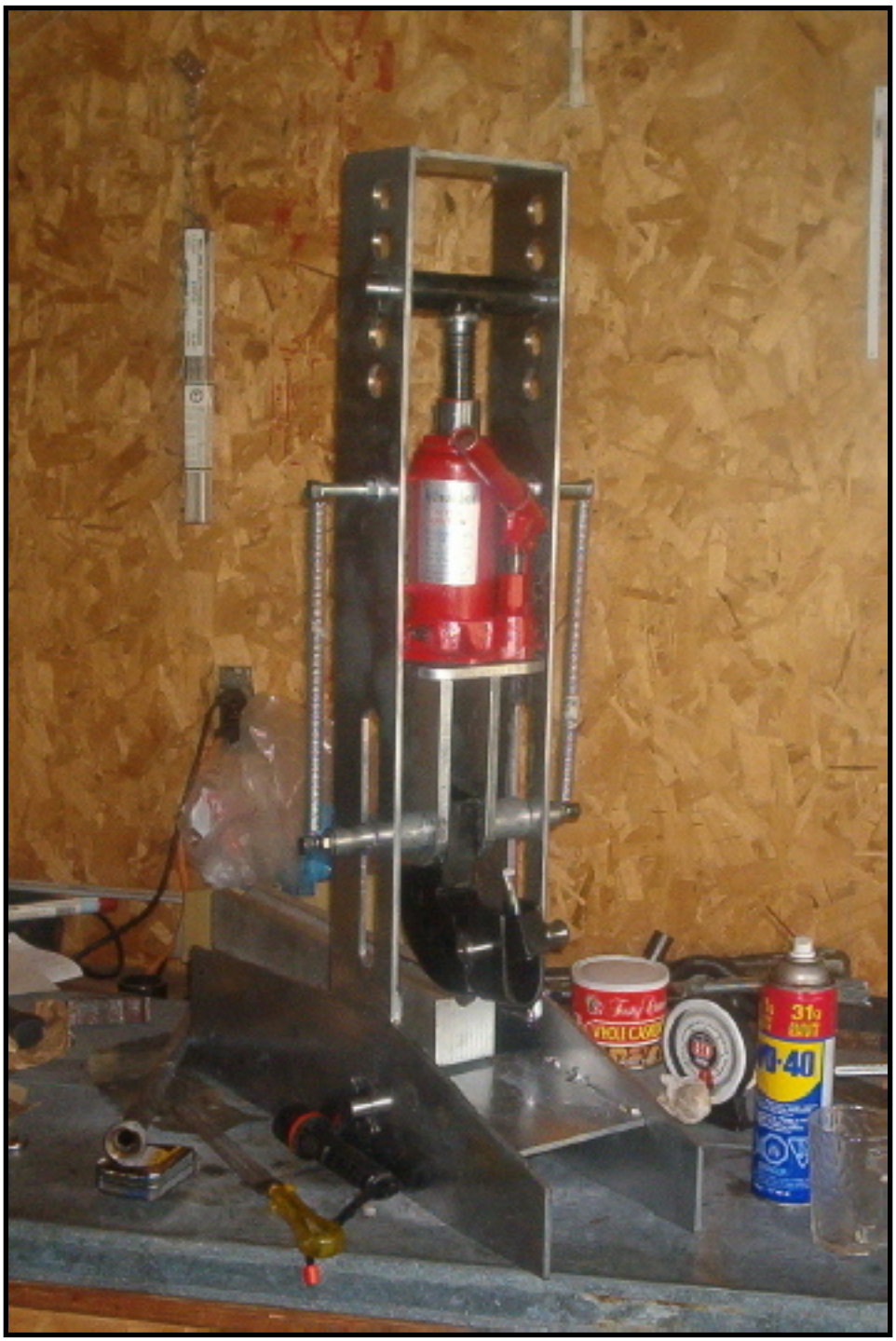
How To Build A Tube Bender

by Terry Tasky



I would like to thank the good people at Blind Chicken Racing for supplying the basics to make this bender. I have taken their project a step further and have included a drawing for the sides, and will show you how the cross braces are installed.

