

Scratch-Building Concrete Bridge Piers

Text and Photos by Steve Malcolm, Director, Eastern Iowa Division



Installing a model railroad bridge into a layout presents many unique challenges. One of the most common obstacles is finding the right pier to support your type of bridge. Commercially available piers will be workable in most typical installations, but they will limit the maximum height, and the bridge types able to be set upon them. One option to overcome the limitations of commercial offerings is to scratch build your own.

Recently, while trying to bridge Minnow Creek on the Hawkeye Model Railroad Club layout, I needed four bridge piers of differing heights. In addition, I faced the challenge of creating a pier design that would support both a Micro Engineering Deck Girder and a Walthers Truss bridge. Realizing that I was not going to find suitable commercial products, I set out to create my own. The first step was to create a template drawing in HO scale. This would allow for easy transfer of the dimensions to sheet styrene with a pair of dividers.



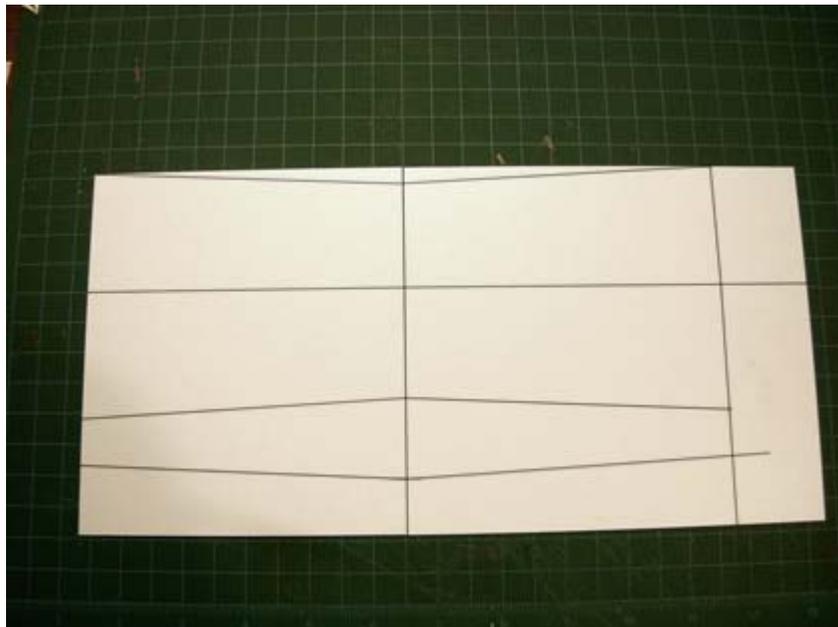
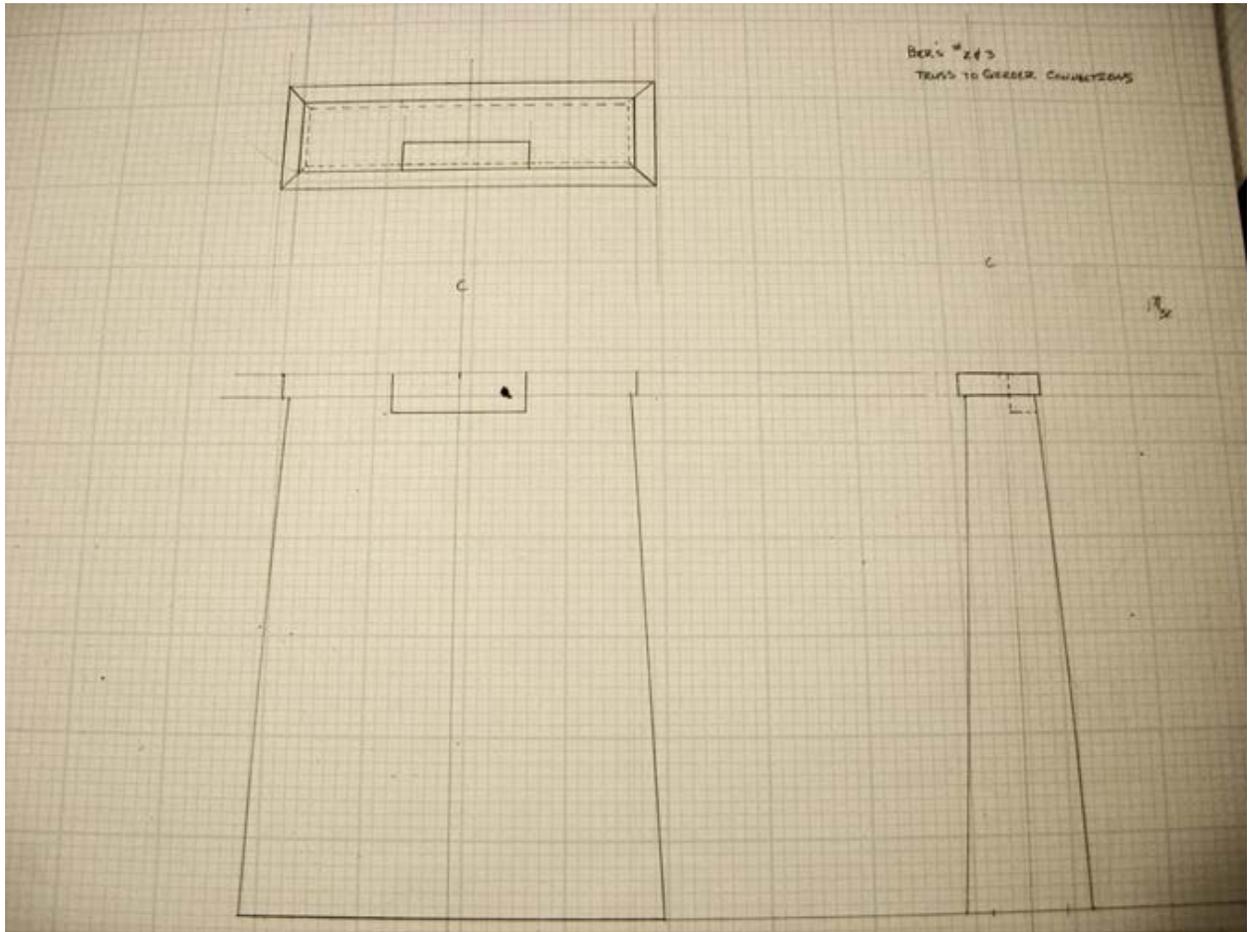
The inspiration for my template design came from the Rock Island Railroad crossing of the Iowa River in Iowa City, IA. I wanted to capture the tapered look of how these piers were constructed. Rather than climbing around the piers to get prototype dimensions, I decided a more practical, if not safer, approach would be to work up the dimensions from the actual model bridges. This, of course, was not as much fun.

