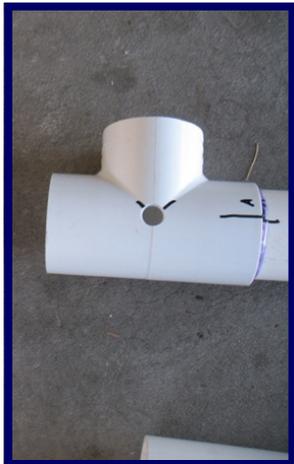


Assembling the Base Lengths

The Base Lengths consist of four parts each—a cross, a tee, a 7' piece of 2" pipe and a 1' piece of 2" pipe. Begin by dry fitting the cross, the main pipe and the tee.



Align the fittings using a flat surface and make your alignment marks and label the joints.

Remove the fittings and make your depth marks.



You are now ready prime and cement the two fittings to the main pipe. Rotate the pipe as you apply primer and cement to it. You will find that there is often a light spot on one side.

Double check the alignment while the cement is still wet.

Repeat with second base length.

Once the fittings are installed on the pipe, install the 1' extensions for the lift handles. These do not have to be aligned. Just make your depth marks and install in the **crosses**.

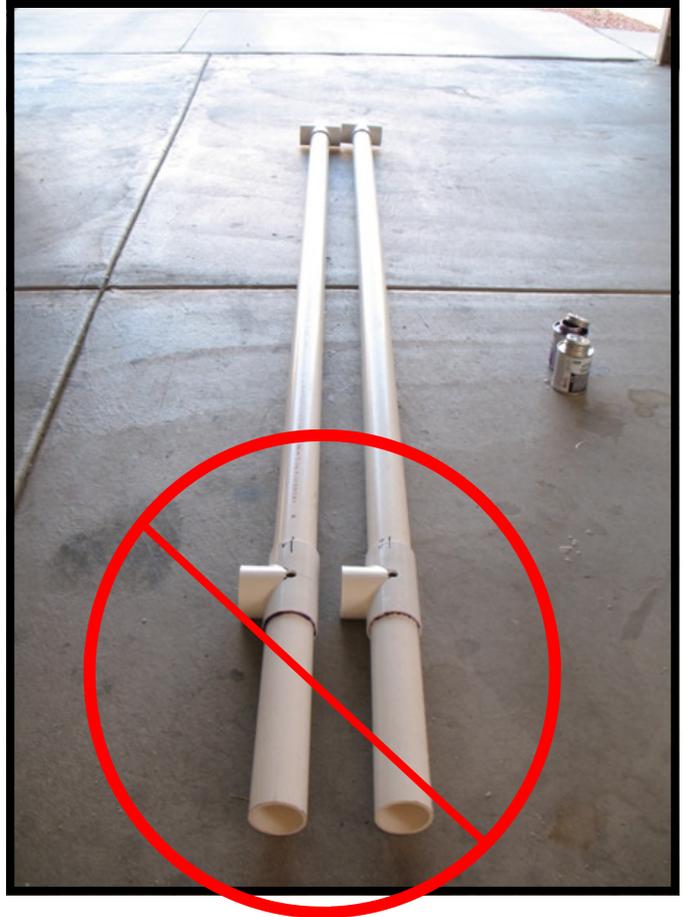


What to Do if I Make a Mistake

20

If you make a mistake, don't panic. It may not be as big a deal as it first appears to be. When I first assembled the Base Lengths I accidentally put the Lift Handle Extensions in the axle end rather than the Cross end. OOPS!

Now What? **Well, first you take a break.** Then you come back later to the situation and look for solutions. In this case the solution was easy.



First cut off the extensions flush with the Tees. This particular part of the fitting doesn't "do" anything anyway. It serves no purpose for the reel.



Then cut two new extensions.

And install them as they should have been.