This may look complex, but it's not. Once I had my sides made, it went together quickly. Here you see a picture of a completed unit. This one has dies for 1" tube fitted, but it will take dies for up to 2" tube.

After a few minor adjustments, this bender has worked very well for me. The

body is made of 1/4" steel plate, except for the jack platform which is 3/8 " steel plate. The jack is a 12 ton variety, A short jack with a screw extension on top is what you want.

You can easily make changes to this unit, I'm showing you how I made mine, but feel free to change things if you like. Whatever works for you.

So, the list of the materials you will need is:

For the sides - either 2 pieces of steel plate, 35" x24"x 1/4", or, (4 pieces of steel plate), 2 pieces at 6" x 24" x 1/4", plus 2 pieces at 4" x 29" x 1/4".

For the top cross brace - 1 pc, 1/4" steel, 6" x 4"

A pair of return springs - I used tension springs with an approx. 8" free length, and 1" dia. They work well.

For the lower cross braces - 2 pc, 1/4" steel, 6" x 6"

For the jack platform and die yoke - 1 pc 1/2" steel, or 3/8" steel, 5" to 5 1/4" square, 2 pcs 1/2" steel, 3" to 4" x 6".

For the return spring anchor points - 2 bolts, 1/2" x 3" with 4 nuts.

For the lower roller pin - 1" x 8" steel rod,

To fit the die yoke - 6" long 1 1/2" dia x .25" wall dom tubing. Note: the picture below shows a piece of dom approx 3" long. I changed this length to extend the full width of the inside of the bender - 6" long. This is not carved in stone. Use whatever works best for you. Get your dies first.

To center the roller - 2 pieces of pipe or tubing that will sleeve over the lower pin, each approx 3" long.

For the lower roller pin support - 1 pc of steel angle, 1/8" x 2" x 2" x 6" long.
(this part is not visible in the above picture).

For the upper anchor pin - 1" x 8" steel rod (the stronger this part is the better). Use a high strength steel here, or maybe stainless, if its available. In mine, I used a mild steel pin that bent, then I went to a non heat treated pc of tool steel, which also bent. I then ended using a piece of high strength steel rod, which I suspect may have been heat treated. This does the job.

To sleeve over the upper anchor pin - a pc of 1" pipe, approx 1/8" wall, 6" long.

