INSTRUCTIONS

for Building the

Skateboard Rack

A Few Remarks About Making the Skateboard Rack

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A WARNING – PLEASE READ

Woodworking can be dangerous! It's up to you to determine if you can safely use the tools and perform the tasks needed to complete this and any other woodworking project. If you are unsure, STOP! Get advice from someone knowledgeable or do some careful studying on your own. Be safe!

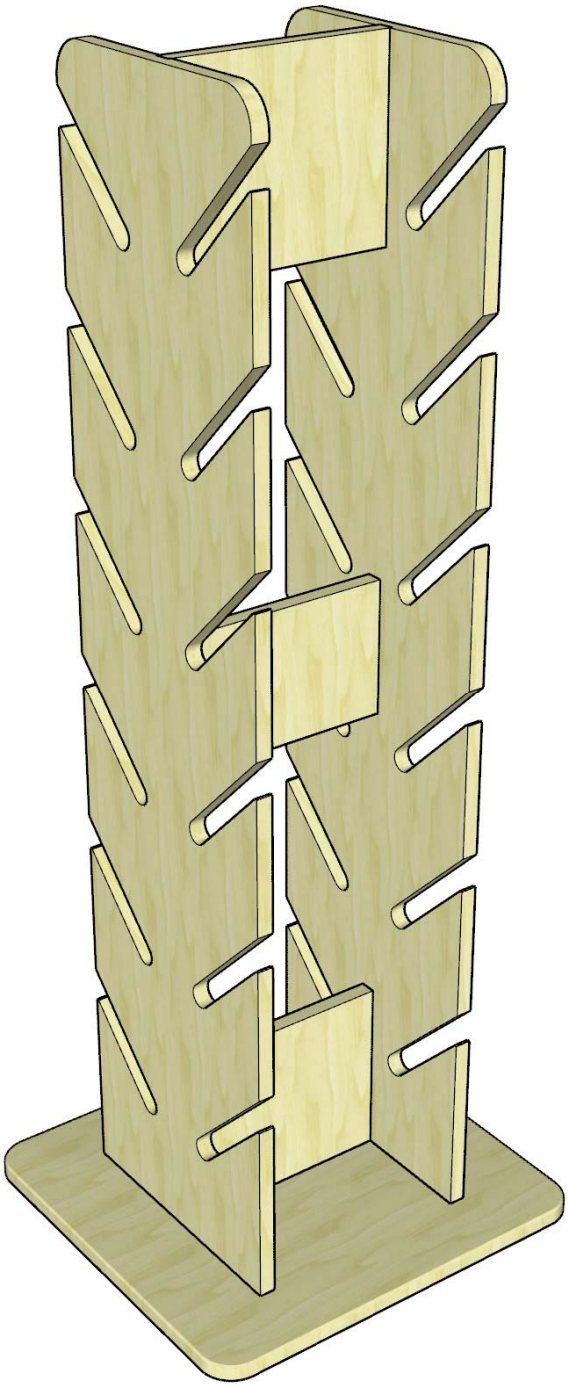
Always wear at least an appropriate N95 dust mask or respirator when sanding or spraying finishes. For advice about dust masks and respirators, visit this link:
https://woodworkingtoolkit.com/best-dust-masks-respirators/

READ, UNDERSTAND, AND FOLLOW ALL OF THE INSTRUCTIONS AND WARNINGS THAT CAME WITH YOUR TOOLS. BE CAREFUL!

Why Build This Project?

The Skateboard Rack is a great way to store up to 12 skateboards in a small footprint. It holds a variety of boards, both large and small.

The Rack is made using 3/4" Baltic birch plywood, so it's sturdy.



Key Features of the Skateboard Rack

- The whole assembly is about 50" high
- The Base is 18" x 18 7/8"
- The rack assembly is 12" from front to back and 10 7/8" from side to side
- Each top corner of the rack and each corner of the Base has a radius of 1 1/2"
- All 3 of the Stretchers are let into mortises that are cut 1/8" deep
- The assembly is held together with #10x2" flathead construction screws, 17 of them
- Material: 3/4" Baltic birch plywood. Baltic birch is flat, uniform, has very few voids, and it's stable. But, of course, there are other types of plywood that you can use.
- Glue: None
- Finish: The rack should be painted to extend its life, secure possible splinters, and give it a nice look

Required Skill Level

You should have at least **intermediate** woodworking skills before attempting to build this project.

A lot of router work is needed, so **router skills are important**. Among other skills, you must understand how to cut with a flush-cutting bit in a way that will minimize tear-out.

Details of the SketchUp File and Equivalent PDF File

File *Skateboard_Rack_11_SKETCHUP_VERSION_8.**skp*** is the SketchUp design drawing for the Skateboard Rack. All of the dimensions and other necessary details are incorporated here. If you should find a dimension or other detail missing, it can be determined by examining this file. And, you can orbit and move the model around for a better look at everything.

File *Skateboard_Rack_11_SKETCHUP_VERSION_8.**pdf*** contains all of the images and dimensions from the SketchUp design drawing file. Use this file if you're not familiar with, or don't use, SketchUp.

If you would like to view the SketchUp file (.skp) without the expense of paying for SketchUp, you can download the free SketchUp Viewer here:

https://www.sketchup.com/products/sketchup-viewer

Use the Included SketchUp or PDF File to Follow Along with These Descriptions

There are 7 pages in this design. The heading of each section below corresponds to the name of a particular SketchUp/PDF page. These files are referred to below as "the design drawing."

