# Grading Roadbed on the Rio Golare Southern

By Pete Bellos$_{n3}$

Several railfans who have toured the Rio Golare Southern recently have commented on the construction of the roadbed. While this construction, using splines and blocks, is far from original and has been published in the hobby press in the past, perhaps it's time to describe it again, along with a couple refinements I've made, for both the newer and the more forgetful model rails.

The basic material for this roadbed is lattice strip, a well-seasoned, clear, straight-grained pine or fir material available in 8 and 16 foot lengths at lumber yards. There are two thicknesses generally available: 3/16" and 1/4". I use the 1/4" material, but for radii under 24" the 3/16" will be easier to handle. The"built-in" advantages of lattice strip splines are:

1. When allowed to bend freely, lattice strip develops a natural easement curve without resort to complex measurements and mathematics.
2. Similarly it enforces gentle grade separations.
3. So long as a minimum of three splines is used, it will hold right-of-way configurations rigidly.

And the disadvantages:

1. Access to a table saw is necessary to saw splines and blocks to size, as well as to make gluing clamps.
2. Assembly requires lots of clamps...but see below.

**Construction**

The Rio Golare Southern is being built using conventional L-girder benchwork. With the L-girder benches in place, the track layout is traced on cross members spaced 16" or less apart, using lengths of the spline material as guides. These splines then become the center line of the roadbed. They also locate the positions of uprights. **FIGURE 1** shows the construction of single track roadbed for HO and Sn3. The center splines are drilled for finishing nails that, along with glue attach them to the benchwork.

Blocks and outer splines are then glued and clamped to the center spline. Be sure that the end grain of the blocks is used for the glue joints. See **FIGURE 2.** This permits a stronger joint (the glue soaks in further) and limits any tendency for blocks to split under strain.

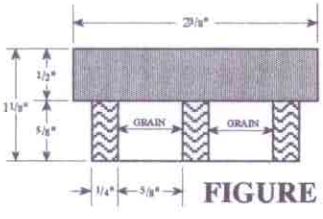
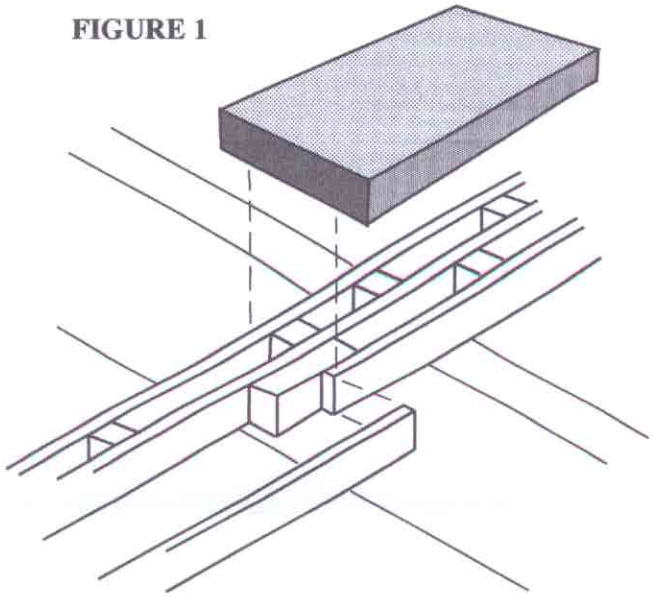



**FIGURE 2**

Splices are backed with double length bocks and

**FIGURE 1**



care is taken to stagger splices as far apart as practical and not to locate them at grade separations. 1/2" Homosote® is then glued and clamped to the resulting assembly, using the same clamps that held the splines and blocks. For double track and larger scales simply add splines and blocks to expand the width of the base to suit the width of the roadbed.

Materials used

1/4" (or 3/16") x5/8" splines ripped from lattice strip.
5/8"x5/8"x5/8" blocks cut from nominal 1" fir.
5/8"x5/8"x1 1/4" (or longer) splice blocks cut from nominal 1" fir.
1/2" Homosote® cut to width(s).
Titebond II or similar waterproof glue.

**Defining and Laying Curves**

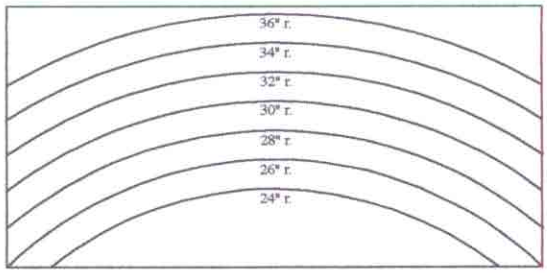



**FIGURE 3:** 3/8"or 1/2" plywood, approx. 18"x36"

Plywood templates are used to define a minimum radius for a curve. I lay these out on 3/8" plywood using a trammel made from a yard stick, nail and pencil. 1/2" plywood also works, but 1/4" just hasn't got the guts for

the job. **FIGURE 3** shows a layout for 24" through 36" radius guides. Of course these guides can be cut out for any radius you'll need.

