



Boulder Model Railroad Club Clinic

Jerry Gilland
Forming styrene



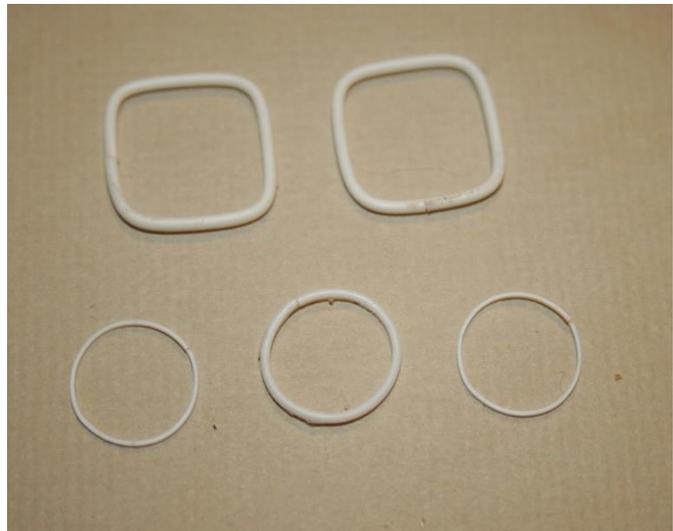
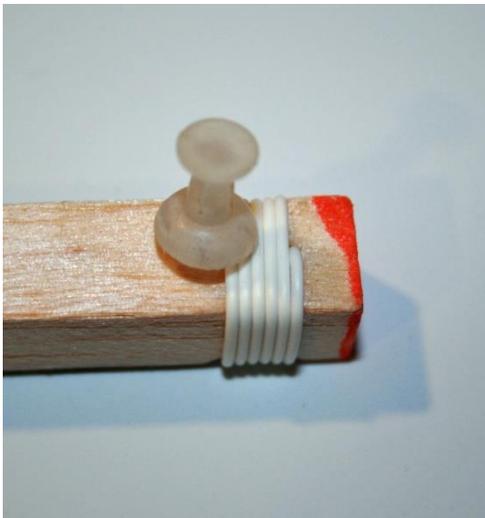
Forming Styrene

Styrene is a popular modeling material, because of its ease of bonding and the wide range of shapes and sizes available. It is a fairly flexible material but has high elasticity and shape memory. This means that it may be easy to form into the desired shape, but it is difficult to keep it in that shape as within minutes, it will revert to its original form. However there is a narrow range of temperatures around 200F where it loses its elasticity but still does not melt. Below this temperature range it retains its memory and springs back to its original shape when cooled. Above that temperature, it begins to melt and becomes sticky. So how do we achieve that stable temperature? Most ovens will cycle well above and below the critical temperature. I have tried heat guns, but ½ inch too close and it melts, and ½ inch too far and I fails to form.

Fortunately for a very few of us in this world, we live in the perfect place. The boiling point of water at around 5000 ft. is just at 200F, and is very stable. If you try to heat water above that temperature, it just boils harder, but stays at the same temperature. So boiling water, or its, steam provides the environment we are looking for. A good old fashioned whistling tea kettle has worked very well for me. It is only necessary to provide some sort of jig, or fixture to temporarily hold the material in the shape you want. Then put it into the steam stream for 15 to 30 seconds. Remove it and cool it and it will retain its new shape forever.

Simple circles and rectangles.

For these simple shapes, just wrap your styrene strip around some scrap wood stock or dowel. Restrain both ends with clamps or a spot of super glue. When cool, slice them off with a sharp Xacto knife or razor blade, a spot of solvent on the ends and there are your shapes





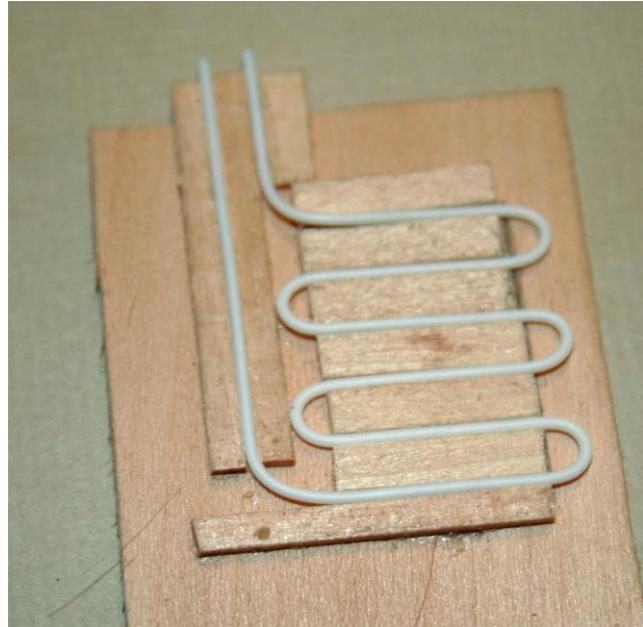
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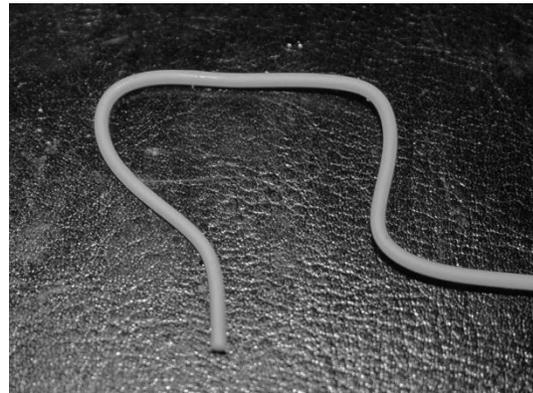
Complex Piping

If you need special shapes and numerous copies of the same part, a little work with some scrap basswood can produce a jig which will hold the material in the desired shape when being steamed. As long as I just used steam, I have had no trouble removing the part when cool. I have tried immersing it directly in the boiling water. This is OK if done briefly. However I have found that prolonged immersions (more than a minute), causes the styrene to become sticky and difficult to remove from the jig.



