

Elegant Bed Steps

Enjoy the accolades and elevate your woodworking skills as you build these steps in a weekend.



by Glen D. Huey

As our family business began, we set up shop in two two-car garages. We often worked with the garage doors open when the weather allowed, even though we were in a residential neighborhood. During one particular stretch, we sold and built a dozen pencil post beds; the majority of which were in tiger maple.

Because it was Spring and the weather was splendid, we had the garage door wide. About every other day a neighbor passed by while out for his walk. On one of his trips, seeing us working on yet another bed, he walked up to the "shop" and asked how many beds we were building. My dad laughed as he replied, "It's the same bed. We're just trying to get it right."

With each bed sold, our customers generally purchased a set of bed steps, too – the mattress top was often between 24" and 30" above the floor, so having a set of steps, for some of our clients, was essential. (One client purchased a set to make sure her aged dog could get up on the bed.)

We quickly discovered that these bed steps were easy to bang out, and they added to our overall sales. If you need a set of bed steps, or you're looking for a product to increase your sales, this could be the answer.

Check Your Scraps

The number of parts needed for these bed steps is small. In fact, the actual board footage used is small, too. It's just more than 10 board feet if you apply a 30 percent waste factor. You may have at least some of the parts stashed in your scrap pile if you're lucky. If not, make a trip to your lumber supplier and select a couple of boards to make it happen.

To save a little money, I glued-up a panel that allows me to get both sides from the single assembly. If you work one slab for each side, you'll waste material above the lower step unless you assemble different length boards. Besides, one glue-up saves time. Also mill the brace material to length, width and thickness. Because the treads are 9-3/4" in width, this is the best time to do the glue-ups if you need to assemble for width – I wouldn't mill the treads to final anything as of yet. (For additional information on milling lumber using machines, [go here](#). If you're milling using handtools, [go here](#).)

With your panel assembled, flat and true, transfer the pattern onto the board. (I took the time to make a full-size pattern.) I found that aligning the bottom of the sides with the trimmed edge of my panel was the best place to begin. Lay in the straight lines using a steel rule or straightedge, and draw in the curved area above the lower step. I did it freehand using the pattern as my guide. (Fig. 1)

The rounded layout at the bottom of the sides is a bit deceiving. It appears as though it's a half-round cutout, but it's not. The distance along the side's bottom edge is 9-1/2", but the radius of the cut is 5-1/4". To accurately draw the arc you need to use a point off the step's side.

Clamp a piece of scrap in position, then set and used a compass to draw in the arc. Of course, you can get by without a compass if you use a thin piece of wood with a pivot point drilled into one end and a second hole for a pencil point drilled 5-1/4" away from the pivot. (Fig. 2)



(Fig. 2) The radius cut at the side bottom has its pivot point off the actual side.



(Fig. 1) Save time by laying out both sides on a single assembled panel, and by printing and using a full-size pattern.

With your layout complete for the two sides, it's time to separate the twins. I found it easiest to divide the single panel into two at my bandsaw. You have to carefully negotiate the turns when using a standard 14" bandsaw or the pattern hits the column before you can get through your cut. A jigsaw would also do the trick.

Once the two sides are separated, I found my table saw ideal for the straight cuts at the top, along the front and to remove any waste from the back edges. (Fig. 3) You could use the table saw to trim the lower tread line, but because you are unable to see the exact location of your blade – it cuts longer at the table than it does at the top of your board

– you would need to accurately determine the long edge of the cut. To make it easy, I used my bandsaw for this task then skimmed the cut at my table saw while I watched the blade move along the cutline.

All the curved lines, along with the notches for the braces, are cut at a bandsaw. Don't fret if your skills at a bandsaw are not the greatest. Each of the cuts can be cleaned, straightened or smoothed afterward – just stay on the waste side so that you can work to the established lines.

When it comes to trimming the brace openings, there are a couple of areas which require additional thought. The first is as

(Fig. 3) I find it better to use my table saw to trim the straight cut lines along the top, back and front of the bed step sides.