Assembly

This is a perspective view of the Skateboard Rack. The dimensions shown here indicate how to center the rack assembly on the Base.

With Skateboards

This is a view of the Skateboard Rack with typical skateboards stowed on it. This arrangement was used to settle on the final dimensions of the Rack.

Exploded

Each component is identified. This view makes clear that there are mortises in the Sides for each of the Stretchers.

Notice that there are two different Stretchers. The two Wide Stretchers (8" wide) are located at the top and bottom. One Narrow Stretcher (6" wide) is located in the middle.

The Wide Stretchers are used for structure. The purpose of the Narrow Stretcher is to remove any bowing or deflection in the long Sides.

The mortises ensure correct alignment of all the pieces when the Rack is assembled.

Base

This view shows the simple rectangular Base. The Base is almost square, *so be sure to keep track of the length and width during assembly.*

Notice that the entire top edge receives a 1/8" radius round-over. This is the only component that receives a round-over.

Sides

The two Sides are identical. These will require most of your fabrication effort. A router and template are used to fashion the slots as will be explained later.

Stretchers

The Stretchers are simple rectangles. As indicated in the drawing, one Narrow Stretcher is needed, and two Wide Stretchers are needed.

Slot Cutting Template

This device is needed as a guide to mark, rough-cut, and final-cut all of the slots.

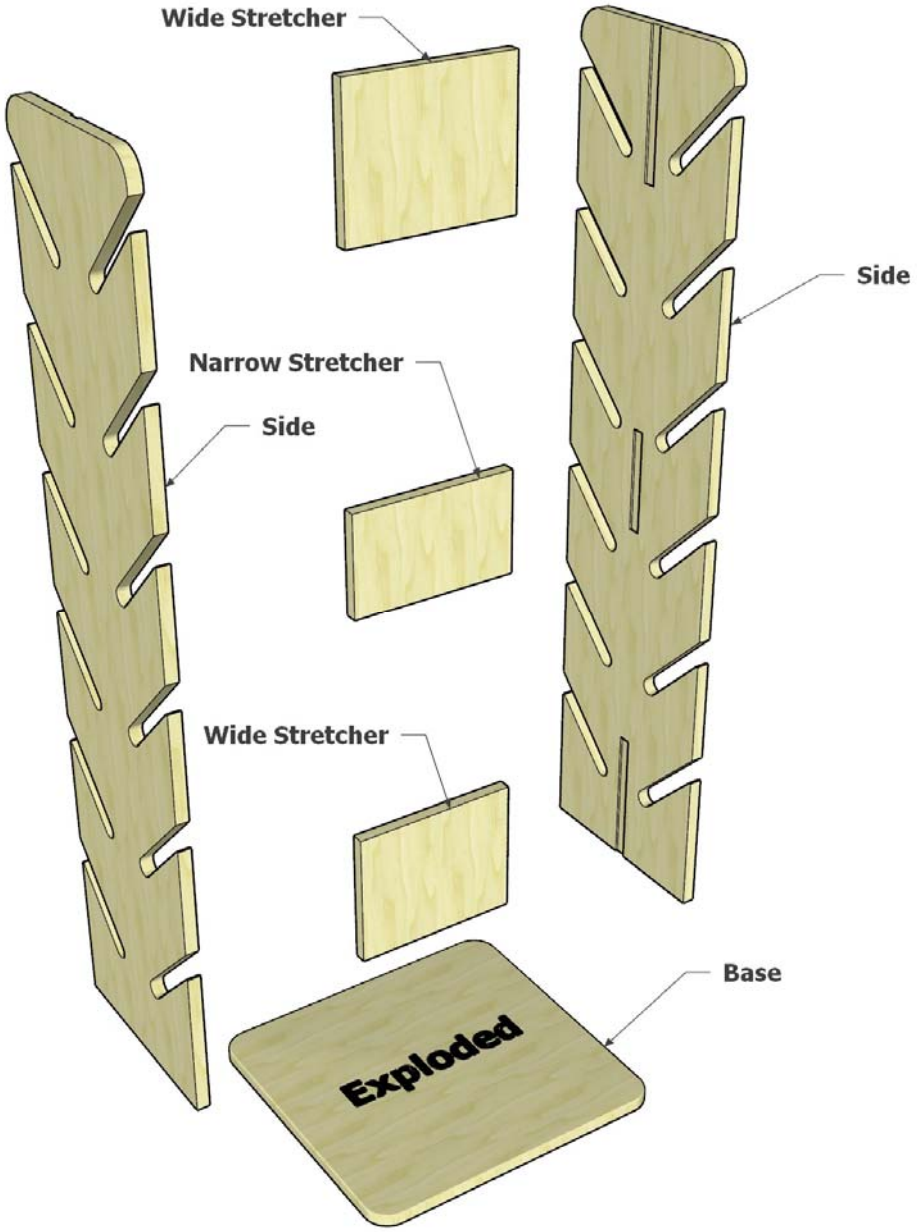


Figure 1. The Skateboard Rack's Components

Keep Everything Square!

The accuracy of the cuts of each component affects the fit of the entire assembly. This is true for most projects, but it's especially true for the Rack because of the long, relatively narrow Sides. The long Sides will magnify any errors in the squareness of your cuts. You can avoid headaches and a lot of extra sanding during final assembly if you make sure that all corner cuts are square and true.

Cut Each Piece to Its Final Size

Base

The Base is unique. Its dimensions aren't related to any of the other components. So, cut a rectangular piece of plywood to final size independently of the other pieces.

