BEST OF

164 PAGES OF ESSENTIAL TIPS AND TECHNIQUES

SCENERY

33 detailed projects to make your layout more realistic

Structures, bridges, and rural scenes

Three inspiring scenic layouts

Be inspired by Mike Danneman's N scale Rio Grande layout. Page 20
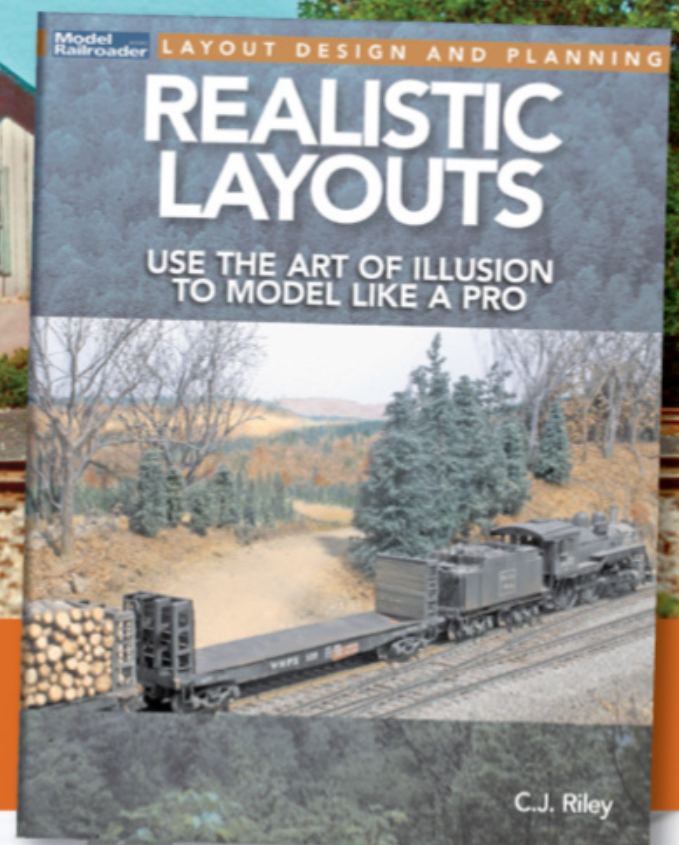
PLUS

17 tips from Pelle Søeborg p.6

Plan and build a city scene p.60

Create layout magic with mirrors p.39

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SCENERY FROM THE EXPERTS

WHAT DOES IT TAKE TO BUILD A model railroad? It takes time, patience, a few simple tools, and the right materials. That's about it; if you fiddle with those things long enough, you'll eventually have a pretty good layout.

Now suppose you want much better results, and you want to succeed on the first try. Then you'll need one more thing, and that's knowledge.

TO GET THE BEST RESULTS you need to learn from the best. In putting together this collection of 33 essential articles, the experts at *Model Railroader* magazine combed through more than a decade of magazines and special publications to produce this comprehensive guide to the most up-to-date scenery techniques. In this 164-page publication you'll find time-tested advice from today's top modelers, including Pelle Søeborg, David Popp, Cody Grivno, Steven Otte, Eric White, Garry Leone, Paul Dolkos, Lou Sassi, James McNab, Thomas Oxnard, and many others.

BUT WAIT – THERE'S MORE! Along with essential tips and techniques – from backdrops to ballast and everything in between – we provide a healthy dose of inspiration, with visits to three layouts featuring extraordinary scenery. Read the behind-the-scenes stories of how Mike Danneman, Lance Mindheim, and Flemming Ørneholm built masterpieces.

Most of the articles in *Best of Scenery* cover one specific skill. In "Weather a brick structure" on page 68, for instance,

On page 142, Eric White explains how he built the mountain on *Model Railroader*'s HO scale Eagle Mountain project railroad. Photo by William Zuback

Model Railroader's Steven Otte shows how he produces walls with a well-aged appearance. Other articles, such as Paul Dolkos' "How to plan and build an urban scene" on page 60, pull together many creative techniques.

Trains.com Executive Producer David Popp walks you through the process of making a realistic layout addition in his article, "Build a portable branch line," which starts on page 44. You see it take shape starting with the benchwork and on to the last finishing touch.

AS WE SELECTED THE ARTICLES for this publication, each member of the *Model Railroader* editorial staff picked a personal favorite or two to include. Look for the yellow Editor's Choice burst as you page through this issue.

In every article, you'll learn from the best. With their help, you'll be on your way to a great-looking layout!

BEST OF
SCENERY

On page 30, James McNab shares his secrets of creating multi-layered foliage. His easy-to-follow technique results in great looking scenes like this. Photo by James McNab

Starting on page 44, you can learn how to build a complete branchline scene, everything from the benchwork to the last finishing touches. Photo by Jim Forbes

EDITOR'S CHOICE

Thomas Oxnard crafted this scene to greet visitors to his layout room. Turn to page 149 to read how he built the rocky ravine. Photo by Thomas Oxnard

ON THE COVER: Mike Danneman showcases realistic Rocky Mountains scenery on his N scale Rio Grande RR set in Colorado. Photo by Mike Danneman

Projects in this book originally appeared in *Model Railroader* magazine. Some have been edited from their original form. Some materials referenced may no longer be available.

BEST OF SCENERY 5

17 TIPS TO CREATE AUTHENTIC SCENES

EDITOR'S CHOICE
CARL SWANSON
EDITOR

Is this what you might consider a highly detailed model railroad scene? Author Pelle Søeborg is a master at composing realistic layout scenes like this one, but he does it without excessive use of small details.

Use details selectively for more realism

By Pelle K. Søeborg • Photos by the author

When my HO scale Union Pacific Daneville & Donner River layout first appeared in the March 2005 issue of *Model Railroader* magazine, I was quite thankful to hear complimentary remarks. However, I was puzzled why so many people considered my model railroad to be "highly detailed." On the contrary, my layout doesn't include many details at all, yet that didn't prevent viewers from believing it does.

From these comments I concluded that people will sometimes mistakenly think that a realistic-looking layout must include numerous details. But in my experience, adding lots of details – large or small – won't guarantee realism. More often, extensive detailing detracts from an otherwise authentic scene.

To clarify my point, imagine a one-square-mile real-world setting that you'd like to model in HO (1:87.1) scale. In order to make that scene fit in the context of your layout, you'll have to compress or even eliminate some major components.

Now try to collect the same amount of fine detail present on the real setting and add it to this relatively smaller area. You'll find the result is a model railroad

scene that looks much too cluttered and becomes inauthentic.

I've found that layout detailing is really an exercise in restraint. What I decide to omit from a scene is equally as important as what I elect to include.

You don't need a lot of details to create a realistic scene – just the right details in the right places.

Additionally, making a realistic model railroad goes beyond adding a few figures here or an old wood pallet there; detailing covers everything above the benchwork. Let's look at the following tips one by one.

BALANCING TRACK AND TERRAIN

In my opinion, a realistic-looking model railroad starts with a simple track plan. A single track winding through the landscape might be viewed as a waste of space on a model railroad, but it looks authentic. This is especially true when you model the American West.

Even if your goal is to build a layout for realistic operation, there are still various detailing considerations that will help you enhance operations while contributing to layout realism.

1 **Elevated main line.** If you examine the main line on a Class 1 railroad, you will notice that the ballast is fairly tall. Most commercial cork roadbed I have seen in HO is ³⁄₁₆" thick. That's not thick enough for my modern main line, so I cut my own roadbed from sheets of ⁵⁄₁₆" thick cork flooring material.

2 **Lowered sidings and spurs.** Be sure to vary the height of your track depending on if it's on a main line, a siding, or a spur. Sidings and spurs are laid directly on the ground, using a small amount of ballast. These tracks are also not maintained as well as the main line, so you can model that detail too.

3 **Broad curves and turnouts.** Factoring wide-radius curves and long turnouts into your plan provides reliable operation and enhances the authenticity of your right-of way. Avoid the temptation to install unusual trackwork, such as three-way or double-slip turnouts, along your main line.

4 **Vary the rail size.** I use code 83 for main lines, code 70 for sidings, and code 55 for spurs. The difference in height may not be apparent to viewers, but there's no reason not to do it. After all, it isn't any harder to lay code 70 flextrack than it is to lay code 83 flextrack.

5 **Service roads.** If you're modeling a modern-era railroad, leave room for service roads along your right-of-way. These paths give maintenance trucks access to remote locations along the tracks.

Pelle installed the sidings on his layout at lower height than the main line roadbed. In some places the track looks as if it's embedded in the ground.

Using code 70 flextrack on the sidings and code 55 flextrack on the spurs helps distinguish these tracks from the mainline, with its code 83 rail.

Including a service road along the main line is essential if you want a realistic-looking modern-era layout. Also note the high ballast supporting the tracks.

Roads follow the contours of the terrain more than railroad tracks do. Pelle also tints the color of the asphalt to blend with the surrounding terrain.

Make realistic billboards and signs for businesses by using photos of actual displays. Scale and print your images on self-adhesive paper fed through a color laser printer.

Adding signs and line poles along the roads or railroad right-of-way can enhance a layout. Wide thoroughfares also add realism to your scenes.

Before building scenery along the track, it's a good idea to observe the world around you. One thing you'll notice is that the world isn't flat, not even in the desert region I model. In fact, the only flat area on my layout is the city.

As you build a layout, make an effort to vary the height of the landscape. Uneven terrain looks considerably more natural and provides a more interesting setting to view trains.

For the most natural-looking scenery, blend a simple selection of colors throughout each scene.

6 Route through the landscape. Railroad tunnels and trestles are often used to add interest to a layout. Be sure to include the dips and hills in the terrain that make these engineered structures essential.

7 Cover the earth. The terrain needs to be covered with rocks, dirt, grass, weeds, bushes, and trees.

8 Color your world. Your choices of colors greatly influence how your layout will appear. I prefer light colors for my Western scenery. In hot, dry areas the colors are gold

tones and olive green. In areas with more rain or along rivers and lakes, the colors tend toward fresh green.

9 Blend the scenery. Look at the world around you and you'll notice how natural elements blend together. Capture the same effect on a layout by applying all ground covering, including ballast, before you wet or glue it in place. I normally work one square-foot section at a time and then repeat the procedure on an adjacent section of the layout.

10 Include roads. There are a couple of things to keep in mind when making roads. Open roads and highways follow the contours of the terrain more so than a railroad line that seeks to limit grade changes. Additionally, I've noticed that many modelers tend to build their roads too narrow. Keeping them as close to real-world width as possible helps make the overall scene look real.

11 Add asphalt accents. I enhance the appearance of my road by matching the color of the asphalt to the surrounding terrain. Since my roads cross the desert, I mix my asphalt gray color with beige to yield a shade that blends well with the surrounding scenery. Road markings are also easy roadway improvements.

SELECTIVE DETAILS

Let's now examine the process most often regarded as detailing a layout. Adding figures, wood pallets, road signs, junk, and other small details is important, but these items can't stand alone. They must first be supported by realistic trackwork, scenery, and structures.

12 Line poles. These are often along railroad tracks or roads. The poles on my layout are by Rix Products. Line poles without lines don't look authentic, so I've wired mine with EZ Line elastic polymer string from Berkshire Junction.

13 Billboards and signs. Although they're more commonly seen within towns, you'll also see billboards in the countryside along highways. My billboards and signs are laser prints of actual displays I photographed on trips.

14 Railroad-related details. Signals, relay sheds, switch stands, and other equipment are essential to real railroad operations. You can't leave these out of if you want to create a plausible scene. Minimally, you'll want to include a relay shed near signals and remote-controlled turnouts.

15 Scene-specific details. Here, the details make the scene. Examples include adding junk to form a junk yard, construction materials to form a lumberyard, or stored replacement rail to suggest a maintenance-of-way stockpile.

16 The trains. Your choice of locomotives and rolling stock also influences how realistic your layout appears. Choose common-place items over the rare. A roster full of heavy-duty flatcars and gigantic tank cars detracts from your efforts to build credible layout settings.

17 Weathering. It just isn't possible to make a model railroad look realistic without some degree of weathering. Weathering is mostly associated with locomotives and rolling stock, but can be found on anything exposed to the elements. **MR**

In most cases, only a few detail parts are needed to create a realistic scene. Weathering effects and some graffiti on buildings and trains also helps.

Sometimes specific details are needed to make the scene look appropriate. Judging by the junk on this property, the owner must run a salvage business.

There are some small detail parts your layout can't do without. Most of these are railroad-related details, including signals, relay sheds, and switch motors.

Paint effective backdrops

Learn great techniques for making your own clouds and landscapes

By Jay Smith

EDITOR'S CHOICE

RENE SCHWEITZER
PRODUCTION EDITOR

A well-rendered backdrop can add a wealth of realism to a layout. When the *Model Railroader* staff built the Wisconsin & Southern (WSOR) project railroad (see the January through April 2008 issues of MR), they asked me to paint the backdrop.

The WSOR project railroad replaced an existing portion of Kalmbach's Milwaukee, Racine & Troy employee club layout, which had a partially finished backdrop of its own. Instead of starting with a blank wall, I simply repaired and added to the scene that was already there.

The techniques I used to spruce up an existing backdrop are very similar to painting one from scratch, so I treated the project as though I was starting with a blank sky-blue wall.

Painting backdrops can be easier than you may think, especially if you start with simple landscapes and clouds. With some practice, you'll be able to render more complex scenery on your backdrop, but keep in mind that a little detail goes a long way.

Step 1 Sketching the scene

Before I pick up a paintbrush, I start a project like this by studying the area to be painted. I do some sketches on a drawing pad first, and then create what's called a color workup. I paint a small portion of my sketch to test colors and get a feel for how my drawings will look as a finished backdrop scene.

It's always best to have reference materials to work from for the landscape you're painting. You can learn much from photos of the region, and even more by visiting it and taking your own reference photos.

By starting with a sketch and working from photos, you'll add to your confidence when it comes time to paint. Once you have your ideas on paper, you can lightly pencil the main points of your drawing onto the wall.

For drawing major structures, I recommend making sketches from reference photos and then using the drawings to trace the buildings onto the backdrop. To add the structure drawing to your backdrop, rub blue pastel or snap-line chalk on the back of the sketch. Next, position the drawing on your scene with low-tack tape and trace over the lines with a sharp no. 2H pencil. When you remove the paper, you'll have the blue lines to use as a guide for painting the building.

Step 2 Washing in basic shapes

Once you have the paint, tools, and plan, it's time to start painting. Using washes of paint to lay down the general forms and colors of the terrain is a quick way of building a composition. This technique works best on landscapes because the form is more free than urban scenes, which require detailed structures.

You can make a wash by mixing a little color with water on your palette. [For more information about paints, see the next page. – *Ed.*] Then, using a broad-tipped brush, fill in the hills and terrain with the thinned paint. The best part about using a wash as a starting point is that it can be easily covered with paint that's more opaque, should you change your mind. In the photo, I'm washing in the hills to fill a gap in the backdrop.

Step 3 Filling in with color

When I'm satisfied with the terrain, I fill in the hills so they're more opaque. The paint should be a mixture of your lightest and darkest color values for the scenery, and you need to work from the background to foreground.

As in real life, you want the background colors to be more muted than those in the foreground. This simulates how the atmosphere affects things seen from a distance – the farther away an object is, the hazier it will appear. As you work forward on a scene you can add more detail, such as trees, bushes, and tall grass. As shown in the photo, I used a paler green on the distant hills than on those in the foreground. This makes them appear to be farther away.

Step 4 Trees and other details

When painting objects in the foreground, try to match the colors of the layout's ground cover, rocks, dirt, and trees. Using colors on the backdrop similar to those found in the scenery materials helps blend the two.

To make trees, I start by painting long dark lines of brown or gray to represent the trunks. Next, I add the basic shape of the foliage and branches, using a dark green. To give the tree more depth, I highlight the branches using the dark green mixed with a little white. The left-hand photo shows all three steps of basic tree

construction: trunks, foliage, and highlights. It's a good idea to practice painting a few dozen trees on a scrap board before painting them on the layout.

Many other backdrop details, such as utility pole lines, fences, and distant structures, can be made with small brushstrokes of color in approximate shapes. I made the swimmers, pond, cows, shed, and truck shown above with simple shapes. Like the trees, I added small high-lights to each of these items by mixing the base colors with a little white.

CHOOSING YOUR PAINTS AND BRUSHES

Palette with wells for liquid paint

Assorted acrylic paints

Water container

Assorted white-bristle brushes

Jay's painting box contains many useful tools, including an assortment of paintbrushes, a palette for mixing colors, and a water container to rinse and soak brushes. He's also collected a wide variety of acrylic paints.

I like using water-based acrylic colors because they dry quickly, hold their color, and are permanent. This type of paint allows me to work over areas without lifting or dissolving paint I've already laid down, and the acrylic is easy to clean up. There are a number of brands of acrylic paints, and they're sold in most craft and art-supply stores.

You don't need a lot of colors to get started. For country landscapes, I recommend having ivory black, titanium white, cadmium yellow, ultramarine blue, cadmium red, burnt umber, and permanent green on hand. You may also want to add cobalt blue, alizarin crimson, viridian, and mixing gray to your palette.

Selecting brushes. You'll need white-bristle acrylic flat and round brushes of varying sizes up to ¾". While your paintbrushes don't need to be of the highest quality, such as sable hair, they should be good enough to do the job. Go to an art-supply store and choose brushes from the known brands – the sales-people can help you choose the right ones. Examples of the flat and round brushes that I use are shown in the bottom left photo.

You'll also need one or more pointed detail brushes, such as a no. 0 or no. 00 brush. You can tell if you have a good-quality detail brush if it forms a fine point without any stray hairs. To test it, dip the brush in water and then remove the excess water by tapping the handle against your finger. The brush should form a point (middle photo below).

Brush care basics. To extend the life of your brushes, keep the tips in water while you're painting. When you finish painting, clean your brushes in the palm of your hand with hand soap, as shown in the bottom right photo. Hang the brushes tip down to dry. Once the bristles are dry, apply a small amount of Vaseline or mineral oil to the hairs. This will keep your brushes flexible and help the hairs keep their shape.

Other tools. In addition to the paints and brushes, as shown in the photo above, I use a plastic container for rinsing brushes. I also use a plastic palette to hold and mix colors. A flat palette works best if you're using tube paints, but I use a mixing-bowl palette since I use liquid acrylics.

If you're planning on using colors you've mixed, it's a good idea to make a large enough batch to maintain consistency. I keep a list of my formulas to eliminate guesswork in the future. You can store batches of paint in small plastic containers.