(Fig. 4) With the arc cut along the side bottom cut, it's easier to get the top brace notch cut.

you cut the notch for the rear brace. Cutting in from the edge – the 90° cuts – is cake. What is catchy is the third cut used to waste out the total area. Cutting along the wall that's parallel to the back of the sides requires that you cut in from one 90° cut, swing

around to the back wall then slice down to the second 90° cut. To extract the remaining waste that's left intact from the swing cut, flip the side over and draw a line connecting the end of the 90° to the parallel wall. Without flipping the panel, you'll not be able to get the bandsaw blade in position. Again, the column gets in the way.

A second area that I found problematic is the notch for the top brace. On my 14" bandsaw I couldn't get to the layout line in order to cut without first cutting away the arc waste along the bottom edge. With that waste out of the picture, sliding in to make the shelf cut was a snap. (Fig. 4)

With all the curves and straights cut on the step sides, smoothing the lines is next up. I use a spindle sander for most of the curved work (around the arc at the bottom and along the front between treads), and files and rasps for anything else, including the front curve as you get in tight to the tread line of the lower step, and the three notches. (Fig. 5)



(Fig. 5) I find that smoothing the edges of the sides is both a power-tool and hand-tool operation – a spindle sander makes quick work of the arc and can only smooth a portion of the shaped design between steps. The area close to the lower steps is where a file becomes a better choice.

Simple Joinery

The braces attach to the sides with a flat-grain-to-flat-grain connection. While glue could do the job, I find that additional support is required, especially due to the treads being attached to the braces. (That connection is discussed in more detail later in the project.)

What needs to be done at this point is to decide on how you're to join the treads to the braces and step sides. Nails or pegs through the treads looks sloppy. Also, it's possible to damage the sides as you drive home your connection of choice. Plus you need to consider wood movement. The treads will expand and contract over time. Nails and pegs could result in tread splits or breaks. My choice is to use wooden clips to hold the treads snug. Clips allow for expansion and contraction.

There are ways in which to cut the slots for the wooden clips. You can use a three-wing cutter, or a straight bit in your router table, but both are made more difficult because of the lower tread – it's a problem to get the piece against your fence. I've cut these slots with a biscuit joiner in the past, which works fine. But this time I'm going with a router, router fence and 1/4" straight bit. (Fig. 6)

(Fig. 6) A router and 1/4" spiral up-cut router bit are great to dig out the slots for wooden clips – three along the front braces and two at the sides hold the treads secure.





(Fig. 7) A view from the rear of the steps after a dry-fit assembly show the location of the slots for the wooden clips.

Set the distance from the router bit to your fence at $\frac{1}{2}$ " to work in conjunction with standard wooden clips, and set the depth of cut at $\frac{1}{2}$ ", too. This arrangement allows you to easily cut slots in the braces – three evenly spaced along their entire length – and in two places in the sides – one centered on each of the tread lines. I made the slots about $1\frac{1}{4}$ " in width to accommodate the $\frac{7}{8}$ "-wide clips. (More on those later.)

Take the time to check your parts so that you have the slots cut offset toward the top of the two braces – no slots need be cut into the rear brace. The treads will be held nicely with the three clips along the front and the additional clips along the treads widths. (Fig. 7)

Before any assembly is done, sand the inside faces of the sides and braces with at least #150 sandpaper to clean any lines and smudges. After you've glued your braces in position, sanding becomes harder.

Assembly & Treads

I decided to glue and clamp the braces to the sides for the time being. (Remember from above that we're getting the best glue bond available.) Fasteners come later. The reason for my choice is that screws or wooden pegs, at the outset, could split the narrow braces. After the glue has dried, however, the probability of splits is greatly reduced because the glue helps hold everything strong.

With a successful dry-fit and the clamps off one side only, grab your favorite wood glue (PVA, animal hide, aliphatic resin, etc.) and paint the notches in the sides and the back face of the braces at the ends, then slip the pieces into place. (Fig.8)

Hold the ends of the braces flush with the outside face of the sides, and carefully add clamps where necessary. With one side glued and the clamps positioned, complete the glue-up on the second side, again holding the ends of the braces flush with the outside face of the side. Set the assembly aside to allow the glue time to dry.