Stretchers

All of the stretchers have the same length: 9 11/16". So, cut a strip of plywood 9 11/16" wide. Then make square cuts from that strip to form 2 Wide Stretchers and 1 Narrow Stretcher.

Sides & Slot Cutting Template

Of course, the Sides are made from 3/4" Baltic birch.

The Slot Cutting Template, on the other hand, is made using 1/2" MDF (medium density fiberboard.) You can used whatever material you like, of course, but MDF often works best for templates and jigs. MDF makes cutting and sanding very easy.

The Sides and the Slot Cutting Template are all 12" wide. *So, use the same table saw setup* to cut both Sides and the Slot Cutting Template to a width of 12". Then cut the Slot Cutting Template to its final length. Finally, make square cuts on the Side pieces to cut each one to its finished length.

Building the Slot Cutting Template

The Slot Cutting Template (I'll call it the "SCT" to make later references to it simpler) will guide all of the cutting and routing of the Rack's slots. So, it should be fabricated as accurately as possible.

Mark the Positions of 4 Holes

With the SCT's outside dimension cut to final size, mark a pencil line along its length 4" from one of the long edges. Using that line as a reference, mark off the locations of the centers for 4 round holes following the dimensions on the Slot Cutting Template page of the design drawing. Finally, use an awl, nail, or other pointed object to carefully mark the centers of the holes so that a drill bit won't drift off center.

Drill 4 Holes

Use a 3/4" diameter Forstner bit to drill 3 holes and a 1" diameter Forstner bit to drill 1 hole at the locations shown in Figure 2.

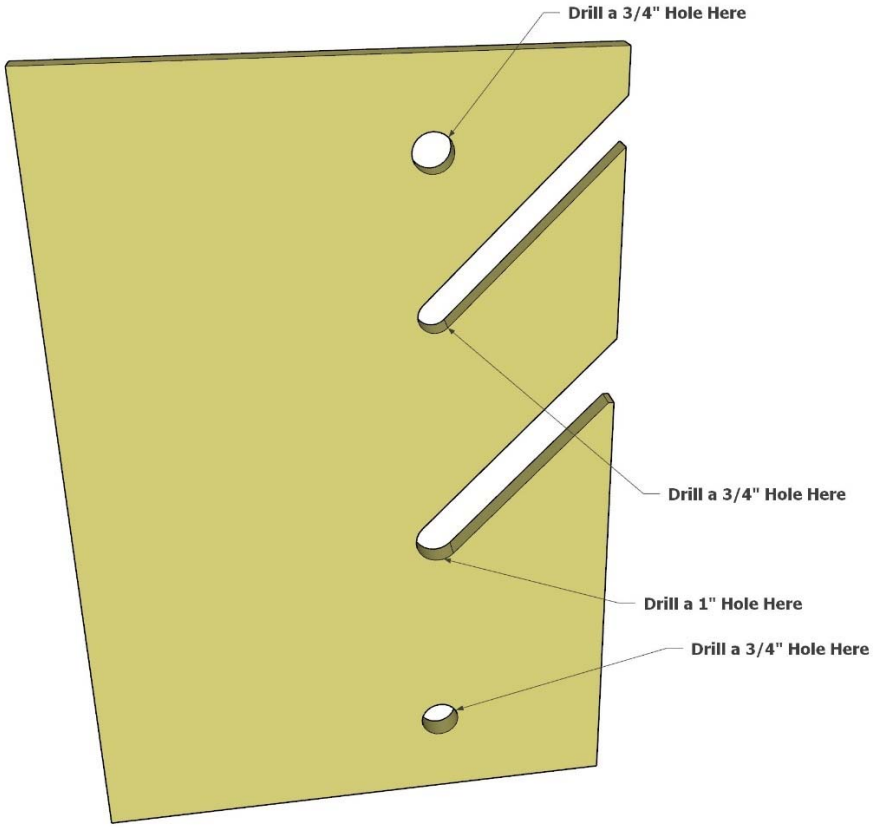


Figure 2. Slot Cutting Template (SCT) Hole Sizes

Draw Pencil Lines Representing the Edges of the Slots

Now we'll draw lines to form the outlines of the two slots in Figure 2. Use a 45° reference such as you can find on a speed square or a combination square to draw pencil lines that just touch the edge of both sides of two of the holes (refer to Figure 2.) Extend those 45° lines to the edge of the SCT.

Rough-cut the Edges of the Slots

Using a bandsaw or jigsaw, make cuts between the lines you just drew to rough-cut the slots. Stay between the lines *but be sure to stay about 1/8" away from each line.*

Flush-cut the Edges of the Slots Using a Router

With the slots rough cut, very carefully place something with a straight edge, such as a straight-cut board on the SCT along one of the pencil lines. The straightedge must just touch the edge of one of the holes and extend past the outer edge of the SCT. You can ensure accurate alignment of the straightedge by butting it up against a speed square or combination square. Secure the straightedge using double-sided tape or clamps.

Use a router with a flush-cutting bit, its bearing riding against the straightedge, to rout from the inside of the hole very carefully to the outside edge of the SCT. **Be sure not to distort the hole.** Repair the edge of the hole if you damage it. Repeat the flush-cutting procedure for the other three pencil lines.

Mark Center References Inside the Two Freestanding Holes

Two of the holes in the Template stand alone. They don't have slots connected to them. Refer to Figure 3 to see where to use a pen or pencil to mark the inside edges of both holes to indicate where the centerlines should cross the holes. These marks will help to align the SCT.

