inch to your stock's thickness to allow for the table saw blade's kerf. Stock preparation otherwise is the same process. Use a push stick and feather board to keep your fingers away from the saw. Rockler has a jig that may help you cut laminations on the tablesaw. A glue joint rip blade may produce ready to glue joints on a tuned saw. Remember, safety first!

4 Sand the laminations to the same thickness if necessary. Thicker laminations are more difficult to glue-up on the form. If you ripped them to 1/8" on the table saw and the surfaces are glue joint quality, don't sand.

5 Cover all glue contact surfaces on the rocker lamination form with clear packing tape and a good coat of wax. I wax before each glue up. Order the laminations into a contrasting scheme. Place rubber bands around them to keep them in order. Try a dry clamp run. Practice using your clamps quickly. Every motion takes a second and every second adds up. You will have about 20 minutes to apply glue, build and clamp each rocker. Number each clamp in the sequence and rehearse. I use a piece of a lamination applicator. A large brush works well, too. I use Titebond II Extended Open Time Glue. I cover both surfaces with glue evenly. Start with the center clamp position (lowest point in the rocker's radius) pull the laminations down and use a quick type clamp (see figure 10.1). Make a reference mark across the laminations and on the form. Work from the middle out to one side and then finish clamping the other. Use a wood block and a mallet to keep them lying down evenly. I use the cut-offs as cauls to equalize pressure along the tops of the laminates. Keep the rocker clamped to the form for 24 hours, and then glue-up the other one.

6 As shown in the video segment, place and glue rocker transitions, scribe, cut and fit rocker to leg joints (see figure 10.2).

7 Place the chair on the table saw. Mark each leg and the top of the transitions with witness marks. Place a ½" dowel center on the end of each front leg and press down.

8 Use a Dowel-It lying flat on top of the front transition surface and drill a ½"X 1 ¼" hole. Insert a prepared dowel (sized and fluted) and assemble rockers to the front leg.

9 At the router table roundover the outside edges of each rocker. I prefer to crown the inside edges, making a soft to hard line ending at the back of each rocker. Do as much shaping as possible before you attach the rockers.

10 Set the rocker on its ears. Clamp the eight degree jig between the rockers at a point that allows the rockers to pass directly over the back legs. Find a center point on the seat between the back legs and mark so it will be highly visible. Clamp a square with an extension pointer lining up with the center of the jig. Move the assemblies until the back legs are lined up and the square's pointer is on the seat's center point (See Figure 10.3). Clamp the leg assembly to the chair. I like to use some clamping blocks made to fit in the curve of the seat to leg joint. I cover these with cork. Clamp so that you can have enough room to drill through the bottom of the rocker (see Figure 10.4). Drill a ½" hole through the rocker into the back leg at least 1". When I first started drilling these holes I used two sliding bevels to line up my drill.

11 Prepare a dowel for each hole. Use a two part epoxy to secure each joint. Drive the dowel into the hole in the rocker and down into the back leg. You will hear an audible difference when the dowel bottoms out. Saw away the excess dowel and sand flush. Be careful not to make a flat on the rocker bottom. Do not starve the joints of epoxy by using too much pressure. Leave the chair in clamps 24 hours. Finish sculpting the rockers. Sneak a rock in the chair. You deserve this and a major celebration!

