

The following is an account of the construction of a mini half pipe I recently built in my garage intended to help others out there looking for tips and information on building ramps in general. I've been skating about 16 years and have built a few other ramps in the past, but really took my time on this one to plan out the best ramp I could pull off in the limited indoor space of my garage. The dimensions for this ramp are ~19' x 8' x 2-1/2'.

I found quite a few useful sites online with information on building ramps, but also thought many out there to be a little vague when it came to complete details. My account isn't a perfect guide for everyone, but I hope it helps someone out there.

The cost for the materials that went into this ramp (not including tools) was approximately \$400-425.

Materials

- 5 3/4" 4'x8' sheets of plywood - One for the side cut template, and 4 for the usable side cuts
- 1 1/2" 4'x8' sheet of plywood - For the platforms
- 8 3/8" 4'x8' sheets of plywood - For the first two underlying layers of the skating surface
- 4 1/4" 4'x8' sheets of best quality sanded plywood - For the final skating surface layer; Alternatively I could have used Skatelite, Polyboard, Rampskin, etc., but I chose to go with plywood for this ramp which would always be indoors
- 2 8' sections of 1 1/2"-2 3/8" Galvanized steel pipe - For the coping; The kind I used is the silver kind commonly used for fence posts
- 4 boxes of 1 5/8" Wood Screws - Skate Surface Layer Attachment
- 2 boxes of 2 1/2" Wood Screws - Joist/2x4 Rib Attachment
- 41 8' Sections of 2x4 - Joists/Ribs
- 1 Bar Of Soap - For coating wood screws
- 10 2" Long 1/2" Bolts - For bolting transition structures together
- 12 4" Long 1/2" Bolts - For bolting flat bottom to transition structures
- 22 1/2" Nuts
- 44 1/2" Washers
- 8 3/16" x 3" Toggle Bolts
- 8 3/16" Washers
- Wood Shims - (optional: I used them to keep my ramp from wobbling on the nearly flat, but imperfect floor of my garage)

Tools

- Power Drill with Drill Bits (must have 1/2" or other appropriate sized metal drill bit for drilling holes in coping to fit toggle bolts)
- Saw Horses or some type of tables to use when sawing
- Circular Saw
- Jigsaw
- Pencil
- String/Twine
- Tape Measure
- Carpenter's Square

Draw and Cut Out Transition Template

The first thing I did was to draw and cut out an outline for my ramp's transition pieces which would become my template for tracing the rest of the side pieces I'd actually be assembling. Using the same template (which is used as a template only and does not become part of the finished ramp) for tracing all side pieces is a good idea because it ensures that all of the transition cuts for your ramp match as identically as possible. Attempting to draw your transition using the string and compass method for every cut would likely produce less consistent results. This initial template took four things into consideration.

1. The desired transition or steepness of my ramp
2. The size of my coping to know how far to cut in at what would become the "lip"
3. The height of my ramp
3. The size of my platforms

To draw the transition, I used the string and compass method with a 6' radius. This makes for a more mellow transition which I like. I experimented with drawing 5' to 6 1/2' transitions before cutting out my template side piece (which I used for tracing the 8 side pieces I actually used in the ramp), but 6' looked like about what I wanted. 5 1/2' - 6 1/2' is a good radius range for mini ramps, but I don't personally recommend using less than 6' because below that it gets a little steep for most people's tastes. The string and compass method of drawing your transition is more complicated to explain than it is to actually accomplish once you understand it. Here's how I did it.

First I placed one of my 4'x8' pieces of 3/4" plywood flat on the ground in front of me. I then placed an extra piece of wood scrap I had above it (you could just as easily use one of your other 3/4" sheets of plywood to do the same). My only criteria for the wood scrap I chose to use was that it was large enough for me to create a homemade compass with a 6' string length to draw my transition.



Starting on the outside bottom edge of the plywood (the left bottom edge in the above photo), I decided where I wanted my transition to start and marked that spot. If you'll be building a flat bottom of 2x4s, you'll generally want to start the transition 3 1/2" from the bottom edge of the plywood to allow for the size of the supporting 2x4's of the flat bottom. In case that sounds confusing, 2x4's actually measure ~1 1/2" x ~3 1/2" rather than 2" x 4" as one might assume. That's where I get the 3 1/2" from.