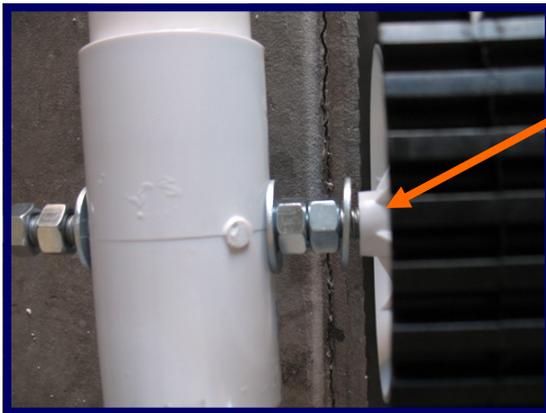
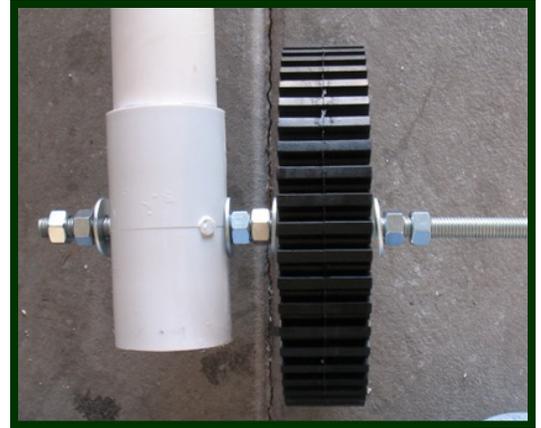


No big deal.

Installing the Axle

21

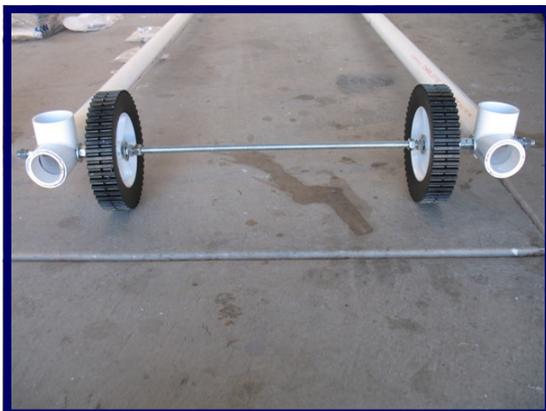
This is the order of installation of components onto the axle: Nut, Nut, Washer, Wheel, Washer, Nut, Nut, Washer, Base Length, Washer, Nut, Nut. NOTE: These wheels have an offset on one side as seen in the photo below.



I chose to put the offset toward the Base Length to give a bit more room between the wheel and the reel.

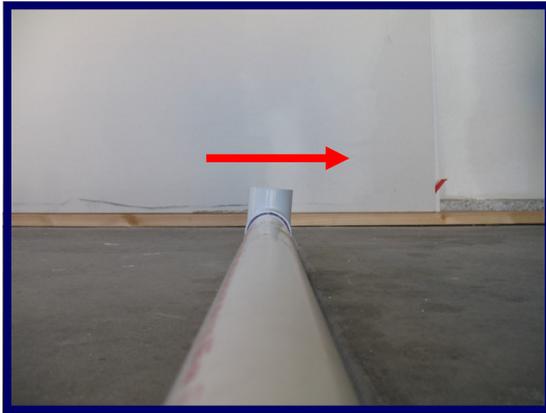
Leave everything loose at this point as seen in the photo.

Repeat this process for the other side of the axle and flip your reel upright if needed. Again, leave everything loose at this point. We will adjust things a bit closer after we check for the “square-ness” of the axle.



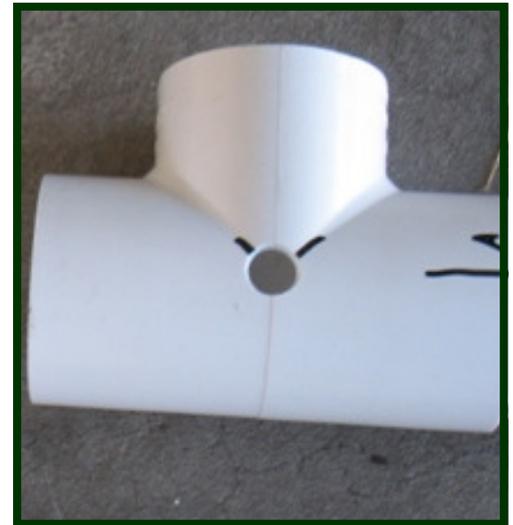
Checking for “Square”

With everything still loose, look at the reel to see if the Base Lengths are square with the axle. You can see in the photo how the right side is a bit forward of the left.



Also look at how the cross sits relative to the floor. The right side Base Length is slightly tilted outward at the top and has gap under part of the leg.

I chose to take the right Base Length off and “hog” out the axle hole slightly in two directions until the Base Length would sit square with the axle and flush with the floor.