When the glue is dry, go back and add the additional support of screws or wood pegs. I'm not a fan of plugs over screw holes, so I opted for wood pegs. I like symmetry, so instead of a single peg at each location, I chose to install four $\frac{1}{4}$ "-square pegs into each of the front braces. At the back brace, I'm going to install two #8 x $1\frac{1}{4}$ " slot-head screws – c'mon, it's the back.

Drill your $\frac{1}{4}$ " holes making sure you stay centered and straight in the side's width, then cut eight $\frac{1}{4}$ " square pegs and pare one end of each to a somewhat point to aid in driving them in. Drizzle a little glue into the holes, then drive in the pegs. Tap them in until you bottom-out the hole – you should see a small amount of glue being forced out. (Fig. 9) Using a flush-cut saw, bring the pegs even with the braces.



(Fig. 8) Leaving one side clamped as you work on the other makes the glue-up smooth.



(Fig. 9) If you allow the glue to dry, it holds the ends of the braces secure as wooden pegs are driven for added support – without the glue, it's possible that the ends of the braces would split as the work was completed.

If you glued-up the panels for your treads, or if you have material wide enough to use, mill the pieces to thickness. Once at the required thickness, joint one long edge and cut the treads to length. Leave the two slabs over-wide for now.

Choose a router profile that you like and install the bit in your router table. (Yes, you can do this without a router table; just be careful to not roll around the back edge as you shape the ends.) Shape the edge and ends of both treads. (Fig. 10) (If you're a fan of hollows and rounds, use your planes to produce a pleasing profile.)

If you're using a router table, do not attempt to take the complete profile in a single pass. This is hard on your bit and tread. Plus, you have more of a chance to burn the profile, especially if your cutting edge is less than sharp. The best technique is to make the molding to full depth in a couple of passes.

The reason I suggest that you leave the tread over-wide is to make it possible to rip the back edge if you should experience blow-out while shaping the edge and ends to profile, and it eliminates any worries about rolling around the end if you're working with a hand-held router setup. With your shaping work complete, rip the tread to final width. (Fig. 11)



(Fig. 10) Any edge profile that you like is OK to use for the edge and ends of the steps – choose your favorite (or at least one you have on hand).



(Fig. 11) By leaving the steps over-wide as you route or shape the edge and ends, you can easily eliminate any problems, such as blow-out or those considered operator error.

Wooden Clips

To make the wooden clips, begin with 3/4"-thick material. Use a scrap piece of hardwood that's wider than it is long – make it at least 5" along the long grain, and as wide as you can along the end grain. You need 10 clips in all, so a piece at least 6" in width should do the job.



Step one is to form a tongue along the two end-grain edges. (If you make the tongue along the long grain edge, the wood fibers are short and would easily break.) The tongue should be 1/4" thick (fit easily into your slot cuts) x 1/2" long. I use a two-step operation at my table saw. (Fig. 12) A dado stack is another option.

(Fig. 12) The tongue formed on the ends of a scrap have the grain orientation correct for making clips.

(Fig. 13) I use a custom-made push block to cut the small wooden clips; it holds the piece tight to the table and pushes it forward through the cut.

The piece is then ripped into two sections resulting in pieces (tongues and bodies) that are each 6" wide and 2-1/4" long. Those pieces are next cut into individual wooden clips that are each 7/8"-wide and 2-1/4" long. (Fig. 13) Each clip is then drilled using a tapered countersink for a #8 x 1-1/4" screw.



Finishing Schedule

I think it's better to apply any dyes and topcoats prior to assembling the treads to the base. That way you're not reaching over and around braces to get a smooth finish. Sand the show faces to #180 grit – that's the outside of the assembled base and the top and edges of the two treads. Step through grits, making sure that any and all scratches are removed prior to moving to a higher grit.



(Fig. 14) Aniline dye is the best choice for figured hardwoods. The water mixture seeps into the up-turned wood fibers that are the figured grain.

For my project, I'm using aniline dye, as I do so often with tiger maple. But this time I'm switching things up. Instead of my regular mixture of brown walnut and golden amber maple, I'm applying a dark wine cherry dye. (Fig. 14) Coloring figured maple with cherry dye is a great way to introduce figured maples into a room full of cherry furniture – you can better match the color, and still bring the wood figure into play. Plus the results are great. And don't forget to dye the clips, too.