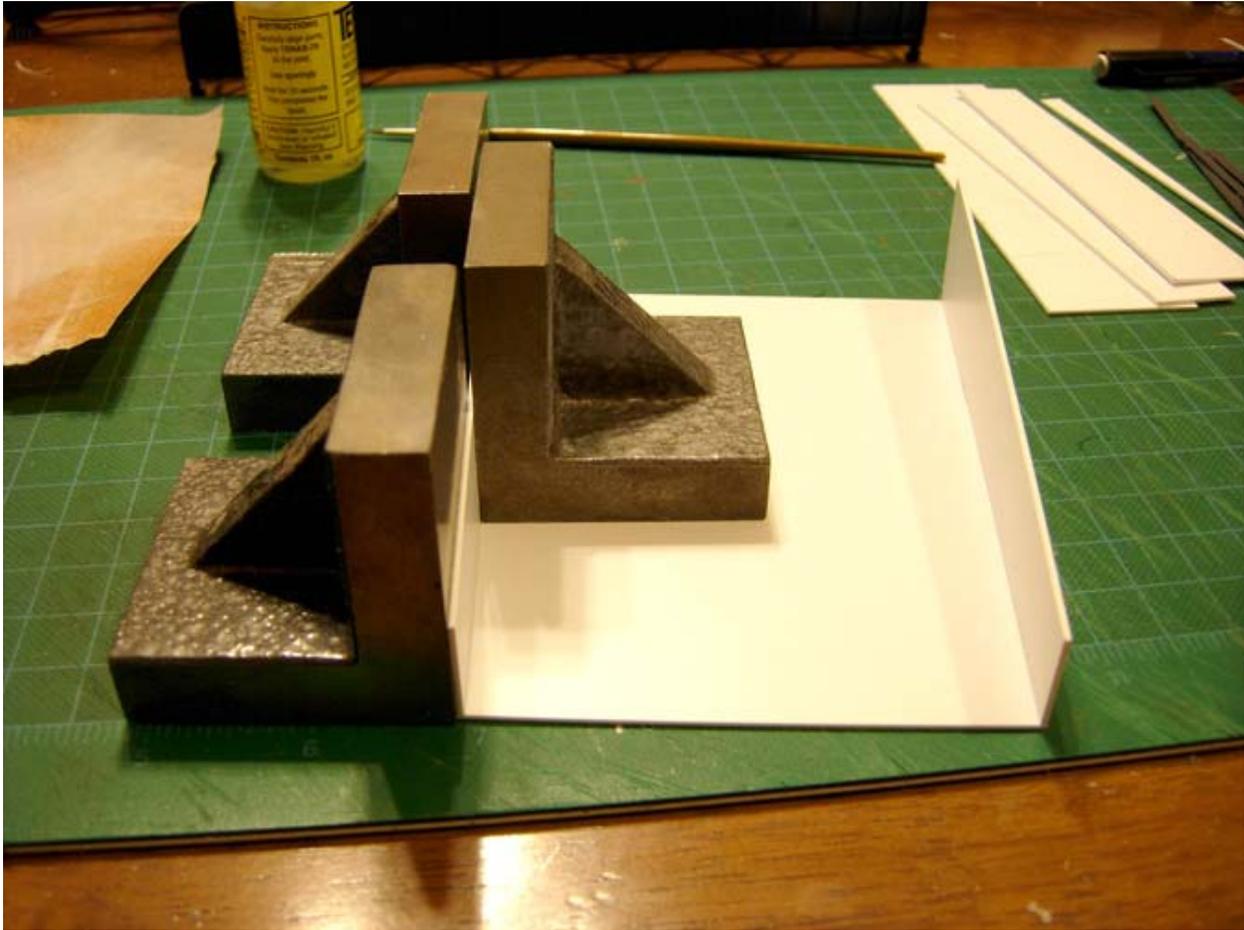
Measuring the outside to outside dimensions of the bridge shoes on the Walters Truss Bridge, and adding two scale feet determined the widths at the top of the pier. The extra two feet would provide an additional 12" of concrete for the bridge to bear on, resulting in a bearing face of 26'x 6'-6". I chose to taper the piers at 5° because, well, it looked right. Using the height requirement of the tallest pier I needed, I decided on 40' for the height of the template drawing. With the 5° taper, this resulted with a pier base of approximately 30'x 9'-4".