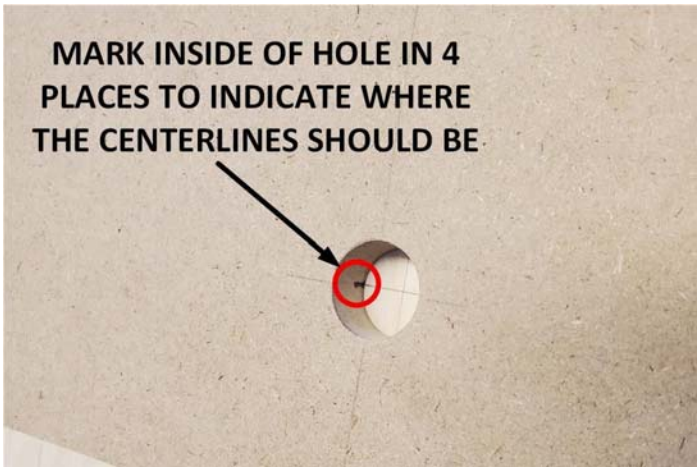


Figure 3. Mark a Centerline at 4 Place in Each Hole

Add Edging Using Glue

The holes and slots in the SCT are now complete. Refer to Figure 4 to see how edging is added to one edge of the SCT. Use material that's about 1/4" thick and 1/2" wide. Carefully glue three pieces as shown in the figure so that the edging extends about 1/8" below the bottom of the SCT. *Be sure that any glue squeeze-out is wiped away from where the bottom of the SCT and the inside of the edging meet; this will be important later so that the SCT and edging can rest cleanly against the edges of the Sides when the slots are flush-cut.*

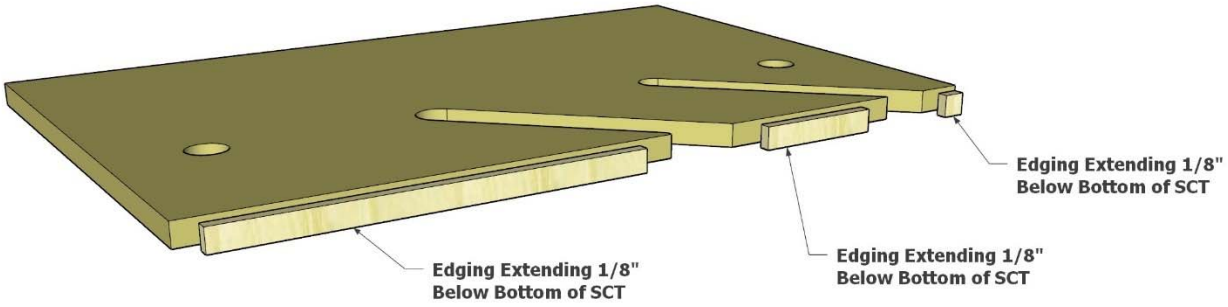


Figure 4. Add Edging to One Edge of the SCT

Notice that *the edging is trimmed a good distance away from the edge of each slot*. This spacing is needed so that a flush-cutting bit has enough room to begin and end its cut on the outside edge of the SCT. Look at Figure 5 and Figure 6 to see an actual implementation.

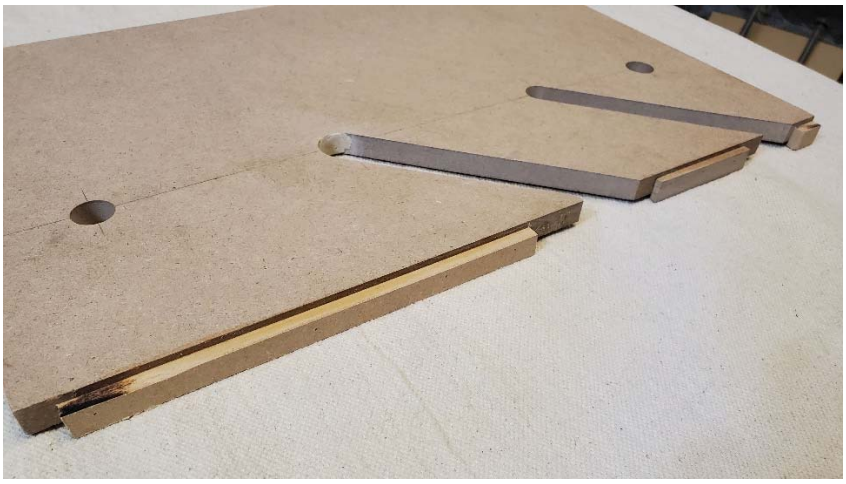


Figure 5. Top View of Edging

Figure 6. Bottom View of Edging

Building the Sides

The Sides require by far the most work. Accurate marking, rough-cutting, and routing is essential. It's important to take care to make the two Sides as identical as possible.

Arrange the Sides for the Best Match

Lay one of the Sides on top of the other. If they have a bow, turn them so the bow of one is in the opposite direction from the bow of the other. Doing this will cause the bows to counteract one another when they are assembled into the Rack Assembly.

With any bowing accounted for, use a pencil or marking method of your choice to mark the boards. Mark the Inside Top (IT) of the sides that face toward each other once you've decided which ends should be the top. Also, mark the Outside Top (OT) on the sides that face away from each other. **Always refer to these reference marks before adding any more marks and before making any cuts to the Sides. The more work you put into this project, the more you will regret making any serious error.**

Do Any Needed Final Edge Trimming

Situate the boards such that one is lying on the other with their inside faces pressed against each other. Check all of the edges of the two boards to ensure that they line up simultaneously. They should agree very closely if you've cut the two pieces accurately. They don't have to be perfect, but you should satisfy yourself that they're "good enough." Trim one or both boards as needed so that all of the edges match up very closely and all of the corners are square.