I've ran through my finishing technique numerous times, so I'll abbreviate the process here. (For a more in-depth description of this process, [go here](#).) To begin, soak your bed steps with water-based aniline dye, keep them wet for five minutes then wipe away the excess. Allow things to thoroughly dry before knocking down any fuzzies raised by the dye's water.

Because my wood choice is highly figured, I add in a coat of boiled linseed oil to help build the depth in my finish. Apply a coat just as you did the dye – soak, keep wet then wipe off excess. Allow the oil time to dry. A good test for dryness is to rub your palm on the project, then check for shine. If your palm is shiny give the steps more time to dry. (Fig. 15)

From here on, I'll complete my finish using shellac. A few coats of clear shellac is sprayed on, sanded using #400-grit sandpaper, then a few additional coats are sprayed before abrading (rubbing-out) the steps using #0000 steel wool. A final coating of paste wax – after the treads are in place and attached – completes the finish.

(Fig. 15) After the oil has dried, lightly go over the surfaces with a non-woven sanding pad (I like the grey) to make sure any dust is removed prior to applying shellac.



(Fig. 16) Hang the steps off the edge of your bench to easily install the wooden clips – I darkened the heads of my screws using gun bluing to appear aged.

Final Assembly

The only concern when tying the treads to the base is that you don't scratch or otherwise mar the surface. I find it better to lay down a towel or blanket to protect the treads.

Place the tread on the towel, position the base to your tread (for the lower tread, the unit is hanging over the edge of the bench), slip in a wooden clip then finish the attachment with a screw – wax the screw for easier installation. (Fig. 16) Repeat the steps for each of the wooden clips, then use the same procedure to install the second tread.

I've seen set of steps such as these with a multitude of designs and fanciful cutouts, but for me, I like the subdued styling. And if you can build a set using scrap, how could it get any better.



Glen Huey (glen@360woodworking.com) is a founding member of 360 Woodworking. He is happy to answers questions about this article, or other matters pertaining to 360 Woodworking.

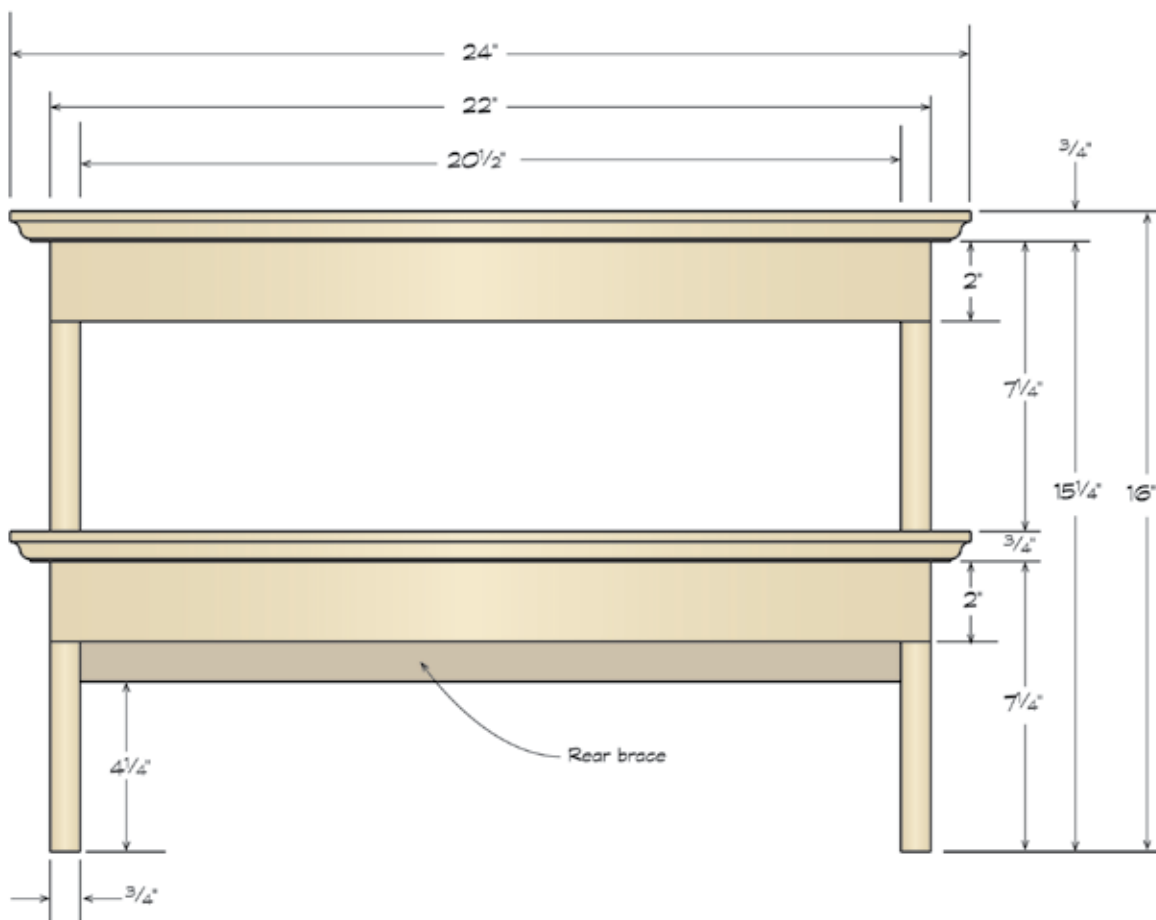
Bed Steps Cutlist								
#	Item	T	x	W	x	L	M	Notes
2	Sides	3/4"		18 1/2"		15 1/4"	Tiger Maple	
3	Braces	3/4"		2"		22"	Tiger Maple	
2	Treads	3/4"		9 3/4"		24"	Tiger Maple	