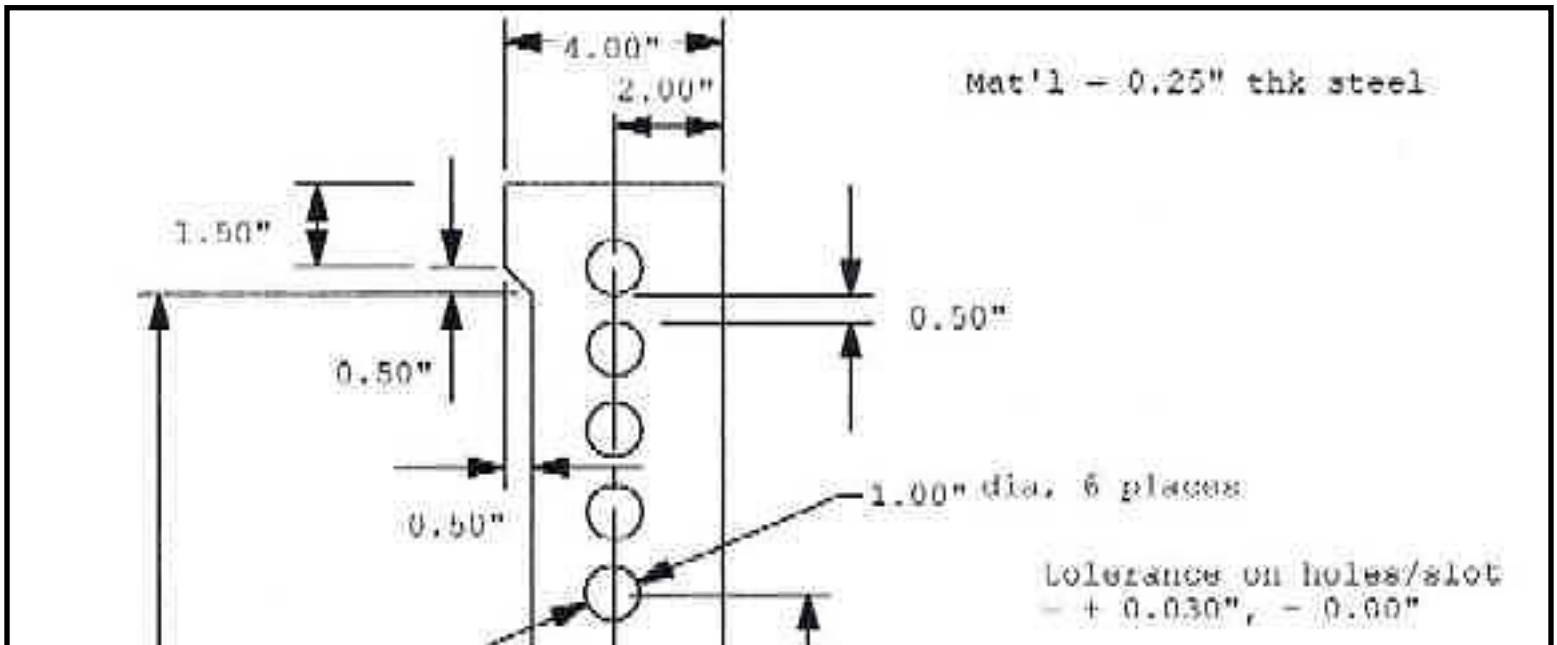
The Bend Die, Follower Die, Roller and Pin are available from Pro Tools. The pin I'm referring to is the part that passes through the yoke and the bend die. The roller is not visible in the above picture, but it sleeves over the lower pin, and is what the Follower Die rests on/rolls on.