The best part about working with water-based acrylic paint is that you can wipe it off or paint over it and try again. Some of the fun of painting is to experiment, so don't be afraid to make mistakes! – *Jay Smith*

Flat **Round**

Flat and round brushes are good general brushes for landscapes.

Good point **Bad point**

A good detail brush will hold its point when the bristles are wet.
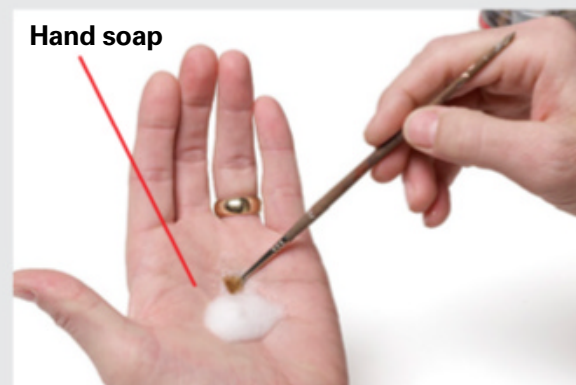
Hand soap

Gently clean your brushes in your palm with hand soap and water.

Step 5 Cloud work

To paint clouds, I use several sizes of round paintbrushes. I also always have a white rag on hand; I'll explain why later.

For paint colors, I use mixing gray, which is a ready-to-use color made with white, black, and ultramarine. I also use white, magenta, and cyan, colors commonly reflected in clouds.

Just like the trees, practice painting several clouds on a scrap board to build your confidence before you begin adding them to your backdrop.

Start by making a wash of mixing gray thick enough that it won't run down the backdrop, but thin enough that it covers translucently. You want to have areas of blue sky show through the cloud here and there.

Apply the paint to the backdrop using a circular motion and give the cloud some billowy height. Keep adding layers of wash to build the opacity of the cloud. This technique provides good control, so you're less likely to paint one brushstroke that will make or break the finished cloud.

If you lay down too much paint at any point, quickly dab it away with your clean white rag. I've also used cotton swabs or my fingers to remove paint (just be careful what you touch if you use your fingers.)

The bottom of a cloud is often flat and more dense than the rest of the cloud, with the exception of wisps trailing behind the cloud. Also, unless it's sunrise or sunset, clouds are lit from above, so the bottoms are darker than the tops. I use more gray wash on the bottom of the clouds to get this effect.

With the basic cloud in place, I add highlights along the very top edge of some of the billows. I use a white paint wash that's thicker than the one I used to build up the cloud. I add just a hint of cyan or magenta to the white, and then use a fine brush to paint a sharp edge, as if the sun is shining on it. Again, as shown on the bottom photo, if you don't like the results, dab the paint with a white rag to remove it.

With that, your cloud is finished, so move on to the next one! **MR**

To begin a cloud, apply a wash of mixing gray to the backdrop with a small brush. Use circular motions to build up the cloud.

Once you are satisfied with the basic cloud shape, use a white paint wash to add highlights to the outer top edges of the cloud.

Next, use the white wash to highlight the edges of the inner billows. Clouds are darker on the bottom, so add few (if any) highlights there.

Make a mistake? Use a white rag to wipe away the problem. Painting clouds like this is easy, and it doesn't take much practice to get the hang of it.

BIG SKY, LITTLE TROUBLE

An airless sprayer can make painting backdrops easier

by Gerry Leone • Photos by the author

A sky backdrop adds depth and interest to Gerry Leone's Bona Vista RR layout. He used an airless sprayer and some common drywall installation techniques to make his backdrops quickly and easily.

There are almost as many ways to make a layout backdrop as there are model railroaders. From rolling-on paint to rolled aluminum sheeting, the techniques are many and varied.

So when the time came to create the backdrop for my new Bona Vista RR, I weighed all my options. The new layout is a multi-deck, and before the upper-deck framing and subroadbed could go in, the lower deck's backdrop needed to be installed – all 85 feet of it. My goals were that it be economical, easy, and effective. I chose ⅛" tempered hardboard and had my home center cut the sheets the long direction, giving me 2 x 8-foot pieces. These were trimmed a little more when I installed them.

I knew I wanted the effect of atmospheric haze, where the sky appears lighter near the horizon. However, I didn't want to go the traditional route of rolling blue paint on the upper portion and white paint on the lower, then brushing them together while they were still wet to blend them in the middle.

There had to be an easier, faster way. If only I could just airbrush the haze effect.

My wish is granted

I quickly realized I could, thanks to an airless paint sprayer I'd purchased to paint our garage door. I used a Wagner model 305, but there are dozens of inexpensive models available from quite a few manufacturers. My model 305 ran about $125, and while I wouldn't use it to paint every room in a newly built house, it's perfect for everyday, around-the-house jobs like painting fences, doors, and sheds. You can also spray stain with it if needed.

My sprayer came with an assortment of spray heads, including one that sprayed an oval pattern that could be adjusted to be vertical or horizontal.

Although you could paint a single piece of backdrop this way, the airless sprayer will hold a lot of paint, and you'll find it's much more time-efficient to paint as many panels as you can in one outing. Cleaning the sprayer is a bit of a pain (you've got to get it totally clean or

Airless sprayers like Wagner's model 305 are available at most home-improvement stores. Optional spray heads can produce different patterns.

your next painting project will be less than desirable), and the preliminary prep work isn't much fun, either. Both take much longer than the actual painting portion of the process.

I decided to do the backdrop painting in my garage, although it's possible to paint your backdrops on hardboard already in place on your layout. You just have to be sure you've covered every surface that you don't want paint on.

I bought several thick plastic drop cloths, stapled them to the garage wall, and laid one out on the floor to catch the overspray. Then I used four shelf brackets, screwed to the wall studs, as an "easel" for the long sheets of hardboard.

What color is the sky?

A word about color: go to your local paint store, home center, or hardware store and collect a handful of the largest sky blue paint chips you can find. But don't take them outside and choose one that matches the real sky. Unless your layout is lit by natural sunlight, the blue color will shift dramatically under your layout's lighting. Instead, put your color samples under your layout's typical lighting conditions and choose the one that looks the most like sky blue to you. That's your base color. I chose a Behr paint color named "Sleepy Blue," but again, that's the one I thought was right under my layout's lighting conditions.

Be sure you get flat paint, not satin or eggshell; you don't want to use any paint that will create light reflections.

When brush- or roller-painting, it's often necessary to use white paint as a primer to hide the dark color of the hardboard. I've found, though, that the airless sprayer lays down a thick enough coat of paint that priming isn't needed. Depending on the size of your backdrop, the savings in primer alone could potentially pay for the sprayer.

My sprayer came with a rudimentary "gauge" that, when dipped into the paint, indicated whether it was thin enough to pass through the sprayer head. Right out of the can, my paint was too thick, but the paint experts at the home center told me I could dilute a gallon of paint with up to a cup of water without affecting the coverage. I found ½ cup of water thinned a gallon of paint to the right consistency.

With your area properly prepared and the hardboard in position, begin by painting the entire board your base sky blue color, as seen in **fig. 1**. I found I could complete a full 2 x 8 section in about a minute. Carefully remove the hardboard and set it somewhere to dry (remember: it's just as wet as if you brush-painted it). Depending on the paint, it should take several hours. Meanwhile, you can continue painting other sections sky blue, as long as you have places for them to dry. While you're at it, paint a scrap piece, too, to use later to test the haze spray pattern.

When you're finished, carefully clean the airless sprayer. The cleaner it is, the better it will perform next time.

Fig. 1 Blue sky base. Gerry paints the base color. Hearing and respiratory protection are advised as the sprayer is noisy and produces airborne droplets.

Fig. 2 Adding haze. After the sky blue is dry, Gerry starts to add atmospheric haze using white paint tinted with the sky blue to help both blend together.

Adding the haze

Once the sky blue paint is dry, it's time to add the atmospheric haze. For this, I bought some flat white paint. However, when you look at the real sky near the horizon, it's not really white, but more light blue, so you'll need to mix in some of your base sky blue color. A little trial-and-error showed me 1 part blue to 4 parts white was about right for my haze. As with the blue paint, I thinned the white with ½ cup of water per gallon.

As I mentioned, my sprayer came with a spray head that created an oval pattern that could be rotated from horizontal to vertical. But even if yours doesn't, now's the time to get out that scrap backdrop section you painted and test the density of the spray pattern. You'll immediately get an idea of how fast or slow to move the sprayer across your backdrop, and how far away to hold it from the backdrop. Remember, your goal is a nice, blended, "airbrush" effect.

Load a dry, blue-painted backdrop on to your easel and start adding atmosphere. What worked for me was to aim the center of the spray at the bottom of the backdrop, make a full pass across, then raise the height of the sprayer so that the "feathered" edge was approximately halfway up the backdrop, as shown in **fig. 2**.

Again, this is very wet paint, so handle your backdrop with care and let it dry thoroughly.

Fig. 3 Mounting the hardboard. The ends of the painted hardboard backdrop sections are butted together and fastened to 2" x 2" joists with nails.

Fig. 4 Taping the seam. Gerry applies self-adhesive Fiberglas mesh tape over the gap between backdrop sections and nail holes. Paper tape can also be used.

Fig. 5 Mudding. Wallboard joint compound ("mud") is applied over the mesh tape and feathered about ½" on either side. Don't worry if it's not smooth.

Putting the pieces together

Mounting your backdrop and dealing with the seams is very similar to mounting gypsum wallboard (drywall). I nailed my backdrop to the 2" x 2" studs I'd nailed to my train room walls at 16" intervals. When mounting the hard-board, I made sure that the ends of each sheet fell on a stud centerline. I butted the backdrops together as tightly as I could and nailed them in (see **fig. 3**).

I then treated the hardboard just like drywall, using self-adhesive Fiberglas mesh wallboard tape to cover the seams

(**fig. 4**). I then used a putty knife and drywall joint compound to cover the tape, making sure the "mud" went only about a ½" beyond the edge of the tape, as in **fig. 5**. The more joint compound you get on the backdrop, the more patch painting you'll have to do later. Don't be overly concerned at this point about making the mud as flat or smooth as possible; it's easy to sand once it dries. If you need more information on this technique, there are many videos available on the Internet if you search for "taping drywall seams."

After letting the mud dry for 24 hours, I used a drywall sanding sponge to gently sand the joint smooth (**fig. 6,** opposite). This inevitably exposes some of the Fiberglas mesh, so I reapplied the joint compound to cover it and any other irregularities on my joints. Once it was dry, I sanded it again. The object of the game is to "feather" the edges of the drywall compound, getting them as close to flat as possible.

Unless you're a professional drywall installer, your joints probably won't turn out perfectly. However, they will most likely be passable. Once you get your scenery in place and your trains running, no one will really notice, so forge ahead with confidence!

Blending it all together

Once your seams are sanded smooth, it's time to do some patch-painting to make the seams blend together with the rest of the backdrop.

I began with a small foam roller and painted the entire patch my base sky blue, shown in **fig. 7** on the next page. I let that dry overnight. Often, paint will be absorbed by the drywall compound, forcing the application of a second coat.

To replicate the "dotted" pattern that the airless sprayer generates for the haze, I used an ordinary, man-made sponge. You can also use a more expensive sponge specifically designed for sponge painting, but my "cheapo" version seemed to work fine.

Re-creating the sprayer's dot pattern by hand is a multi-step process, so don't be frustrated when it doesn't look right at first. It will definitely be necessary to go back a few times to add one color or the other. You'll also find the color of the paint changes as it dries, so it's best to add less than you think you'll need, then wait for it to dry and judge the results. Patience here will pay off.

I poured my mixed haze-colored paint into a small container and barely touched the side of my sponge into the

paint. It's important you don't soak the sponge – think of this as "lightly printing" rather than "heavily painting," and that the sponge is acting like a rubber stamp instead of a brush.

Just as with a drybrushing technique on a model, you'll want to get most of the paint off the sponge before you touch it to your backdrop. I found that using a black piece of cardboard to test the sponge was extremely helpful because I could see exactly how much paint was going on with each tap, (**fig. 8**). Also, if you can see the flat edge of your sponge being printed in paint, wipe most of the paint off that edge – you never want to see a flat edge getting painted (or printed, in this case).

Once you're satisfied the sponge is printing very little paint, lightly tap it on the seam of your backdrop, near the bottom in the "haze" area, shown in **fig. 8**. Tap it again and again, and when your sponge is barely printing any paint, move upward into the higher sky area and keep gently tapping. You want the most dense haze near the bottom, feathering it out near the top.

Continue until your whole seam is painted, always starting low on your backdrop when you reload the sponge with haze-colored paint.

Let the paint dry for several hours and you'll see what I mean about the color changing. Often I found that I added too much paint to many areas in an effort to compensate for the paint drying lighter. I wound up with large, light vertical stripes in what should have been a deeper blue upper sky.

No problem. You can just repaint some of your base sky blue over those too-light areas. Do the same exercise as you did above, except this time, start with a loaded sponge at the top (the darker portion of the sky) and gradually work your way down into the haze portion of the sky.

Go back and forth between haze and sky blue as many times as needed. The more layers you add, the better your result will be.

I'll say this again for emphasis: your seams will never be perfect, so don't drive yourself to the funny farm trying to exactly replicate the paint pattern of the airless sprayer.

Once everything is dry, you can add photographic prints to your backdrop, or try your hand at painting scenery. You can also just leave your sky as it is and add some trees and shrubs in front of it.

Give this technique a try but remember to wear protective clothing, goggles,

Fig. 6 Sanding it smooth. When dry, the mud is sanded, hiding the seam and nail holes. Mud may need to be re-applied and sanded for a good finish.

Fig. 7 Paint the seam. Once the joint compound is smooth, it's painted with the base sky blue color. You might need a few coats, as the mud absorbs paint.

and a face mask or respirator. I also wear hearing protection. By making use of an airless sprayer, you'll create a lot of great looking sky in relatively little time, and with surprisingly little effort! **MR**

Gerry Leone hosts the "Off the Rails" video series. Learn more by visiting MRVideoPlus.com.

Fig. 8 Printing and blending. A piece of black cardboard lets you test how much paint is on the sponge when blending. Gerry wanted a very light dot pattern before applying it. He started at the bottom, where the haze is heaviest, and worked his way up as the sponge ran out of paint, varying the angle of the sponge so as not to create any repetitive marks.
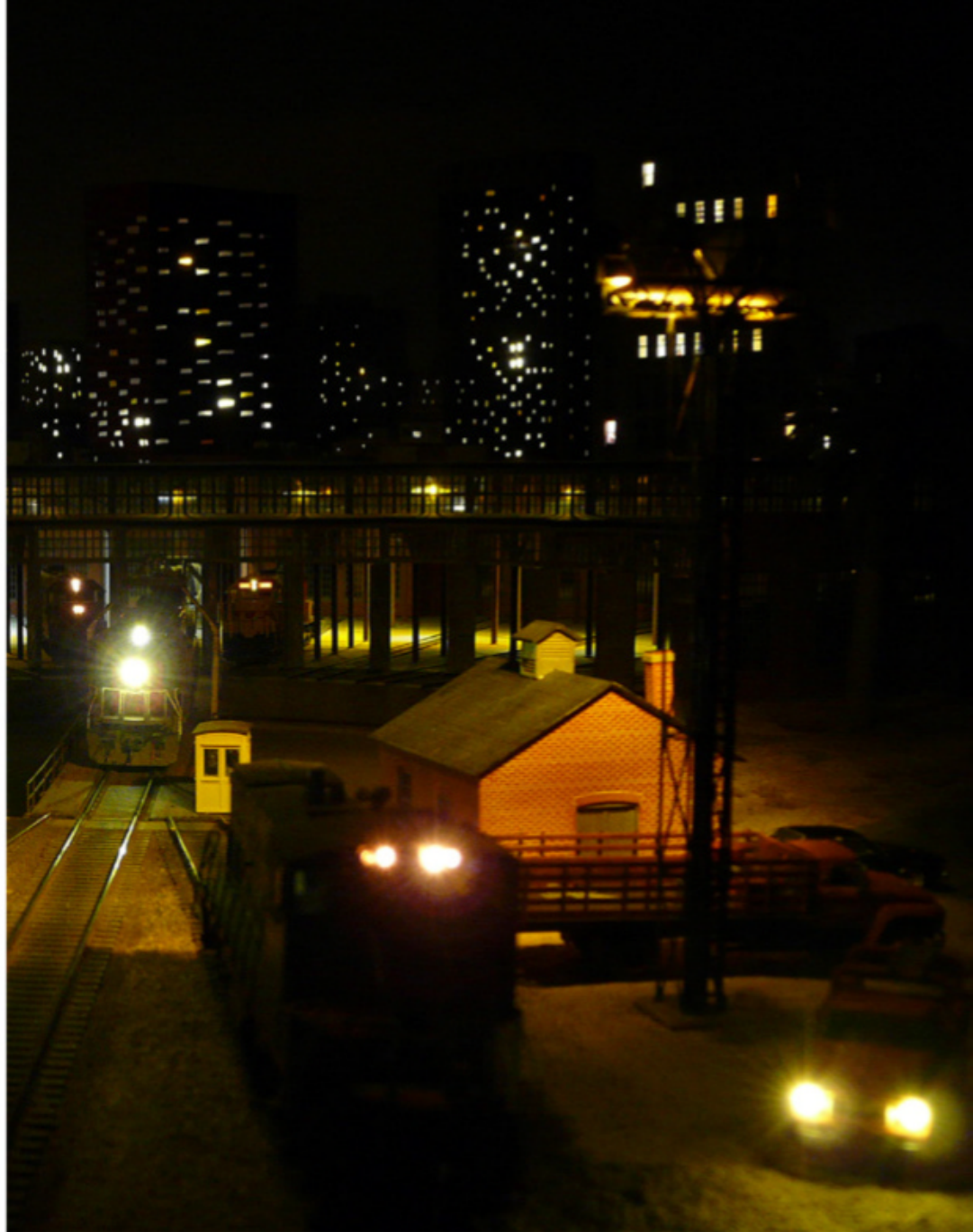
By embedding small, low-voltage light-emitting diodes (LEDs) into his printed photo backdrop, author Richard Wendt keeps the distant city skyline visible during full- and low-light operating sessions on his freelanced HO scale layout.

LIGHT UP
A BIG-CITY SKYLINE

Use LEDs to illuminate photo backdrop buildings from the inside out

By Richard Wendt • Photos by the author

Adding a printed photo backdrop is one of the easiest ways to include a city skyline on a model railroad. Whether you purchase or make your own printed photo backdrop featuring skyscrapers or industrial structures, you'll find they're both effective options for suggesting there's greater depth to an urban scene. But the instant you dim the room lights to simulate nighttime, these backdrop scenes are cast into darkness and the illusion of distance is lost.