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Front View

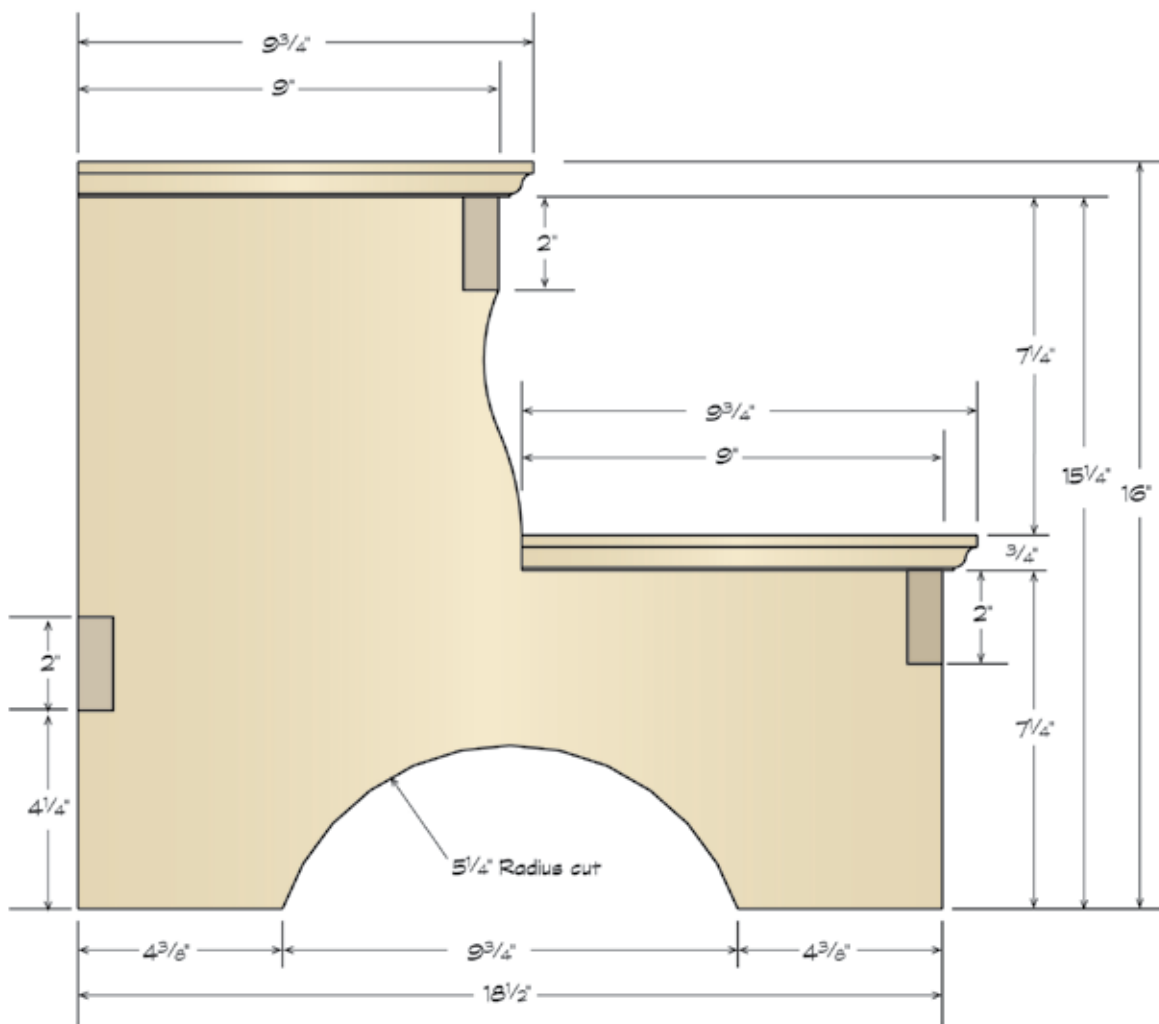
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Side View