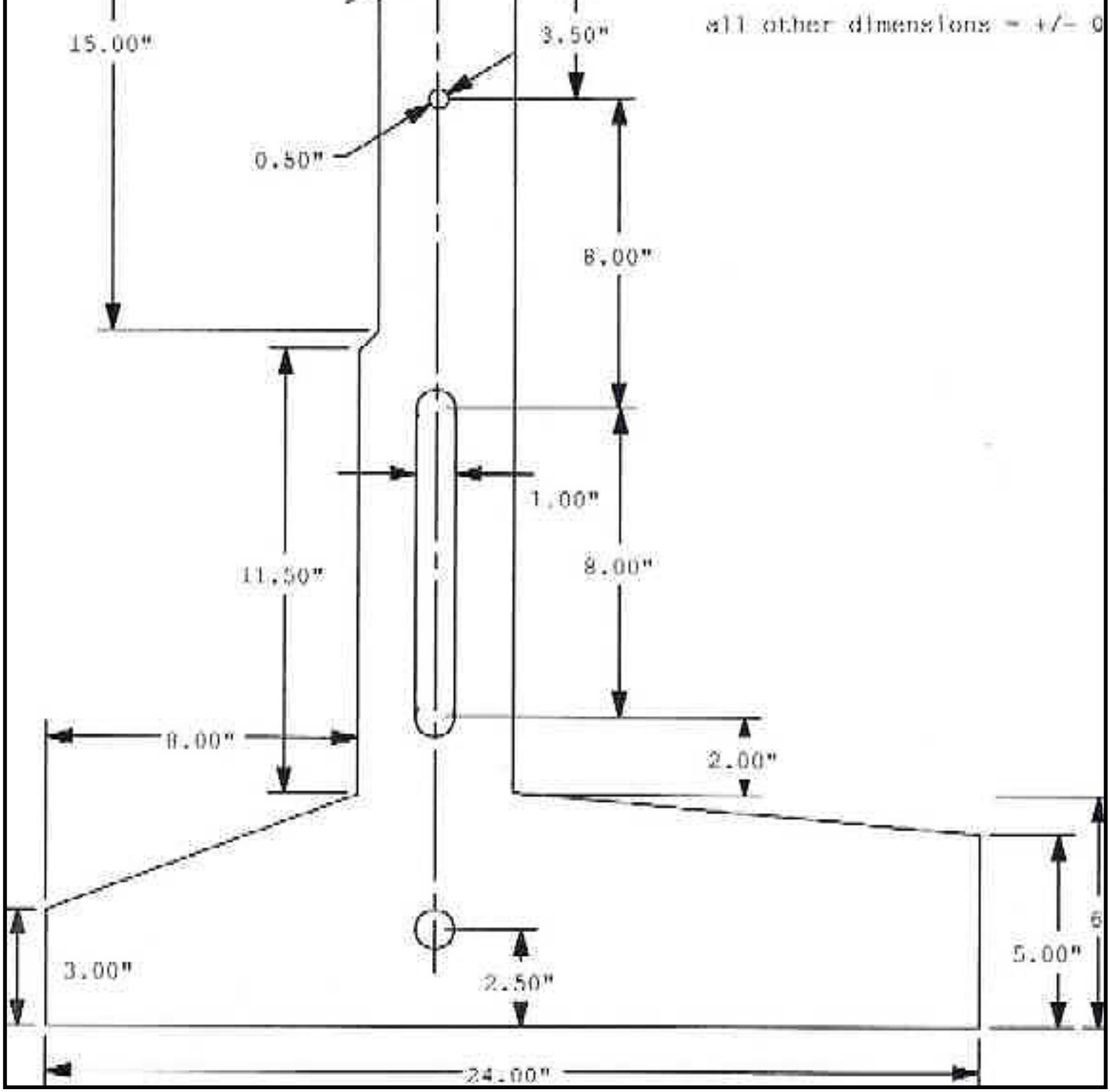
The die set that I ordered was for 1" tube, 3 1/2" bend radius, 120 degree type, used to fit their model HMP200 bender. This die set will work on tube up to a 0.134" wall. Their price is (as of the time of this writing), $155 US. You will also need a roller w/Teflon impregnated bushings, and a 1" diameter pivot shaft, that they sell. I suggest when you call them that you make sure you order a die set that will fit their HMP 200 unit. They have different size dies, for different tube sizes and bend radii, so it depends what you need. Click on this thumbnail for a shot of their bend die and mating pivot shaft.

(Click for larger image)

This is a drawing that you would use if you wanted to have these sides lasered or plasma cut from one piece. I made mine by using two pieces for each side, and welded them together at the point where the base meets the upright section. It worked well and allowed me to use two smaller pieces of steel rather than one large one for each side. I apologize for the lack of definition. The drawing lost some of its detail during the process of converting from a cad file and shrinking down to fit this page.

Bender Sides

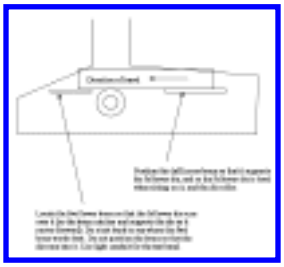




If you have your material for the sides, go ahead and weld them together (if you are going the 2 pc route). Or you could have your sides lasered to the same dimensions as this drawing (if you are going to use 1 piece sides). If you are making these sides yourself, lay them out and cut the holes with a hole saw. It might be a good idea to tack weld the two sides together when drilling these holes, so that both sides come out identical. On mine, I omitted the 15" notch, and moved the row of holes 1/2" closer to the edge, instead of centered on the upper part, as you see here (the purpose of the notch is to allow clearance for the jack handle when you are pumping the jack). The slot can either be made by joining up a bunch of 1" holes, or by having someone mill the space between the two holes. Whatever works for you. I had mine milled because the slot works best if the sides are clean and straight. Also, I would add a small radius to all of those outside corners (except for the top corners) if I were having these cut.

