Suspension/Flogging Rack Design

by Jim Duvall
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This is a rack that can be transported and set up by one person, requires no tools for set up and has no bolts. Structurally it goes together using mortis and tenon joints. It can be used for suspensions and flogging at the same time and can accommodate a sling. The construction is fairly simple if done by experienced carpenters. and it is reasonably inexpensive to build. You can add hardware if you like but my preference is to leave it as is and let people get creative with rope to attach to it.

For suspensions it is not wide enough for a swinging load but will handle spinning and movement that stays with in the bounds of its stability. It fits under an 8' ceiling and covers an 8' x 40" of floor. Setup to accommodate flogging on each end it needs about 24' but gives you three play spaces in that one package .

It can be built unfinished in about 3-4 hours with practice(excluding glue curing time). It is handy to have two people for the leg assembly and probably safer. take as long as you want finishing it but my advice is keep in mind the first person thrashing about in chains on it or loading it into a truck. Then take a deep breath.

Materials list:

8	8'x2"X4"
4	10'x2"X4"
4	8'x2"x6"
1	10'x2"x6"

1 box of 250 2.5 inch exterior grade deck screws

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2 tubes of heavy duty construction adhesive (PL, Liquid Nails etc.)

When choosing the lumber be picky most of this can be built out of stud grade lumber and be sound but it will look better if you pick through the pile at your local home improvement center for lumber that looks good has few and very small tight knots, none of which are on an edge and has no splits, cracks, or other flaws. The 10'x2"X6" should be structural select grade and not stud grade. Your lumber yard may not carry this but you can often find one in a stack of stud grade lumber that fits that bill if you are choosy.

Tools:

Circular saw
Squangle or other construction protractor capable of setting a 15 degree angle
2-3 bar clamps or C clamps with an 7 inch throat
2 Pipe clamps with a 45 " opening
Belt sander
Caulk gun
Cordless drill driver
1/2 " drill bit
1" sharp wood chisel

1. Making the Top Piece

The top piece is made out of the 2"x6"s. Assemble the 8'x2"x6" boards and choose the two nicest of the sides these will be on the outside where most people will see them.

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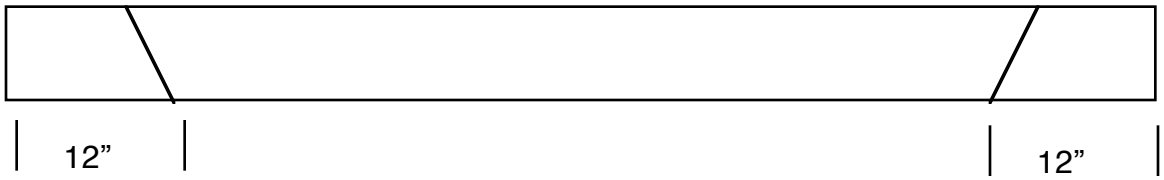
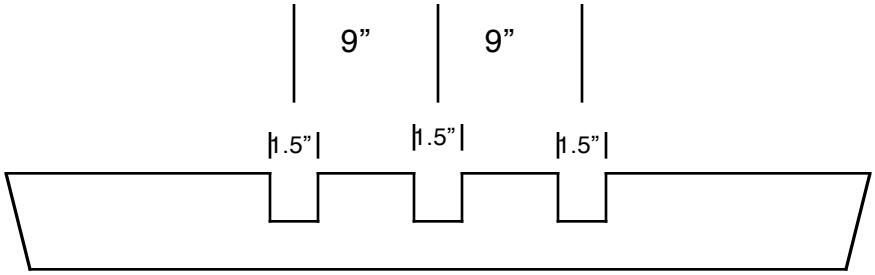
Set the squangle to 15 degrees. Mark and cut all 4 2”x6”s as shown in the drawing below.



