



DATA SHEET

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Sheet #:	D3e
Title:	MODEL RAILROAD ROADBED
Updated by:	Paul Locher, MMR
Updated:	October 1999
First Issued:	March 1959 (D3g.1)
Originally Compiled by:	Committee
Revisions by:	Dennis Vaccaro
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INTRODUCTION

Three things combine to make a model railroad track structure. These are the framework, the sub-roadbed and the roadbed. In addition to strength, the model layout structure should allow above and below the layout easy blending of scenery and for placement of accessories such as switch machines, signals and bridges.

The framework is often of wood but may be made with extruded foam or foam core for lightweight construction used in module layouts and on shelves. A solid foundation is as important as carefully laid track. The framework may be L-girder or box type of construction. There are articles in the hobby press about these types of construction and materials.

This Data Sheet concerns itself with the sub-roadbed and roadbed.

TYPES OF MATERIALS

Many types of material are used. The more common ones are wood, Homasote, extruded foam and foamcore. The characteristics and usage are explained in the following sections.

WOOD

The sub-roadbed is constructed from $\frac{1}{4}$ - $\frac{3}{4}$ plywood or 1" dimensional lumber which is nominally $\frac{3}{4}$ " thick. If dimensional lumber is used, it should be of good quality with few if any knots or other defects. It should also be straight and not warped. Plywood may be cut in curved or straight strips. The thinner plywood is stiffened with 1"x2" wood on edge on the bottom between risers. The stiffener material may go diagonally under a curve.

HOMASOTE

The brandname HOMASOTE is cellulose based (paper) available in various thicknesses and widths. It is usually gray in color. A similar product is called UPSOM board. CELLOTEX or similar products do not have the strength for good roadbed and are subject to humidity.

Large $\frac{1}{2}$ " thick sheets are available at home centers or lumber yards. It is easy to work with but does make a lot of dust. However, the dust can be dried and used for scenery. The same goes for wood sawdust.

EXTRUDED FOAM

Various thicknesses may be used but usually 1" or 2" are the ones most commonly used. The white bead board can be obtained at home centers at low cost but makes a mess when cut. The beads of foam fly all over and have static charges that make them stick to everything. The fine foam in blue, green or red is better and easier to use but costs more than bead board. This is usually available in 2" thickness and is available at many home centers or lumber yards.



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FOAMCORE

There are many types available but the most common are:

1. Paper on the outside and foam in the center. Known as Foamcore.
2. Impregnated paper on the outside with dense foam in the center. Known as Gator Board.
3. Styrene on the outside and with dense foam in the center. Known as Duraplast.

SUB-ROADBED

Usually, the sub-roadbed is wider than the roadbed to provide a good base and to allow for ballasting and scenery blending. In special situations, the sub-roadbed may be the same or only a little wider than the roadbed such as at bridge abutments. In HO scale, the sub-roadbed is usually 2"-3" for single track or 7"-8" for double track. That is 1"-1½" in N scale, 3"-4" in S scale, 3½"-5½" in O scale and 7"-11" in G scale.

The risers are usually spaced 1'-3' apart, depending on the style and type of material used for the roadbed and the weight supported. If thin material is used for the roadbed, it may be stiffened between risers with wood, extruded foam or foamcore on edge. The width of the stiffeners is usually about 2".

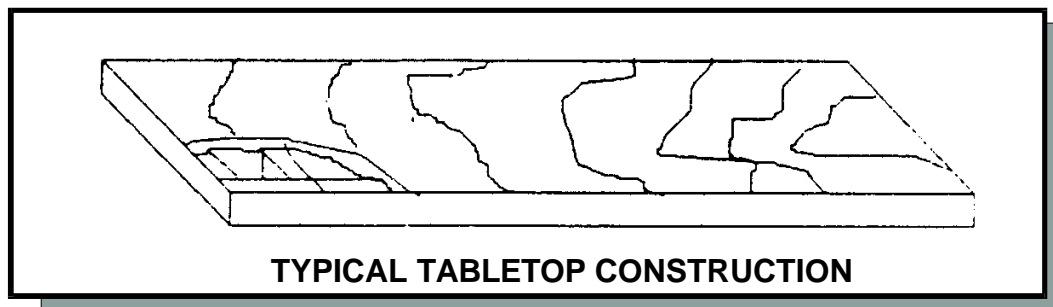
The glue used should be of good quality. Waterproof glue is preferred. Many of the new glues as well as glue in tubes used in caulk guns may be used,.