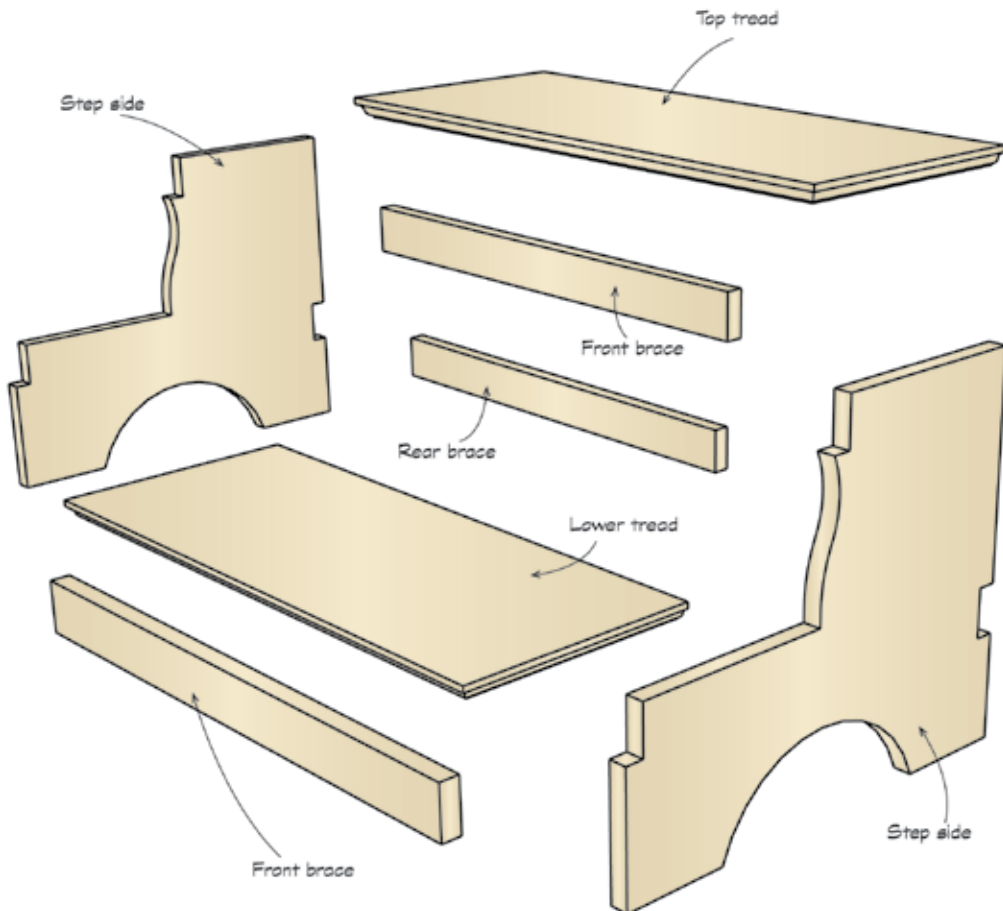
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Exploded View