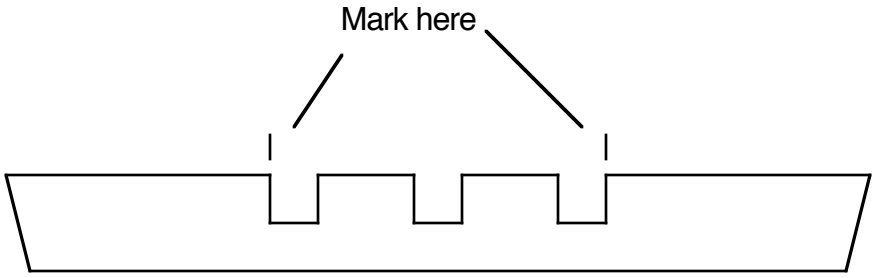
Save the end pieces we will use them to make the mortises later. Set aside the two outside 2”x6”s and clamp the two inside 2”6”s together side by side using the C clamps or bar clamps.

Mark the tops of the 2”x6”s as shown.



Set your circular saw to make a 3.5” deep cut and cut slots in the tops of both boards as they are clamped together. Make repeated cuts until material is removed so that a 2”x6” will slide into each slot firmly. Clean up with a sharp wood chisel. Take care to make slot firm but wide enough so that board will slide in to bottom. These will be your inside rail pieces.

Inspect the outside rail pieces and choose which sides you want showing to the public. Lay the inside rail pieces on the opposite sides (the hidden sides) and line them up. Mark the outside rail piece where the dado groove lines up on the outside edge as shown.



Now find two of the ends you originally cut off and trim them so the long side is 9 inches long.

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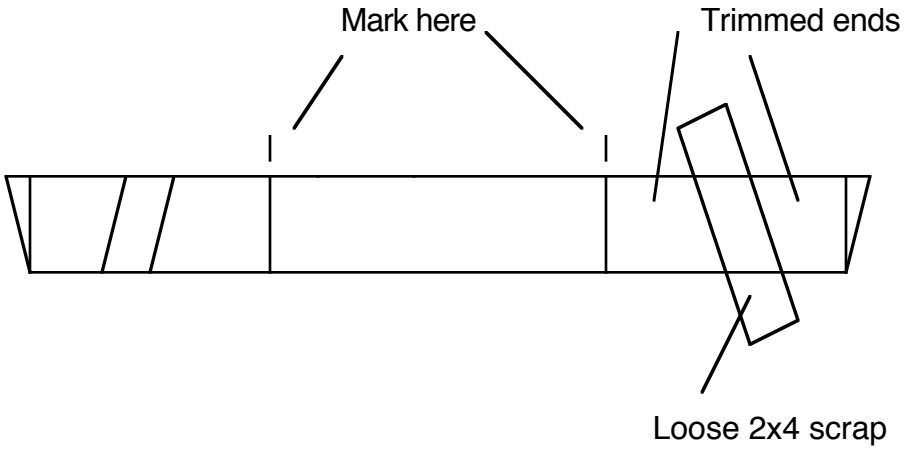
| 9” |

Place the 9” long end piece on the inside side of the outside rails lining the square ends up with the previous marks.



Place a scrap 2”x4” next to it just as a place holder and add the other non trimmed end piece. Glue and screw these down to create a slot the 2”x4” can slide through on each end. These will eventually form the mortis that the legs slide into.

Next take the rail pieces with the dadoes cut into them on each rail piece and glue and screw it into place so that it lines up with the other rail piece.

Take the 10’ 2”x6” and cut it into three 39” pieces. Take care to get the lengths as exact as possible. If you are using a chop saw with a stop block now is a good time to make the cross pieces for the legs also so they can be the same length.

Set the rail pieces on a flat floor on edge and dry fit the 3 pieces of 2”x6” in the slots. Check that everything fits and it level and square. Use the 1/2” drill bit to drill a hole in the top of each end of the cross pieces above the inner rail. This should be deep enough allow a 2.5” screw to make a joint with the wood below. Apply construction adhesive to each slot and to each end of the cross pieces. Fit them together and clamp with the bar clamps. Recheck for square and then drive screws into the joints Let this assembly dry per instructions on construction adhesive.

2. Leg Assemblies

Choose 4 of the 8’ 2”x4”s to be the outer legs and 4 to be inner legs. Stack the inner leg pieces flush with each other and clamp together. Mark as shown in the drawing below.

