

# How to Build Your Own 3-Point Lifting Boom, by Marshal Rossow

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See attached sketch corresponding to instructions below.

This boom is similar in design to what you would find at Tractor Supply or Central Tractor. The store-bought" booms using a bent pipe isn't nearly as heavy-duty (but cost around \$60), and the square-tubing booms are fine but cost over \$100. I built mine out of scrap steel for a total price of less than \$20. Even with new steel, the cost shouldn't exceed \$40 or so -- and you'll have fun in the process. I strongly suggest spot-welding everything together to make sure it will fit on the tractor before doing the final welding.

- The 26-inch "drawbar" piece, the 24-inch upright and the 50-inch boom are made of 2-1/2-inch square tubing with 3/16-inch-thick wall. The drawbar piece and upright are welded together into an upside down T, as shown. The boom is welded to the top front (or is it rear?) of the upright at a 125-degree angle. See sketch.

- The two angle braces (from drawbar piece to near the end of the boom) are 1- 1/2 x 1- 1/2-inch angle iron with 1/8-inch thickness. Weld one end on near the end of the drawbar piece, as shown, and the other end wherever it falls on the side of the boom -- probably about a foot from the end, although the exact point isn't too critical. You'll have to do some cutting and grinding to get the correct mating surface where the brace contacts the boom and drawbar piece.

It's my sense that most of these dimensions and angles aren't critical. Some of them occurred simply because they happened to be whatever scrap steel I had lying around. Obviously, the drawbar piece must fit between the tractor lift arms, and the upright must work with the top link. But boom length could be a bit longer or shorter, as could the angle braces. You could even build an adjustable boom -- although too much longer will cause a small tractor such as an 8N Ford to do wheelies if you get much weight on the boom. Even the materials themselves are optional - pipe would work, although it's trickier to weld around the curves, etc.; square tubing gives nice, straight joints for deep welds. Angle braces could be pipe or flat bar stock. Don't skimp on the places where 3/8-inch plate is used, however. Keep in mind the kinds of lifting you plan to do, and overbuild rather than under build in terms of "heavy-dutiness." If you go with lighter material for the boom, consider adding a bridge-type truss along its top to add stiffness. You could make it out of something like 3/8-inch round stock or 1-1/2-inch flat stock.)

- The three-point top-link attaching pieces and boom-end chain-attaching pieces are 6 inch x 2-1/2-inch x 3/8-inch steel plate. Weld them solidly to the upright and boom as shown in sketch.

- To attach the Category-1 (7/8-inch) lift-arm pins on each end of the drawbar piece; drill a large hole through the center of a 2-inch-square x 3/8-inch-thick plate. (Check the plate size -- you want a square plate that will just fit into the end of the square tubing; you'll have to grind comers off to make it fit.) Drilling the holes in these two plates is the hardest part of the project -- getting holes big enough for the lift pins. I found it took a lot of hand filing to get a hole big enough. You might be able to burn a hole through with a cutting torch or an arc rod set at highest heat. Make sure the threaded end of the lift pin goes through the hole easily. Put the lock washer and nut TIGHTLY onto the threads -- I like to use Loctite to be sure the nut can't come off, but that may be overkill. Also, it wouldn't hurt to spot-weld the nut to the plate. Then weld the plate, complete with the mounted lift pin, into the end of the drawbar piece. (The nut and lock washer will be inside the drawbar, never to be seen again.) Be sure to get a solid, deep-penetrating weld here. If these pins become detached while you're lifting, things will get exciting in a hurry.

If you've stayed with me this far, you should be ready to lift something. However, if you're having fun with the project, here are some other ideas:

## OPTIONS:

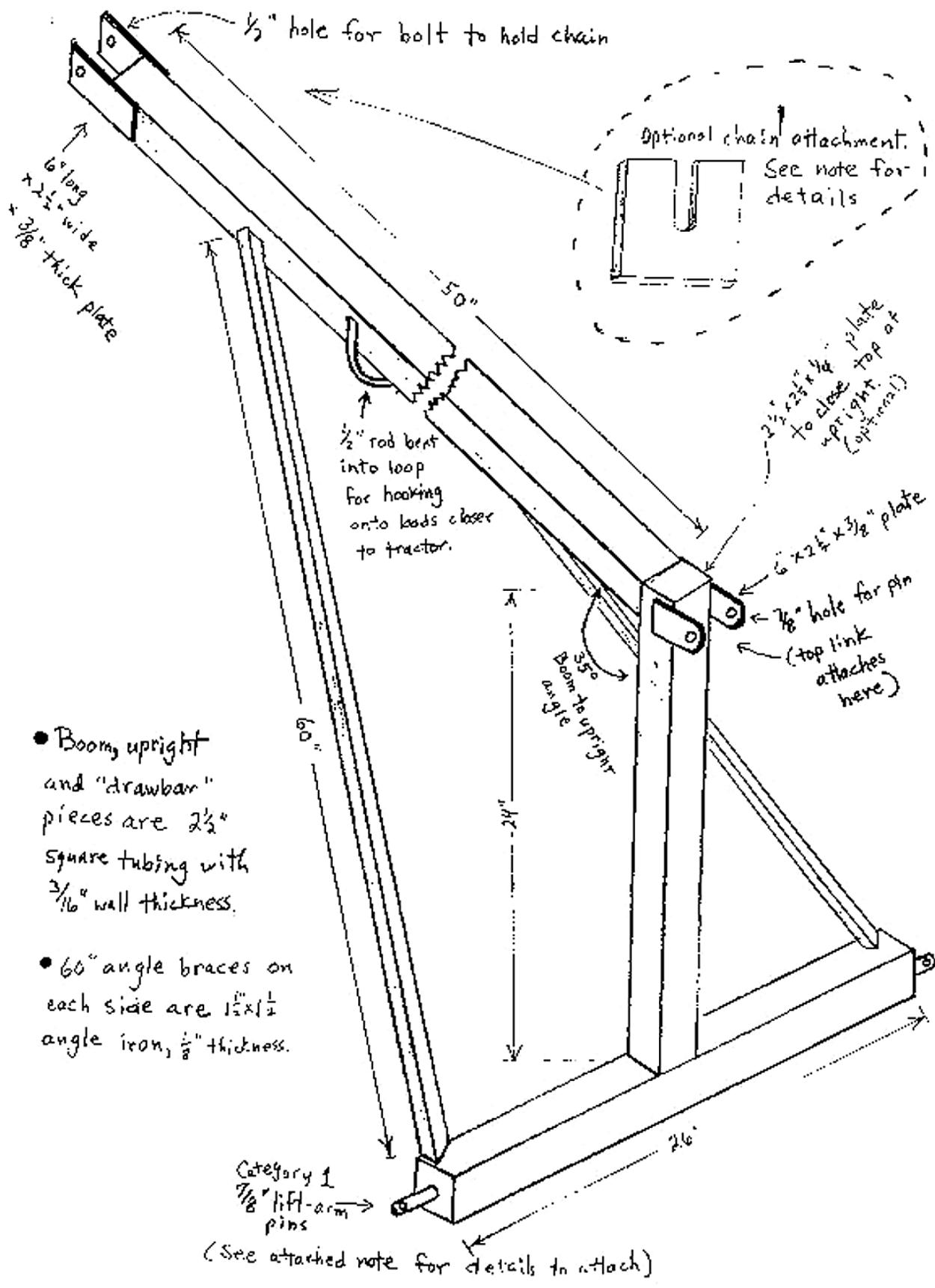
- Paint it. Two spray bombs will be enough.

- I welded a 1/2-inch steel loop to the bottom of the boom, about halfway along its length. I hook a chain onto it for lifting really heavy stuff -- stuff that would cause the tractor to pop a wheelie if hooked on clear out at the end of the boom.

- I welded a 1/4-inch plate over the top end of the upright, just to keep crud from falling into it. Grind off the welds and it will make your project look like it was done by a pro.

- Another nice touch is to weld a 2-1/2 x 2-1/2 x 3/8-inch-thick plate across the end of the boom-end chain-attaching pieces -- see "optional chain attachment" on sketch. Cut a vertical 3/8-inch wide slot into the piece as shown on the sketch. If you don't want to mess with taking a bolt out all the time to shorten/lengthen the chain, you can simply drop a link into the slot at any length you need. If you choose this option, be sure the piece is welded on very solidly.

NOTE: Boom to upright angle specifies 35 degrees. **It should read 145 degrees!**



- Booms, upright and "drawbar" pieces are 2 1/2" square tubing with 3/16" wall thickness.
- 60" angle braces on each side are 1 1/2 x 1 1/2 angle iron, 5/8" thickness.

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Here's one built by Dave Grant:



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