To restore the effects of forced perspective during low-light operation on my freelanced HO scale layout, I used numerous light-emitting diodes (LEDs) to illuminate building windows and help define the overall shape of the printed backdrop structures. The following steps show how I modified sheets of 1"-thick extruded foam insulation board to form backdrop panels fitted with LEDs. **MR**

Richard Wendt of Toronto, Ontario, has been a model railroader for more than 25 years. In addition to developing Southwestern scenery for his freelance HO scale layout, he enjoys scratchbuilding structures.

1 Compose backdrop print. Using editing software, Richard combined various photographs into a single backdrop image. Next, he divided it into three 13" x 19" sections before printing them as borderless color prints.
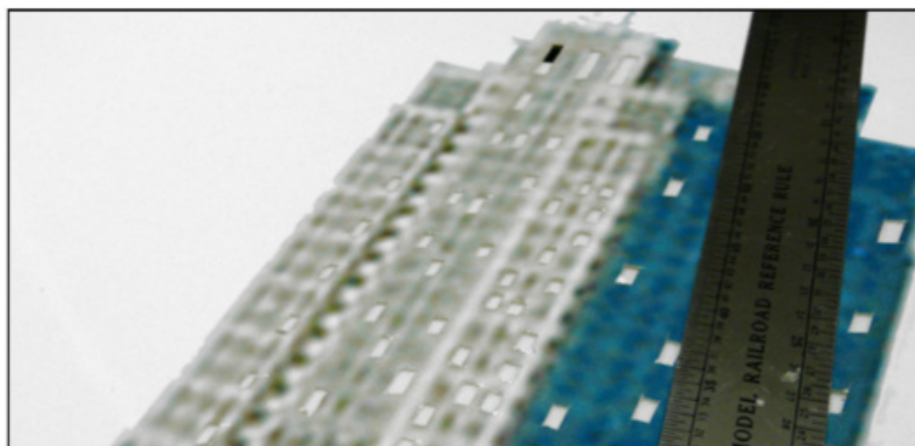
2 Cut window openings. Richard used a hobby knife and straightedge to cut square and rectangular window openings into the buildings. Next he sprayed clear flat lacquer on the front of the prints and flat black over the back.

3 Foam board preparation. Richard prepared a 2 x 8-foot section of 1" foam insulation board by using a brush to apply a blend of sky blue and white latex interior wall paint to one side. He later used a wad of cotton to paint clouds.

The 1" border provides enough surface to secure prints to the front side
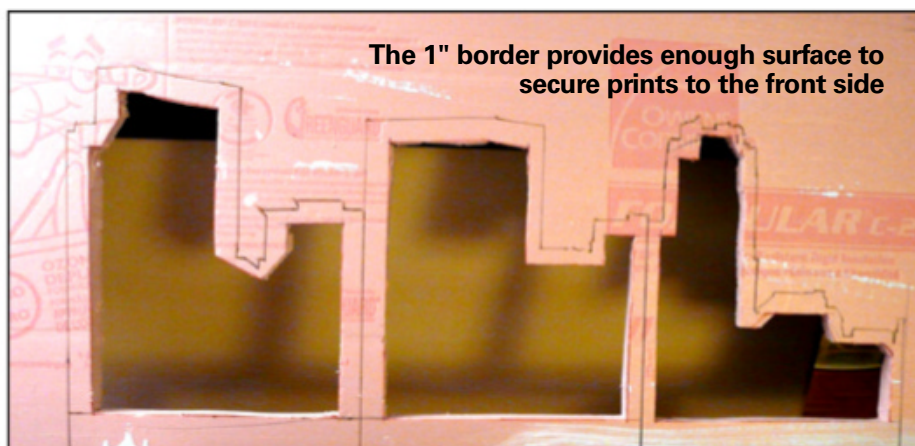
4 Backdrop cut-outs. Using a hobby knife, Richard trimmed the prints to down to a basic profile of the structures. After marking this profile on the back of the foam panel, he used a serrated knife to cut a rough opening.

5 Attach prints to front. Richard applied spray adhesive to the back of the prints along the perimeter. He aligned each print's bottom edge to the painted side of the foam panel before pressing the print into place.
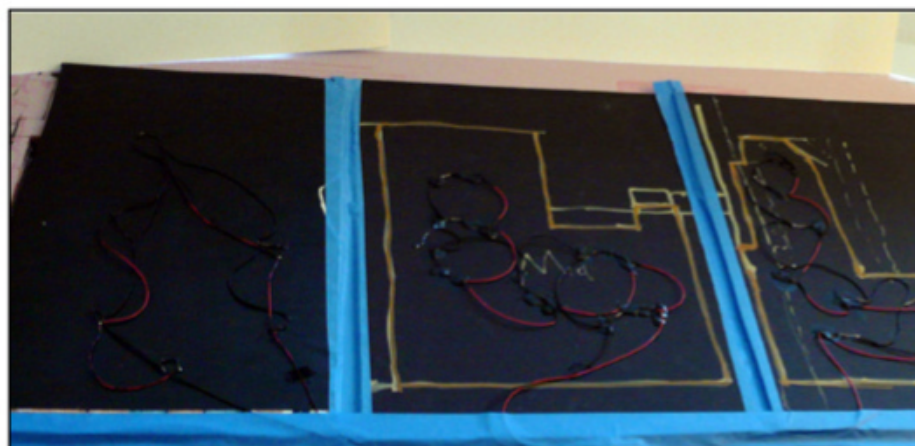
6 LED installation. After trimming ³⁄₁₆" Gator Board to cover cut-out areas of the foam panel, Richard drilled ⅛" holes used to secure 3mm (3.2–3.6V, 20mA) LEDs. He inserted LEDs and bent the long lead ("+") to attach a 91Ω resistor.
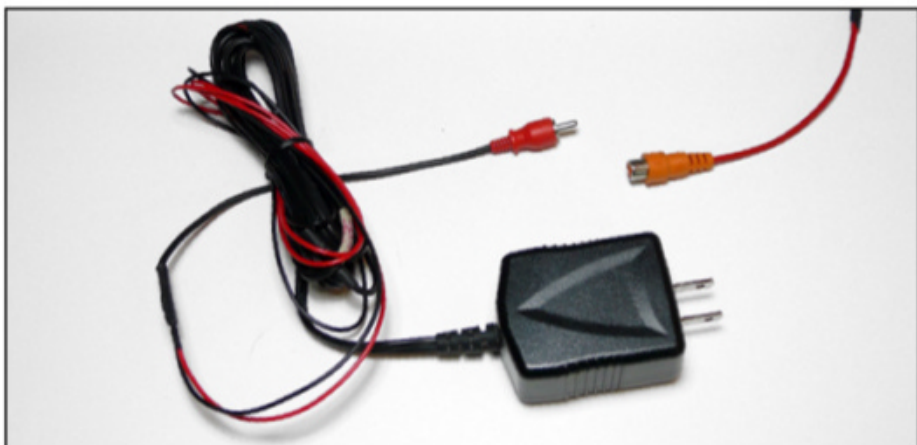
7 Wiring the LEDs. Richard wired the LEDs by routing 30AWG black wire to between the negative leads of LEDs and a similar daisy-chained red wire between the positive leads. At the last LED in the chain, he routed one last red and black wire to a 5V (1 to 2 amp) power supply.

8 Add window "shades." Richard trimmed pieces of white copy paper to cover the back side of the prints and diffuse the light from the LEDs. He also applied spots of Tamiya X24 Clear Yellow and X26 Clear Orange transparent paint to create subtle variance in the color of light in the windows.

Rio Grande in the

Follow Mike Danneman's N scale Moffat Road main line through spectacular mountain scenery

By Mike Danneman • Photos by the author

1. It's nearly impossible to tell where the foreground scenery ends and the hand-painted backdrop begins on Mike Danneman's stellar re-creation of the Big 10 curve on his N scale Rio Grande layout.

ROCKIES

2. The overpass at Colorado Highway 72 bears the weight of Rio Grande's Krauss-Maffei diesel-hydraulic locomotives, unique units in the wide-ranging fleet of 1960s and 1980s-era power that simultaneously shares the rails on Mike's layout.

3. An empty hopper train trundles through the siding at Plainview, Colo., just as Rio Grande F9s charge down the main with the *Rio Grande Zephyr,* one of several passenger trains Mike regularly operates.

Mention the Denver & Rio Grande Western RR to a model railroader, and you're likely headed toward conversation about narrow gauge locomotives climbing up and down the rocky canyons of Colorado. While I also enjoy the three-foot heritage of the Rio Grande [Mike and Herb Danneman's D&RGW San Juan Extension HOn3 layout appeared in the May 1985 issue of *Model Railroader – Ed.*], I chose to model a different path through the Rockies.

As an impressionable youth, I learned to appreciate another side of this historic railroad during family trips to Colorado. I can vividly recall watching fast *Railblazer* intermodal trains slithering across the stark Utah desert. I also remember seeing huge coal trains powered by as many as 18 hard-charging locomotives struggling to crest historic Tennessee Pass. And how could I forget the shiny silver *Zephyrs* threading between tunnels punched through the craggy formations of the Rockies? All of these experiences influenced my decision to re-create a portion of Rio Grande's modern main line and timeless mountain scenery on my 18 x 24-foot N scale layout.

Dreaming and planning

After living and working in Wisconsin for years, I relocated to Colorado in 1997. The move brought me ever so close to my favorite railroad. Although my railroad of inspiration was now owned and operated by Union Pacific, I could still see and hear remnants of the D&RGW near the place my wife, Katie, and I called home. But even that wasn't close enough.

By January 1999, I could no longer resist the urge to bring my memories to life in the form of a model railroad. That's when a friend and I hauled two pickup truck loads of lumber and plywood into the basement, and my Moffat Road layout began to take shape.

I chose to model the Rio Grande's direct westerly assault on the imposing Front Range of the Rocky Mountains. Between Denver Union Station and milepost 50, near the Moffat Tunnel, the railroad climbs a 2 percent ruling grade through these mountains to reach the Continental Divide. My challenge was two-fold – condense this 50 mile route into my rec room and model the scenic wonders I can see near my house.

Following 18 months of home ownership chores and sketching designs that fell short of my goals, I finally ended up with a plan to model a portion of the railroad, concentrating mainly between Rocky and Pinecliffe, with the end points being Union Station and the Moffat Tunnel.

Would it have been nice to have more space? Yes and no. With almost any layout, more space means more railroad and the construction and maintenance labor that comes with every added foot. For my one-person construction effort, the size of the layout is just right.

Construction begins

The rec room was previously completed with painted and textured walls, a finished ceiling, and carpeted flooring, which allowed me to start building right away. Additionally, building the apartment bedroom layout that was shown in the March 1996 issue of *Model Railroader* helped me decide which techniques and materials I should use.

4. A westbound freight leaves Plain Siding and curves through Tunnel nos. 2, 3, and 4 as it works its way up the 2 percent ruling grade to the Moffat Tunnel. The Flatiron scenery began as insulation foam Mike installed on an angle and then carved and textured to represent these unique rock formations.

I built the open-grid benchwork from 1 x 4s that I secured with yellow carpenter's glue and drywall screws. In several locations on the layout, I attached cantilevered sections to the wall, eliminating many of the legs. I used simple bracing of 1 x 2 and 1 x 4 lumber to make the most of these braces. For other narrow sections, I used commercial metal shelf brackets. In addition to giving the layout a clean

2 percent up grade
Colo. Hwy. 93
Beer Line
Rocky Siding
Big 10 Curve
Hopper car wind break
Clay Siding

Open access

Rocky Flats
42"

Tunnel 8
Tunnel 18

C
C&S Junction
Utah Junction
TOFC ramp
Cargill elevator

Rocky Spur
2 percent up grade
44"
46"
49"

Tunnel 7

Tunnel 6

Crescent Siding
59"

Tunnel 5

The Flatirons

C&S main
D&RGW main
Little 10 Curve

Tunnel 4

55"

North runaround track

Tunnel 3

6

Tunnel 2

Tracks 6-12: classification

Tunnel 26

Tracks 4-5: coal trains/miscellaneous (yardmaster's discretion)

1

Tracks 1-3: arrival/departure

51"

NORTH YARD
Rio Grande Motorway

Blue Mountain Drive
Colo. Highway 72

2

4

Rainbow Cut

42"

Tunnel 27

Engine servicing
Oil spur
Caboose track

Tunnel 1

53"

3

Fox Junction

Plain Siding

Keebler
Yard Office and Tower
W. 48th Avenue

PLAINVIEW

Tunnel 29

Prospect Junction
I-70
Longmont Mill
Hendrie & Bolthoff Warehouse
American Furniture
20th Street Viaduct
Centennial School Supply Co.

Colo. Hwy. 72

7

61"

PINECLIFFE

Rio Grande
Moffat Road

2 percent down grade

D

41"

N scale (1:160)
Room size: 18'-6" x 24'-9"
Scale of plan: ⅜" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Bill Edgar and Rick Johnson

West to Bond and Salt Lake City (Helix to staging)

62"

East Portal Moffat Tunnel

Find more plans online in the ModelRailroader.com Track Plan Database.

DENVER

D&RGW yard lead

A

Mine & Smelter Supply Co.

Blue Flame Coal Co.

D&RGW Track:
Colorado & Southern Track:

40½"

9

Open access

Steam plant

Cliff Siding

8

Beatrice Creamery

Denver Union Terminal

5

16th Street Viaduct
17th Street
Wynkoop
18th Street

Lower level staging
Scale of plan: ¼" = 1'-0", 24" grid

Labels on plan:
- B
- 2 percent up grade
- Emergency lift out
- Belt Junction connects to Utah Junction
- C
- 37"
- Beer Line Junction
- 2 percent up grade
- 9-track west staging for Rio Grande trains
- 7-track east staging for Rio Grande trains
- 5-track C&S/CRI&P staging
- 45½"
- Switch ladder no. 8 turnouts
- PINECLIFFE
- Moffat Tunnel 4 x 5 foot spiral helix, tracks on 1⅜" centers, 2 percent grade, drops track 16½"
- Open access
- D
- 40½"
- 2 percent down grade
- A

appearance, the cantilever design allows for more space to store and display things under the benchwork. Believe it or not, only six legs support the rest of the layout.

To provide a "canvas" for the background murals I planned to paint, I first installed backdrops and fascia made from ⅛" hardboard. Along the outer room walls, I used drywall screws to attach the hardboard to the studs in the finished walls. To build the double-sided backdrop on the middle peninsula, I used short stainless steel screws to secure the hardboard to 1 x 4s. In both cases, I countersunk the screws, patched the indentations, and covered the gaps along the seams with drywall mud and tape. To prepare for more detailed painting, I primed and painted all of the backdrops with sky blue latex interior paint.

Due to the location of the peninsula's backdrop, I shifted the room's fluorescent fixtures to even the lighting over the layout. I also installed two strips of track lights to further enhance and highlight focal points on the layout.

To build the main line through the mountains, I drew track lines directly on the ⅝" plywood using a bent wooden yardstick to establish curve easements. After cutting out the subroadbed, I installed it over 1 x 4 risers positioned every 8 to 12 inches.

I glued cork roadbed to the right-of-way, then applied contact cement to the sanded surface to install Peco code 55 flextrack.

5. In this overall view of Mike's finished basement rec room, you can see the full extent of the 21½" vertical climb from Denver Union Station (lower left) to Moffat Tunnel (upper right). What you won't see are many legs supporting the benchwork. Instead, Mike cantilevered much of his benchwork from the walls.

6. A westbound freight has just met a hard-charging eastbound Denver-to-Salt Lake City piggyback train. Here at Crescent Siding, Mike painted the backdrop to reflect the climate change that occurs in the higher elevations.

The dispatcher-controlled turnouts are powered with Tortoise by Circuitron switch motors, while the remaining turnouts use the stock Peco spring contacts. As a matter of accessibility, I installed track and wiring on the lower-deck staging yards before beginning the main line. Within 12 months of hauling lumber home, I was pleased to have trains traversing the steep main line.

From the seven-track East Staging Yard and Union Station (40½" elevation),

the railroad travels upgrade slightly to North Yard (42" elevation). From there the railroad climbs the 2 percent ruling grade to Moffat Tunnel, at an elevation of 62". A spiral helix routes the track down to the nine-track west staging yard.

As a provision for continuous running, I added a single-track connection between the two staging yards. This connection is beneficial for repositioning trains following an operating session or just watching trains carve through the landscape.

Realistic mountain scenery

When it was time to add scenery to my layout, I wanted to try something out of the ordinary. I decided that the nearly two-foot vertical climb my railroad makes

to Moffat Tunnel should reflect the change in climate that occurs during the ascent.

I wanted a train heading west from Denver on a typical spring day to traverse green grass around the mesas of Big 10 curve, carve through the rugged Flatirons rock formations, and arrive at Crescent, where dense evergreens display the trace amounts of snow that blanket higher elevations near Pinecliffe.

To build this dynamic scenery, I first installed a terrain base made of 1" and 2" foam insulation board. I found that when glued into stacks, this material was easy to carve into realistic landforms. Dense foam board is also quite solid, which is especially important in sections where I planned to plant trees or apply

7. Four SD40T-2 diesels hustle an empty hopper train through Pinecliffe, Colo., where the snow covers every surface of the scene, including the ground, trees, structures, and even between the rails.

Hydrocal rock castings. To hide any visible seams between the pieces of foam, I applied a thin layer of Sculptamold over the carved terrain.

After completing each section of terrain, I colored all of the scenery with a thin coat of earth-colored latex paint tinted with artist's acrylic paints. This base color provides a uniform, realistic terrain covering that blends with other scenery colors and textures. In addition, I added different rock materials from Arizona Rock & Mineral and ground foam from Woodland Scenics, Highball, and Architectural Model Supply Inc. (AMSI).

I used black and brown bumpy chenille to fill most of the dense forests with

Adding snow to the scenery wasn't as difficult as I suspected. I used lightweight Hydrocal sifted over a finished scene that I prepped with "wet water" (tap water with a drop or two of dish soap). I reapplied a mist of wet water to saturate the Hydrocal, but not to the point where the material starts to run down the terrain. After allowing the snow to dry, I repeated the sequence to increase the depth of the snowpack.

I applied snow to the trees the same way I added the flocking to the bumpy chenille. The process was much more efficient when I prepared a batch of trees at my workbench or outdoors before adding them to the layout.

Adding snow on the tracks followed a different process. Here, I used marble dust from Arizona Rock & Mineral Co. I used diluted matte medium to apply the dust in the same manner as ballast. In areas where I wanted the snowpack to be fairly high along the rails, I made a basswood template to clean out the flangeways. I used this tool prior to affixing the dust with matte medium. Before the snowpack dried, I used toothpicks to clean the flangeways.

