The Stone Viaduct on the Knockwood Line

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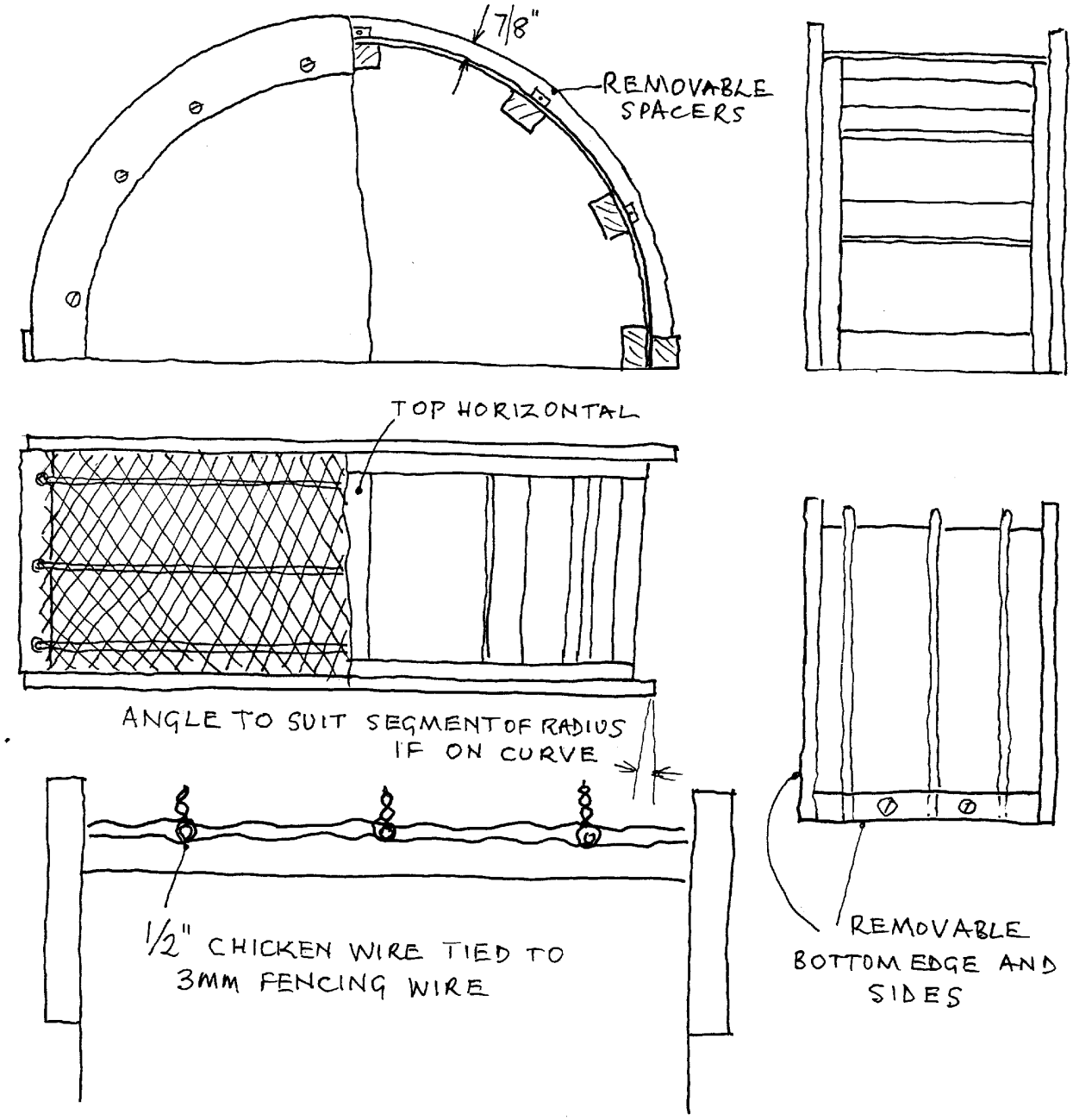
Some Members have shown interest in how I constructed the viaduct on my garden railway. These notes may help to give some ideas to other line builders. The viaduct is built with ferro cement arch supports and sandstone salvaged from a strata found when digging the footings for my workshop.

Ferro cement is used for constructing boat hulls and roofs in some countries. It is popular in New Zealand for boat hulls. For hulls a reinforcing rod armature is covered with chicken wire and ties into the rods to give the hull shape and then plastered both inside and out simultaneously in one continual operation. My arches were constructed differently using an inside mould, but using the chicken wire technique.

I used two layers of hardboard for my mould pinned and glued to the formers and each other. I did not have any thin ply at the time which may have been better. I damped the hardboard and you may need to with ply. The mould needs treating with a release agent every time the mould is used, but use it as directed and it must be left to dry. I know some people use old oil but I don't know how effective this is.