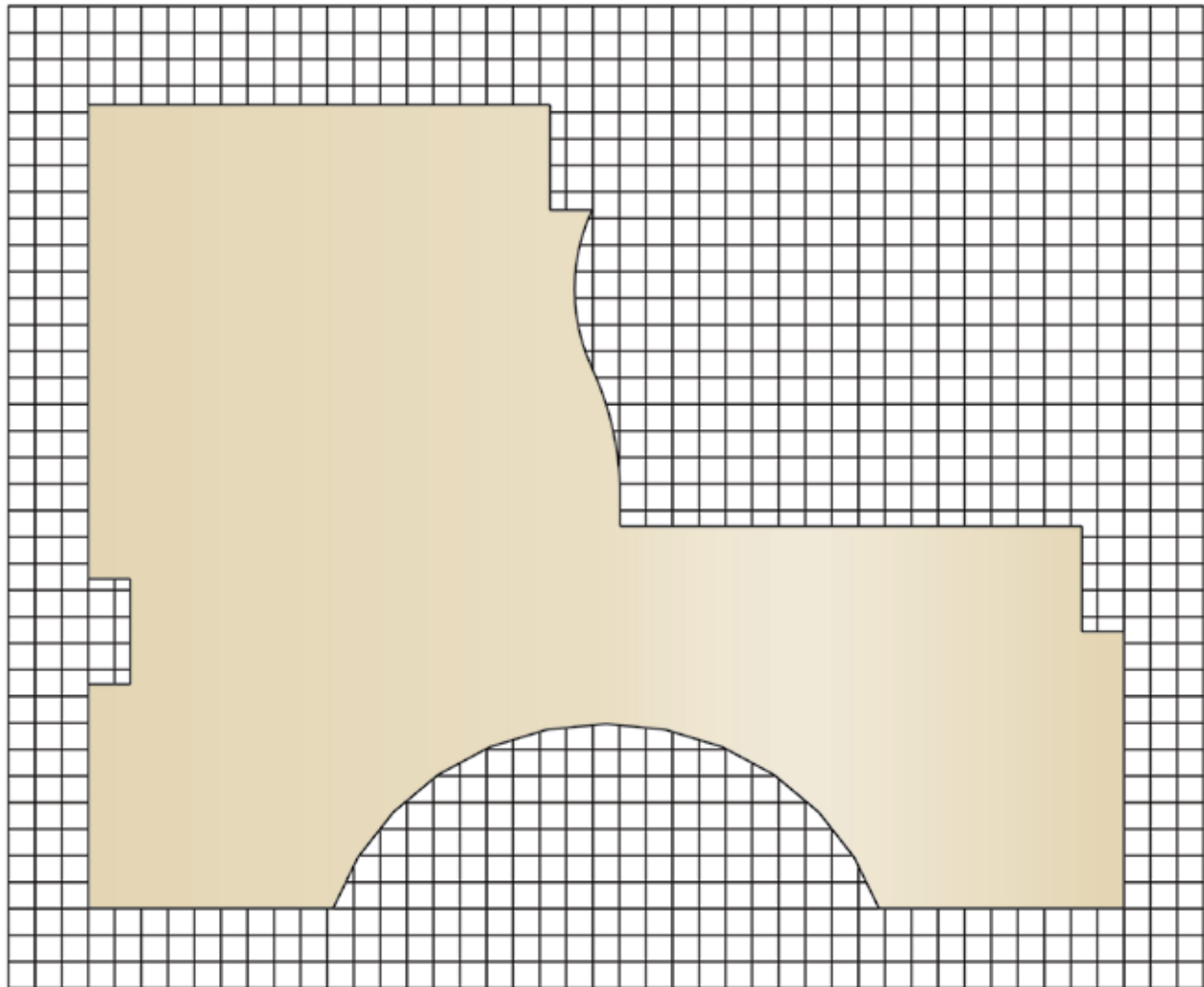
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Scale: Each Block = 1/2"

Pattern View

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