In areas along the aisle and other locations where the snow might be more prone to damage, I applied matte medium over the Hydrocal. Some snow may also turn slightly yellowish due to the glues used and underlying scenery materials leaching through. My remedy for this effect was to apply several thin washes of white gesso primer or flat white latex paint.

And for something out of the ordinary, I modeled the Moffat Tunnel scene to appear as though it's still snowing! First, I painted the backdrop sky with cool white. Then I painted the mountains in light, muted colors to suggest conditions of limited visibility. Finally, I lit the scene using cool white fluorescent bulbs that cast light without creating shadows. – *Mike Danneman*

8. An eastbound coal train emerges from Moffat Tunnel, the highest point of the layout, in the midst of a spring snowstorm. Mike created the effect by placing a paint-splattered glass plate in front of his camera lens. Beyond the portal, a spiral helix carries trains down to lower level staging yards.

evergreen trees. After trimming this inexpensive material to shape, I used matte green spray paint to coat the boughs. While the paint was wet, I sifted Woodland Scenics soil-colored fine ground foam over the entire tree for texture. Finally, I applied another light coat of spray paint to help adhere the foam. In additional to these evergreen trees, I used commercial Forests In A Flash

kits to model many of the deciduous trees I planted throughout the layout.

The painted backdrops on my layout are the key component to establishing the illusion of distance. In hard to reach areas such as Big 10, I painted the backdrop before I completed the foreground scenery. However, I prefer painting most backdrops during or after scenery construction. At that stage, it's easier to blend the colors and textures of the foreground scenery with imagery on the flat backdrop. To paint the detailed background images I used the same acrylic and latex paints that I applied to the terrain. In some cases, I also applied the same scenery textures, including ground foam and bumpy chenille, directly on the backdrop.

This further disguises the line where foreground scenery ends and backdrop scenery begins.

Though I built some of the structures based on specific prototypes, most are kits I modified to resemble a building found somewhere along the D&RGW. Sometimes you only have to capture the essence of the real thing to build a credible scene. I've completed nearly all of the mountain

MORE ON THE WEB

Get more inspiration! Follow Mike as he guides you through a tour of his layout in an exclusive video at ModelRailroader.com

9. An SD9 leads a westbound freight past a maintenance-of-way gang working to clear the house track at Pinecliffe. In addition to mainline freight and passenger trains, Mike also enjoys running snowplows, wreck trains, and work extras.

scenery, but there are plenty of urban scenes yet to build at North Yard and downtown Denver.

Trains and operation

I enjoy many aspects and eras of the historic Rio Grande. I like operating freight trains powered by F units and unique Krauss-Maffei diesel-hydraulic locomotives, along with great passenger trains like the *California Zephyr* and the *Prospector*. But I also get a thrill from operating a fleet of SD40T-2 "tunnel motors" tugging coal trains over the mountains and GP40s edging piggyback trains down the grade. Accordingly, I've developed two distinct equipment fleets representing different eras, most of

which wouldn't be seen operating together. I eventually chose to model both the early 1960s and early 1980s. At the moment, I rather enjoy running both eras on the layout at the same time. Eventually I'll figure out a more logical scheme, but not until I first determine an equally pragmatic car storage system.

Regardless of the era, my operating fleet of Rio Grande motive power and rolling stock features all degrees of authentic weathering. Now my efforts are focused on adding realistic weathering effects to my passenger car fleet and the locomotives from connecting roads that appear in Denver.

I operate the railroad using DC cab control with six radio-controlled walk-around throttles. During a normal operating session, crews operate between 20 and 30 trains over the railroad. Besides the usual freight and passenger trains, I run a west local, along with an occasional snowplow, wreck train, and work extra. Recently, I've even begun using helpers on heavy-tonnage westbound trains, as well as loaded eastbound coal trains.

Looking ahead

A friend recently told me I was "dangerously close to being finished" with my current layout. Contrary to his perception, the scenery in the city of Denver has only just begun. Plus, there are always more details to add to the rolling stock or scenery.

If I ever do "finish" the layout, I might wonder what else I should do. But for now, I find solace in being able to head downstairs, flip on a couple of switches, and arrive in the mountains where Rio Grande trains battle gravity and nature. **MR**

MEET MIKE DANNEMAN

Mike Danneman is a railroad artist and photographer with a lifelong interest in trains and art. Prior to departing for Colorado, Mike was as an illustrator for *Model Railroader* and the art director of *Trains* magazine. He is the author of seven books, including his recent tribute to the Rio Grande, *Last of a Breed*. Mike and his wife, Katie, also an artist, live in Arvada, Colo., where they enjoy spending time with their two horses and two dogs.

USE LAYERED FOLIAGE
to enhance your scenery

EDITOR'S CHOICE

CODY GRIVNO
GROUP TECHNICAL EDITOR

By installing the taller trees along the backdrop interspersed with small clumps of low shrubbery and other weed foliage along the track, James McNab has captured a realistic-looking backwoods setting for his HO scale Iowa Interstate RR.

Multiple applications of trees, grass, shrubbery, and other foliage textures add depth and realism

By James McNab • Photos by the author

Scenery is one of the most enjoyable parts of model railroading for me. Watching bare benchwork and track transformed into scale mountains, deserts, and pastures is a rewarding experience, but many modelers stop short and leave scenes incomplete. Beginners often forget to work in the wide variety of vegetation present in nature.

Take a close look at any prototype right-of-way and you'll notice a lot of textures and layers. Nothing in nature is uniform, and the only truly straight lines come from man-made objects.

You'll also notice the blending of shapes and colors that add to the whole scene. Some of the best model railroad builders strive to reproduce this overall look. And the best part is that it doesn't take much more effort for you to bring this effect to your layout.

I've found that the secret is to work in additional layers of different scenic materials over and over again. This layering effect creates believable scenes with a surprisingly small investment of time and money. My HO scale Iowa Interstate Grimes Industrial Track layout began with a base layer of scenery and has grown from there. In fact, I often go back over an area multiple times until I achieve the look I want.

James McNab is an award-winning producer and editor. He models the Iowa Interstate RR in a new streaming video series on MRVideoPlus.com.

MATERIALS LIST

Micro-Mark
84922 Green poly fiber
Mirka Abrasives Inc.
18-573-943 Mirlon gray ultra fine scuff roll
Scenic Express
EX886C Farm pasture blend
EX0214 SuperTrees value pack
EX0020 Prepared matte medium
Woodland Scenics
FP178 Poly fiber green
T1349 Blended turf green blend
T1363 Coarse turf light green
T1364 Coarse turf medium green
T1365 Coarse turf dark green
T1366 Coarse turf conifer green
Miscellaneous
Flat gray spray paint
Hairspray
Lightweight spackle
Plastic containers
Pump sprayer
White glue

Step 1 Grass application
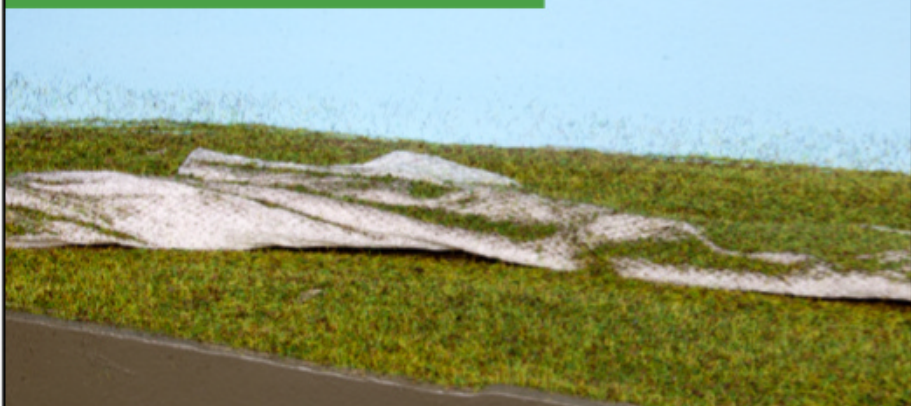
Jim uses paper towels and masking tape to protect the track during the static grass application. This reduces the mess and cleanup time afterward.

Once the roadbed and track is in place, I protect the track with paper towels and masking tape before applying a solid base of static grass attached with matte medium. Woodland Scenics, Scenic Express, and other companies offer static grass fiber in many sizes and colors. Some of the pre-mixed blends are fine, but I try to use a variety of colors for more realism.

After the first layer of static grass is dry, I go back and add a second and third, varying the thickness. Sometimes I'll do spot applications in some areas to help build up depth. I find that the best results come from using repeated multiple layers over each other.

Step 2 Blending the backdrop

Mirlon can be cut with scissors for a sharp-edged look, but Jim prefers to rip it in half to produce the fuzzy looking edge along the top of the distant tree line.

To hide the joint between the benchwork and the backdrop, I use a technique developed by modeler Lance Mindheim that was published in the August 2009 *Model Railroader*. His method uses a roll of Mirlon abrasive material ripped into narrow strips to simulate a distant tree line. Mirlon is an ultra-fine abrasive finishing material made by Mirka Abrasives Inc. for automotive and marine applications, and it's sold in hardware and janitorial supply stores in 4-inch x 33-foot rolls. Mirlon can be used in its natural dark gray color behind the trees, or it can be lightly spray-painted green to simulate the distant edge of a wooded area.

Step 3 Realistic tree foliage

Jim chooses the largest SuperTree armatures, presses the trunks into a piece of plastic foam, and then spray paints each one flat gray.

After the paint dries, Jim dips the upper branch portion of each armature in the diluted matte medium to coat all of the branches.

The final step is to gently roll each wet armature in the mixed-color ground foam foliage so the "leaves" will stick and fill in all the branches.

Modeling effective trees is crucial to realism, since we see them all around us. Commercial trees with plastic armatures tend to be too uniform in shape and size, so I prefer to make mine from natural materials. SuperTrees from Scenic Express is a natural, bushy material that has convincing branch structures and believable shapes.

I select the biggest and most natural-looking Super Tree pieces and push the trunk ends into a scrap piece of foam. Then I spray-paint them with a light coat of flat gray paint to cover all sides of the tree armatures.

Once the paint dries, I fill a large plastic tote with matte medium diluted 3:1 with water, and a second tote with a mixture of different green Woodland Scenics foam foliage products. Then I dunk each tree into the matte medium, taking care to keep its lower trunk dry. When the branches are completely coated with the adhesive, I place each tree into the container of foam and roll it around to achieve complete coverage. After gently shaking off any clumps of excess foam, I return the tree trunk to the foam block and allow the matte medium to dry.

Step 4 Planting the trees
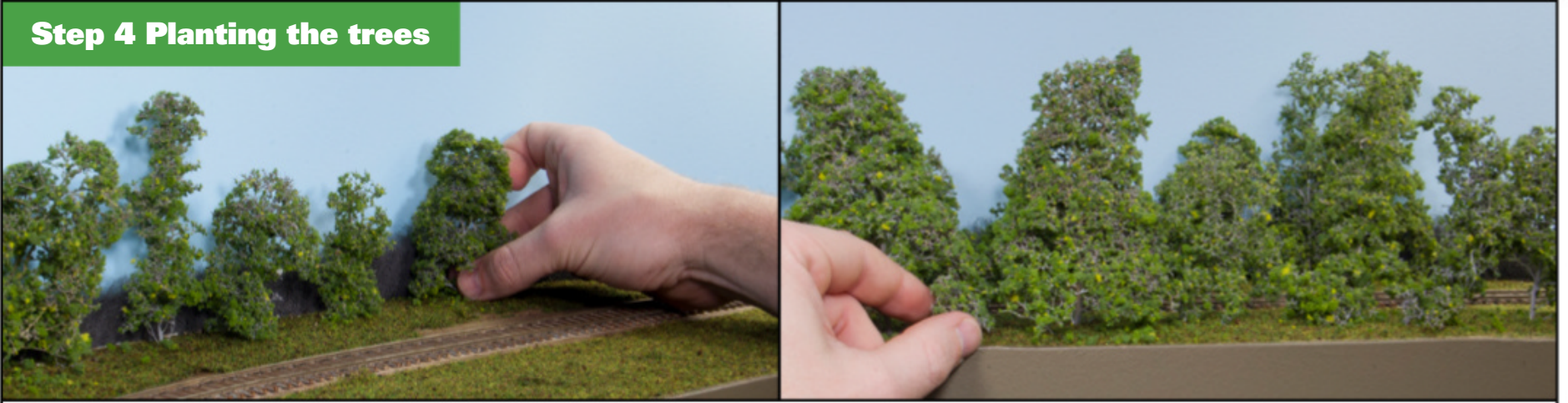
Once the foliage is dry, Jim begins by planting his tallest trees first along the backdrop. He's careful to vary the spacing between the individual trees.

I plant the largest trees first along the backdrop and then go back and work in the smaller ones between them, trying to overlap and fill as many gaps as possible. Since my prototype passes through some heavily wooded areas, I continue to add trees and underbrush until I get enough dense foliage for my desired "tree tunnel" effect.

A variety of the smaller trees follow so they can be placed to fill in the gaps between the larger trees. Any broken pieces are worked in as underbrush.

As I work with the SuperTrees, it's not uncommon for small parts to break off. Occasionally I need to trim a tree once it's in place, but I'm careful to save all of these scraps to use as brush and undergrowth. These scraps come in handy to fill in the scenery around the bases of the trees. They also make excellent bushes and weeds.

Step 5 Final layering

Bits of poly fiber dusted with hair spray and dipped in foliage are easy to use as layers of low underbrush and weeds around the larger trees. Perhaps the best part of the layered scenery look is that additions can be made at any time.

With the trees in place, I go back and work in additional layers of the basic texturing. Poly fiber is one of my favorite materials for this step, as I can cover it easily with blended turf. I coat a small, wispy clump of poly fiber with hairspray and immediately dust on the ground foam turf. When it dries, I can work these clumps in and around the tree trunks or make them into small weed patches.

Next, I go back and add more layers of ground foam and turf. I use the same foam I used to cover the trees as filler around trunks, along the tracks, and in open fields. Once I'm happy with the appearance, I ballast the track and finish by misting diluted matte medium over the entire area to lock it all in place. A thin layer of light green along the ties simulates spilled grain that's sprouting. **MR**

How to model an
ALFALFA FIELD

**Didn't get it right the first time?
Tear it out and start over!**

by Cody Grivno

A farmer bales alfalfa in his field near Lake Beulah on the HO scale Milwaukee, Racine & Troy. Cody Grivno shares his techniques for modeling this field in an 8 x 29-inch space. Photos by Bill Zuback and Jim Forbes

It's time for a show of hands. How many of you have a project on your model railroad that you'd like to do over again? Yeah, that's what I thought. I had one of those projects on our HO scale Milwaukee, Racine & Troy club layout. The scene, which I wrote about in the October 2009 issue, depicted two farm fields (soybeans and wheat) in a compact space. The project went poorly from the early stages, but I felt it was a learning experience worth sharing. Five years later, I got a chance to make things right.

The original scene just lacked, well, everything. At this point the layout is 65"

tall, at or above eye level for most visitors. Because of this, the neat rows in the Faller soybean field couldn't be appreciated.

The remnants of the Busch wheat field I had to work with left a lot to be desired as well. The small patch of wheat looked more like a garden plot than part of an expansive field. Furthermore, both fields were at right angles to the right-of-way which, while not unprototypical, lacked visual appeal.

This time, I modeled an alfalfa field surrounded by a barbed wire fence. I used static grass for the field, which has a texture that can be appreciated from most

viewing angles. I placed an obstruction in the field so the windrows (rows of cut or mowed alfalfa) aren't at a 90-degree angle to the tracks, adding visual interest. The barbed wire fence provides texture, too, and helps frame the scene.

As retired *Model Railroader* managing editor Jim Kelly wrote many years ago, "No stretch of scenery has to last forever. If you don't like it, you can just knock it out and try again. You're only out a few bucks worth of materials, and you've gained valuable modeling experience." I couldn't agree with you more, Jim!

Step 1 Setting the stage

T-pins

Foam block

DAP Dynaflex 230 sealant
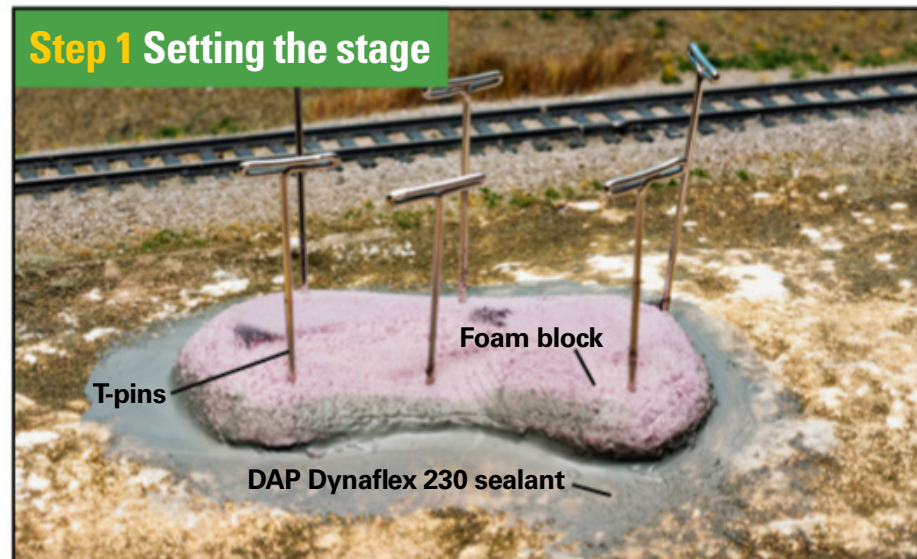
To avoid having another farm field run parallel to the tracks, I modeled a rock pile near the middle of the scene. I used a utility knife to cut a dog-bone-shaped piece of extruded-foam insulation board and rounded the edges with a sanding sponge.

I secured the foam to the layout with DAP Dynaflex 230 sealant, available at most home centers. Do not use an organic solvent-based sealant, as it will dissolve the foam. I used T-pins to hold the foam in place while the sealant dried.