(As a side note, if you were building a quarter pipe, the transition would start at the bottom edge of the ply because rather than meeting an elevated flat bottom, it would transition directly to the ground.)

From this point (the point 3 1/2" inches up from the bottom that I wanted my transition to start), I measured 6' straight up and hammered a nail in. I then tied a piece of string to the nail, measured 6' feet of string from that point, and tied a pencil to the end of the string. This results in a homemade compass which, when pulled tight, causes the upright pencil to fall directly on the point where my transition would start. Keeping the string tight and free of slack, I used this large compass to draw a curve from the starting point of the transition to the desired height of the ramp. My ramp was going to be 2 1/2' so I stopped drawing my transition when I hit 2 1/2" up from the bottom of the plywood I was drawing on.

You may notice from the above photo that I have drawn several lines on the plywood and there are actually 3 pieces of string visible - one that the pencil is tied to and two in the upper left portion of the photo going off to the side. This is because I was experimenting with drawing slightly different transitions and heights to see how they looked before deciding on my final outline. I encourage you to do the same until you're comfortable with what you're going to make your template. You'll have a better idea of exactly what I ended up deciding on by viewing the photo of what I cut out below.

Once you have the transition drawn, decide if you need to make additional cuts to accommodate your coping. I recommend using coping that is a diameter of 1 1/2" - 2 3/8". For my ramp, I chose to use coping that measured 1 5/8" in diameter. For a coping of 1 5/8" I had to make a cut that measured 1" down from the height of my ramp, and 1 1/2" back from the transitioned surface.

To draw my platforms, I then measured 24" from the coping notch away from my transition towards what would become the back of my ramp. I then cut out the entire outline which resulted in the following template piece.



Draw and Cut Out Side Pieces Using Template

To trace the side cuts I was actually going to use, I positioned the template appropriately on the other 4 sheets of 4' x 8' 3/4" plywood and cut out two side cuts from each one.

Here's a picture of the tracings on one piece of 3/4" 4'x8' plywood before I cut them out.



When done I had 8 side pieces almost identical to, but not including my template. Next, I prepared these side pieces for assembly with 2x4's.

Assemble Side Pieces and 2x4's Into 4 Sections of Transition Framing

Before assembling the 2x4's and side pieces, I chose to trace their planned positioning and pre-drill holes for the screws that would be going through my side pieces into the 2x4's. To do so I created a tracing tool which sped up the process. This tool is quite simply a small cut off the end of some scrap 2x4 I had with 2 holes drilled through it. The holes are just large enough to fit a pencil through and mark where the screw holes are to be drilled. This allowed me to trace the 2x4 positions and drill marks quickly, then take a drill and pre-drill on the marked dots. Obviously this method is not a necessity, but I found it helped me.

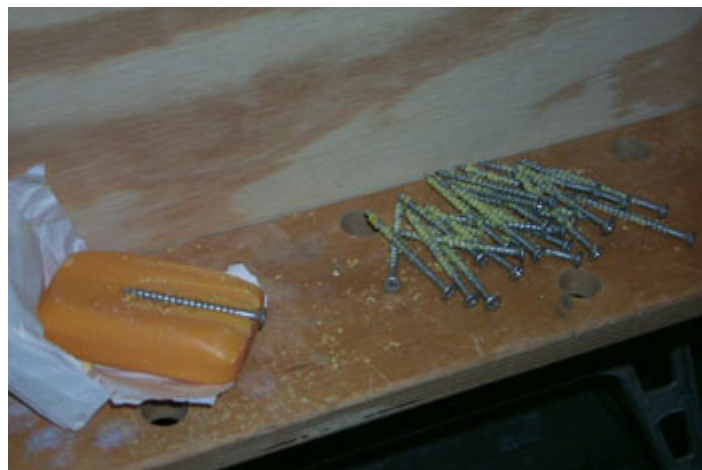
As far as planning each 2x4's positioning on the ramp, I measured every 8 inches down the transition so that every 8 inches starting at the bottom edge of the coping notch (where the skating surface would begin below the coping) would fall in the center of a 2x4 where the wood screws would anchor the skate layers to each rib. The only exceptions to the 8 inch rule on the transition framing were the 2x4 directly below the coping and the 2x4 at the bottom of the transition that would be attached to the flat bottom

Also important, at 48 inches from the coping, I added two 2x4's next to each other for support because this is where one piece of plywood ends, and the next begins. At this point, the 8 inch increment actually falls in between the doubled up 2x4's and not on the center of either of them individually.