Set Up to Cut the Mortises for the Wide Stretchers

You'll need an accurate straightedge that's more than 49" long. I used a self-clamping straightedge that's typically used for guiding straight cuts with a circular saw. It's made for 48" material but it's big enough to fit over the length of the 49" Sides.

Very carefully and accurately mark points at each end of the board indicating the position of the centerline on the inside face. Connect the points with the straightedge and mark the line with a pencil.

Determine the exact thickness of your Stretchers. Plywood that's rated as 3/4" thick is typically actually 23/32" thick. Your plywood might be different. I will assume for this presentation that the thickness is 23/32".

Use a pencil to mark points half the thickness of the Stretcher, 23/64" in this case, on either side of the centerline at both ends of the board. Carefully connect those points with the straightedge and mark lines using a pencil.

Get a piece of scrap more than 8" long having a straight edge and align that edge along one of the two outside lines at either the top or bottom end of the board. The straightedge can help to line things up correctly. Clamp the scrap into place.

Lay the end of one of the Wide Stretchers on the board and against the scrap board. Place the edge of a second scrap board against the other side of the Stretcher so that a snug "sandwich" is formed. Look at Figure 7 for an example.

Figure 7. The End of a Stretcher is Snuggly Sandwiched Between 2 Straight Edges

Once the two straightedge boards have been clamped into place, slide the Stretcher so that it's edge is flush with the end of the Side. Then place a narrow piece of scrap between the two clamped side pieces so that the end of the narrow piece butts against the Stretcher. Secure the narrow piece in place using double-sided tape.

Remove the Stretcher from the setup of Figure 7. You should see something like the image in Figure 8.

Figure 8. Ready for the Mortise Cut

Be certain that the gaps between the narrow piece and the two side pieces are not so large that the bearing of a router mortising bit won't slip into either gap. See Figure 9 for the arrangement between all of the setup pieces.

Figure 9. Don't Let the Gap Between the Setup Pieces Be Too Large

The gap in Figure 9 is about 1/8" between the center piece and each side piece. This is no problem for a mortising bit with a 3/8" bearing.

Cut the Mortises

With a setup like the one shown in Figure 9, you are ready to cut the mortise. Use a mortising bit in your router. It should have a small cut length, 1/2" or smaller, and a top bearing. A 3/8" diameter bit with a 1/4" or 1/2" cut length is ideal.

Set your router to cut to a depth of 1/8". Run the mortise from the outside of the setup pieces, along the edge of one of the pieces, then up against the end of the narrow setup piece, over against the other setup piece, and finish the cut as you move the router to the outside of the setup guides.

Repeat the setup and then cut the mortise for the Wide Stretcher at the other end of the board. Engage the long straightedge so that the outside edge of the mortise just completed is exactly aligned with the outside edge of the other Wide Stretcher. Place and clamp the straight guides for the cut as before. Then make the cut.

Square the Corners of the Mortises

The round mortising bit will leave the inside corners of the two mortises round. Square the corners up using chisels. Ensure that the Wide Stretchers fit into both of the newly cut mortises and that *they seat fully*.

Each mortise should look as square and clean as the one in Figure 10.

Figure 10. Squared Mortise

Marking and Cutting the Mortise for the Narrow Stretcher

Since the Narrow Stretcher is located in the middle of each Side, find and mark the middle of the centerline that you drew along the length of the board. Then measure and use a pencil to mark the distance on either side of the middle point that's half the width of the Narrow Stretcher. You're now prepared to setup the cut for the mortise.

Place the Wide Stretchers into their mortises. Place the long straightedge against one side of both Wide Stretchers. Place one end of the Narrow Stretcher between the two pencil marks and against the straightedge.

Place the edge of a straight piece of scrap snuggly against the other side of the Narrow Stretcher and clamp the scrap into place.

Remove the straightedge and sandwich another straight piece of scrap against the Narrow Stretch where the straightedge had been. Clamp that piece of scrap into place.

Be sure that the Narrow Stretcher is exactly between the pencil marks. Butt a narrow piece against one side of the Narrow Stretcher as you did with the Wide Stretcher earlier. Finally, butt a second narrow piece against the other side of the Narrow Stretcher.

Remove all of the Stretchers. Set your router to a 1/8" depth of cut, as before, and rout the mortise for the Narrow Stretcher.

Square the corners as before. You should end up with a mortise that looks like Figure 11. *Be sure that the Narrow Stretcher can seat completely in the mortise.*

Figure 11. Squared Mortise for the Narrow Stretcher

Cut all of the mortises into the inside face of the second Side, being sure to keep track of your chosen inside and outside faces.

NOTE: *Centering and alignment are important! You must ideally cut the mortises so that, when the two Sides are sandwiched against each other, with all of their outside edges aligned simultaneously, the locations of the mortises of one Side match the locations of the mortises on the other Side exactly.*

Mark the Hole Locations on the Boards

Note that the SCT has edging along only one edge. Refer to the Sides page of the design drawing. We will mark only the holes on the righthand side of the Sides as viewed in that image.