Next, I wanted to see how many windrows I could model in the 8 x 29-inch space I had to work with. On

Step 1 Setting the stage (cont'd)

Pencil

Flexi Edge, Woodland Scenics C1294

Portion of this windrow breaks at fascia

Awl

Fence line

1" paintbrush

Flat, earth-toned latex paint
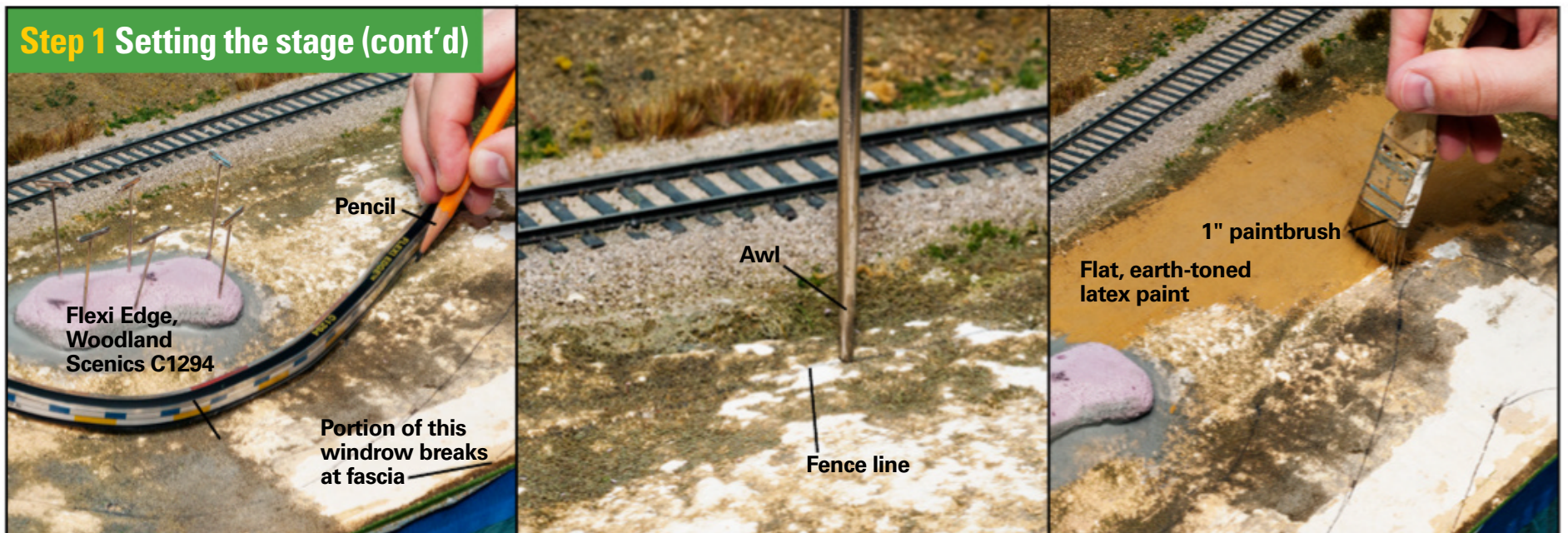
12-scale-foot centers, I could model three rows. The "bottom" of the row closest to the aisle breaks temporarily at the fascia, which suggests the field carries on into the aisle.

While I was in planning mode, I also marked out the fence line for the Yesteryear Creations etched-brass, barbed-wire fence (no. 4). After marking the location of

each post, I used an awl to carefully poke a hole in the scenery base made of plaster gauze over cardboard strip.

Happy with how everything looked, I painted the area with a flat, earth-toned latex paint. This covered the pink foam, exposed plaster, and nasty looking residue from the old scenery. Yes, it also covered the pencil lines, but I re-drew those later.

Step 2 Modeling the field

Painted field

Pencil

Flexi Edge

1

Tubesand, Quikrete no. 1159

Spoon

Thinned white glue

2

Yarn

White glue

Pencil lines

3

Dirt

Thinned white glue

4

Green Blend

Earth Blend

5

Damp paper towel prevents static grass fibers from sticking to rock pile

Grounding clip

Clipped toothpicks plug holes for fence

6
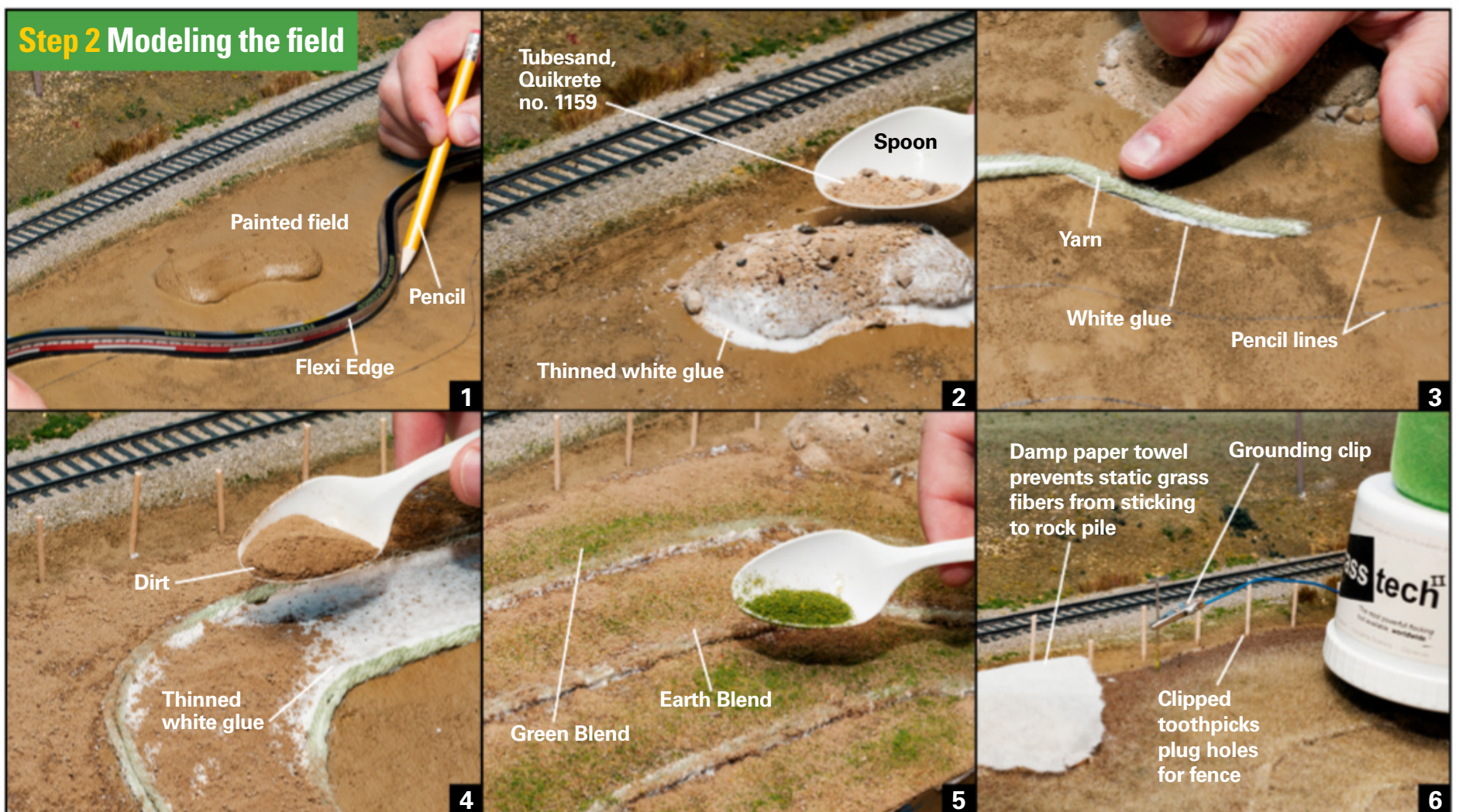
I let the paint dry overnight before re-drawing the windrows (**1**). Then I worked on the rock pile. First, I applied thinned white glue (9 parts glue, 1 part water) with a ½"-wide paintbrush. With the glue still wet, I sprinkled in Tubesand (**2**). I secured the Tubesand, sold at home centers, by wetting it with isopropyl alcohol.

When alfalfa is raked into windrows, it has a slight hump in the middle. To capture this look, I applied two strands of Red Heart Frosty Green acrylic yarn (one on each side of the pencil line) with white glue (**3**).

I then brushed thinned white glue (same thinning ratio as before) between the strands of yarn. With the glue still

wet, I sprinkled in Scenic Express no. SE0403 Fine Natural Soil and Dirt (**4**). Don't worry if it gets on the yarn.

I added Woodland Scenics Green and Earth Blend blended turf (nos. T1349 and T1350, respectively) between the windrows (**5**). This represents new grass starting up underneath the crop that is being harvested. Then I wet the scenicked areas with isopropyl alcohol.

With the scenery still wet, I used a GrassTech II static grass applicator to apply a blend of Woodland Scenics Static Grass Flock (⅔ Burnt Grass, ⅓ Wild Honey, **6**). This represents the stubble of the alfalfa that was mowed. I pressed down any fibers that were standing on the yarn.

Step 2 Modeling the field (cont'd)

Custom-mixed static grass flock

Thinned white glue

Press fibers against yarn

Pipette with 70 percent isopropyl alcohol
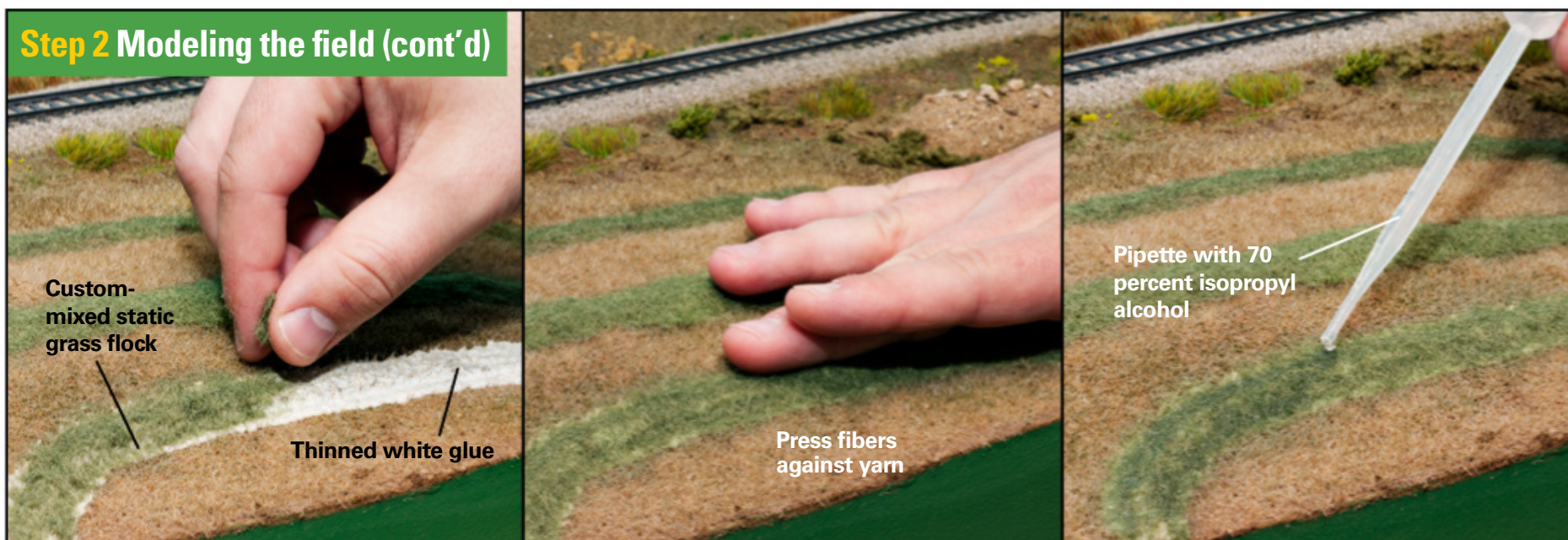
I let the first layer of scenery dry overnight. Then I used a ½"-wide paintbrush to apply thinned white glue over the acrylic yarn, as shown at left. With the glue still wet, I sprinkled in a 50/50 mixture of Woodland Scenics Medium and Dark Green Static Grass Flock. Then I gently shaped the windrows by pressing the fibers against the yarn (center). Finally, I wet the static grass with 70 percent isopropyl alcohol. After an hour or so, I checked the windrows and added more static grass in areas where the yarn was visible.

Step 3 Barbed wire fence

HO scale 4 x 4

Nitrile gloves

Rusty Brown wash, Monroe Models no. 975

Creosote Black wash, Hunterline weathering mix

I used Yesteryear Creations etched-brass barbed wire fence to frame the alfalfa field. I didn't use the cattle guard or gates included with the kit.

Though the kit includes materials to make the posts thicker, I needed to make them longer. I did that by attaching ⅝" lengths of HO scale 4 x 4 styrene strip with cyanoacrylate adhesive.

With the posts attached, I sprayed the entire fence with Rust-Oleum Gray Automobile Primer. Wear nitrile gloves when spraying this organic solvent-based spray paint, and work in a well-ventilated area, preferably a spray booth.

To make the fence look like it's been around for a while, I weathered the barbed wire with a Rusty Brown wash (Monroe Models no. 975) and stained the posts with Hunterline Creosote Black weathering mix. Then I installed the fence into the holes I made in **step 1** with full-strength white glue.

Step 4 The bales

1 **2** **3** **4** **5**

What would an alfalfa field be without bales? After nosing around on the Internet, I learned that there are two- (14" x 18" x 36") and three-(16" x 24" x 48") string bales. Since those dimensions are approximate, I made my bales a scale 40" long.

I used ³⁄₁₆" x ¼" balsa wood for the bales (**1**). After cutting it into scale 40" pieces, I painted the wood with Apple Barrel no. 20648 Mossy Green (**2**).

I dipped each block into thinned white glue. With the glue still wet, I sprinkled on my 50/50 mixture of static grass. I shaped the fibers with my fingers until I had a rectangular bale (**3**). I set it on waxed paper to dry.

Next, I attached 1¼" strands of sewing thread to each bale with wood glue (**4**). Then I painted the bottom the bales (placed away from the aisle) with Mossy Green paint (**5**) and secured them to the layout with white glue. MR

ADD A CORNFIELD
TO YOUR LAYOUT

Get rid of the artificial turf. These injection-molded plastic corn strips feature realistic detail

By Cody Grivno

Three Busch cornfield kits were all Cody Grivno needed to model this realistic farm scene on *Model Railroader*'s HO scale club layout.

Photo by Jim Forbes

The HO scale Milwaukee, Racine & Troy is set in southeastern Wisconsin, an area with a large number of farms. Though the backdrop on our model railroad has farmsteads painted on it, we've never modeled a three-dimensional cornfield. Since corn is an abundant crop in this part of the country, it seemed that a field of it would be appropriate.

Over the years *Model Railroader* has published articles describing how to model corn, including asparagus fern (April 1981), artificial turf (April 1993), and etched brass (June 2002).

Recently, Busch started offering injection-molded plastic cornfield kits. German modeler Horst Meier wrote an article on modeling a cornfield using the kits, and some of his photos appear in this article.

Using these and other modern scenery materials, adding a field to a model railroad is much less time consuming than it used to be. Even if your layout is finished, it's not that difficult to go back and replace an existing scene with a farm field.

STEP 1 CORN ON THE STRIP

Busch's cornfield kit (no. 1202) covers a 4" square area, so I had to purchase three kits to make a convincing cornfield. The corn was molded in olive green plastic, but it's not quite the right color. To fix that, I painted it with the following paint mixture: ½ ounce Polly Scale Burlington Northern Green and 25 drops of Engine Black, thinned 10 percent. If your layout is set in the fall, you could paint the corn a tan-gold color. Since I didn't want the corn to look too uniform, I applied the paint lightly in some

STEP 2 TASSELS AND A TWIST

areas and heavier in others, as shown in the photo at bottom left.

Once I'd airbrushed the corn, I brush-painted the bases with Delta Ceramcoat Dark Brown to help them blend in with the ground foam cover I added later. This paint covers in one coat – a real timesaver when painting 75 corn strips.

If you don't want to brush-paint the bases, you can spray them with an airbrush. Once the green dries, spray the bases with Polly Scale Dirt. Don't worry about getting overspray on the bottom of the stalks. It makes them look realistic.

To simulate tassels, I dipped the tips of each corn strip into Woodland Scenics Scenic Cement, and with that still wet, I dipped the corn into the firm's Earth Blend turf. In the top photo, Horst is demonstrating the technique, but with static grass.

Finally, I used needle-nose pliers to give each stalk a quarter turn so the rows wouldn't be perfectly straight. Horst is showing the same technique in the bottom photo. Don't twist the stalks too far; otherwise, they may snap off.

Photos by Horst Meier

STEP 3 PREPPING THE SCENE

I installed the cornfield in an area that already had basic scenery. I removed the ground cover with a putty knife but wound up exposing some of the plaster scenery base. To cover the exposed plaster, I airbrushed it with Polly Scale Earth.

Next, I test fit the corn. I first set the corn parallel to the tracks, but I didn't like the appearance. I then ran the rows a bit off of perpendicular to the tracks. Because this part of the layout has rolling hills and the corn curves down over a rise, the field appears to go on much farther than it actually does.

I attached the corn rows using hot glue. I found it best to apply the glue to the strips and then press them onto the layout. When I applied the glue to the layout first, and then pressed the rows into place, the corn lifted after I sprayed the field with diluted 70 percent isopropyl alcohol and Scenery Cement. I used cyanoacrylate adhesive (CA) to reattach the loose rows.

STEP 4 SCENERY

After the hot glue had set, I turned my attention to the scenery. I started by sprinkling Scenic Express Fine Dark Brown ground foam over the cornfield, leaving a 1" band around the outer edge, as shown in the top photo.

Since installing the cornfield on the MR&T, I've had a few more chances to work with the corn. I'd recommend applying the ground foam before twisting the stalks. If you twist the stalks first, the ground foam will get hung up in the corn.

Next, I sprayed the foam with a 50:50 mix of 70 percent isopropyl alcohol and water. Then, using a pipette, I applied matte medium. In the middle photo from Horst's article, the same technique is being demonstrated.

Since the brown foam looked like freshly turned soil, I sprinkled Woodland Scenics Medium Green static grass over the foam to help mute the color. There are plenty of photos of cornfields online, so study those to get other ideas on how realistically weather your crop.

Finally, I scenicked the area around the field with ground foam to match the surrounding landscape. However, the foam looked a bit too manicured for a farm setting, so I used Noch's Gras-Master (right) to apply the firm's static wild grass. You'll notice that I covered the corn field with a damp (not dripping wet) paper towel because static grass has a tendency to cover nearby scenery.