The main reason for doubling up every 4' (48") is that you definitely DO NOT want your plywood seams to meet in between 2x4's because then you won't have supports underneath them to screw them down evenly.



For attaching the side pieces and 2x4's I used 2 1/4" metal woodscrews. Before using them, I soaped each one as I went. 2 1/4" screws are fairly long and the soap makes screwing them in easier by coating them as a lubricant. Without the soap, it's easier to strip the screw heads as they drive in deeper and become more difficult (or next to impossible) to turn all the way in until flush with the surface of the plywood.



After pre-drilling the holes for the woodscrews, I used a table with a built in clamp to clamp each side piece upright, and screw in the screws until they just barely stuck out the inside surface where they would meet the 2x4s.



Here's another shot from the inside surface of a side piece. If you look closely (you may need to launch the full size image using the link below) you'll see that the woodscrews are sticking out ever so slightly on the inside surface. This helps when positioning 2x4's before screwing them in because each woodscrew tip functions somewhat like a small tack holding the 2x4 temporarily in place before screwing the wood screws all the way in.



Before I was able to start screwing in the 2x4's, I had to cut them to size. My ramp was going to be 8' wide so that meant that each individual transition section of the frame would need to be exactly 4' wide since I would be using 2 for each side.

Since the side pieces are made of 3/4" plywood, my 2x4's would need to be 46 1/2" inches wide for the width of the finished structure to be 4' (or 48") with the 2 sides measuring 3/4" into account ($3/4" + 3/4" + 46\ 1/2" = 48"$). For each of the 4 transition sections I would be building, I would need 13 46 1/2" 2x4's not including the additional platform supports which you'll see me add towards the end of this section.

To begin attaching the 2x4's, I used two cinder blocks to hold the first side piece upright, then screwed in the bottom front, and bottom back 2x4 supports first so the side piece would be able to stand upright on it's own.



Next, I did the same thing for the other side piece, and the result was a two sided structure that stood on it's own before attaching the rest of the 2x4's.



From there I simply worked my way up the ramp adding 2x4 by 2x4 according to the positions I had traced earlier which match up with the woodscrews already in the side pieces.



Before adding the last 2x4 on the skating surface (the one that will lie right below the coping on the finished ramp), I screwed in 3 supports for each section that would support my platforms. If I had not done this first, the 2x4 just below the coping would have been in the way and I would not have been able to screw in the platform supports from the front.



Below you can see where I pre-drilled the holes, and screwed in wood screws in preparation for attaching some additional platform supports.





After screwing in the platform supports, I prepared to screw in my last 2x4's (you can see the wood screws sticking out in the photo below as I prepare to do this).



I repeated the process for each section and when I was done I had two 4' wide transition structures for each side of the ramp (4 in all).

Next, I stood each section on it's back and bolted 2 together for each side using 2" long 1/2" bolts. Before bolting them together, I placed them where I wanted them, matched them up, and used clamps to position them in place.

Here's a photo of one of the bolts I used.



Here's a photo of the clamped together sections



Here's another after I pre-drilled 1/2" holes, and secured the bolts in place. I chose to use 5 bolts to secure the two pieces together.



Once secured I removed the clamps. Below are photos of 2 of the transition sections which, when bolted together, comprise 1/2 of the ramp's 8' wide skate-able transition frame. In the first photo, you can look closely and see where the 5 bolts are securing the two pieces together.





My next task was to attach and secure my coping. To do this, I used 4 3/8" toggle bolts with washers on where the bolt meets the wood to secure each 8' pipe. First, I drilled holes into the supporting 2x4's at an appropriate angle to the coping I'd be attaching I then taped my coping to the ramp and marked it at each bolt hole so I knew where to drill holes in the pipe.



In order for the toggle bolts nuts to fit into the pipe, I had to drill 1/2" holes at each of the marks I made on the coping.