Determining the dimensions of the pocket to support the Micro Engineering Deck Girder was figured in much the same way as the bearing face for the Walters Truss. Again, the outside measurements of the bridge shoes were used to create the width and depth of the pocket. Figuring the height of the pocket was a little tricky, and required the use of calipers to measure the offset distance between the shoes of the two bridges. After working up the pocket dimensions, I did decide to incorporate a concrete cap into the template for the piers where the girder and truss meet. The cap increased the bearing face for the two bridges, allowing for more horizontal tolerance when actually mounting them. An added benefit was one template that provided two options of pier construction.

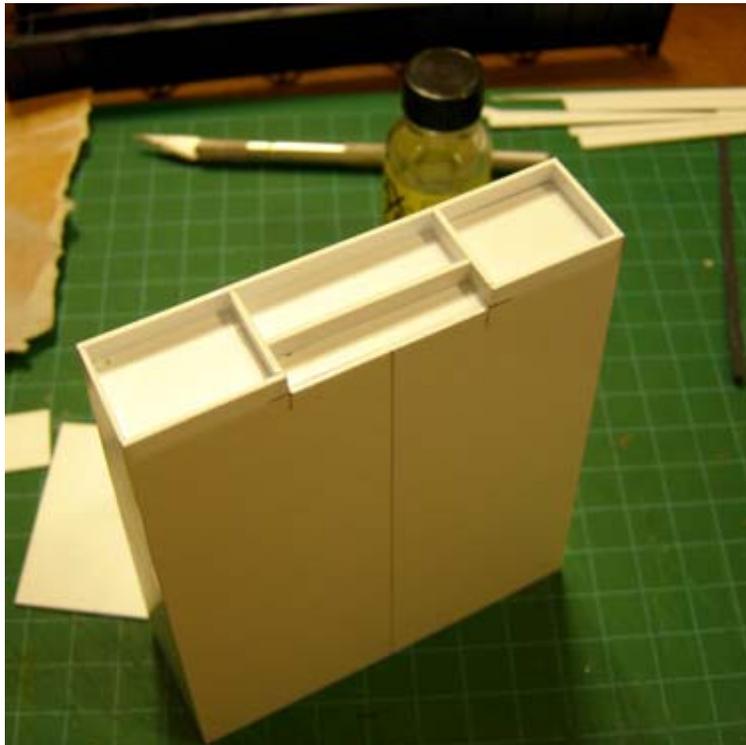


Once the template drawing was complete, starting construction of the piers is simply a matter of transferring the dimensions to a sheet of styrene. For this project I chose to use Evergreen Scale Models .040" plain sheet styrene. One sheet provides enough material to complete one pier at a scale 40' height. Centerlines are the most important part of transferring dimensions from a drawing onto a cutting template on a sheet of styrene. I started with the vertical centerline for the pier, and then added the horizontal centerline for the pier height. Working out from the intersection of these two lines I laid out the width of the top of the pier first, then marked the base width. Note that two pier faces are laid out inverted on the sheet, with the sides neatly tucked next to them. This minimizes the cuts with a Xacto knife, and reduces material waste. The pieces were cut out with a Xacto knife by scoring along the cut lines and snapping the styrene. Cut edges were cleaned up with a few passes over a fine grit sanding block.