The static grass, in conjunction with the ground foam, gives the area around the farm field a realistic, overgrown appearance.
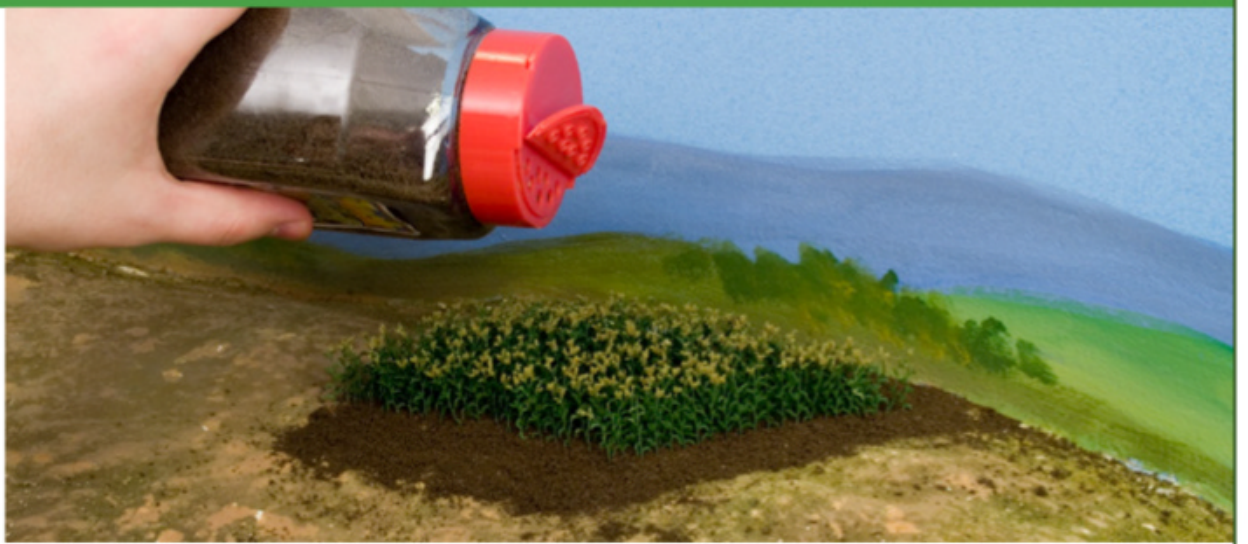
Middle photo by Horst Meier

STEP 5 LESSONS LEARNED

I've adjusted my techniques for working with Busch corn field kit since this article was first published.

I now use latex adhesive to attach the strips to the layout instead of hot glue. I let the adhesive dry for two days before applying scenery.

My new color of choice for airbrushing the stalks is Polly Scale Reading Green. It's a slightly darker shade of green, which I think looks better. It also saves me from having to mix paint. **MR**

EDITOR'S CHOICE

ERIC WHITE
ASSOCIATE EDITOR

The mighty Black River can't just end at the backdrop! Instead, a mirror helps give the illusion that it curves around the hillside. Inspired by famed model railroader John Allen, Gerry Leone installed 12 mirrors on his Bona Vista RR layout.

CREATING
MIRROR MAGIC

Using mirrors on streams, structures, streets, roads, and roadbeds can make layouts seem larger

By Gerry Leone • Photos by the author

We model railroaders are a crafty lot. We spend our time creating illusions of small worlds that give the impression of being real. We also have a big bag of tricks that helps us achieve that goal. Techniques such as selective compression let structures and scenery have the flavor of the prototype and fit into the space we have. Forced perspective allows us to create the illusion of great distance. By painting highlights and shadows on rocks and structures, we give the impression of strong sunlight.

But of all the tricks we modelers have up our sleeve, none is as effective as a mirror. A cleverly placed one can create the impression your "world" extends into a place it couldn't possibly exist. With one mirror, we can make a solid backdrop completely disappear to an onlooker. It's no wonder that part of the reason famed model railroader John Allen earned the moniker "The Wizard of Monterey" was because of his deft use of mirrors.

As you might guess, mirrors are my favorite model railroading trick. Perhaps that's why I included no fewer than 12 of them on my Bona Vista RR. In essence, if a trick works in one spot, most likely it will work in another. I found that from streets, to structures, to streams, and from roads to roadbeds, mirrors can add a whole new dimension to a layout.

A few general principles

After doing a fair share of experimentation with mirrors, I discovered several general principles that make these tricks work to their fullest.

• 90 degrees or nothing – Mirrors have to meet their subject at exactly 90 degrees. This means roads, streams, and tracks all have to be perfectly perpendicular to the mirror's surface. If they aren't, the subject will have an unnatural jog or bend, and the illusion will be shattered.

• Reflect from the front – There are two types of mirrors: front-silvered, and rear-silvered. Most of us are familiar with rear-silvered mirrors, in which the reflective surface is painted on the back side of a piece of glass. While this works fine for combing your hair, it's not ideal for our purposes because the subject you're reflecting (e.g. track, water, streets) stops at that piece of glass, creating an empty space between the front of the glass and the reflection.

Front-surfaced mirrors can be purchased at most mirror supply stores, and are readily available all over the Internet by searching "front-surface mirror," "front-silvered mirror," or "first surface mirror." You can sometimes stumble upon front-surfaced mirrors at surplus stores, which is where mine came from.

• Long horizontals help – Having horizontal items that butt directly up against the mirror helps the eye lose track of where the mirror actually is. When you look at the photographs in this article, notice how the fences, the guardrails, lane stripes, and sidewalks help draw the viewer's eye "through" the reflection into the other "scene."

• Subtle works best – The best mirror illusions are the ones that don't draw attention to themselves. A mirror that cries out, "Hey, look at me! I'M A MIRROR!" is the best way to ruin the effect. Provide some visual distractions that keep visitors' eyes from easily discovering the mirror – light poles, trees, signs, and other visual clutter keep the mirror from becoming the star.

With those principles in mind, here are some mirror uses that really worked on my layout.

MIRRORS FOR STREETS

Mirror location

One of Gerry Leone's favorite tricks on his Bona Vista RR layout is the well placed mirror. **The blue-and-white car, flagpole, and street beyond it are actually reflections. Buildings hide the sides of the mirror, and a street banner hides the top.**

LaPointe's Main Street – In my city of LaPointe, Main Street seems to go on for blocks because of a mirror that reflects a scene hidden inside a building. From the alley behind Main Street, it looks like a typical three-story building,

but inside that building is a printed street scene, car, and roundabout with a flagpole. The mirror is positioned such that when visitors look down Main Street, they see the reflection in the mirror positioned up against the backdrop.

Two-sided building

Flagpole and round-about

Photo of Main Street

There's only one view down Main Street, and that looks directly at a mirror on the far end, which reflects this scene.

Two-sided building blocks view down alley

Main Street

Alley behind Main Street
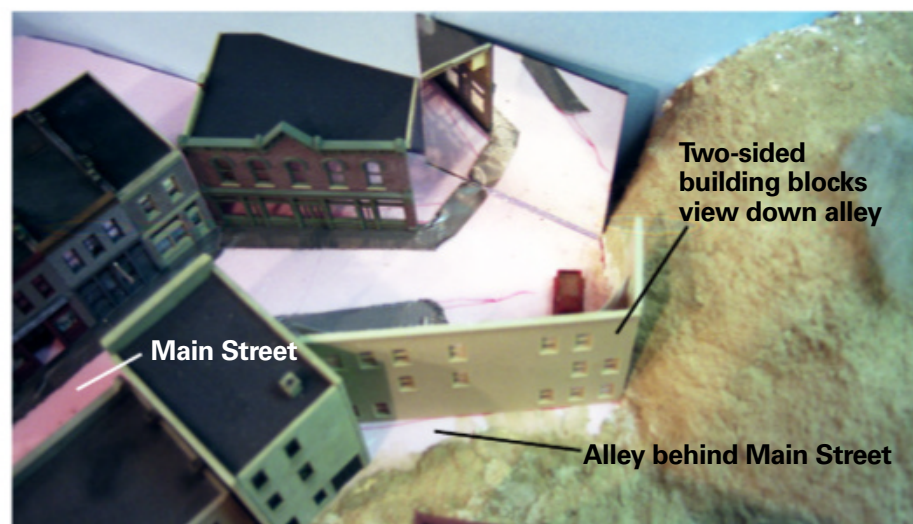
This construction shot shows the mirror and two-sided building that contains the Main Street scene.

Location of two-sided building

Mirror location

The two-sided building has been removed to show the flagpole and blue car that are normally seen in the mirror.

The Farm Highway – The largest mirror on my layout (6" x 6") reflects a blacktop highway in farm country. Adding expansion joints all along the highway helps draw attention away from the seam where the road meets the mirror. The room lights and their reflections create some interesting light patterns on the highway to further hide the mirror.

Turn left in Glen Oaks – The main drag in Glen Oaks couldn't just end at the backdrop, so I had it curve around the block.

The fence line, which is perpendicular to the mirror, helps lead viewers into the scene. The light pole and brick pattern on the street help distract from the mirror's edge.

Mirror location

Trees hides the sides and top of this mirror. The highway stripes and guard rail help the eye ignore the mirror.

Mirror location

A fence helps draw the eye through the mirror positioned alongside Phyllis and Norm's General Store in Glen Oaks.

MIRRORS ON THE WATER

In this close-up of the Black River, you can see how the mirror is hidden by "rapids" Gerry placed just in front of it.

The Black River – The main feature of Glen Oaks is the Black River, which appears to curve around the facing hillside, thanks to a mirror placed at the far end. The joint between the Enviro-Tex Lite water surface and mirror is hidden by "rapids," made by teasing silicone sealant with a toothpick just before it sets.

The Eureka River – Overhead lights on this portion of the layout made it an ideal spot for a stream passing through a backwoods area. Stippled gloss medium created the high-lights on the water, seen in the bottom left photo, hiding the seam between the Magic Water and the mirror. The bottom right photo shows the scene under construction.
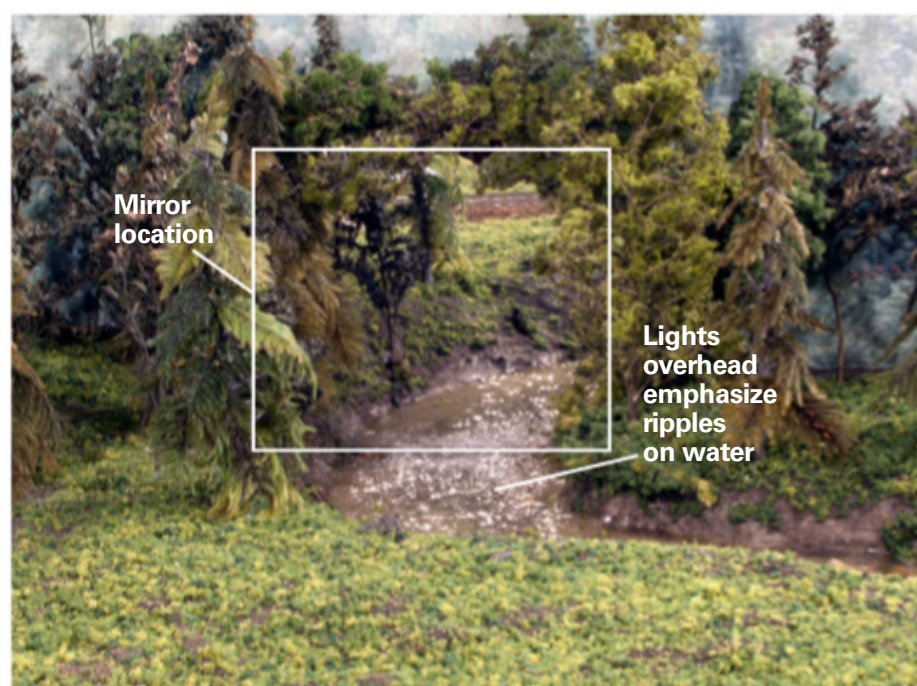
Light, reflected off of stippled gloss medium, may create a pleasing, peaceful scene, but its main job is to help hide the seam between the water and mirror.
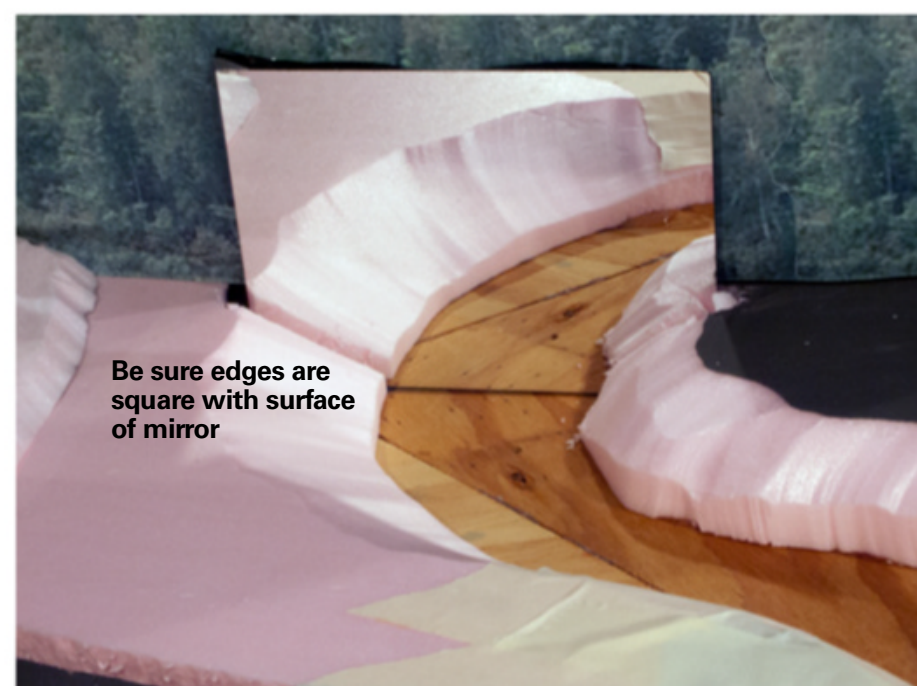
Even without completed scenery, the mirror makes the stream bed, which intersects the mirror at a 90-degree angle, appear to continue into the backdrop.

MIRRORS FOR STRUCTURES

Dunn Welding – Not all mirror illusions have to be spectacular. Dunn Welding, which is only a half-building butted directly up against the backdrop, received a "back-side" thanks to small mirrors placed on both ends of the building to reflect the roof eaves. Strategically placed foliage helps hide the edge of the mirrors.
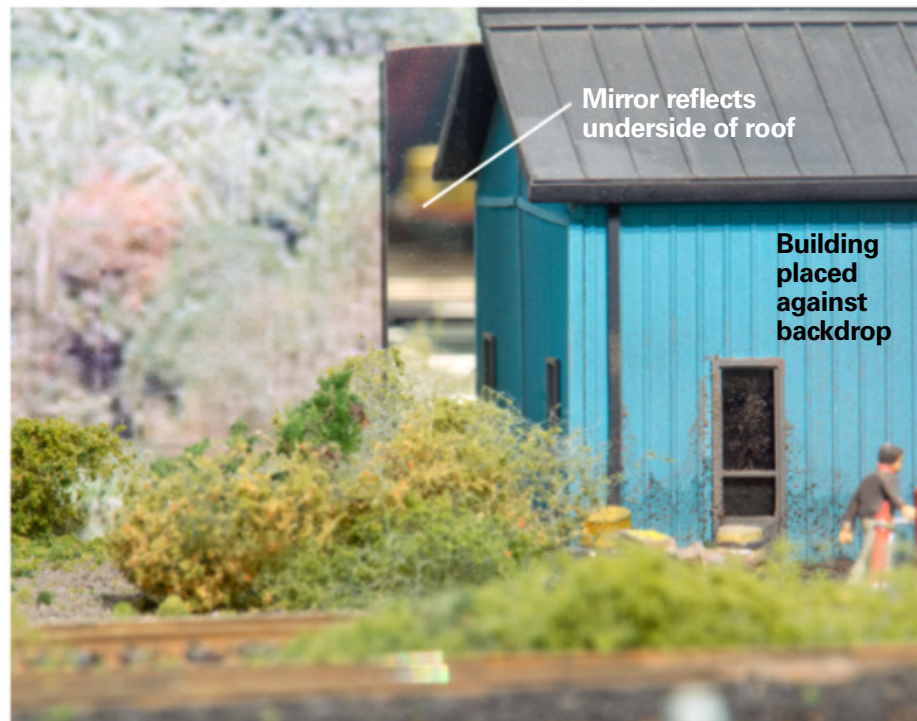
Sometimes small mirrors can make a big difference. Here a building butted up against the backdrop receives a new dimension thanks to small mirrors.

Westcott's other half – Sometimes mirrors can exist right out in the open and no one notices. Such is the case in the town of Westcott, where half of a block turns into a full block, thanks to the mirror. The figure, which is positioned directly in front of the mirror, is painted differently on his front and back, making it appear to be two figures talking.
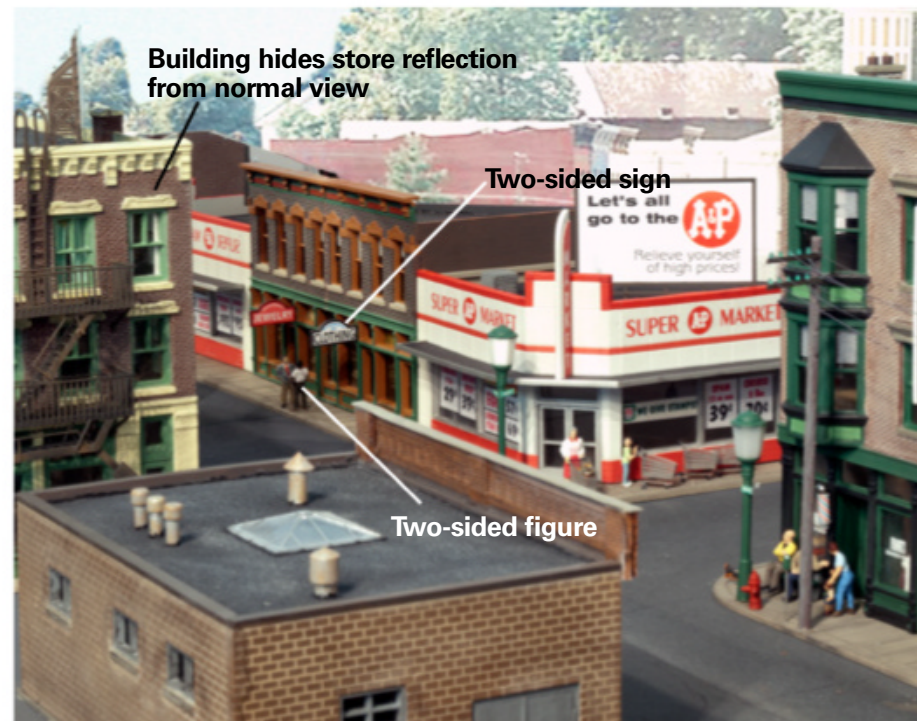
This view is higher than visitors would normally see the scene, and the building with the fire escape hides the backward reflection of the supermarket sign.