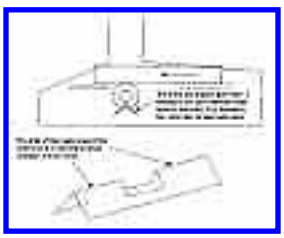
When your dies have arrived, you can begin welding the cross braces in, and use the bend die to assemble/space out the die yoke, and to check the size of the holes in the die yoke. I'll start with the main body of the bender first. Make sure all of your cross braces are the same width. I used 6" x 1/4" bar for all of my braces, so that all the cross braces were 6". The location of the top brace is obvious. It is located flush with the tops of the columns. Weld it in.

Install the lower roller (the roller that supports the follower die), then position the lower aft brace so that the follower die is sitting level when resting on the brace and the lower roller.
Click on this thumbnail for a visual of what I'm talking about.

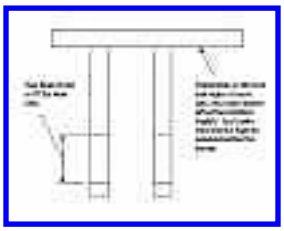


Forward/aft location of the brace is not critical, you want this brace to support the follower die as it moves along under the bend die. Mark the location of the brace, and weld it in at this point.

The last thing you will need to do is to make an angle to fit between the sides of the bender, that will fit under the roller for the follower die. Because there is so much load on the roller, the lower pin will deflect and bend if there is no support. If you can find heat treated high strength rod to use as the lower pin, you may not need support under the roller. If you are using ordinary steel rod, then you should include this support. With the lower roller in place, it is time to weld in the support for the lower pin. This should be welded in so that there is about 1/32" of clearance between it and the roller pin. **Click on the thumbnail** to see how I did mine -