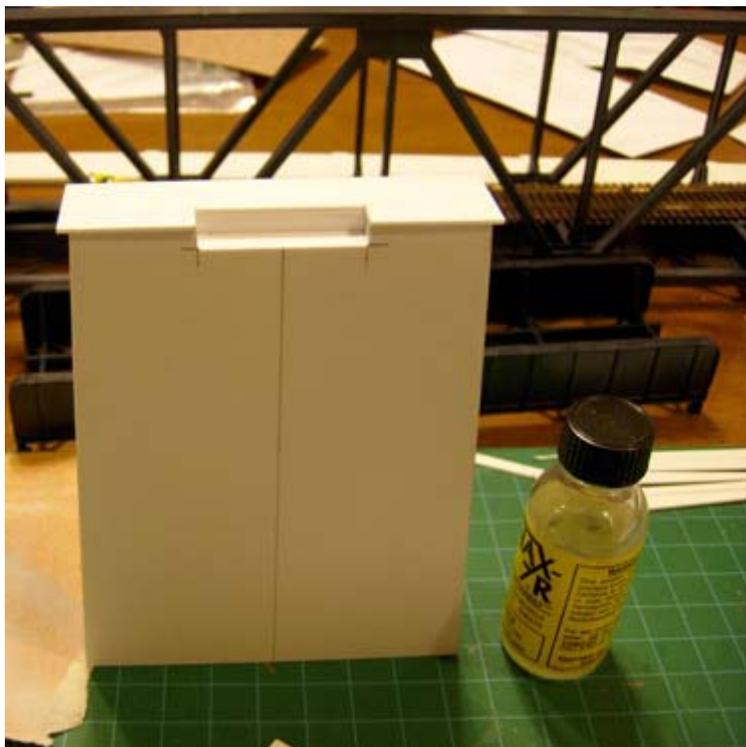




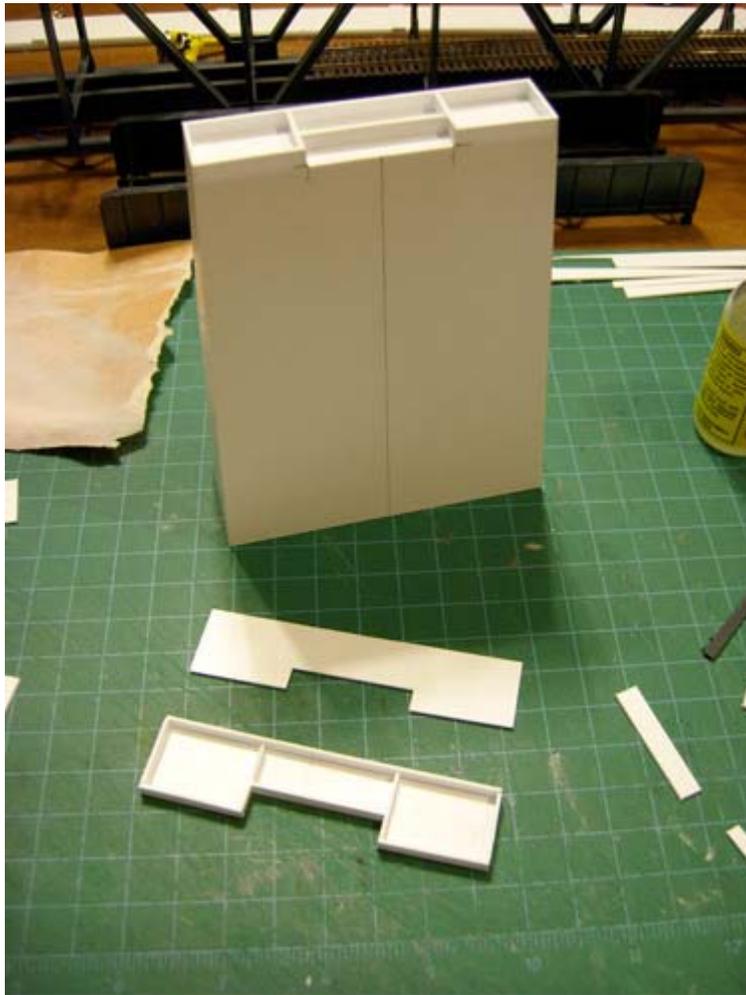
To assemble the pieces, I used 2x2x2 steel Angle Plates, available from Micro-Mark, to hold them in place. The configuration of the three plates will produce perfect 90-degree angles with very little joint clean up.