Now that all holes were drilled, here's a few photos of the toggle bolts I used on the ramp in preparation for coping Attachment

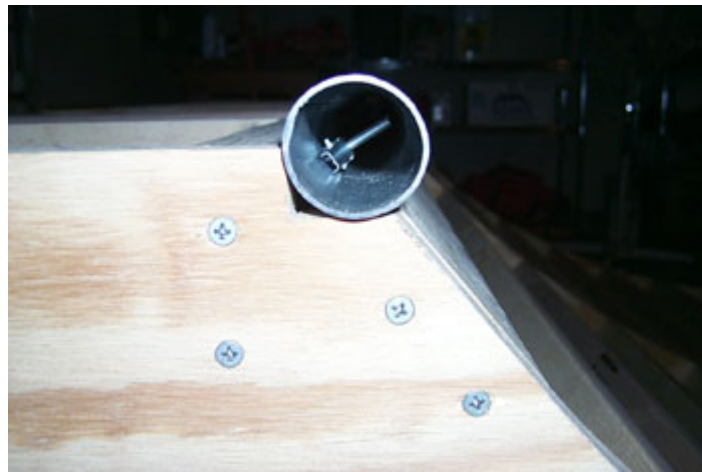




I then put the coping in place so the toggle nuts went through the 1/2" holes I drilled in the coping, popped open, and held the coping in place.



The last step in attaching the coping was to screw the toggle bolts in from the back until the coping was flush with the notches in the side piece and securely in place on the ramp.



At this point, the transition frames for both sides of the ramp were done. All that was left was the flat bottom framing, and the surfacing of the skating surface and platforms.

For my flat bottom, I decided on ~6'. I wish I could have gone longer to 8' or 10', but the space in my garage and desired size for my platforms forced me to keep it minimal. I say ~6' (approximately 6 feet) because I slightly modified the length to plan my surface so that when the first layer of ply was added, it would fit exactly 4 4x8 sheets of plywood without me having to even cut them to fit. The way I did this was to continue to measure down the transition with a rib support

every 8 inches until the ramps center point in the middle of the flat bottom (96 inches from the top of the ramp's transition where the coping would meet).

As I added the second and third layers of skate surface I thought I'd be able to do the same with them, but (as I soon realized made sense) the surface area of the ramp changed due to the added thickness of each layer so I did have to cut the second two layers ever so slightly to fit exactly. If I had realized this before applying any of the plywood layers I might not have bothered being so precise, but I suppose that was just a little experimental planning on my part and the ramp definitely didn't end up any worse off for it.

The flat bottom construction is fairly simple compared to the transition framing so I won't go into as much detail, but you can see from the photos below that I created a flat bottom that was actually two pieces which I bolted together in the middle, then bolted to the transition frames on either end. I used the same type of 1/2" bolts as before to do this, but I did need to use longer 4" bolts to go through 2 2x4's at a time.



Here are some photos of the entire frame just before surfacing. This frame is now completely assembled, but can be disassembled into 6 pieces for transport without the presence of the skate surface layers.



Now it was time to surface the ramp with the first layer of plywood. As I mentioned, I planned carefully so this layer would go on without me even having to cut any of the 4 plywood sheets. For the first layer using the 3/8" plywood I put the sheets on by bending the wood with the grain. Bending with the grain is easier to do, but it makes the surface a bit slower if you're skating on it. The first or second layers don't matter as much because you won't be skating directly on them, but for the final layer I applied the wood by bending it against the grain for a smoother ride. You'll see photos of that further down the page.

To begin fastening the plywood to the frame, I marked each plywood sheet using a carpenter's square so that I had a penciled grid to guide me through the placement of each 1 5/8" wood screw. When planning wood screw placement, it is very important to plan each plywood layer carefully so that the screws are slightly offset on each one. If I hadn't of done this, the screws from my second layer might lay directly over the screws from the earlier layers and I wouldn't be able to screw very far into the wood without hitting the underlying screws. From coping to coping you'll want a wood screw every 8" because that's where they will meet the underlying rib supports. From side to side width-wise is where you'll want your offset because as long as it's on one of your ribs, you can easily adjust from side to side.

After I had my plywood marked, I positioned and started screwing in my first piece beginning at the center seam of the flat bottom. For the skate surface layers, I did not pre-drill the holes. From the photo below you can see that I used my cinder blocks again to help hold the plywood in place as I went to screw it in.

It helps to have someone else around to hold each ply in place as you go (usually by standing on it), but at this point I didn't have that option.



To continue, I fastened the other 3 sheets and there was my first layer. Here are some photos of how it looked at that point.