Free-Form Shapes

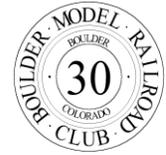
I keep a small piece of corkboard and some stick pins handy for these one-off jobs. Your imagination is the limit as to the shapes that can be achieved. As you see, the cooled part retains the desired shape almost perfectly.





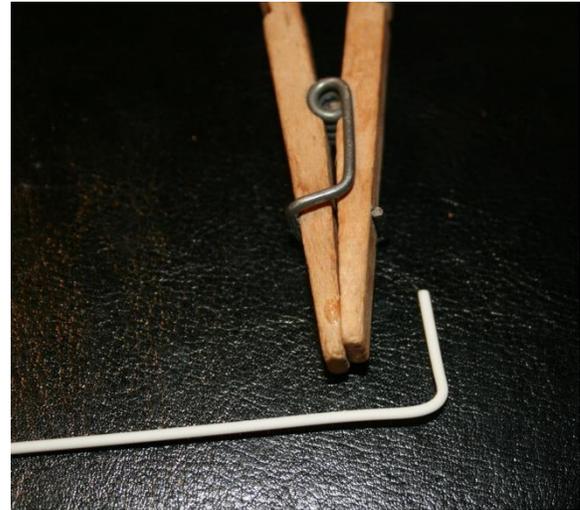
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Sharp Bends

As I am sure you have all experienced, if you attempt to bend cold styrene too sharply, it breaks. Therefore it is sometimes necessary to form the sharp bend while the material is hot. This takes some practice, but I have done it successfully. Just heat the styrene slowly in the steam, until it just starts to sag. Then quickly grab it with a tool and make the desired bend. Don't use metal pliers, as they conduct the heat away too rapidly. I use a clothes pin that I have turned around backwards, as shown. It seems adequate for the job.



Sheet Stock

Although most effective with strips, the same principles apply to sheet material. The photos below show my attempt to make a locomotive piston shroud. As you see the jig is pretty simple – just two pieces of dowel of the correct diameter, and a smaller dowel to get a little reverse curvature. And, yes, rubber bands work well to hold it all together. When I tick to steam heat, I have no trouble with the rubber band leaving marks. However, when immersing too long directly in boiling water I have gotten some depressing under the bands.

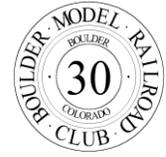


I learned something here that I should have realized. If you look closely at the upper photo, you will see that I had put some rivet marks on the styrene sheet before wrapping it on the form. But if you look at the finished part, they are completely gone! That is because the styrene where the rivet marks were was stressed and annealed back to its original flat shape when heated. This tells me that if it had just waited a couple of days, the rivet marks would have disappeared anyway. The heat just accelerated the process.



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I hope that you found this little trick useful to make that one special part that you have been struggling to achieve!

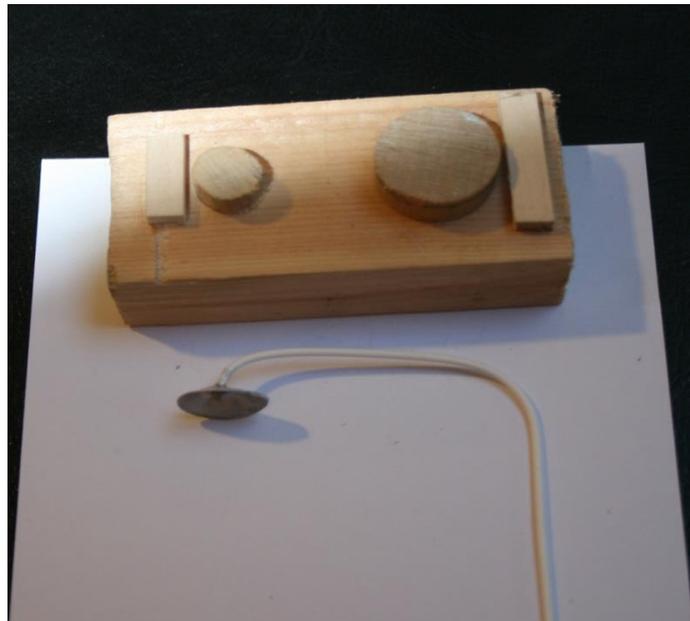
Jerry G.

Addendum

This is a technique that seems to have no limits. Since my original handouts were reproduced. I have had occasion to apply this methodology to a couple of other needs

Light poles

I had a need for some modernistic street light poles. Some would be dummies, but I wanted some to be lighted. Forming styrene rod for the dummies and styrene tubing for the lighted ones provided the answer. The lighted ones required a little larger tube, but by stripping the insulation off of one lead, I was able to get both wires inside a 3/32 tube.



Jar Lid



I had a small left over paint jar that would be ideal for storing small parts. Unfortunately the lid was lost. Since I had the tea kettle steaming for another project, I did an experiment. I wrapped a styrene strip around the threaded portion of the jar, secured it with rubber bands and dunked it into boiling water for about a minute. Presto the styrene schunk around the threads creating a perfect female copy.. I added a circular styrene cutout for closure and I have a lid that is serviceable, if not a thing of beauty