Dry wall screws are usually used for assembly because of the low cost, the wide variety of sizes and ease of use with power drivers. Cordless drivers make it easy to work on a layout.

There are various ways of constructing roadbed depending on personal preference and the particular situation. Amongst the more popular methods are the following.

TABLETOP

This method places plywood, extruded foam or plastic foam core directly on the framework. This is often how new modelers construct their first layout. It is also used for yards, modules and shelf layouts. The **COOKIE CUTTER** version of the **TABLETOP** method is often used. For this method, the track centerlines and matching lines to define the sub-roadbed are drawn on the material and then cut out along the matching lines. Risers of various heights are used to raise the cut out sections to the desired height(s).





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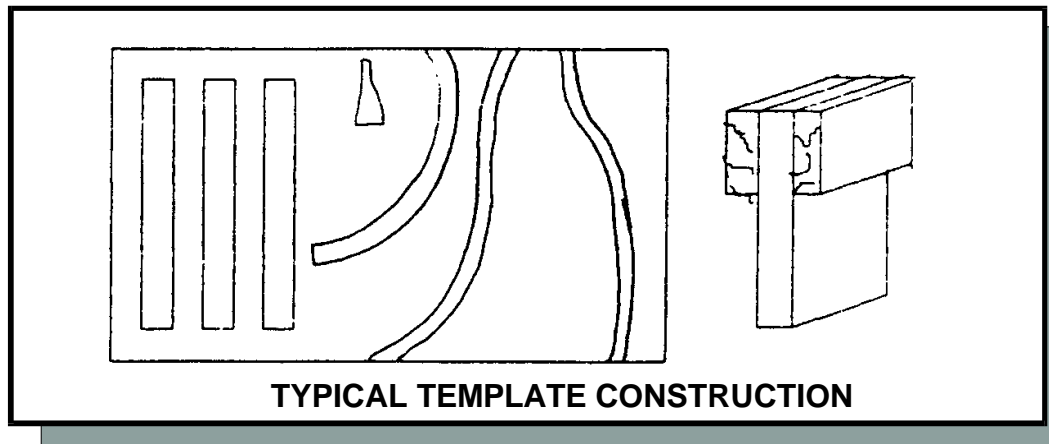
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TEMPLATES

For this method, the roadbed shapes (straight and curved) are drawn on the material and cut out. The roadbed is then attached to risers and stiffeners added between risers if needed. Always think about what has to go on the bottom, like switch machines and other accessories. The joints between pieces of roadbed should be over risers. The top of risers at joints in roadbed may have additional material to make the joints stronger. These have to be accounted for.

A variation of this method uses dimensional lumber. Curves are made up of tangents and/or wider lumber. The lumber is also attached to risers. Extra pieces of lumber are used at the joints to make them stronger.



LAMINATED

There are many types of laminated structures used. The more common are wood, HOMASOTE and foam. Wood or HOMASOTE can be made wet to make it easier to do sharp curves. This type of sub-roadbed construction is strong and resistant to a wide range of temperature and humidity changes. It can be mated with other types of roadbed construction such as large flat surfaces for yards. Once the glue and/or screws holding the pieces together dries, the top can be sanded smooth using a belt sander.

The wood method uses pieces of wood on edge laminated (glued) to each other to make free flowing support for the roadbed. The strips are made by ripping strips $\frac{1}{4}$ - $\frac{3}{4}$ " wide by 1" or 2" in height or get lattice strips at the home center or lumber yard. It provides for naturally formed easements and radii of nearly any size. Screws are sometimes used in place of glue or along with the glue to hold things together until the glue hardens. The joints between pieces making up a laminate are staggered so the joints are overlapped by other pieces of the laminate for strength and flowing shapes. The wood laminates are attached to risers. Sometimes there are wood blocks between solid pieces of wood to make up a laminate and, depending on the type of framework, the risers are a part of the laminate either in the spaces between the blocks or in between pieces making up the laminate.