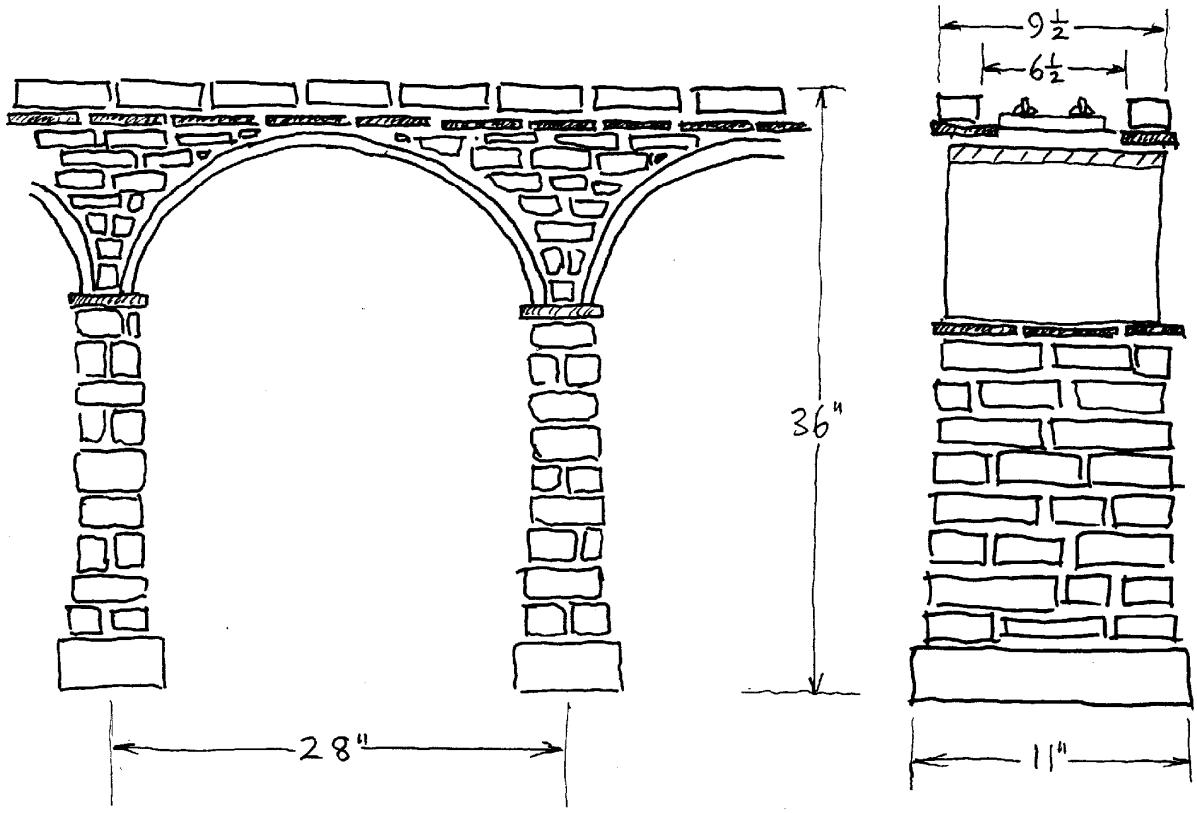
For fitting the wire to the mould removable cross spacers 5/16th thick are held in place by loose nails through the ends to keep them in position. A piece of ½" chicken wire is fitted over the spacer, then the 3mm fencing wire armatures, which fit into holes in the end blocks, then another layer of chicken wire is fitted on top, all tied with thin wire twists. With the wire in place, one side is removed and the spacers pulled out. When happy with the position of the reinforcing (which should be central in the mould 'thickness') it can be plastered.

I used 3 parts sharp sand, 1 part soft sand, plus 1 part cement, also adding brown colouring to



take the greyness away. The mix needs to be stiff enough to stop “slumping” (as it is very easy to get it too wet) and firmly plastered on. It needs to be left on the mould for a couple of days at least and covered with polythene to stop it drying out too quickly. The sides and end blocks can then be removed and with it laid on its side the arch can be eased out and left to mature for a few more days, again covered with polythene.

This method may seem over elaborate and I have since thought that



the small weld mesh sold for pet cages may be simpler to use. One layer might be OK if it holds the render and the thickness could be reduced as it would be less likely to slump.

The piers were built with the sandstone on a plinth cut from a thick paving stone with an angle grinder fitted with a diamond blade. Luckily I had some that were made from a very even sandy yellow toned aggregate that cut well and looked good. I intended to fit a reinforcing rod at the centre of the piers, but it got overlooked at the time, but I think it would have been sensible. The piers were capped with cut roof tiles, two courses I think would have looked better. The arches were then bedded in position and built up with stone and mortar with a row of cut tiles leveled and filled flush to take the track. Thinner cut paving stones were bedded at the edges to finish off and give an edge to the ballast. These edge stones were cut with a hired block cutter to give a 'hewn' look. Alternatives to natural stone for viaduct building are clay roof tiles, these can easily be cut with a diamond blade. Terracotta floor tiles (especially the old thick ones) can also be cut to small brick-size proportions. Paving slabs can be cut with an angle grinder to size and a block cutter for a hewn look. Avoid cast paving stones with a hard flinty aggregate, they do not look good when cut and soon ruin diamond blades. The pressed type of slab are usually best. An attractive structure in the garden does go down well with the Ladies. One remarked to her husband that she would like a viaduct in their garden. Neither of them were interested in Model Railways!