Next I applied my second layer of 3/8" plywood in the same manner, marking it first, then applying it. For this layer I decided to bend the center two pieces of plywood against the grain, and the two just below the coping with the grain. I did

this on purpose because I did not want every layer's seams to fall in exactly the same place. If they do fall in the same place with each layer, then the seams can be a little bumpy and it can also cause more wear and tear on these seams as you skate the ramp. With this second layer I'm overlapping the center seam. On the third layer I'll overlap the transition seams, and in the end, no seam will be in the exact same position all the way through the finished 3 layers of plywood.

Another thing worth mentioning for this layer is that although my first layer went on as 4 sheets without me having to cut, the second layer needed a slight amount trimmed off of each sheet just below the coping. This is because with each sheet you apply you're slightly decreasing the radius of the surface of the ramp due to the plywood's thickness.

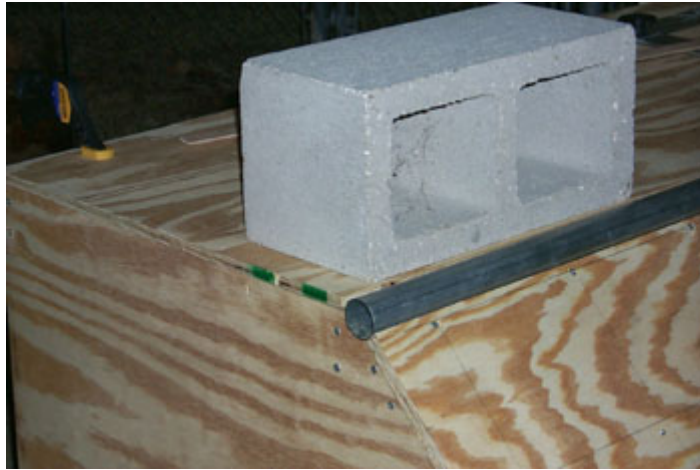
Here's a photo of the ramp after the second layer of plywood surfacing.



Here's another photo with one of the platforms in view since that's what I decided to work on next.



For the platforms, I used 1 sheet of 1/2" plywood cut in half lengthwise so that each half would fit my 8' x 24" platform frame perfectly. I measured using my carpenter's square and marked where I wanted my screws to go measuring carefully so that each one would fasten to the 2x4 supports below. I then predrilled the holes where I'd drawn marks, and screwed in the woodscrews. Here are some photos of the process including the use of clamps and cinder blocks to hold the platforms perfectly in place as I began to fasten them.



Here are some photos of the ramp at this point with both platforms and 2 layers of ply. Only one more layer left and it's ready to go!





Finally, it was time to add the last layer to the ramp and complete the project. For the last skate layer I considered many surfaces. For a mini-ramp like this one skatelite, rampskin, and polyboard were just too expensive to get a hold of for my tastes. I'm sure any one of them would have been great to skate on, but I would have spent more on the final layer than I did on the rest of the entire ramp. Don't get me wrong, if you can afford it, then by all means fork out the money and build the best quality possible, but my budget was not unlimited.

Another surface I considered was Masonite. I've built ramps before using Masonite and many people swear by it over plain wood, but I decided Masonite was a little too slippery for what I wanted to skate. In the end I chose to surface the last layer using 4 sheets of the best 1/4" sanded plywood I could find. Again, worth noting is the fact that I applied it so that when I skated I'd be skating with the grain and not against it since it generally rides smoother that way. I love skating ramps at parks that use skatelite, but in the eighties almost every ramp I grew up skating was surfaced with wood and I just like the way wood feels.

Here's a photo as I begin to apply the last layers of sanded 1/4" plywood.



If you look at the above two photos you'll notice I've fastened a strip of extra scrap 3/4" plywood to the ramp as a guide. I did this where I wanted my seams to be in the center of the ramp which helped me position each of the first two sheets more precisely. After attaching the sheets on one side of the ramp I removed the scrap strip of plywood and fastened the other side's sheets by butting them up against the ends of the first two.

Here's a photo as I'm about to attach the very last sheet of plywood to complete the ramp.



That's it! My ramp is done and there's not a thing I would have done differently. I love the way it skates, it fits perfectly in the garage, and now I'm skating it every day.

Here are some photos of the final product.