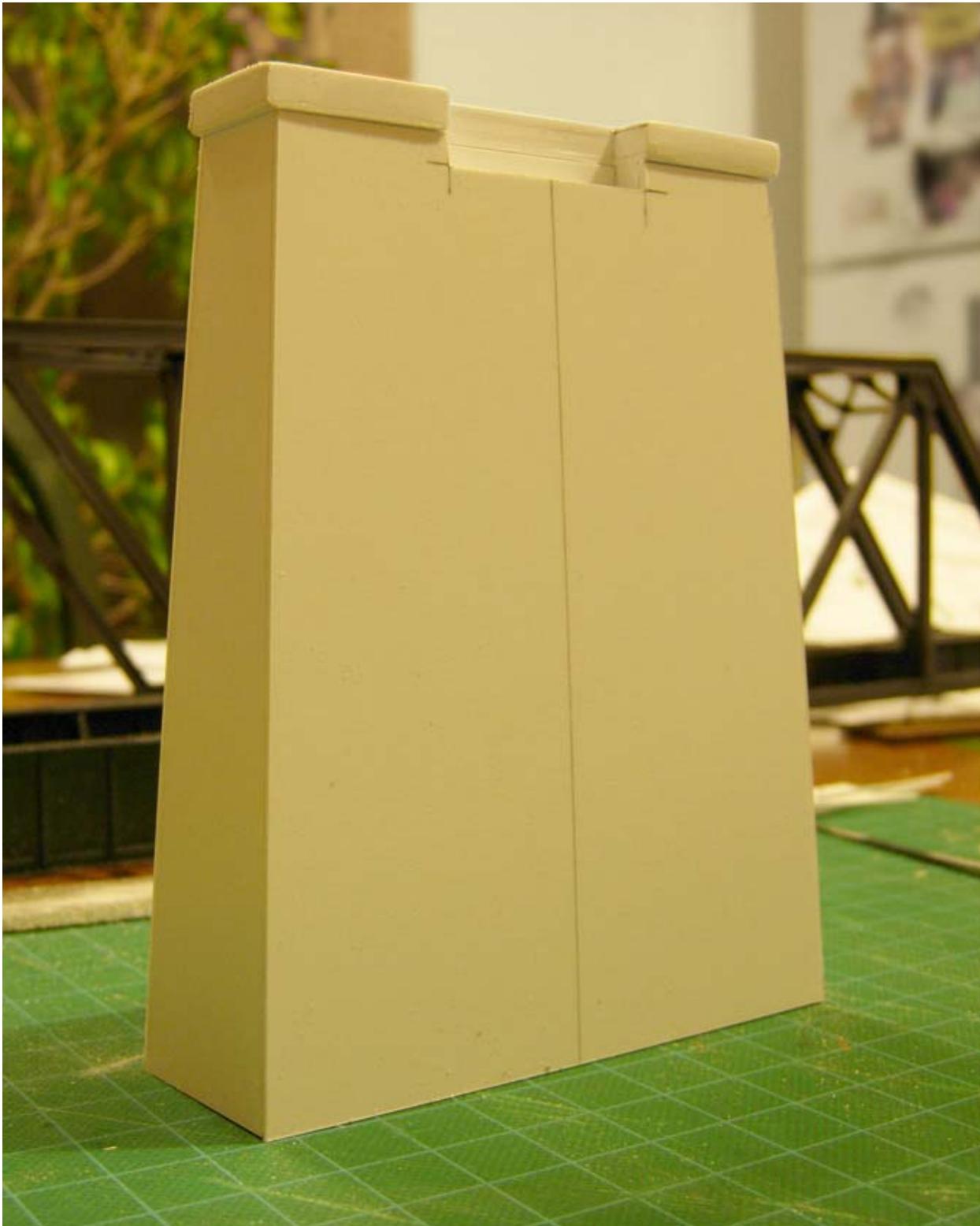
This picture shows the internal construction of the deck girder bridge pocket. The pier cap will rest on top.



Test fitting the pier cap prior to final assembly.



Here we see the pier cap construction, with a completed pier assembly waiting.



The pier is complete. Joint lines have been worked with a jewelers file, and need a final clean up with fine grit sand paper prior to painting.

Scratch building bridge piers is surprisingly straightforward, and offers many benefits. Not only are they inexpensive, but you can create piers based the needs of your own unique engineering challenges.

If you are interested in a copy of the pier template drawings shoot me an email at gsmalco07@aol.com .

That is, if I can find them....doh!

A special thanks to Clark Cooper for painting the completed piers. They can be seen down at the Hawkeye Model Railroad Club. Stop by and take a look.