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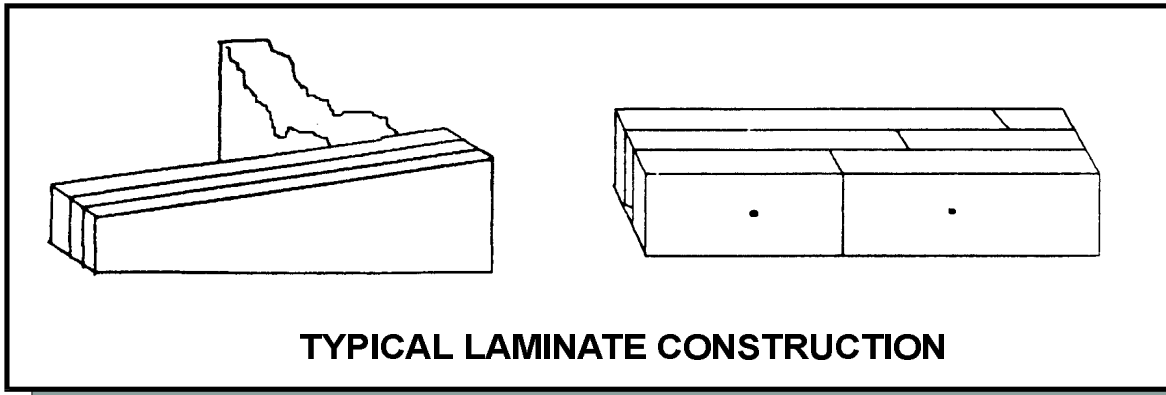
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LAMINATED - continued

The HOMASOTE type of laminate uses strips of ½" thick HOMASOTE glued together with the joints overlapped. The width of the strips is a function of the weight that is supported. The strips are about 1" for N scale, 1½" for HO and S and 2" for O scale. If the risers are further apart, the width of the strips is increased.

The foam method may be similar to the wood or HOMASOTE versions when strips of constant width are used. In some cases, the foam strips are cut to the vertical profile of the roadbed and attached directly to the framework. This could be done with the wood or HOMASOTE methods but is more difficult to achieve with these materials. Sub-roadbed already cut for vertical profiles is available commercially



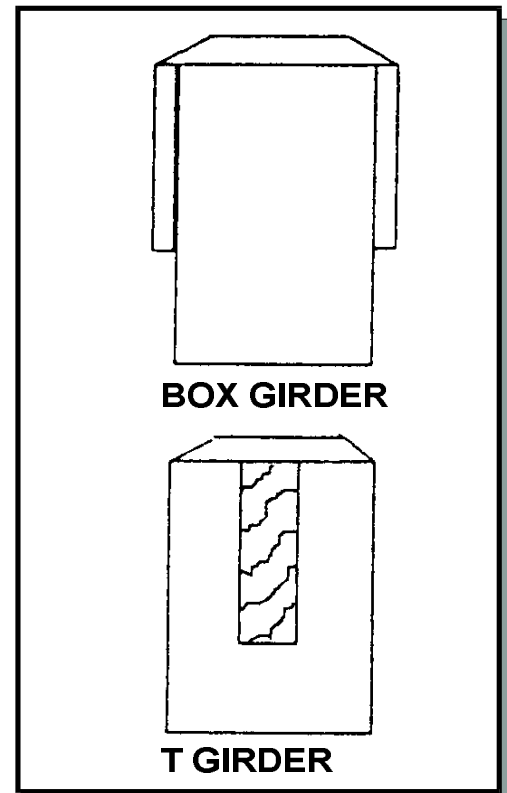
TYPICAL LAMINATE CONSTRUCTION

BOX GIRDER

This type of sub-roadbed construction uses strips of material on the outside of risers. For single track, ¼"x1¼" pieces (usually plywood) are attached to the outside of 1"x2" risers with the top edges flush with the top of the risers. The top may be finished with plywood or milled wood roadbed. All joints are glued and screwed for strength.

T GIRDER

A variation of the **BOX GIRDER** uses a single ¼"-¾" by 1" - 2" tall strip in a slot cut in the top of a riser. Plywood works best on curves as it can be bent. The top can be finished with the same way as a **BOX GIRDER** covered above.