Referring to the Sides page of the design drawing, carefully measure and use a pencil to mark the centers of all the holes on the righthand side that will be the round ends of all the slots on that side. *Be careful to mark both boards exactly the same way.*

Now turn the boards over so their opposite faces are facing up. Repeat the measuring and marking of the holes as you did on the first side.

Drill 3/4" Holes

The slots will ultimately be 1" wide, but that final dimension will be achieved using a router. Begin by drilling 3/4" holes.

Use a **3/4"** Forstner bit (***NOT*** **1")** to drill 12 holes in each board. To do this, place the SCT on the board so that:

1. The SCT is flat on the board—no sawdust or debris between them
2. The edging of the SCT is against the edge of the board—again, no sawdust or debris between them
3. One of the 3/4" holes in the SCT is centered on the place that will be drilled
4. The SCT is secured to the board with clamps or double-sided tape
5. There is scrap backing behind the board to help avoid tear-out

NOTE: It's important to ensure that the bit drills perpendicular to the board. A drill press is best for this. *Be extremely careful* if you don't have a drill press and will be drilling the holes using a handheld drill.

Carefully bring the 3/4" Forstner bit into the hole in the SCT. Then start the drill and drill the hole.

Drill all of the holes this way in both of the boards.

Mark the Slot Locations

Place the SCT such that it's firmly positioned on the board and its edging is firmly against the edge of the board. Slide the SCT along the board until the rounded end of the 3/4" slot is aligned exactly with one of the 3/4" holes in the board. Use a pencil to mark the slot edges on the board by running it along the sides of the SCT's 3/4" slot. Repeat this procedure for every hole.

Rough-cut the Slots

Use a bandsaw or jigsaw to rough cut all of the 3/4" slots. Carefully cut along the inside edge of each pencil mark. Be careful about possible tear-out. For example, it's helpful to use a fine blade to limit tear-out.

Preparation for Routing the Final Cuts of the Slots

The final cuts are made to each slot using a router once all of the slots have been rough-cut. The 1" slot of the SCT will be used for this purpose together with a flush-cutting router bit.

Be aware of grain direction to avoid tear-out! The grain of the outer plies of my plywood ran along the lengths of the Sides. This direction dictated the best cut direction. The relative directions are shown in Figure 12.

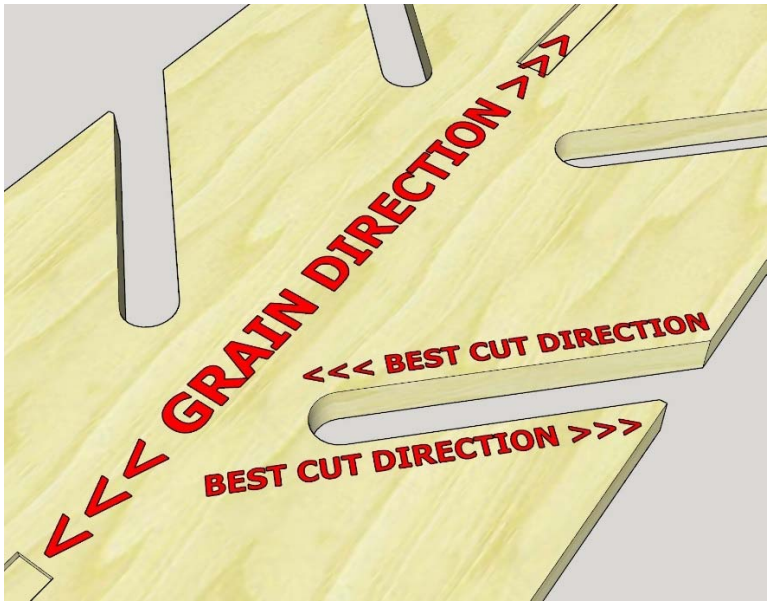


Figure 12. Best Cut Directions for the Given Grain Direction

You should see in Figure 12 that the best cutting direction is the one that causes the edge of the router bit to cut "away" from the direction of the grain. *Cutting in the opposite direction will likely cause tear-out.*

*If your grain runs across the board, your best cutting directions are **opposite** the directions shown in Figure 12.*

If the grain runs in the direction shown in Figure 12, then the SCT is mounted to the near face in the figure, but the router must cut from the **other side** of the board in order that the bit will turn in the desired direction to minimize tear-out.

If your grain runs across the board, instead of the direction in Figure 12, then the SCT is mounted to the near face in the figure, and the router must cut from the **same side** of the board so that the bit will turn in the desired direction to minimize tear-out.

Selecting a Router Bit and Preparing to Cut

A 1/2" bit is narrow enough to ensure that it won't contact any of the rough-cut slot edges opposite your cut as long as you made those rough cuts in accordance with the description under "*Rough-cut the Slots*" on Page 20.

A 1/2" trim bit (bearing on the bottom) is best when the grain runs in the direction shown in Figure 12; cutting will be done from the opposite face of the board in the figure. That is, secure the SCT to the board where the cut will be made and turn the SCT and board over so that the SCT is on the bottom. Use some spacer boards along the length of the board to lift the SCT away from the table and keep the board flat. Position the bit height so that the bearing will ride against the SCT. Everything is now set to make the router cut of a slot.

A 1/2" pattern bit (bearing on the top) is best when the grain runs across the board; cutting will be done from the top of the SCT on the same face of the board shown in the figure. That is, secure the SCT to the board where the cut will be made so that the SCT is on the top. Use some spacer boards underneath the board to keep the board away from the table and keep the board flat. Position the bit height so that the bearing will ride against the SCT. Everything is now set to make the router cut of a slot.

