

HORIZONTAL SLIDING ARM DESIGN

This document documents the construction of my arm. Actually, it documents the construction of the arm I constructed. Hopefully you will be able to follow in my proverbial footsteps and possibly improve on the 6-inch reach. Essentially, what follows is a series of pictures with captions. Everything used in my model is part of the consumables list, with the exception of the wooden rods used in the crank. Hopefully, however, you won't try to put a hand-crank on your robot. Modification of the current design to accept a motor should be simple task, and I actually mention a bit at the end to help you along. Good luck!

Tools (In order of appearance): table saw, hack saw, drill (drill press would be nice), heat gun

1. Cut two strips of plywood, each of which should be 3" wide and sufficiently long (2 ft?). These will become the two sides of your arm.
2. Get yourself a pair of 2" x 3" pieces of wood. These will separate your arm sides. Note the strips of plywood from the previous step in the picture.



3. Attach the pieces you just cut out to the arm sides using wood glue, clamps, and patience. It doesn't really matter how far down the arm you attach them, but make sure they're flush with whichever way is the bottom. You may want to let this sit overnight.



4. Using a hack saw, cut off the Right Length of 1/4" steel rod. You'll know it's the Right Length because you can do the cool thing I did in the picture.



5. You actually were expecting something cool, weren't you? Sorry. Make marks on your glued-together arm $5/8$ " from the top and 1" from each end. Spacing isn't super critical here, but that's where I put mine.



6. Apply drill press, followed by hammer. Your hole should likely be $1/4$ " in diameter to match the rod. This makes a fit which is snug enough to keep the rod from going anywhere, especially as there is no sideways force on it during operation.



7. The arm part of the arm is now done. All that remains is the motor mount, the arm holders, and the string. Congratulate yourself and enjoy a beverage appropriate to your age.

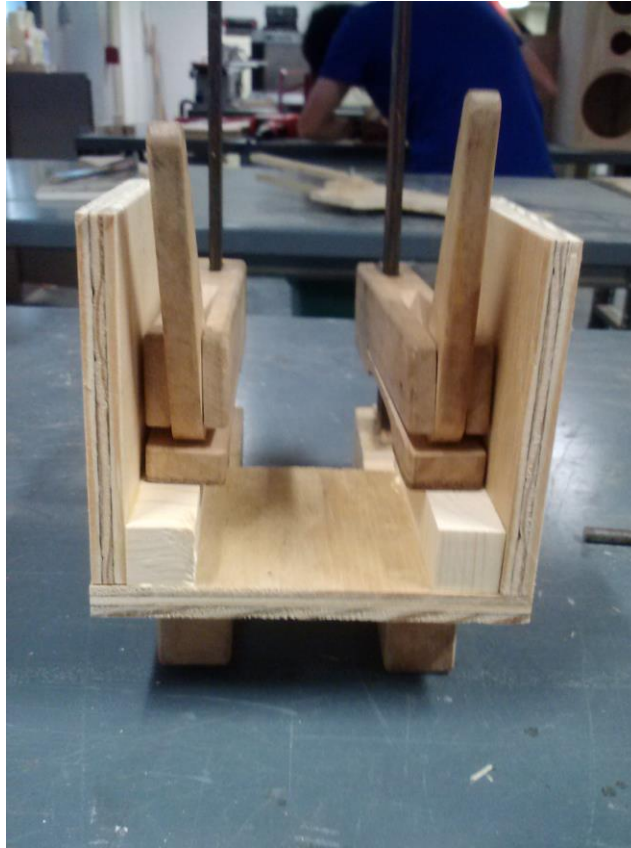
8. Cut out three sections of plywood. Two should be 4" long, and one (the middle one) should be 5" long. All should be on the order of 3 1/4" tall. These will form your motor mount.



9. Take your "one by four" which is really 3/4" thick and cut off 2 rectangular prisms which are 3/4" x 3/4" x 3 1/4". These will brace your motor platform. Wood glue them to the tops of the side pieces of the motor mount (the 4" long ones). Don't forget the clamps. Pictured is one of my friends, the narwhals.