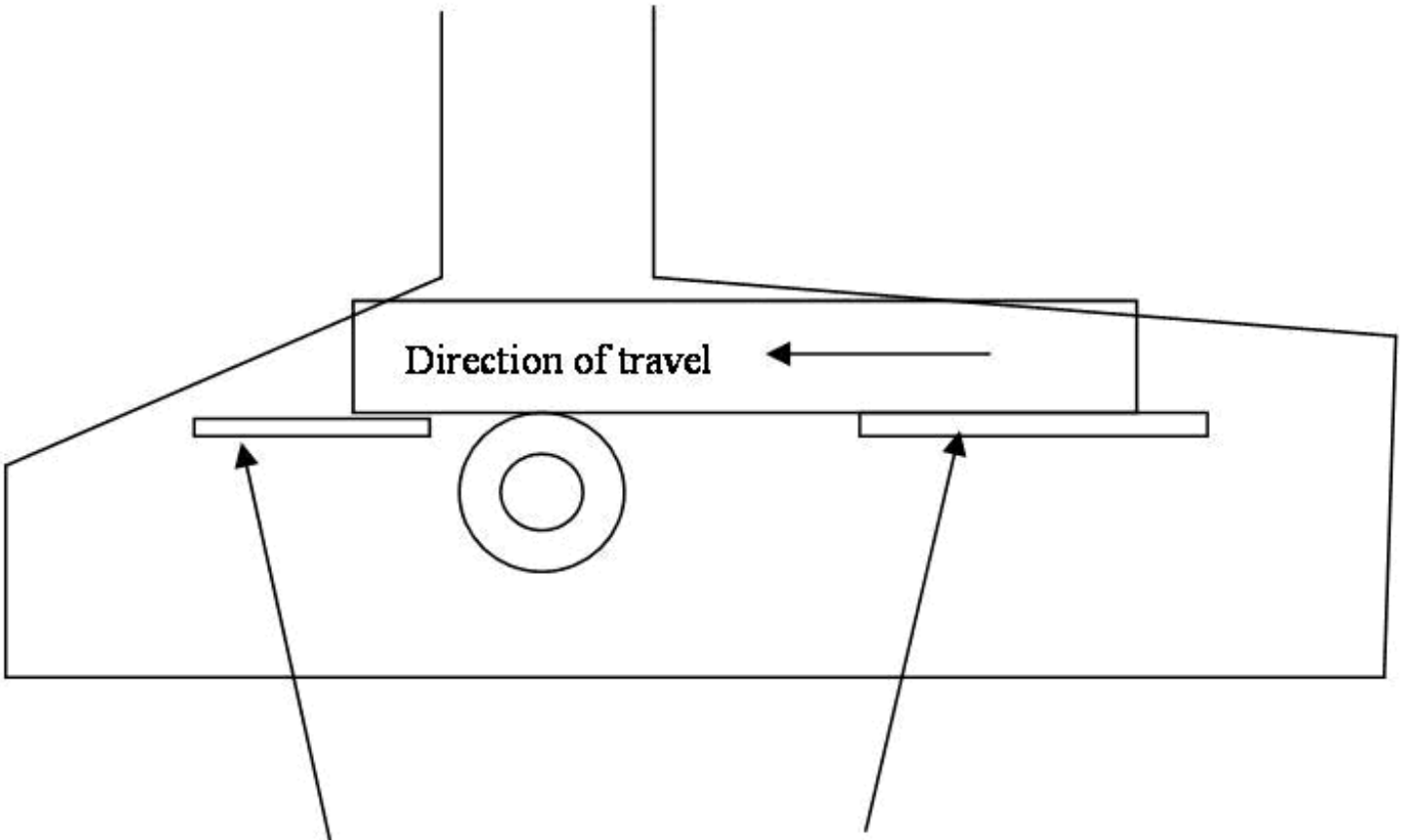
The die yoke supports the jack, and holds the bend die. It is made like this:



The legs are spaced to fit the bend die. Allow slight clearance between the die and these legs. The legs will want to suck inward when welded, so make sure you leave a generous space (maybe 1/8 - 3/16 ") to allow the bend die to swing freely inside the yoke.