MIRRORS FOR TRACK

The bridge track – John Allen created half of a classification yard with a large mirror. Here, the application is somewhat smaller. A track running between a mirror at the backdrop and fascia creates the impression of a larger world, and gives the bridge a reason for being.

At the end of this track, a mirror – made from a piece of "day/night" automobile rearview mirror – makes the track seem to continue onward. The darker color of the mirror also helps create the illusion of shadows.

ONE FOR THE ROAD

The Froton Road – This was the very first mirror I added to my layout, and it turned out to be the most effective. The fence, the reflected road sign (with a reversed sign on its back), and the near-seamless joint all fooled visitors into thinking that there was a hole cut in the backdrop. **MR**
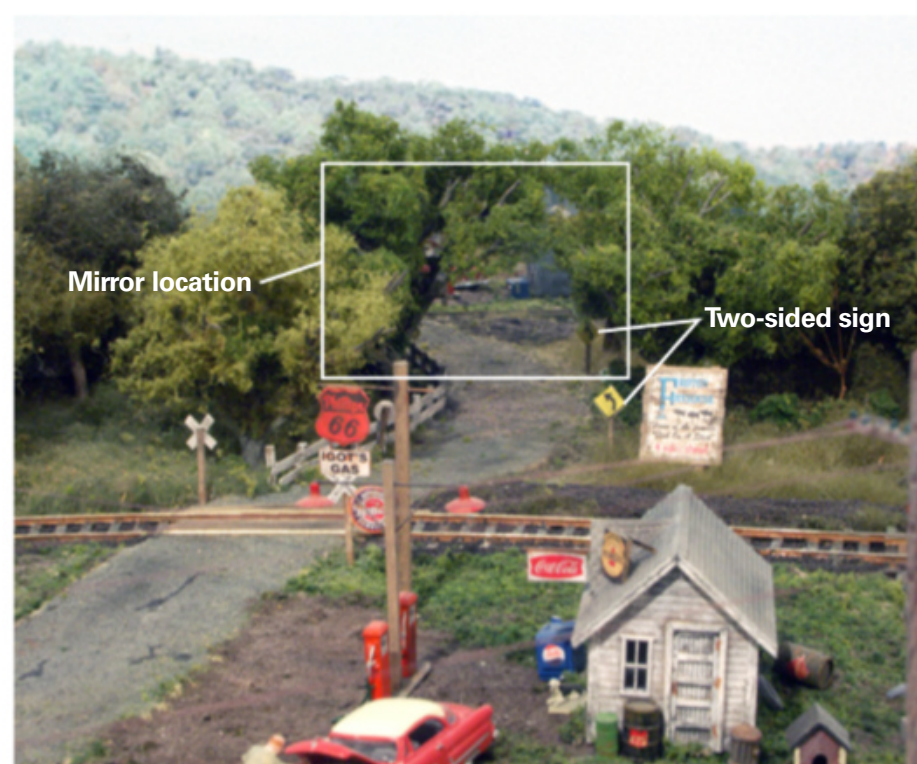
The challenge with this mirror outside the town of Froton was to keep it from reflecting a nearby siding. So it was positioned with a slight side-to-side and top-to-bottom angle that kept the reflection low in the glass.

Build a portable BRANCH LINE
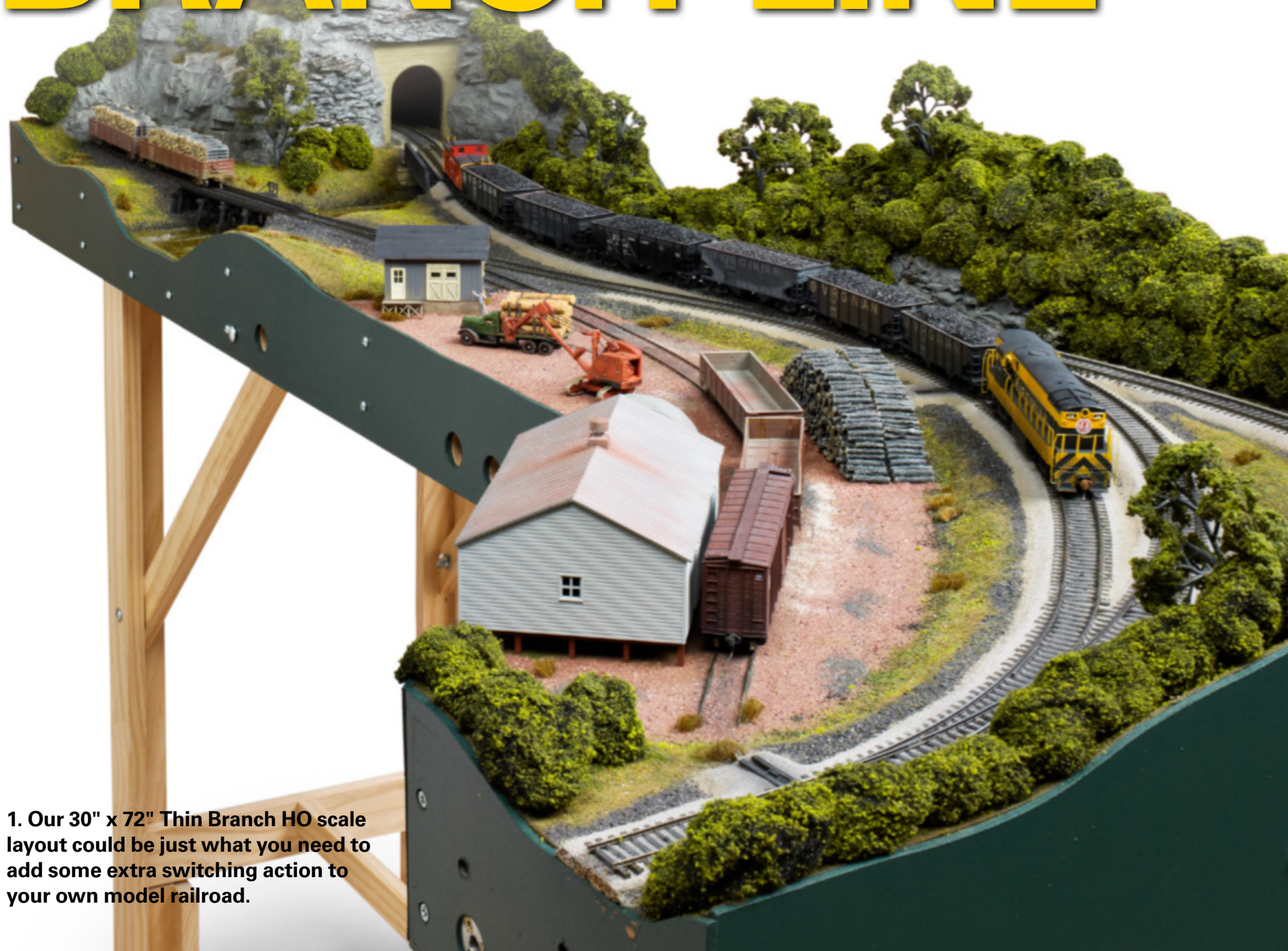
1. Our 30" x 72" Thin Branch HO scale layout could be just what you need to add some extra switching action to your own model railroad.

PART 1

Part 1: Benchwork and foam scenery for our HO scale branch line

By David Popp • Photos by Jim Forbes and Bill Zuback

So, you've got a model railroad, but you're looking to build something new. Instead of taking down your current layout, which represents a lot of spent time and resources, consider adding on in a small way. Enter the Virginian Thin Branch project, a compact HO scale switching layout that could be plugged into many different existing model railroads.

The Thin Branch is just 30" x 72", and its L-shape allows it to fit easily along a wall and into a corner. You can plug into an existing layout in a variety of ways, making the connection from either end. If you have more room, you can tack on a small staging yard to represent a longer branch line, complete with off-layout industries that need to be worked. Or you could expand the Thin Branch with yet another section, adding more on-layout switching action.

Since the Thin Branch is on wheels, you could even make it a temporary

To Virginian project railroad

Through girder bridge
(Micro Engineering 75520)

Walthers left-hand
no. 7 curved turnout

Atlas right-hand
22" radius Snap-Switch

G.C. Albert Mine
(Kitbashed Walthers 933-3062)

½"

¾"

0"

-1½"

Whistle Creek
2

Pile trestle
(Campbell 302)

Peco right-hand
no. 6 turnout

Office (Bar
Mills 742)

Pulpwood
pile (Walthers
933-3905)

Pulpwood
yard

Company store (Walthers
933-3529 and Rix 410)

Walthers left-hand
no. 6½ curved turnout

0"

1

Original plug-in
staging yard

Virginian Thin Branch

HO scale (1:87.1)
Scale of plan: 1" = 1'-0", 6" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson and Kellie Jaeger

Find more plans online in the
ModelRailroader.com Track Plan Database.

THE LAYOUT AT A GLANCE

Name: The Thin Branch
Scale: HO (1:87.1)
Size: 30" x 72"
Prototype: Virginian Ry.
Locale: West Virginia
Era: spring 1955
Style: portable
Mainline run: 7 feet
Minimum radius: 18"
Minimum turnout: Atlas 22" radius
Snap-Switch

Maximum grade: 3 percent
(switchback)
Benchwork: cookie-cutter
Height: 38"
Roadbed: cork
Track: code 83 and some Atlas
sectional track
Scenery: foam insulation board
Control: NCE Corp. Digital Command Control

addition to your railroad. Plug it into the layout when you want to run trains, then roll it out of the way when you're finished. The Thin Branch is a versatile little model railroad.

The 10-cent tour

I designed the Thin Branch as an addition to *Model Railroader*'s HO scale 4 x 8-foot Virginian layout, which was first featured in the January 2012 issue. The branch connects to the existing layout on the corner where the three-track staging yard once was. That yard is now placed at the opposite end of the Thin Branch, as shown above.

The Thin Branch serves as both a new branch line and as an extension to the existing main line for the original Virginian layout. While some may think this isn't the best idea, it actually makes the entire layout a lot more fun for operators: There's now a satisfying new switching job, the Thin Branch Turn, and those mainline trains get a little more running time.

The Thin Branch is nestled along Whistle Creek, and it has three modest industries. In the corner of the layout is the G.C. Albert Mine. The mine's tipple provides small but steady traffic, and can handle two to three carloads at a time.

The other two industries are situated downhill from the tipple on a switchback and include a pulpwood yard and a mine supply company. The switchback can handle just a locomotive and two cars, so crews must carefully plan their work when making pickups and setouts. (As a hint, pull all the cars out of the pulpwood track before bringing anything back in to spot.)

Whistle Creek and Baxter Tunnel are the layout's two most scenic features. The branch line crosses the creek on a rugged through-girder bridge, and the switchback crosses lower on a spindly pile trestle, making for a photogenic scene.

For the 10-cent photo tour of some of the layout's features, turn the page. To begin the construction process, see page 48. In this installment I'll explain the

basic construction of the benchwork, subroadbed, and foam scenery.

As for laying the track, since this is an addition to an existing layout that has already been covered in detail (see the March 2012 issue), I've included part numbers on the track plan for the five turnouts. Everything else can be done with your favorite code 83 flextrack.

The Virginian layout is wired for an NCE Power Cab Digital Command Control system, so the Thin Branch follows suit. For a free video tour of the Thin Branch, visit MRVideoPlus.com.

SEE IT IN ACTION!

Construction of the Thin Branch was detailed in a series of how-to videos, which are available for streaming on the Model Railroader Video Plus website. To learn how you can access this and all the informative content on MRVP, visit MRVideoPlus.com
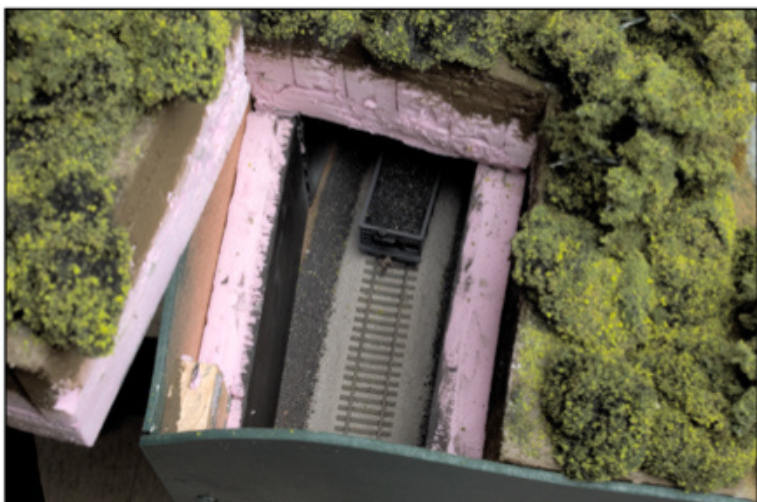
Tunnel

David built the tunnel on the Thin Branch using foam insulation board. The top of the tunnel is removable to facilitate cleaning track and retrieving the occasional derailed car.

Pulpwood yard

Although coal is the main traffic on the Thin Branch, pulpwood is also a common commodity. The pulpwood

Whistle Creek

The Virginian crosses Whistle Creek on two picturesque bridges. The water is made with casting resin, and the process will be explained on page 56.

Because it has wheels, the Thin Branch can be easily plugged into an existing layout when needed, and rolled out of the way when not.

yard is on a switchback, making an interesting switching puzzle for operating crews.

G.C. Albert coal tipple
The G.C. Albert coal tipple is a source of steady traffic on the branch line. David built the tipple by kitbashing pieces of styrene and a Walthers Glacier Gravel model until, as he says, "it just looked right."
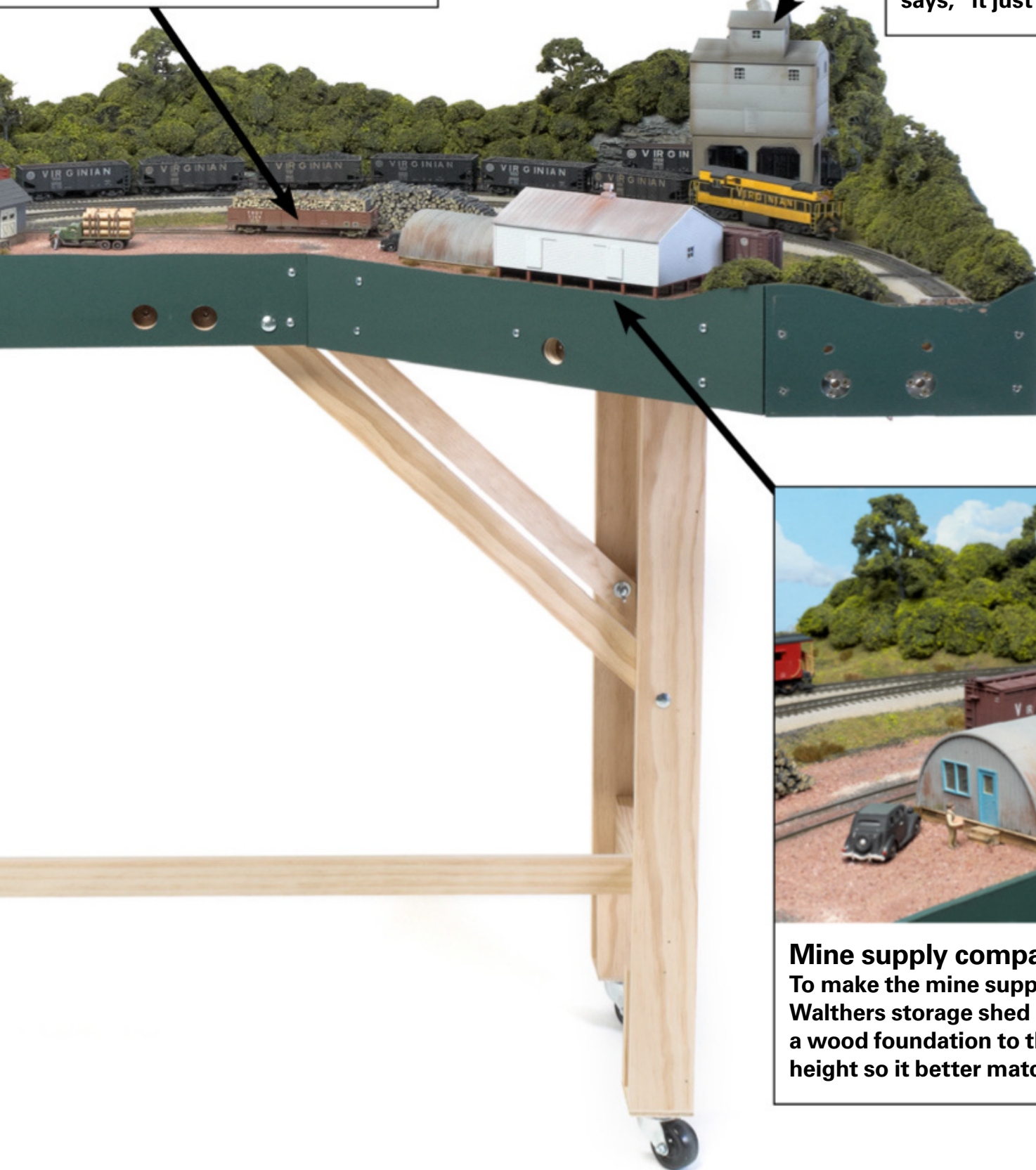
Mine supply company
To make the mine supply company, David combined a Walthers storage shed and a Rix Quonset hut. He added a wood foundation to the hut to raise it up to a suitable height so it better matched the shed.