Much better. That is how you want the Base Lengths to sit.

Installing Uprights and Legs

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Hold the Base Length level and measure the distance to the floor. If you are using the same wheels I did, this should be about 1". Add the distance to the floor to the depth of the fitting and you have the needed Leg length.



I knew from building another reel with these same wheels that I would need 2.5" Legs. Install the two Legs. The wheels act as the third and fourth leg.

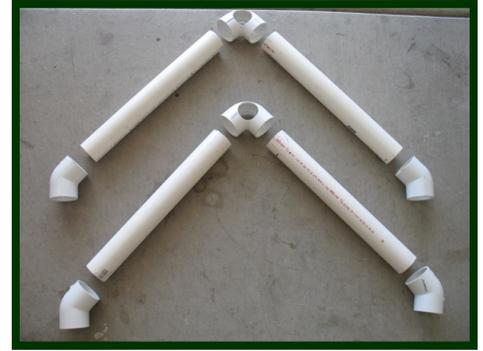
The Uprights can now be installed. The actual height is not critical. What is important is that they are all THE SAME height. They just have to raise the Inverted V Uprights enough to clear the wheels. I used 4.5" pieces. Mark your depth lines and prime and cement them in place.



When you are done with this part, your reel should look like this.

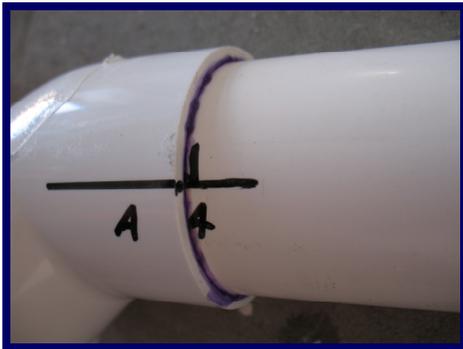
Assembling Inverted V Uprights – how to align

Each Inverted V Upright consists of five pieces. Dry fit them together and align the three fittings by making sure they lay flat on a known flat surface.



Make your four alignment lines on the fittings and pipes. Label the joints for reference during reassembly.

Take the V apart and make your four depth marks on the pipes.



Prime and cement the pieces together. Double check the alignment of fittings after adding each one. Repeat the process for the second Inverted V.

If the pipe extends into the opening of the Pass-Through fitting, now is the time to carefully trim it out. Try not to enlarge the hole itself. Just trim out the obstructing part and test the fit with a piece of 1.5" pipe.



Installing Inverted V Uprights onto Base Lengths

This is one of the trickier parts of the assembly. You will need to apply primer and cement to two fittings and install them simultaneously. It is a “ready, set, go” process. First put your depth marks on the uprights.



Push the reel up against a straight wall. This will aid in Squaring it up. Dry-fit both Inverted V Uprights. This will square up the entire reel. If something doesn't look right, NOW is the time to address it.

Once you are past this step, it is much harder to correct mistakes. Remove one Inverted V Upright while leaving the other dry-fit in place.



Apply primer to all four surfaces. Then apply cement to all four surfaces. And push the Inverted V upright onto the two uprights. Do so with some authority. You will not be able to twist these so **PUSH!** USE THE RUBBER Mallet to SEAT THE FITTINGS IF NEEDED.

Remove the dry-fit second Inverted V Upright and repeat the above process.



Installing Lift Handle on Ends of Base Lengths

As long as we are installing multiple fittings simultaneously, let's finish off the base by installing the Lift Handle. The Lift Handle consists of two 90 degree elbows and a section of 2" pipe. Now that the Inverted V Uprights have established the final width of the reel, we can measure for the pipe section of the Lift Handle.



Dry-fit the two 90 degree fittings on the ends of the Base Lengths.



Measure the distance between them both above and below the fittings. This is to check for alignment of the fittings with one another. If needed, also measure the distance from the floor to the fittings and equalize them.



Turn the fittings until they align with one another. Measure the distance between them. In this case the distance is 23 and 1/16 inch. Add to that two times the depth of the fittings or a 2.75 inches. The total length of pipe needed (in this case) for the Lift Handle is 25 and 13/16 inches. Once you have your measurement, cut a pipe of proper length.



