½ inch PVC Irrigation Full Sliding Coupler and Patch, version 2.0

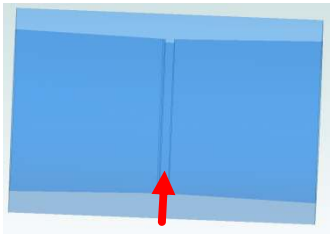
By R. G. Sparber

It is an unhappy moment when I discover that I have pierced a PVC irrigation pipe with my shovel. Any room needed to repair the damage must be hard earned by digging an otherwise unnecessary trench. So the obvious goal is to dig as little as possible around the damaged pipe and still fix the break.

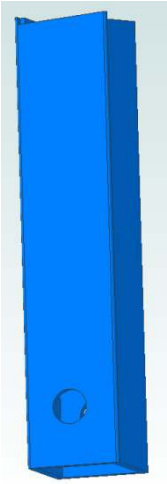
There are no lack of fancy couplers that will make this task easier. Most involve a sliding coupler. The user cuts out enough pipe to allow the retracted coupler to fit. Then the coupler is extended to fit and be cemented. For example, see https://www.youtube.com/watch?v=so9XZS0aD1s

Expect to pay about $5 for this type of coupler. This is cheap compared to digging a 5 foot long trench in rocky soil. But is there a way to do it for essentially free?

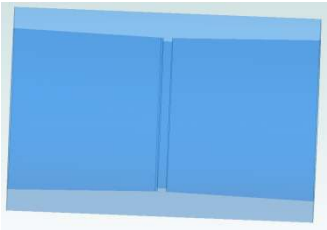
These couplers are designed to withstand the same pressure at the pipe. But in irrigation, the pressure is much lower and often pressure reducers are employed so as to not blow the soft pipe that goes between the hard PVC pipe and the tree or shrub. This means alternate methods can be considered.



The best approach I've seen involves using a modified coupler as can be seen in this video: https://www.youtube.com/watch?v=x7NWmdlvVIQ The author, "electronicsNmore", files out the center stop (red arrow in this X-ray view) so the coupler can freely slide along the existing PVC.



I don't trust myself to use a file this precisely so came up with a simple cutter that removes the stop. It consists of a 3 inch length of steel square tubing. I cut relief angles from each corner. Then I crushed the cutter end slightly in a vise. It was just enough to move the cutting points apart the right distance. The tool removes the plastic stop without cutting into the tapered section. The results were better and faster than what I could do with a file but did leave some areas of the stop extending up a few thou. This may be enough to block the pipe.



Of more concern was the fact that the tapered ends mean that only a small length of the coupler will actually weld to the PVC. electronicsNmore said this works and I'm sure it does. But I would feel more confident if there was no taper and I had a snug sliding fit.

My solution was found in my PVC scrap box. On the right is ½ inch PVC schedule 40 pipe. This is all I use on my property. On the left is some ¾ inch PVC schedule 40 pipe.

The ½ inch PVC has a nominal OD of 0.840 inch. The ¾ inch PVC has a nominal ID of 0.824 inch. This means the ¾ inch PVC pipe can be bored out about 8 thou on radius to permit a snug sliding fit on the ½ inch PVC pipe. The PVC cement acts as a lubricant so this fit works well.

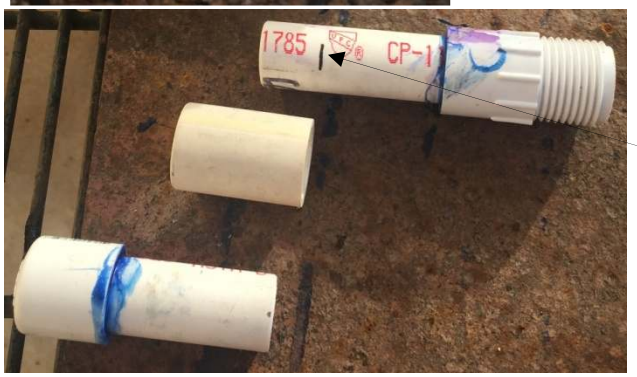
See http://rick.sparber.org/TFPC.pdf for an alternate way to make the coupler using thermal forming. All you need is a heat gun.

I sawed off a 1.6 inch long piece of scrap ¾ inch schedule 40 PVC pipe. Had I used my PVC cutter, there would have been a square and clean end. But since I used my bandsaw, I had to deburr the cut and will need to square it up. This is not a problem because the part went into my lathe for boring.

The plastic must be held snug in the 3 jaw vise. Excessive pressure would have distorted the part. Since I was cutting plastic and taking light cuts, weak jaw pressure worked fine.

Using a piece of ½ inch schedule 40 PVC pipe as a gage, I bored until I achieved my snug sliding fit. Feed the cutter down the pipe slowly to achieve a smooth surface on the inside. The PVC cement does not work well on rough surfaces. I beveled the edges for a finished look. The plastic was scrap and it was fun to use my lathe. Win-win.

I needed to test this coupler using maximum water pressure plus be able to clearly see any leaks. My solution was to build this test fixture. It simply connects to a washing machine hose and lets me apply full city water pressure. I cemented it up, waited an hour, and it held without any leaks.



Next I sawed the fixture in half and deburred the ends.
This black line told me how far to push in the pipe in order to leave an equal amount of coupler for the other end.

Then I used the procedure from electronicsNmore to join the two halves together. Using "Christy's – Red Hot Blue Glue" there was sufficient work time to position the couplers but just barely. Longer work time solvents do exist but they are not found at your typical big box stores.

I had made a second coupler which I sawed in half axially. Could it be used as a patch on a small defect in a pipe? On eBay I found this product which cost $10. OK, that is good enough reason to try out my idea.

It certainly fits the contour of the ½ inch PVC pipe nicely.

I drilled a ¼ inch hole to simulate a defect. Then the pipe and patch were coated with primer followed by cement. I used finger pressure for 30 seconds to insure the patch was tight against the pipe. If this didn't hold, I would have used a hose clamp but that would be tricky given the short work time.

Not pretty. Will it hold?

I waited a hour and then connected the test fixture to city water. Amazing! It all held with no leaks. If there was any possibility of the pipe flexing, I would use the full sliding coupler. But if the defect is small and the pipes solidly supported, the patch might be the fastest and easiest solution. Besides, you get two patches for the price of one slide coupler.

I strongly recommend you ***do not*** use either of these repair methods on inside plumbing. If the repair fails outside, it will cost you some water and having to dig a new trench. If inside, the damage could be extreme.

Acknowledgments

Thanks to electronicsNmore for the great method of repairing irrigation pipes.

I welcome your comments and questions.

If you wish to be contacted each time I publish an article, email me with just "Article Alias" in the subject line.

Rick Sparber
Rgsparber.ha@gmail.com
Rick.Sparber.org