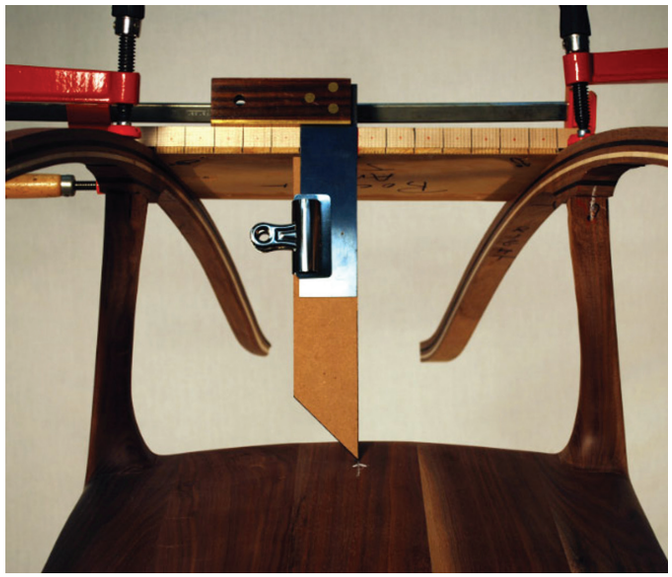


figure 10.3

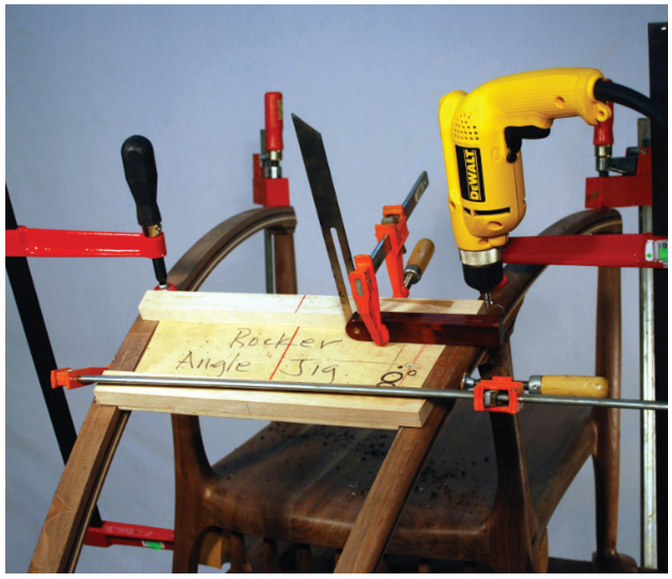
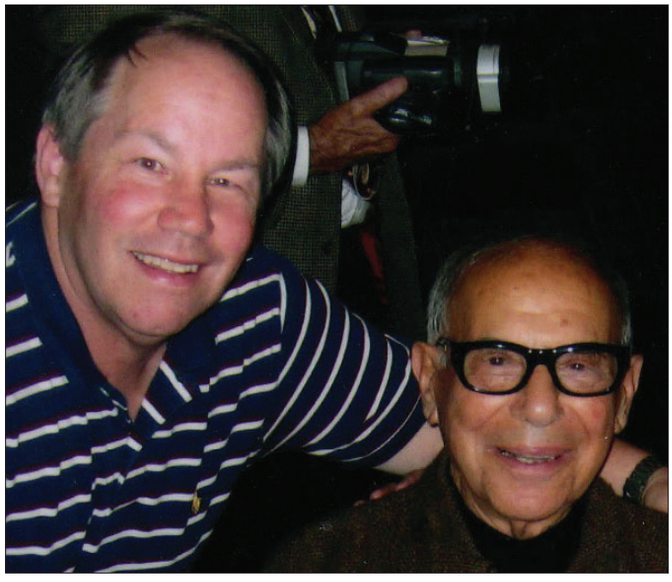


figure 10.4

sam maloof Who Inspired Us All



There would not be a “Build a Maloof Inspired Rocker with Charles Brock” without Sam Maloof. I recently taught a woodworking class on the subject of the rocker in a room Maloof himself taught in. There were two huge pictures of him hanging on the walls and I felt like he was with me guiding me along.

I spent a weekend with him in Atlanta several years ago at a workshop. Sam was a humble genius at work even though there were problems with the equipment. He never stopped or complained. He worked and taught wonderfully as if everything was perfect.

Sam was an icon in so many ways. He made a living doing what he wanted to do. Instead of selling his designs to be manufactured or mass-produced, he built them one at a time. He rose well beyond the title he loved- “woodworker.” Sam Maloof has become the most inspiring furniture maker and designer of the late 20th century.

Sam brought his gifted visions to functional forms that serve as inspirations for us all.

Appendix

Schedule and Check List for Assembling the Rocking Chair with Glue
Leg up the seat with screws and glue when:
_____ Joinery is complete, _____ Legs rough shaped, _____ Radii cut _____ Seat sides, back and front shaped
_____ Ears cut _____ Six degrees cut from back leg bottoms, _____Holes drilled for spindles

Assemble the arm to leg joints with glue and screws when:
_____ Arm joint fits the front leg and back leg flush, _____ Arm is shaped except for faring the leg joints
_____ Seat has been sanded to a minimum of 220

Assemble, screw and glue headrest and spindles to the seat and back legs when:
_____ Spindles are carved and sanded to 400 grit, fitted to the seat and headrest
_____ Headrest is shaped and fits between the back legs snuggly with screws in place
_____ Headrest and spindle assembly fits _____ Shaping and sanding is complete on insides of back leg and seat
_____ Bottom profile of the headrest is shaped and sanded to 400 grit

Assemble and glue the rockers to the chair when:
_____ Chair has been assembled, parts shaped, joints faired, chair sanded to 400 grit
_____ Rockers fit and dowel joint prepared for assembly

Glue recommendations
One of the top ten questions I hear is concerning glue choices. Everybody has their favorite. Some people have cited tests from Fine Woodworking and others. There are many types of glue that will do a great job and I haven't tried them all.