Installing Lift Handle on Ends of Base Lengths

Remove the fittings from the Base Lengths and dry-fit the three pieces together. Use a flat surface to align the two fittings with one another. Mark your alignment lines and label the joints



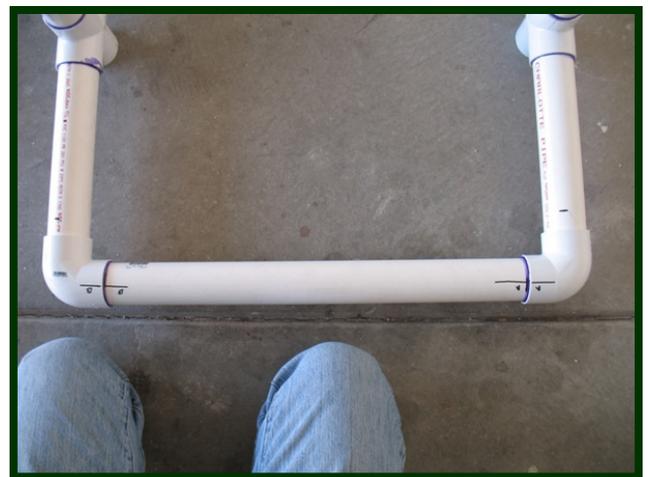
Remove the fittings and make your depth marks on the pipe.

Brace the wheels of the reel against a wall so you can push with some authority and the reel will not move.



Permanently assemble these three pieces with primer and cement.

Check to see that they are very close in width to the ends of the base by dry-fitting the assembly onto the Base Lengths. Mark your depth lines on the Base Lengths.



Apply the primer and glue to all four pieces and **PUSH!** USE THE RUBBER MALLET TO SEAT THE FITTINGS IF NEEDED.

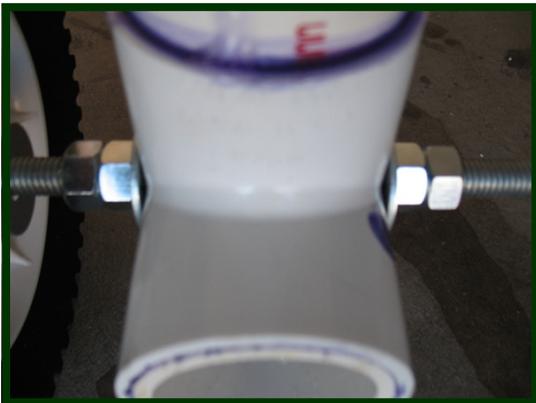
Tightening Axle Nuts, Finishing Axle

28



Now with the width of the base established by the Inverted V Uprights and the Lift Handle, you can finish adjusting the axle. Begin by moving one nut and washer next to each side of the Base Length. Finger tighten only.

We are using two nuts in each position so we can tighten them onto themselves and lock them into position. We don't want to tighten them onto the PVC fittings. The washers should be a finger tight "interference" fit—just touching the PVC and wheels.



Now turn the second nut until it comes into contact with the first.

Once the washers and nuts are where you want them, lock one nut to the other by holding one nut with a wrench and tightening the other onto it. Repeat this process for all six sets of double nuts.



Finishing Axle

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Once you have tightened all of the nuts onto themselves, trim off the extra axle material flush with outside nut.



Then take your file and round off the sharp edges created by the cutting process.

Carefully run your finger over the filed axle and make sure it will not catch on anything or cut a passerby.



When done, your axle and reel should look like this.



Assembling the Tie-off Tees

30

The first parts of the Crank Assembly to be assembled are the Tie-off Tees. Each of these consists of two Tee fittings, one reducer and a piece of 3/4 PVC pipe.



When working with reducers, or any PVC for that matter, watch for “Rebound” or “Push Back” of the reducer or pipe as you cement it. Sometimes the piece you cement in tries to slide back out under its own power. You may have to hold it in the fitting for a few seconds until the cement hardens slightly.

The Reducers do not have to be aligned so just prime and cement them in - one per large Tee fitting.