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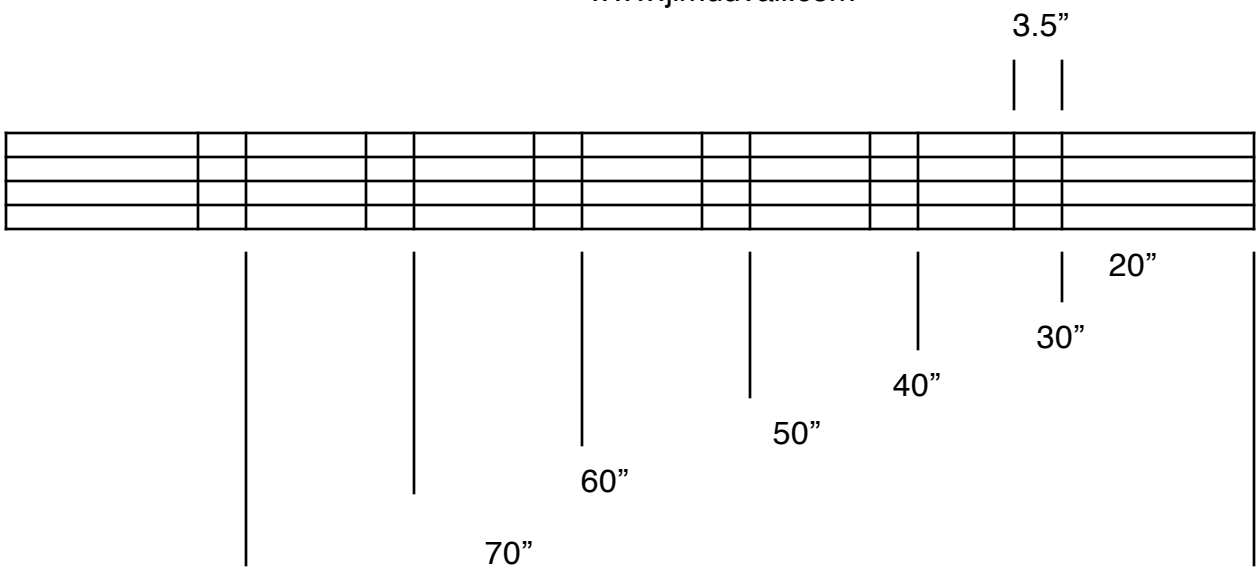
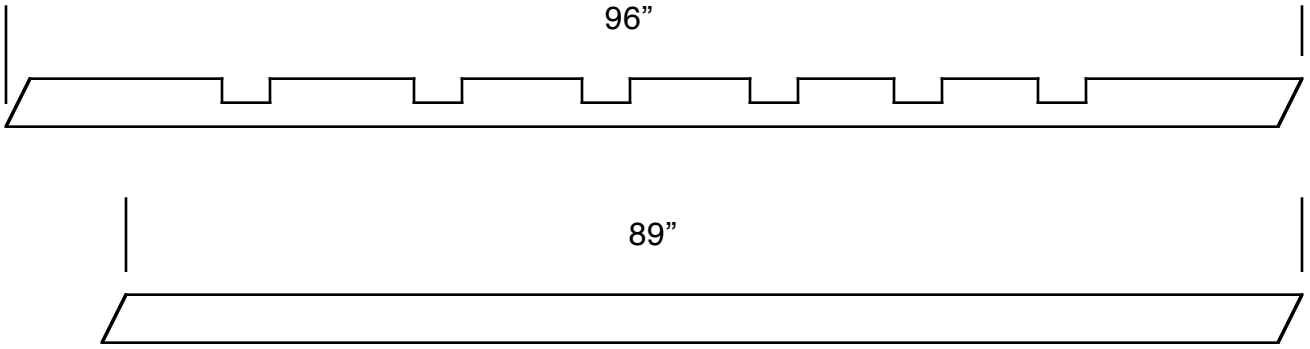


Set your circular saw blade to a depth of 1.25” and cut along the lines creating dadoes 3.5” wide that will fit a 2”x4” snugly. A snug fit here is important.

Set your squangle or chop saw to 15 Degrees and mark and trim the ends as shown below.