These are my recommendations for the following glue ups:
Titebond Extended Open Time - Seat, Seat to Leg Joints, Arm to Legs, Headrest to Back leg, Rocker Laminations (I tint the laminate glue with a brown water dye so the glue joint won't show through the sculpted laminations)
Franklin Liquid Hide Glue -Spindles to Seat and to Headrest
West System 3 Epoxy - Attaching Rockers to Legs with Dowels

Sanding
I dislike sanding, and I know you do too! I wear a breathing apparatus that makes me look like a scuba diver, not one at peace with the joys of working wood. My best results come from a mixture of hand sanding and power sanding. The choice is made according to the needs and shape of the surface. After shaping, I sand all surfaces with the highest effective grit that will remove tool marks and abrasions and leave its own scratch pattern after sanding completely. Sometimes it may be as low as 60 grit, but for most of the chair is usually 100 grit. Starting at that point, I go through the complete schedule of 100, 120, 150, 180, 220, 320 and finally 400. Before finishing I will vigorously rub the entire chair with a red, gray and finish with a white 3M pad. This leaves the surface almost burnished at 1000 grit.

Finish
My finish of choice for the sculptured rocker is 3 to 4 coats of 1/3 tung oil, 1/3 boiled linseed oil and 1/3 satin varnish applied with a rag. This is followed by a mixture of the same leaving out the varnish and instead adding a grated handful of beeswax. This is heated slowly in a double boiler until the wax melts, leaving a cream like mixture that is applied in 3 coats by hand rubbing until your hand is hot. Rubbing causes the wax to melt allowing the wax to build and fill up the wood's pores. I use Waterlox instead of the three-part oil mixture. I like the way it builds. Each coat is rubbed out with a white 3M pad when completely dry. The way I prepare the oil and wax mixture is in a low temperature crock pot in the driveway. At about 120 degrees the wax will finally melt. When it cools it is ready to start rubbing.

Plugs
I make my plugs from ½" thick X ½" wide sticks of ebony. One 12 inch stick will provide enough for a chair. I make a tapered plug for each hole using the same Veritas 3/8" tenon maker that I use on the headrest end of the spindle. Place the stick in a vise and use it like a pencil sharpener. Test it in the hole and mark it for cutting off. Place it back in the vise cut it off the stick leaving an extra 1/4 ". Add glue and tap it in until it stops. Cut and sand it flush when it dries. A scraper comes in handy for final surfacing.

Tool List
I have provided a partial tool list. A complete list can be found at my website.
www.charlesbrockchairmaker.com

Preparing Stock:	Bandsaw-14" or larger w/riser, 8" jointer, 10" Table Saw, Planer
Producing Parts from Template:	Bandsaw, Router Table, 2" Spiral Trim Bit
Coopering the Seat:	Festool Domino or Freud Dowel Joiner or biscuit joiner, Bandsaw, Grinder w/ 4" carbide Kutzall (Blue Donut Shaped), Sander w/ 24 Grit Sandpaper
Seat to Leg Joinery:	Router, Router Table w/ Fence, Whiteside Router Bits (Bits must have matching radii!)Rabbet bit #1922 (1 ½" diameter) ¾" Roundover Bit #2010, Cross cut Sled, Small Router Plane
Layout/ Marking:	Colored Pencils, White-Red-Black, No.2 Pencils, Sharpies, Chalk, Marking Knife, Dividers, Tape Measure, Rule, Squares, Protractor, Bevel Boss, Sliding Bevel
Front Legs:	Table Saw, Lathe, 1" Roughing Gouge, Lathe Chuck w/ ½" Brad Point Bit
Shaping Tools:	Die Grinder w/ Various Burrs, Various Burrs and Rasps, Router w/ ¾" and 1 ¼" Roundover Bits, Microplanes - All Sizes and Shapes, Spokeshaves Flat and Round Soles, Woodworker's Vise Mounted On Workbench
Laminating Rockers:	Bandsaw or Table Saw w/Glue Joint Rip Blade, Sander, 12-10" "C" Clamps
Sanding:	Sandpaper 60-400 Grit for Hand Sanding, 3M Pads Maroon-Gray-White
Miscellaneous:	Veritas Tenon Cutters (Round Blade Model) 3/8" and ½", Block Plane, Dowel-It

Jigs and Forms
Six Degree Taper Jig
Material - 3/4 "Birch Plywood
Sides 2@ 3 ½"X 22", Bottom 2@ 5" X20 (double)

Directions:
1) Glue together the doubled bottoms
2) Taper one side at the table saw at six degrees
3) Glue and screw the assembly together
4) Mark left and right leg

Rocker Laminating Form
Use the profile in the patterns to lay out your form. Make it out of plywood or particle board. Cut the profile in one sheet of ¾" material. Glue it to another piece cut close to the pattern line. Use a router with a pattern cutting bit to trim the second piece flush. Attach another piece as a backer. Keep the profiled cutoffs as it calls for clamping pressure. Drill holes to accept clamps.

Material – 1 sheet of ¾" birch plywood or MDF

Eight Degree Jig
Material – ¼" to ¾"- 7"wide X 14 1/8"long scrap of birch plywood or MDF
2 sticks @3/4" X 1" X 16"

Directions:
1) Use your miter gauge at the table saw and cut 8 degrees off of each end of the scrap plywood.
2) Find and mark the center point on the plywood. Find the centers of the sticks and attach them on each long edge of the plywood. Be sure to line them up on center and flush with edge.