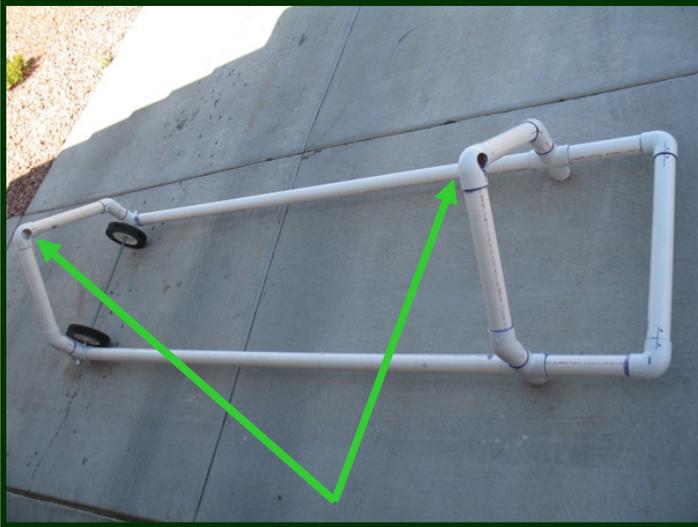
Next, measure the depth of the 3/4” fittings and make your depth marks on the pipe. Install a short piece of 3/4 pipe into each large T fitting.



Lastly, install the small T fitting onto the 3/4 pipe. This is to keep the rope from slipping off as you wrap up the cover. It doesn't matter how they point. I prefer how it looks when they align with the larger Tee so I use the flat surface to make them parallel to one another.

Measuring for Crank Length

31

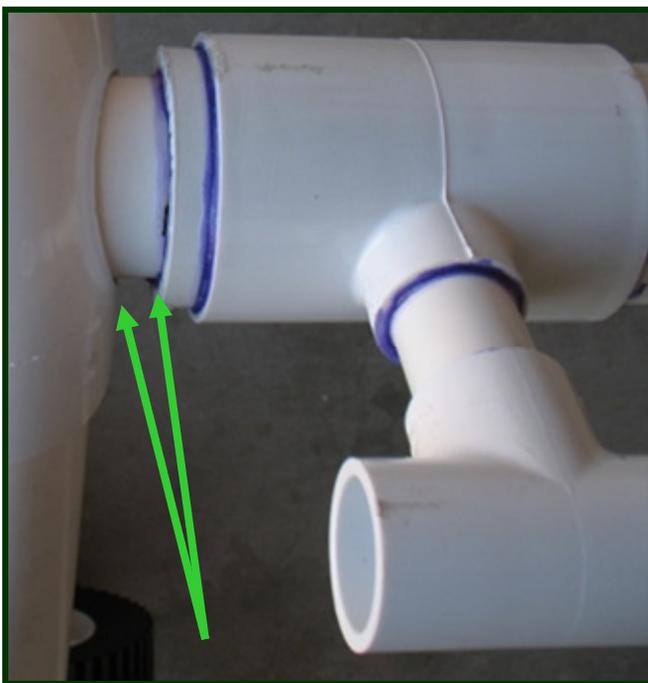


Now you will need to measure for the length of the 2" diameter pipe used in the main part of the Crank Assembly. The length of this piece of 2" diameter pipe is a function of the overall gap between the Inverted V Uprights.

So, first measure the opening between the Inverted V Uprights. Measure from the center (3:00 or 9:00 position) of the hole in the 90 degree fittings.

This is the widest part of the fitting and this will be the narrowest part of the opening between the Inverted V Uprights.

In this case, we have an opening of $83 \frac{3}{4}$ inches.

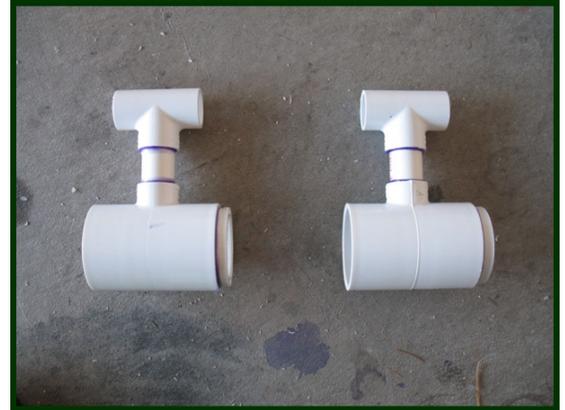


The overall length of the main portion of the Crank Assembly that is between the two Inverted V Uprights should be a full inch less than the total opening between the Inverted V Uprights. This will allow the $\frac{1}{2}$ inch gap on each end so that the Crank can turn without rubbing the Uprights.