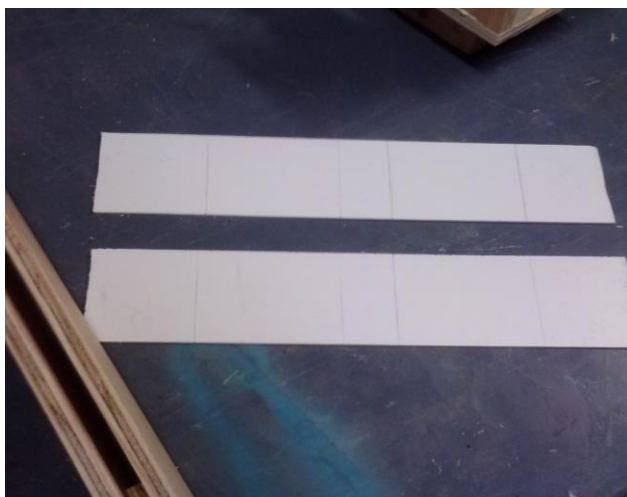


10. Wood glue the top on. Engage the help of more sea creatures.



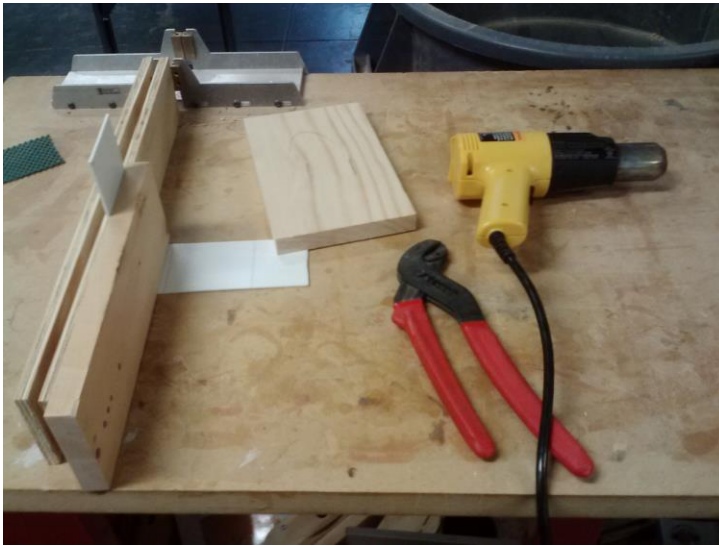
11. Now your motor mount is also finished! Woo! I drilled a hole through the side, but you're going to want to put yours beside the arm and set a motor atop it. This way the head of the motor (with any attachments for moving string) will stick out over the arm.

12. Now for the arm holders. These are constructed with the 1/8" PVC sheet. Cut off two strips, each 2.5" wide and 12" long. You may want to pencil out where the various bends will be. Initial PVC and final product are shown for reference.



13. Prepare to bend your PVC. Find your heat gun, make sure you have ventilation, and possibly prepare a decent collection of plywood pieces to help with the shaping of the hot PVC. A collection of people who care about your success and well-being (friends) would also be nice. Wielding the heat gun will occupy one of your hands, which makes shaping the plastic tricky.

XIV. Bend the PVC. Too much wiggle room is better than not enough here. My second holder had to sit on extra plywood because it was too short. There is no PVC-bending science of which I am aware, so wing it. Use any supports available to get the right height.



15. Position everything on the board. Possibly trace positions so things don't move. Drill through the PVC pieces (3/16" bit, I think) and bolt them down. Wood glue the motor mount down. Remember: Your motor mount is going to go beside the arm so the motor sticks over it. Needless to say, in no way attach the arm itself to the board.

16. String it up. Make sure you wrap it enough times around the motor attachment to allow for the range of motion you need. Push the string under the arm holders and tie it to the steel rod segments at the ends. I should mention that your motor attachment might benefit from a way to secure the string at some point so it doesn't harmlessly slip over your spinning motor. Be creative.

17. Behold! Of course, you still need something on the end of your arm, but I have faith in you.