Positioning the SCT for Final Slot Cutting

With all of the holes drilled to a diameter of 3/4" and all of the slots rough-cut to a width of 3/4", we're now ready to use the 1" slot in the SCT. Select a slot to be finish-routed and place the 1" slot of the SCT over that slot.

Be sure that these conditions are met:

1. The SCT is flat on the board—no sawdust or debris between them
2. The edging of the SCT is against the edge of the board—again, no sawdust or debris between them
3. *There is an equal margin of about 1/8" between the edges of the 3/4" slot in the board and the edges of the 1" slot in the SCT*
4. The SCT is secured to the board with clamps or double-sided tape

Finish Cutting the Slots Using a Router

Carefully make the cut in one continuous sweep down one side of the SCT slot, through the curved end, and back up the other side. You might want to repeat the cut a second time to ensure that it was done accurately, and no material was missed. After all, you won't be able to repeat the cut once the setup is undone.

Forming the Rounded Corners

The design uses 1 1/2" rounded corners at the top of each Side and the corners of the Base. You can form these corners using whatever method you choose. One approach, of course, is simply cutting and sanding. However, a router with a flush-cutting bit combined with a corner-rounding jig gives excellent results with the least amount of labor.

Make a Corner Rounding Jig

The corner-rounding jig I used for the 1 1/2" radius cuts is shown in Figure 13 and Figure 14. It has added edging just like the SCT in Figure 4 on Page 12. The one difference is that this jig has edging on two adjacent sides.

Figure 13. Corner Rounding Jig - Top

Figure 14. Corner Rounding Jig - Bottom

The jig is made from a piece of 1/2" MDF cut large enough so that clamps can secure it to the workpiece without interfering with the router.

Cut the MDF to an adequate size, about 12"x12". Make sure at least one of its corners is absolutely square. Use a pencil to mark that corner for a 1 1/2" radius by using a compass, or a paint can, or any other suitable round object of the right size.

Cut away any excess material from the corner using a jigsaw or bandsaw. *Stay away from the line!* Now carefully sand away the rest of the material outside the line. MDF is easy to cut and sand, so you should eventually end up with a nice, smooth edge with a 1 1/2" radius. Be sure to mark it for later reference as in Figure 13.

Now add edging to the two sides adjacent to the rounded corner using Figure 5 and Figure 6 as a reference. *Notice in Figure 13 and Figure 14 that the edging is placed well away from the curve of the corner; this allows room for the bearing of a flush-cutting router bit to begin and end the cut on a straight portion of the jig.*

Marking and Cutting the Corners

Place the Corner Rounding Jig (CRJ) over one of the corners of the top end of one of the Sides. Make sure that the jig is completely seated on the corner and then use a pencil to mark along the rounded corner of the CRJ. Repeat this process on all of the corners on the tops of the Sides and on the corners of the Base.

Use a jigsaw or bandsaw to cut away the excess material on all of the corners. *Stay outside the line by about 1/8".*

Place the CRJ on one of the marked and cut corners. Be sure that the jig is firmly against the sides of the workpiece. Clamp the CRJ into place.

Now use a router with a flush-cutting bit, with the bearing riding on the CRJ, to cut away the remaining waste on the workpiece.

Think about tear-out. If your grain runs in the direction shown in Figure 12, then the best way to avoid tear-out when rounding the corners is to bring the router bit up along the outside edge of the Side and over along the top. This means that you should use the CRJ on one face of the Side to cut one corner, and on the opposite face to cut the other corner.

If your grain runs across the board, instead of the direction indicated in Figure 12, then you will want to bring the router bit up along the top of the Side and over along the outside edge. Again, the CRJ will be on one face of the Side for one cut and on the other face for the other cut.

Repeat the cut for all of the remaining marked and cut corners.

Round Over the Top Edge of the Base

With the Base cut to size and all of its corners rounded, it is now time to round over its top edge. Use a 1/8" round-over bit only on the top edges of the Base.

Assemble the Rack Assembly

The Rack Assembly comprises the two Sides and three Stretchers. The Base will be addressed later.

Sand Everything

Sand all of the surfaces and edges of all the components with at least 120-grit paper. Be sure to hand-sand all of the sharp edges and corners of the plywood, including the edges and inside surfaces of the slots. The eventual finish will look better, and you will eliminate a lot of splinters that naturally occur on the sharp edges.

Drill Pilot holes for the Screws

Lay each Side on a flat surface with the mortises facing up. In the Wide Stretcher mortises, use a pencil to mark the mortises 2" in from each end of the mortise. In the Narrow Stretcher mortises, use a pencil to mark the mortises 1 1/2" in from each end of the mortise.

Place some scrap backing behind each mortise. Drill a clearance hole for a #10 wood screw (3/16"—or smaller; see the comment in NOTE 2 on Page 26) on the centerline of each mortise at the pencil marks that were just added.

Assemble the Rack Assembly Using Clamps

Review this entire process before beginning:

1. Lay one Side on a flat surface with its mortises facing up
2. Fully seat each Stretcher into its respective mortise, being careful not to allow any of the Stretchers to fall
3. Hold the other Side with its mortises facing down and lay it onto the Stretchers. You might need another set of hands for this step.
4. Seat all of the Stretchers into the mortises of the Side that's on top
5. Confirm that all Stretchers are fully seated into all of the mortises in both Sides

6. Place a clamp across the assembly at the top Stretcher and another clamp across the assembly at the bottom stretcher. NOTE: The bars of the clamps can fit through nearby slots in the Sides.
7. Leaving the clamps slightly loose, be sure that the top and bottom Stretchers are flush with the tops and bottoms of both Sides
8. Tighten the clamps while keeping the faces of the Stretchers and Sides square to each other

Screw the Rack Assembly Together

With the Rack assembly clamped securely and the Stretchers and Sides square with each other, drill a clearance hole for a #10 wood screw (3/16") into the Side only. Continue drilling the hole using a drill bit sized to be a pilot drill for a #10 wood screw (1/8" or 7/64") for about 1 1/2" into the edge of the Stretcher.