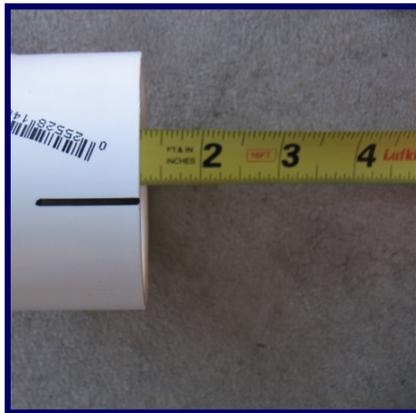
Our measurements so far are: $83 \frac{3}{4}$ minus $\frac{1}{2}$ minus $\frac{1}{2}$ = $82 \frac{3}{4}$.

Measuring for Crank Length

Now we have to subtract off the overall length of the Tee fittings and reducers. Each of these assembled Tie-off Tees measures 4 and 1/4 inches.



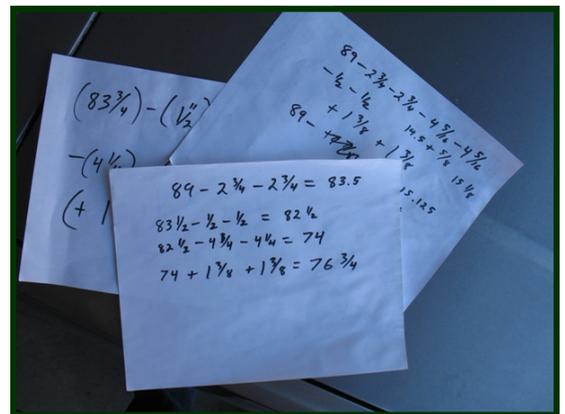
Our measurements now become: $83 \frac{3}{4}$ minus $\frac{1}{2}$ minus $\frac{1}{2}$ minus $4 \frac{1}{4}$ minus $4 \frac{1}{4}$ = $74 \frac{1}{4}$ inches.



Lastly we have to add back on the depth of each of the Tee fittings into which the pipe will fit. Each of these fittings has a depth of $1 \frac{3}{8}$ inches.

Our measurements now become: $83 \frac{3}{4}$ minus $\frac{1}{2}$ minus $\frac{1}{2}$ minus $4 \frac{1}{4}$ minus $4 \frac{1}{4}$ plus $1 \frac{3}{8}$ plus $1 \frac{3}{8}$ = 77 inches.

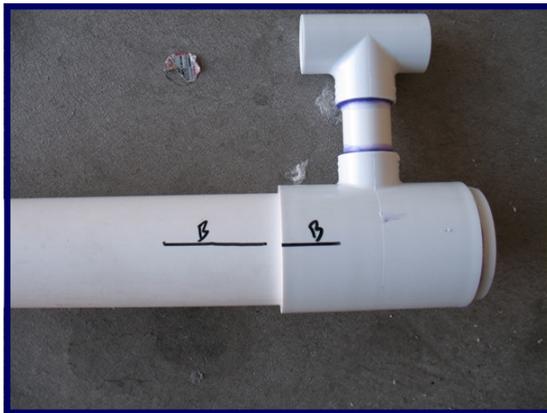
REPEAT THIS PROCESS UNTIL YOU GET THE SAME MEASUREMENT MULTIPLE TIMES AND ARE CONFIDENT YOU HAVE THE CORRECT MEASUREMENT. It is not the end of the world if the Main Crank Assembly comes up a bit long or short but it should be close to what is needed.



Now cut the length of 2" diameter pipe needed and lay out the three pieces for your Main Crank Assembly.

Assembling the Main Crank Assembly

Dry fit the Tie-off Tee assemblies onto the pipe. Use the flat surface to align the Tie-off Tees with one another.



Make your alignment lines and label the joints.

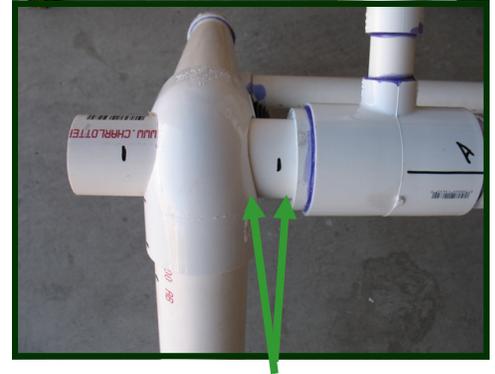
Mark your depth lines on the pipe.



Prime and cement the three pieces together. Use the flat surface to align the Tees.