BOX GIRDER

T GIRDER



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ROADBED

This part of a model railroad structure serves many purposes. It acts as a noise suppressor and provides for the general shape of ballast. It acts as the base for ties and rail or for pre-assembled track. It is also a part of the scenery holding the ballast and blending the track work to the surrounding scenery.

It is constructed of a broad variety of materials available commercially or made in the home workshop. The roadbed is attached to the sub-roadbed using glue, nails, screws or staples. Glue is harder to change later than the other attachment methods. The attachment method depends on the material used and personal preference.

Joints between pieces of roadbed should not be at the same place as joints in the sub-roadbed to avoid kinks and problems with shrinkage and expansion.

Roadbed should support only one track except for yards, crossovers and switches. Separate roadbed is used for multiple parallel tracks to simulate the prototype's profile between tracks. This is especially true when superelevation is used on curves.

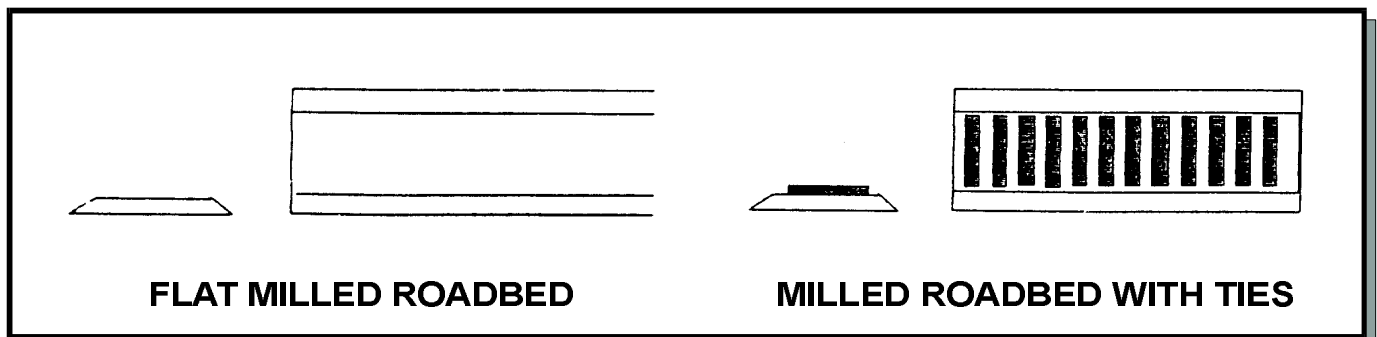
Track is attached to roadbed using glue, nails, or scale spikes. Once again, glue is harder to change later than the other attachment methods. The nails should be painted and/or put near the rails.

The most common materials available for roadbed are:

WOOD

There are two types of milled roadbed available commercially or made in the home workshop. One is profiled for ballast on the sides with a smooth top. The other is similar but in addition has ties on the top. There may also be simulated tie plates to automatically gauge the separation of track.

The roadbed is about 1/4" thick with the edges at a 45 degree angle for plain top roadbed. The second type is 1/8" thicker to allow for the ties. Wider stock is used to make curves.





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ROADBED - continued

RUBBER or COMPOUND

This commercial product is very flexible. It is available in long rolls. The features of this style include pre-coloring and texturing to simulate ballast. Noise reducing qualities also are a benefit. It is available as a sticky surface to stick to the sub-roadbed, track and ballast. It can be cut with scissors, pocketknife or utility knife.

CORK

This commercial product has been popular for many years. It is flexible and very easy to work with. It can provide noise reducing qualities depending on how it and the track are attached. It is available in a variety of scales, sizes, colors and with or without beveling on the edges. Usually the support for one track is made up from two strips. One for either side with the joint down the middle. The end to end joints should be staggered for smooth track support. It can be cut with scissors, pocketknife or utility knife.

TEMPLATE

As with the **TEMPLATE** style of sub-roadbed, the roadbed sections are drawn on the material chosen and cut out. If multiple tracks are cut from one piece, the area between the tracks should be removed to simulate the drainage ditch between the tracks. A router, gouge, special plane or knife may be used.