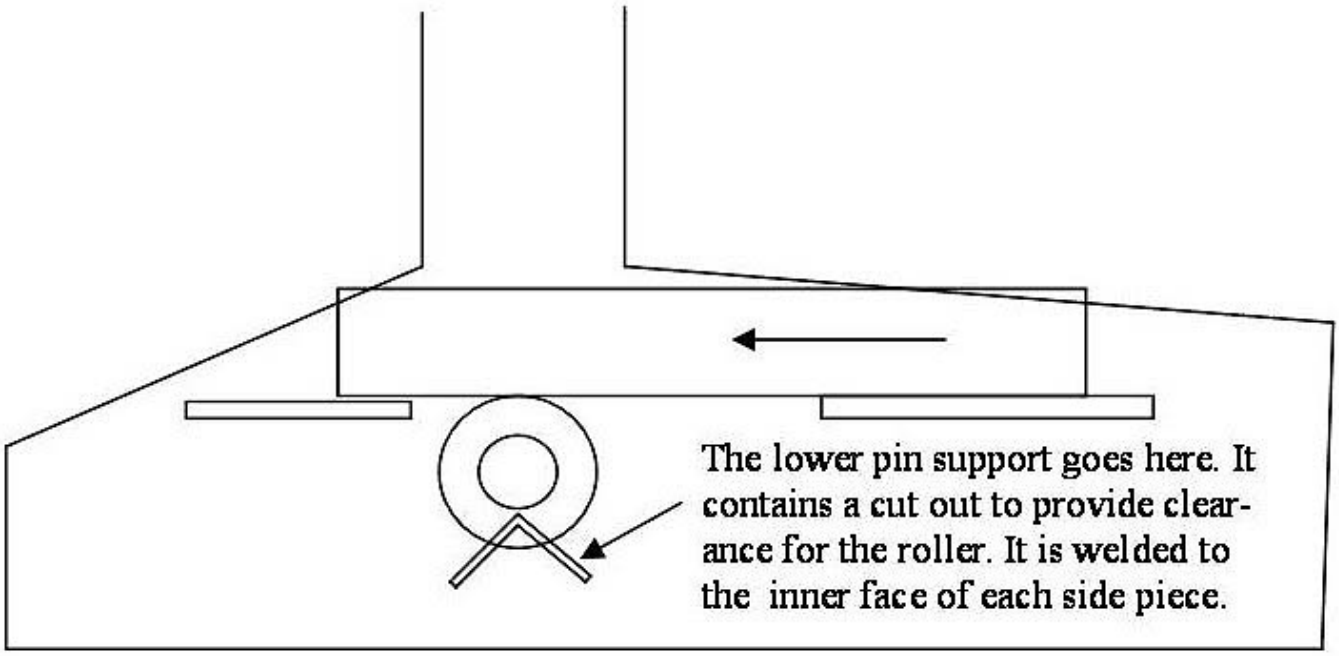
Weld the top of the jack to the tube that sleeves over the top pin when you have it all together, and you're done. One last comment - When I tried mine out, I found that the jack lever that came with the jack was too short. It wouldn't work until I got a longer lever. Keep this in mind when you are doing your first bends. Also, make sure that the fronts of the follower die and bend die are lined up whenever you start a bend. I believe Pro Tools includes a how-to/additional info on this topic when they send their dies.

The above information furnished by: Terry Tasky Favorite Projects Visit Terry's site for more information.