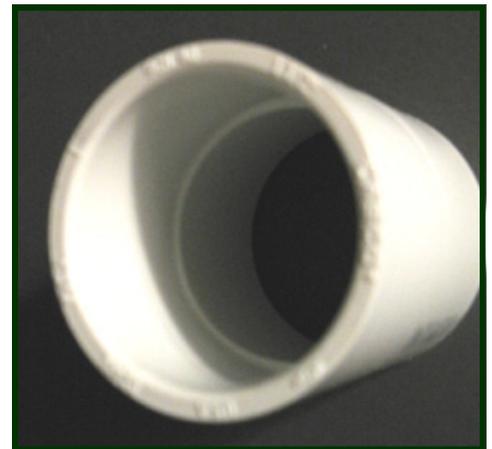
Checking Fitment of Crank and Pass Through Pipes

Now that the center portion of the Crank is complete, dry-fit it into the opening with the two pieces of 1.5" Pass Through pipe. Check to see that you have a gap on each end of the Main Crank Assembly so that it doesn't rub on the Inverted V Uprights.



When working with the Main Crank Assembly, don't let it hang on one Pass Through Pipe. It may break the Pass Through Fitting. Support it on the end with something.

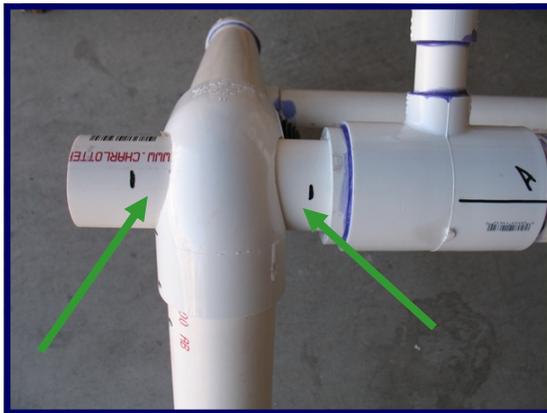
What do I do if the Main Crank Assembly is too long or not long enough? If it is too long, you will need to cut a piece out of the middle and join the two pieces with a coupler. If it is just a little bit too short, the difference can be made up with longer pieces of 1.5 inch diameter Pass Through pipe. If it is much too short, you will have to cut the crank in half and add in a section using two couplers.



If the Main Crank Assembly is of the proper length, now you can check for alignment of the Pass Through Fittings. Dry-fit the two pieces of 1.5" Pass Through Pipe and Main Crank Assembly into the Pass Through Fittings. Rotate the whole assembly. If it turns freely you are good to go. If it is difficult to turn, you will need to "hog" out the holes with your file until it turns freely.

Checking the Length of the Pass Through Pipes

When your Main Crank Assembly and Pass Through Pipes rotate freely in the Pass Through Fittings you are ready to check for the proper length of the Pass Through Pipes. First measure the depth of the reducers and make your depth marks on the Pass Through Pipes.



Next Dry fit the Pass Through Pipes and Main Crank Assembly in place. Align the depth marks on one Pass Through Pipe so that they are evenly spaced on both sides of the Pass Through Fitting. Ask yourself: “When the Pass Through Pipes are fully seated in the Tie-off Tees, will there be enough pipe for the cap and/or handle on the outside of the Inverted V Upright?”

If the answer is NO, then you will have to cut some longer pieces of Pass Through pipe.

If it looks like things will work, start by installing only one of the Pass Through Pipes.

Apply primer to the Pass Through Pipe and reducer.

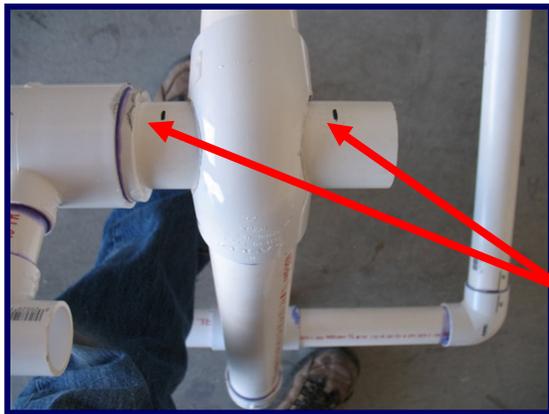
Apply cement TO THE REDUCER ONLY. That way you don't have to try and slide a cement covered pipe through the 90 degree fitting.