NOTE 1: DO NOT rely on self-tapping screws. You must drill a pilot hole or risk splitting the Stretchers.

NOTE 2: A tapered drill bit is ideal for drilling the clearance hole, pilot hole, and countersinking in a single step. Also, a tapered bit has a small point so that the bit can be positioned more precisely before beginning to drill; this is why it was recommended to drill a hole smaller than 3/16" under "Drill Pilot holes for the Screws" above on Page 25.

Countersink the hole for the head of a #10 flathead wood screw. The screw's head should ultimately tighten just below the surface of the Side.

My choice of screw for this project is the #10x2" construction screw shown in Figure 15. It holds well, it uses a star drive, and I didn't split any of the plywood when a pilot hole was drilled first.

Figure 15. Recommended Screws

Drive a #10x2" flathead wood screw through the Side and into the Stretcher. Secure it snuggly but be careful not to drive the head through the Side. And don't split the Stretcher.

Repeat the drilling and driving process for the remaining 11 holes.

Secure the Rack Assembly to the Base

Place the Base face-up on the floor. Stand the Rack Assembly on the Base.

Refer to the Assembly page in the design drawing and note the locations of the 3" and 4" dimensions. Be sure that the Base's 18 7/8" dimension is oriented across from side to side on the Rack Assembly and that the Base's 18" dimension is oriented from front to back on the Rack Assembly.

Square up the Rack Assembly and the Base with each other and move the Rack Assembly until it has 4" spacing from the edges of the Base on both sides and 3" spacing to the front and back.

Once you're satisfied that the Rack Assembly is placed on the Base correctly, draw a pencil line onto the Base around the entire perimeter of the Rack Assembly. Your pencil line should look like the letter "H" when you're done.

Remove the Rack Assembly and put it aside. Place the Base on a flat surface with scrap under it.

Five #10x2" flathead wood screws are used to secure the rack assembly to the Base. Using the pencil H-pattern, drill 5 holes from the top of the Base into scrap that was placed below the Base. Four of the holes should be on the respective centerline such that a hole is located 2 1/4" from the end of each Side leg of the H and a fifth hole should be located in the center of the Wide Stretcher.

The holes would ideally be made with a tapered drill bit as was recommended in NOTE 2 on Page 26. Otherwise, use a clearance hole drill bit (3/16") to drill through the Base. Be sure to drill vertically. A drill press is best for this purpose.

Clamp a straightedge scrap board along the edge of one side of the pencil H pattern. Clamp a second straightedge scrap board 90° to the first board along the ends of the H pattern. Your setup should look like Figure 16.

Figure 16. Base with Clamped Straightedges

Lay the Rack Assembly on a table. Pick up the Base with boards and clamps and "hang" it on the bottom ends of the Sides. Make sure that each straightedge board is resting against the bottom of the Rack Assembly.

Hold the Base steadily in position and used one of the holes in the Base to guide a pilot drill bit (1/8" or 7/64") through the hole and into the Side about 1 1/2". Countersink the hole in the Base. Now drive a #10x2" flathead wood screw through the Base and into the Side. The head of the screw should be about 1/16" below the bottom surface of the Base. (The Base might get dragged across a concrete floor, so the screw heads should not be near the surface.) Repeat this process for all of the screws in the Sides and the screw in the Wide Stretcher. The screw pattern should look like Figure 17.

Figure 17. Hole Pattern in Bottom of Base

Remove the Pencil Marks

You might want to remove the pencil marks. Of course, this isn't important if you expect to paint the Rack.

One good method for erasing pencil marks from wood, aside from using an eraser, is to wet a piece of cloth or paper towel with denatured alcohol or acetone and simply rub away the marks. Both alcohol and acetone dry quickly.

Apply a Finish

No finish was applied to the Skateboard Rack described in this presentation because the end-user wanted to paint it. Nevertheless, I recommend a semi-gloss painted finish of at least 2 coats.

Paint will give the Rack a nice look. And it will seal in all or nearly all of the splinters.

Preparation for the First Coat

Everything was sanded before assembly, so aside from some possible touchup sanding, none is needed.

The best thing to do before painting is wipe the entire assembly down with a tack cloth to remove any dust and other particles that might detract from a nice finish.

Applying the First Coat

The Skateboard Rack has a lot of flat surfaces that invite the use of a roller. Try this simple process:

- Use a brush in and near all of the corners
- Use a mini roller to coat the insides of all of the slots
- Use the mini roller or a different roller to paint all of the flat surfaces

I recommend not painting the bottom of the Base. If the Rack is kept on concrete, such as in a garage, it will probably be dragged against the floor from time to time. The paint would rub off and discolor the concrete if the bottom of the Base were painted.

Preparation for the Second Coat

Allow adequate time for the first coat to cure properly. Once it's dry enough, use some fine sandpaper, 400- to 600-grit, to lightly sand all of the bumps and other flaws that occurred during the painting and drying process.

Apply the second coat as you did the first coat.