

HEFTY CHAIN

I have made large chain from PVC pipe, from 1/2" (for 3" single links) to 1-1/2" (for 12" links).

Stuff the pipe with sand, close off the ends with gaff. Heat until pliable. The sand prevents kinks and allows the pipe to bend smoothly. It also holds the temp so you have more working time. For chain you can pre-cut the pipe into shorter sections for ease of handling but NOT as short as individual chain links. You will lose 3 to 4 pipe diameters at each end as waste.

The best heat is a vacuform oven if you have one; it allows you to heat large sections at a time. The commercial bending ovens for electrical bends are also good. It can be done with a high temp hot air gun but it is hard to heat up more than a few inches at a time. Don't use any open flame type of heater as it runs the risk of over heating and charring the pipe. Although you can "smell" the pipe when you heat it, there are no toxic fumes released until you reach the char point, check the MSDS.

Figure out what size you want the INSIDE of your links to be and make a mandrel that size. For the 3" links I used a piece of 1x2" T, and rounded the edges slightly. For the 12" links, I used 3 2x8s in a sandwich. The two outer pieces had a 45 degree bevel rip along each edge.

Wrap the pipe loosely around the mandrel in a tight coil. That's not an oxymoron, loosely in circumference, tightly side by side. When the pipe cools, undo the ends and roll the pipe to get a large portion of the sand out, and then blow air in from the top end while holding it vertical. Slit the pipe along one of the narrow sides and you will have a bunch of individual links that look like the bent split repair links you buy at the hardware store. Now you can get the last of the sand out. I have found it easiest to do most of the painting while the links are still single but there will be touch up after they are linked.

To link the chain, heat the first link gently with a hot air gun on the end opposite the slit and twist closed as soon as possible. Now slip the next link in and repeat the heat-twist closed process until you reach the length you need. If you close the links before joining, you will not be able to spread them enough to join. The PVC pipe chain is surprisingly strong. I used the 12" chain for a "Man of La Mancha" stair. Each strand was 25 feet long and the slits were sealed with tape for paint purposes only. The PVC chain did not, of course, lift the stair, it only looked like it. The show was playing in rotating rep in a no fly system house and the light weight roof trusses would not have had a chance of lifting the stair. The landing at the top extended 6' up stage, the stair was hinged at the top and the end of the landing was pulled down to lift the stair. The stair was a totally self contained unit that rolled on and off in seconds.

The chain went up to the "grid" and over pulleys made of empty wire rope spools. The chain was attached to a wire rope that ran off stage to a standard pulley and down to a sand bag counterweight. When the stair rose up, the sand bag went down and it looked as if the chain was doing the lifting. With a little help from the sound designer it was totally convincing. In fact the architect on the board that helped up renovate the space into a theatre came up to me after the show and told me he was very concerned about the roof structure supporting that much weight. Initially I was worried about how to secure each link of the chain to properly support the sand bag, considering plastic welding, metal straps, etc. but during the joining process I discovered how stiff the links were. I tested the chain supporting up to 150 pounds dead weight. As it only needed 20 pounds counter weight to work I was beyond a 5:1 safety factor, the sand bags were in locations that could not be above anyone. For the rep changeovers, the chain was unclipped and pulled up to the grid, the stair was rolled to the shop and the change was done.