Install the pass-through pipe twisting it as you push in. Hold the fitting for a few seconds to prevent rebound.



Installing Second Pass Through Pipe

Center the cemented end so that the reducer has the ideal 1/2 inch gap from the Pass Through Fitting.



With the cemented/finished end where it should ideally be, check the unfinished end to see how it aligns. I can see that when the Pass Through Pipe is fully seated into the Tie-off Tee reducer, I won't have enough on the outside to fully seat the reducer in the Crank Handle. The depth line will be inside the Pass Through fitting. So, I cut a slightly longer piece of Pass Through Pipe and checked again.



Dry-fit the new piece. Now I can see that I will have enough room once the Pass Through Pipe is fully seated. The additional pipe needed to fully seat into the reducer is less than the extra pipe on



the outside of the fitting. I need less than 1/2 inch to fully seat the pipe into the reducer and there is more than an inch on the outside of the Inverted V Upright. Remember that you want a 1/2 inch gap on each side of the Pass Through fitting for the crank to turn freely with all components installed.

Prime and cement the second Pass Through Pipe into its reducer. Hold it for a few seconds to prevent rebound.



Finishing Non-Handle End

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You are now ready to finish off the non-handle end of the Crank. This end consists of a reducer and end cap.



The depth marks should already be on the Pass Through Pipe so just make sure one more time that when the reducer is fully seated, you will have a gap on both sides of the Pass Through Fitting.

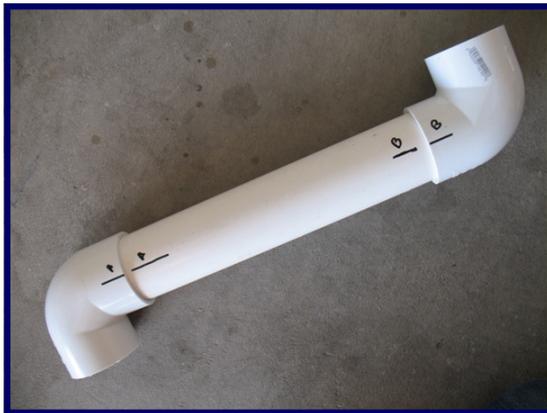
Prime and cement the reducer into the end cap.



Prime and cement the assembly onto the Pass Through Pipe and you are done with this end of the Crank.

Assembling and Installing Crank Handle Arm

The Crank Handle Arm consists of five pieces as shown. Dry-fit the elbows and pipe with one elbow facing opposite the other. Use your flat surface to assure alignment of the fittings.



Draw your alignment lines and label the joints. Take the fittings off the pipe and draw your depth lines.

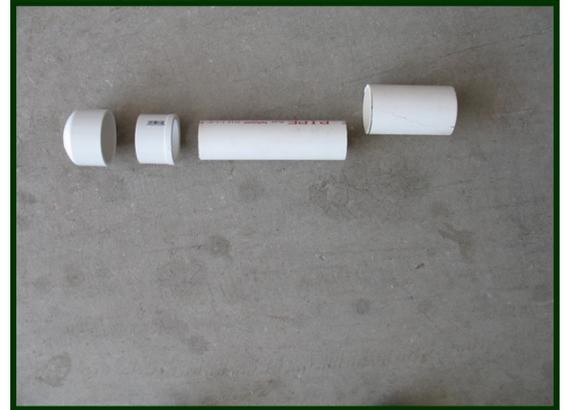
Prime and cement these three pieces together. Then install the reducers. Hold them in place for a few seconds to prevent rebound.



Before cementing the Crank Handle onto the Crank, decide where you want the Tie-Off Tees to be when the Crank Handle hangs straight down. I chose to have them point about 45 degrees off straight up. Place an alignment mark on the Crank reducer and the Crank Handle and glue them together.

Assembling and Installing Spinning Handle Grip

The Spinning Handle Grip consists of four pieces. A cap, a reducer, a section of 2" Diameter pipe and a section of 1.5" Diameter pipe. The second reducer is already in the Crank Handle.



Prime and cement the reducer into the cap. Watch for "Rebound". Prime and cement the 1.5" pipe into the reducer. Watch for "Rebound".

Slide the spinning 2" piece of pipe over the 1.5" pipe. Look at the depth mark to make sure the 2" "grip" pipe will remain loose when installed. Prime and cement the assembly into place.



And That Should Do It! Your reel should be complete! Congratulations!