Now line up the inner and outer legs apply construction adhesive and screw them together. Be sure to create a left and right leg for each end of the rack.

Take your belt sander and taper the surfaces to the tenon on each leg do not take to much as you may take more later. This is something you can adjust to keep the rack stable anad still easy to assemble after it is all done. But you need to do a little of this now to assemble it.

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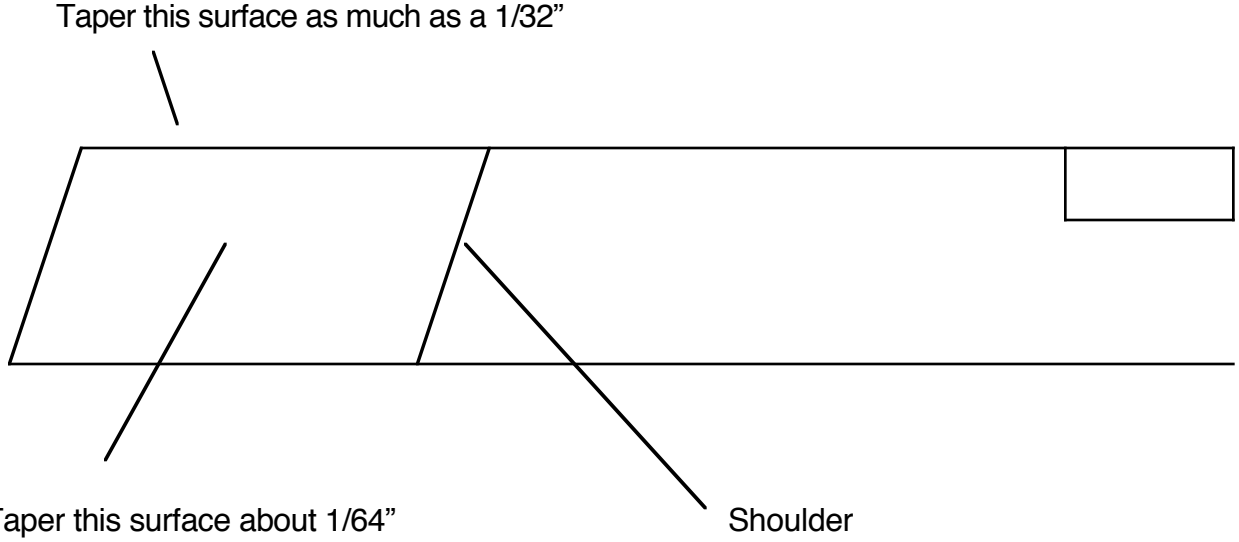

Taper out to the end from the shoulder this will allow the tenon to slide in easily abut make a firm joint when in all the way.

Now if you have not done it already cut the 10’ 2”x4”s into 39 inch sections making sure to get them as even as possible.

Now if the top piece is dry and the glue cured according to the instructions you can begin assembling the legs. I have found due to tolerances in stud grad lumber this is best done built to fit rather than relying strictly on measurements to make everything work out.

Stand one end of the top piece up and insert two legs as shown below. measure the distance between legs and check for square on a flat floor. Dry fit the cross pieces into each dado. check for square again.

Starting at the bottom use a liberal amount of construction adhesive on each joint wetting all surfaces and apply two screws to each end. Check for square as you move up gluing and screwing the cross pieces in. repeat for the other side. Let the rack stand until glue cures as per the instructions mark the tenons and mortices “A” and “B” so that you will assemble them over and over again the same way. Take you belt sander and finish any sharp edges while the glue cures.

When the glue is finally cured tip rack on its side and remove the legs. This may take some force. Then increase the taper slightly on the tenons and reassemble. Do this a few times going slowly until the rack assembles easily but is still firm under a load.

Finish the rack however you desire but take care not to get varnish or paint in the mortices or on the tenons as that may alter the fit.

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Notes:

1. Hopefully you read this far before building, Thank you. This design is public domain. Build as many of them as you like. If you reproduce this document please leave it intact and credit me.

2. Thanks to Eddie and Mitch for the engineering advice when I first drew up the ideas.
3. These drawings were done in a word processor and are not to scale trust the numbers when in doubt.