Clamping a template to the center spline defines the minimum radius. Leaving a foot or more of the spline free will deliver an easement into a tangent or adjacent curve.

Handy Household Hint: To make bending curves easier and relieve stresses, sponge your splines thoroughly with "wet water", that is water with a little detergent added. This improves pliability, and when the wood dries it will tend to retain a bend.

**Handling Homosote®**

Of course in the yards and under turnouts my Homosote® is cut to the sizes and configurations required. But out on the line the roadbed is sawed into strips (2 3/8" wide on the RGS) with a portable saw...outdoors. To bend these strips to curves, cross cuts are made every 1 1/2" or so, leaving about 1/2" of material to hold them together. See **FIGURE 4**.

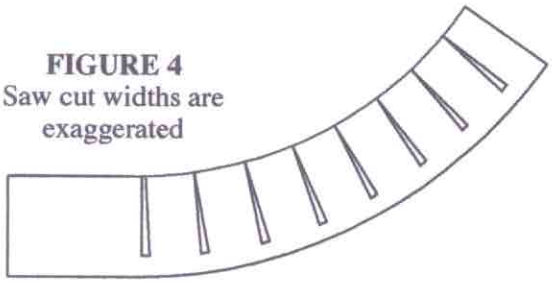


**FIGURE 4**
Saw cut widths are exaggerated

At this spacing, with a 1/16" thick blade, a Homosote® strip can be bent to as tight as a 30" radius. A 1/8" thick blade will allow bends under 24". The idea is to have the slots close snugly at the inner edge when the roadbed is curved. You may want to experiment with kerf widths and spacing to suit your needs.

Another hint: if your layout is subject to wide swings in humidity, a coat of shellace for the Homosote® may be called for.

The Homosote® is then glued and clamped to the sub-base, using the same clamps that were used to glue up the spline/block sub-base. Use lots of these to hold the Homosote® evenly. Any remaining fuzz or irregularities are then removed with a sanding block.

**Making Clamps**

Your neighborhood hardwood store would love to have you buy them out of C-clamps for your roadbed project, but here's a cheapskate design that won't take so much out of your brass loco budget. This design, shown in in **FIGURE 5**, works better than C-clamps for this job and costs a bunch less. You will need to cut and drill more wood, but the hardware needed will be only one carriage bolt, one flat washer and one wing nut for each clamp you make.

The chart accompanying **FIGURE 5** gives dimensions for the three sizes of clamps I use. The smallest size is used both to glue up the splines and blocks and to glue the Homosote® to them. Two dimensions: the thickness of two splines plus a block and the width of a spline plus the thickness of the Homosote® are designed to be equal and define the width of this clamp (refer to **FIGURE 2**). You'll need the most of these. The RGS owns 25 or more.

The mid-size clamp is one spline thickness wider and is used to clamp diverging splines to the sub-base at turnouts or an additional spline used as a reinforcement where changes are made. Three or four of these should be enough.

The largest clamp spans the width of the three splines and two blocks that make up the width of single track sub-base. A half dozen of these is not too many.

The center blocks for all these clamps are nominal 1" fir. The legs are 1/4" to 3/8" thick fir or, better yet, 3/16" to 1/4" thick oak or birch.

Reinforced packaging tape holds the three parts together. Since some flexibility is needed. these are not glued

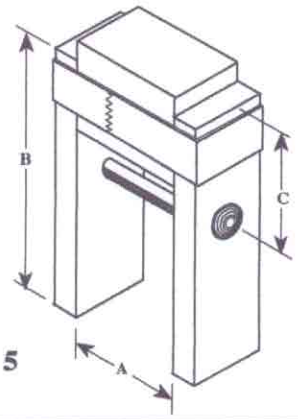



**FIGURE 5**

| CLAMP SIZE | BLOCK SIZE | BOLT SIZE | A | B | C |
|---|---|---|---|---|---|
| SMALL | 1"x1 1/8" x 3/4" | 1/4"x 2" | 1 1/8" | 3" | 1 1/4" |
| MEDIUM | 1"x1 3/8" x 3/4" | 1/4"x 2 1/2" | 1 3/8" | 3" | 1 1/4" |
| LARGE | 2" x 2" x3/4" | 1/4"x 3 1/2" | 2" | 6" | 3" |

NOTE: Dimensions given are for use with 1/4" thick splines. For 3/16" thick splines, reduce block widths and "A" by 1/8" for SMALL clamps, by 3/16" for MEDIUM and LARGE clamps.

**Winding Up**

The spline/block//Homosote® road bed I've described here has proven itself for strength and stability on my own and others' railroads and modules I've been involved with over the past 20 years. Relocating and adding roadbed is effectively as easy as revising a section of hardshell scenery: just cut out a section, remembering to stagger or reinforce the joints and build the new section in place. To cut in a bridge, just add spacer blocks and risers to stabilize each end, then saw away the segment to be spanned. With properly fitted and clamped joints using waterproof glues, the resulting construction is practically bulletproof .