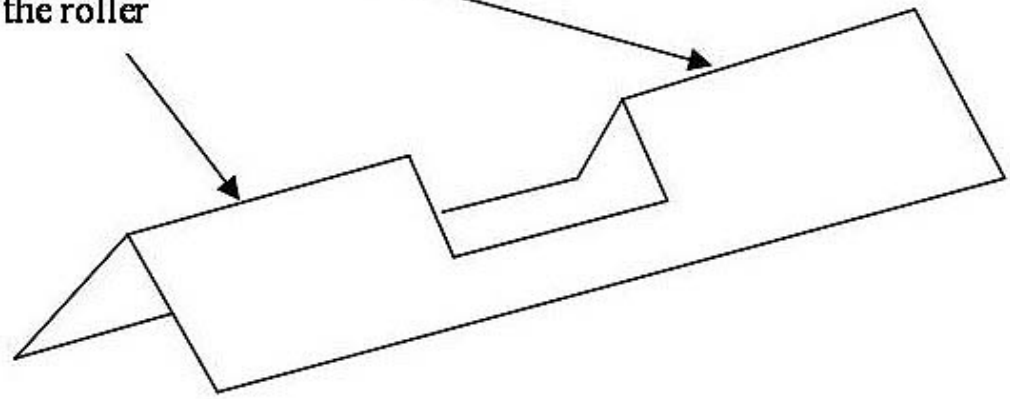


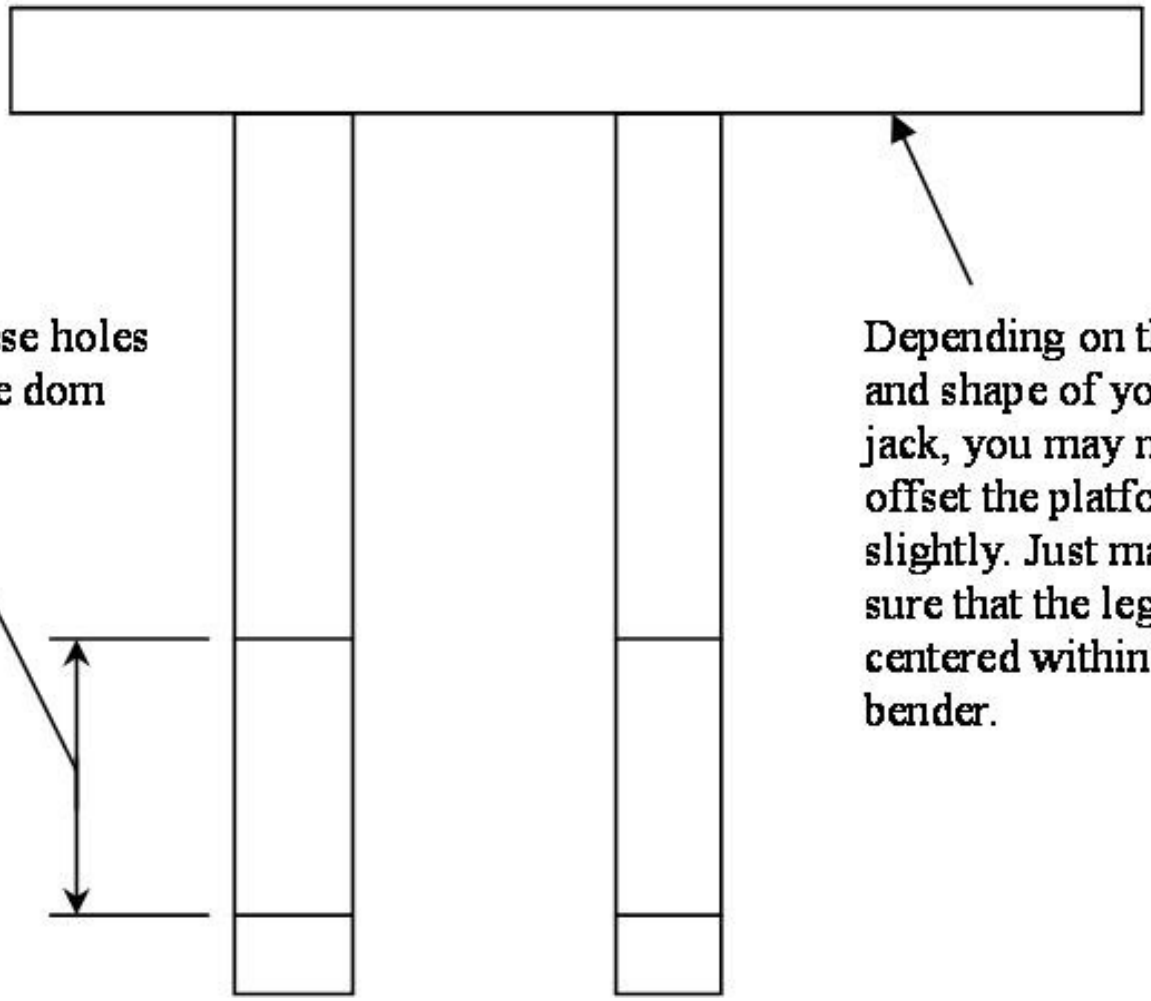
Position this (aft) cross brace so that it supports the follower die, and so the follower die is level when sitting on it, and the die roller.

Locate the fwd lower brace so that the follower die runs over it (so the brace catches and supports the die as it moves forward). Do a test bend to see where the fwd brace works best. Do not position the brace so that the die runs into it. Use light conduit for the test bend.



The ends of this angle support the lower pin. It is notched to allow clearance for the roller




Size these holes to fit the dom tube .
Depending on the size and shape of your jack, you may need to offset the platform slightly. Just make sure that the legs are centered within the bender.