1 x 2 crossmembers to support riverbed

1" riser block glued to 1 x 3 crossmember to support main line

Frame front made with 1 x 3s

Frame back and sides made with 1 x 4s

24" 1 x 2 angle braces

Legs attach to frame with carriage bolts

Locking caster

Trestle board

2" swivel caster

Locking caster

1" riser block

1 x 3 crossmember
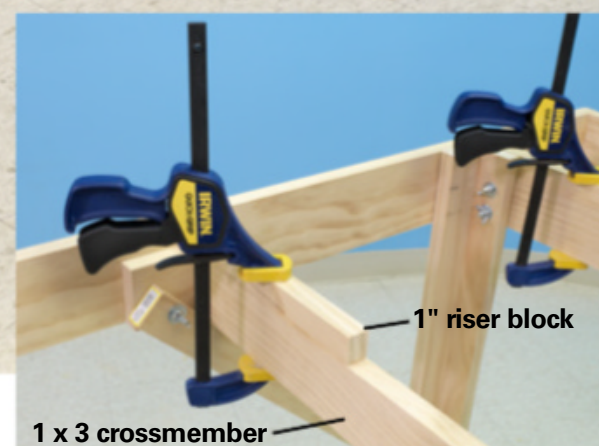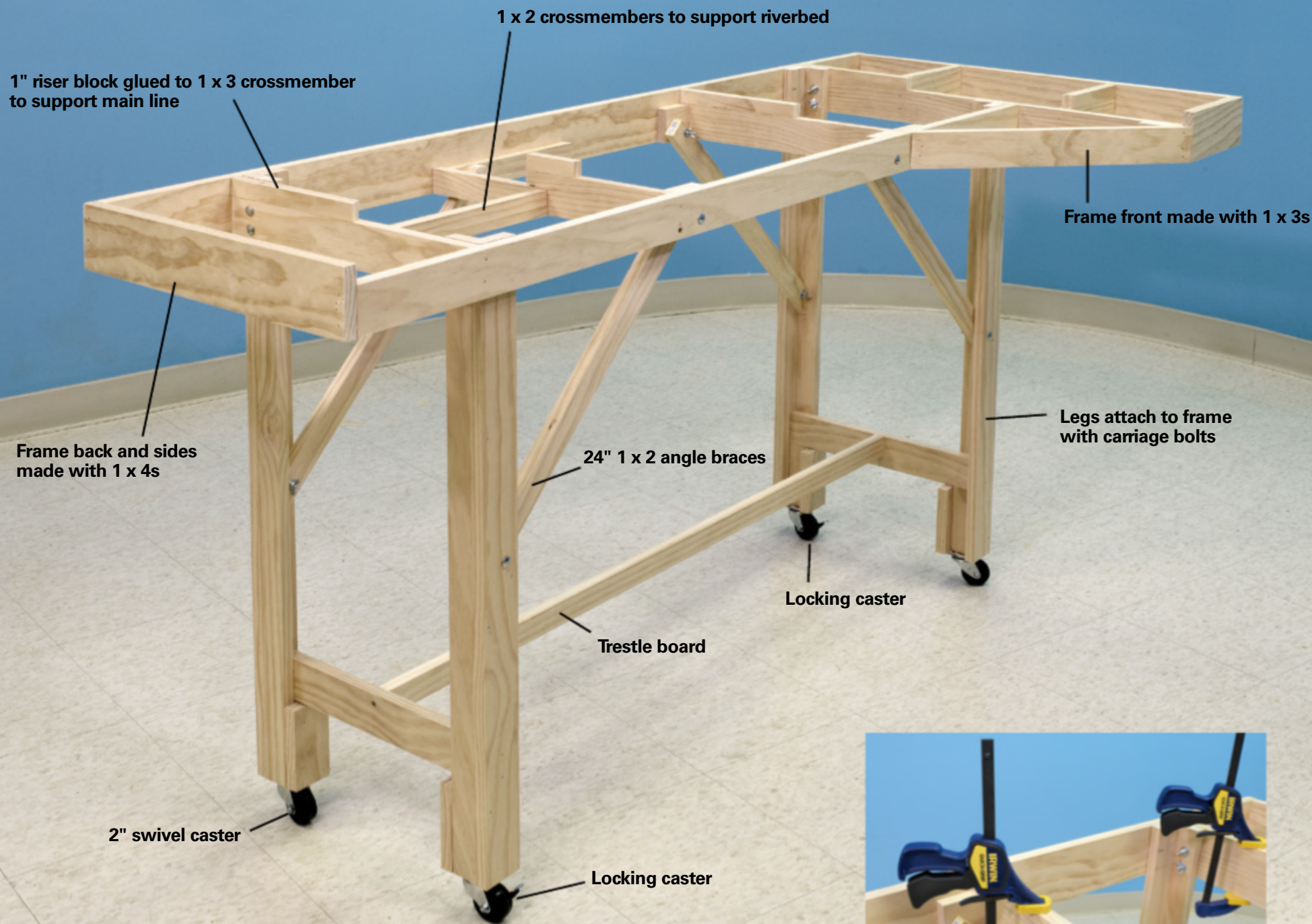
David built the benchwork for the Thin Branch using the same techniques he used on the Virginian. The legs can be removed for easy transport and storage.

The benchwork for the Thin Branch is fairly straightforward and uses the same design I used to build both the Virginian project railroad (February 2012 MR) and the Beer Line (January 2009 MR). The frame and legs are built with clear, knot-free pine to form a straight and solid support for the layout. The materials list on the next page shows the key lumber and hardware used.

I usually take a lot of ribbing for using lumber that's better than the standard no. 2 pine, but there's a lot to be said for working with furniture-grade boards. For starters, they've been thoroughly kiln dried, which means when you buy a straight board at the lumber yard, it's still straight when you go to use it for your layout, even if it's months later. Also, it's much easier to build square, level benchwork if you don't have to fight the material to make it straighten out.

I call it the "Three Little Pigs Theory" of layout building – cheap lumber never turns out to be the bargain you think it is, especially when you find you need to replace the boards you bought before you even get them installed in the layout.

The illustration on the next page provides dimensions for the frame, as well as indicating the location and size of the crossmembers. There's also a cutting diagram for the plywood subroadbed ghosted in over the top of the illustration. The color key indicates the risers you will need to support it.

The legs are designed like a trestle table and form a rigid support for the layout. I set the height of this layout section at 38" from the floor to match the existing Virginian layout, but obviously you can place it at just about any height you wish. In a permanent installation, you could even attach the layout to a wall, eliminating the legs.

To create the elevations on the layout, David glued the risers to the frame. Here 1" blocks are being added to the 1 x 3 cross member for the main line.

I attached the legs to the layout using carriage bolts and wing nuts (two on each leg and one at each end of the angle braces). The legs and braces are removable, making it easy to transport the layout. The trestle board is held in place with two 3" deck screws.

One thing to watch for when building the legs is that the leg directly under the switchback needs to be 1" shorter than the others due to the lower foreground table top. I didn't make the cut until after I built the frame and test fit the leg, just to be sure it would fit properly.

Like everything I build these days, the layout rides on 2" casters, making it very easy to move it around and plug into the Virginian layout when needed.

½" plywood subroadbed

Tipple area supported with ¼" plywood strips

Pulpwood yard

Riverbed cut 1½" from bottom of frame

Risers made from ½" plywood strips
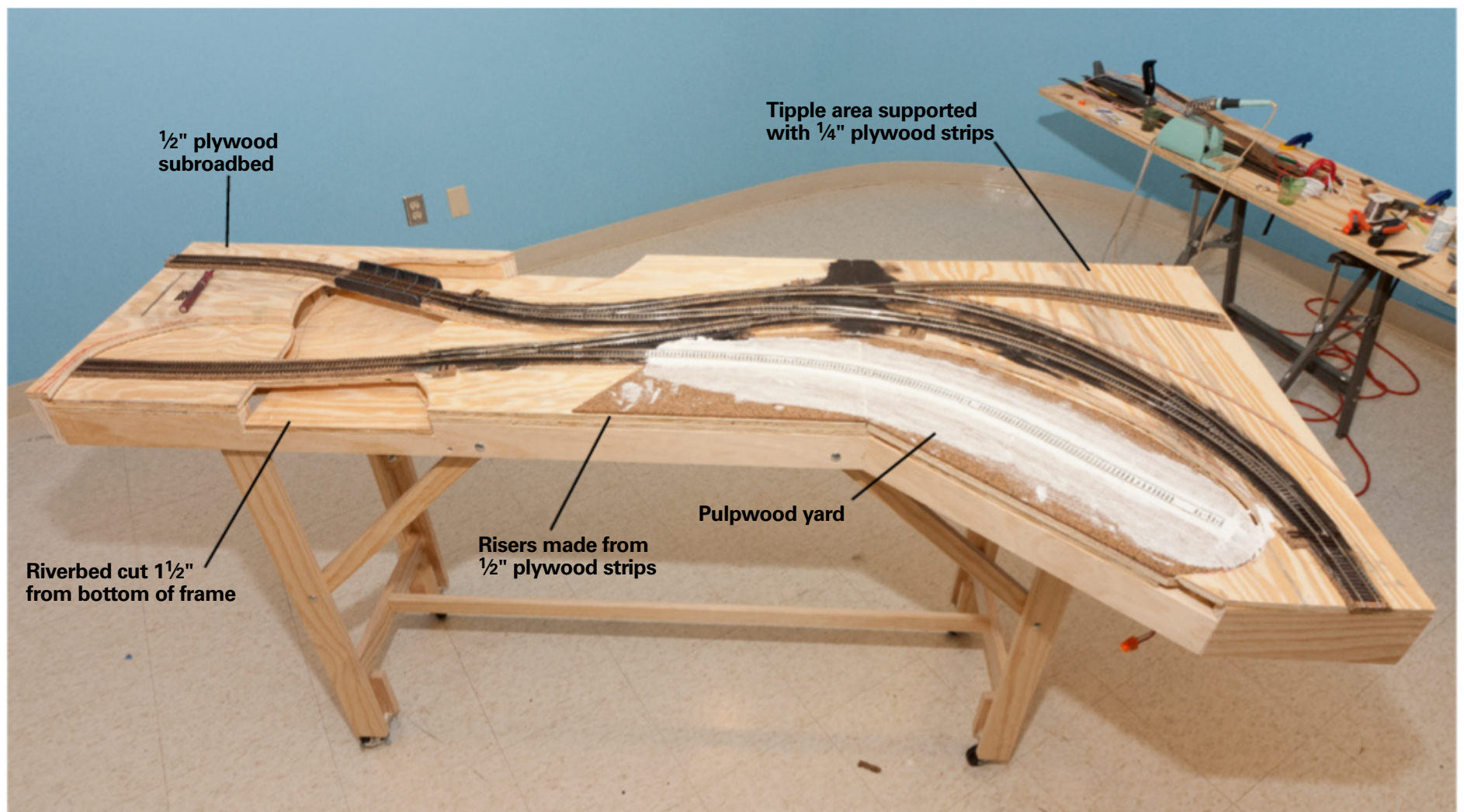
This photo clearly shows the elevations. The pulpwood yard is supported by ¾" wide strips of ½" plywood. The riverbed is made from a separate piece of ½" plywood and sits 2" below the main line. The illustration below shows riser placement.

72"

18"

30"

9"

Leg

1 x 2

1 x 3 angle brace block

Leg

1 x 2

1 x 3

1 x 4

1 x 3

1 x 3

1 x 3

1 x 3 angle brace block

Leg

1 x 2

1 x 3 angle brace block

1 x 3 angle brace block

1 x 3

Leg

1 x 3

1 x 3

Plywood cut marks

Scale: 1" = 1'-0"
Framework made from 1x4 unless noted

(blue) Cut down to 1½"
(green) Add ¼" riser
(yellow) Add ½" riser
(red) Add 1" riser
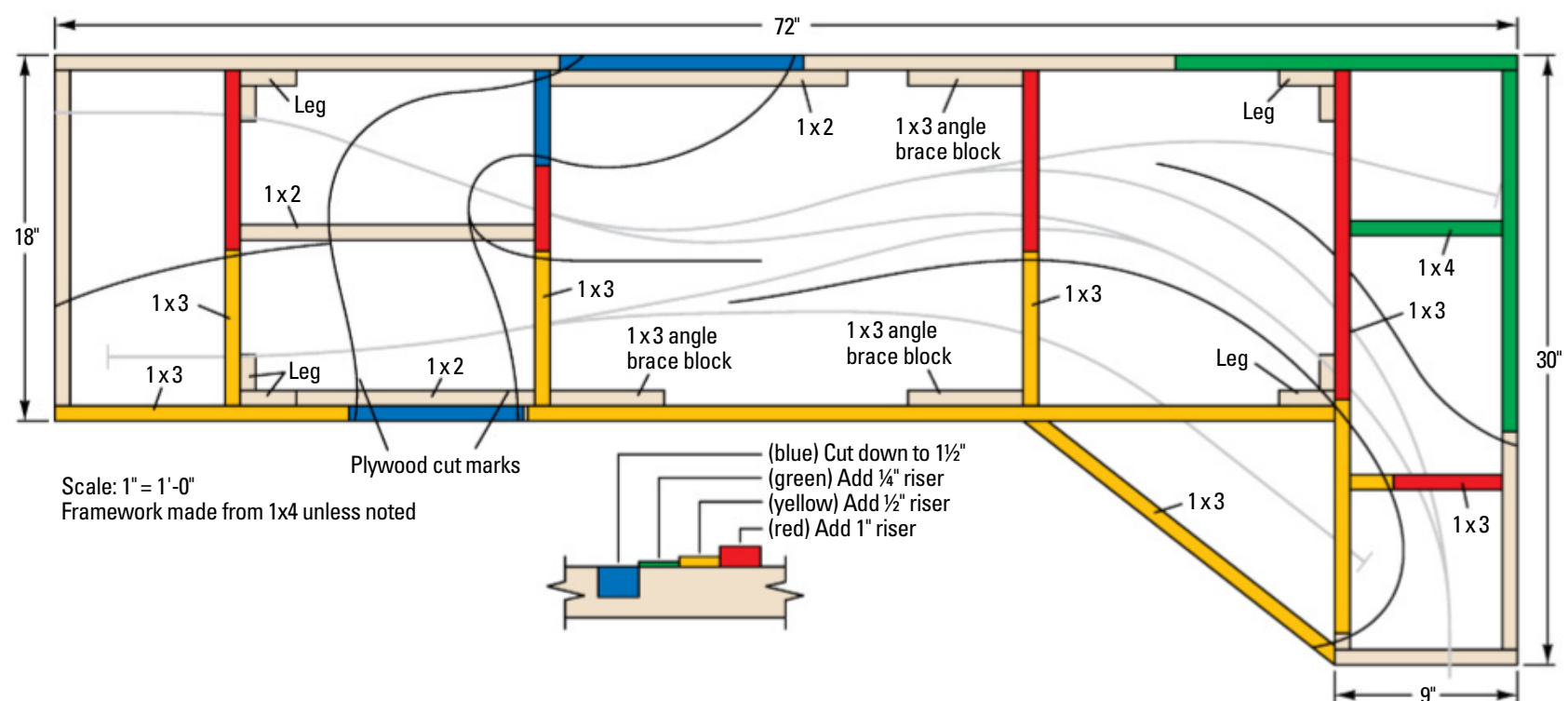
THE LAYOUT AT A GLANCE

Frame and top
1 x 2 (1)
1 x 3 (3)
1 x 4 (2)
½" plywood 2 x 4 handy panel (2)
³⁄₁₆" tempered hardboard 2 x 4 handy panel (2)
Assorted ¼", ½", and 1" blocks used as risers

Legs
1 x 2 (3)
1 x 3 (4)
2" swivel casters (4)
No. 10 x 2" roundhead screws (16)

Miscellaneous
Carpenter's glue
2" finishing nails (frame)

1" paneling nails (top)
¼" x 2" carriage bolts (12)
¼" x 3" carriage bolts (4)
¼" washers (16)
¼" wing nuts (16)
3" deck screws (2)
1" 4 x 8 extruded-foam insulation board (1)
DAP Dynaflex 230 gray caulk (2)

2. The scenery for the Thin Branch started with layers of 1" extruded-foam insulation board. David built this tunnel scene starting with a foam box constructed around the track. He then added layers of foam to build the rest of the hillside.

³⁄₁₆" hardboard fascia

1 x 2 corner support block
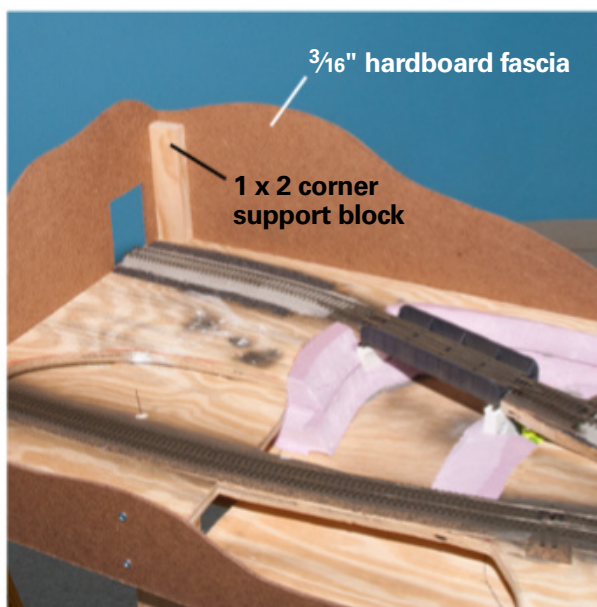
Before building much of the scenery, David added ³⁄₁₆" tempered hardboard fascia to the layout. The fascia serves as a guide for building up the foam hills that form the layout's scenery.
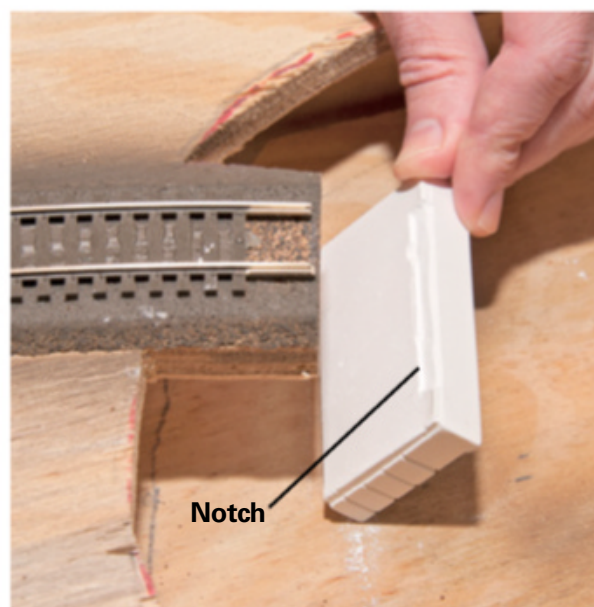
Notch

David used A.I.M. Products poured concrete retaining walls as bridge abutments, cutting them to size. He also notched the back of the plaster castings to fit around the subroadbed.

I used 1" foam insulation board for the sub-scenery layer of the Thin Branch. I like the material because it's easy to cut, glue, and shape, and it also holds trees and rock castings well. Although thicker foam board isn't sold everywhere, you can usually find 1" sheets in most home centers, even in southern climates, and if not, they will special order it for you. I bought a single 4 x 8 sheet for the project.

Before adding the foam, I installed all of the fascia on the layout section. I used ³⁄₁₆" tempered hardboard for this project, and as shown in the photo at the bottom of this page, I cut the contours for the hills into the fascia ahead of time. I'd made a rough sketch of the profile of the layout first, which made this task much easier.

1" foam layers cut to fit riverbank

Ballast track before building tunnel

Bridge abutments sunk into foam
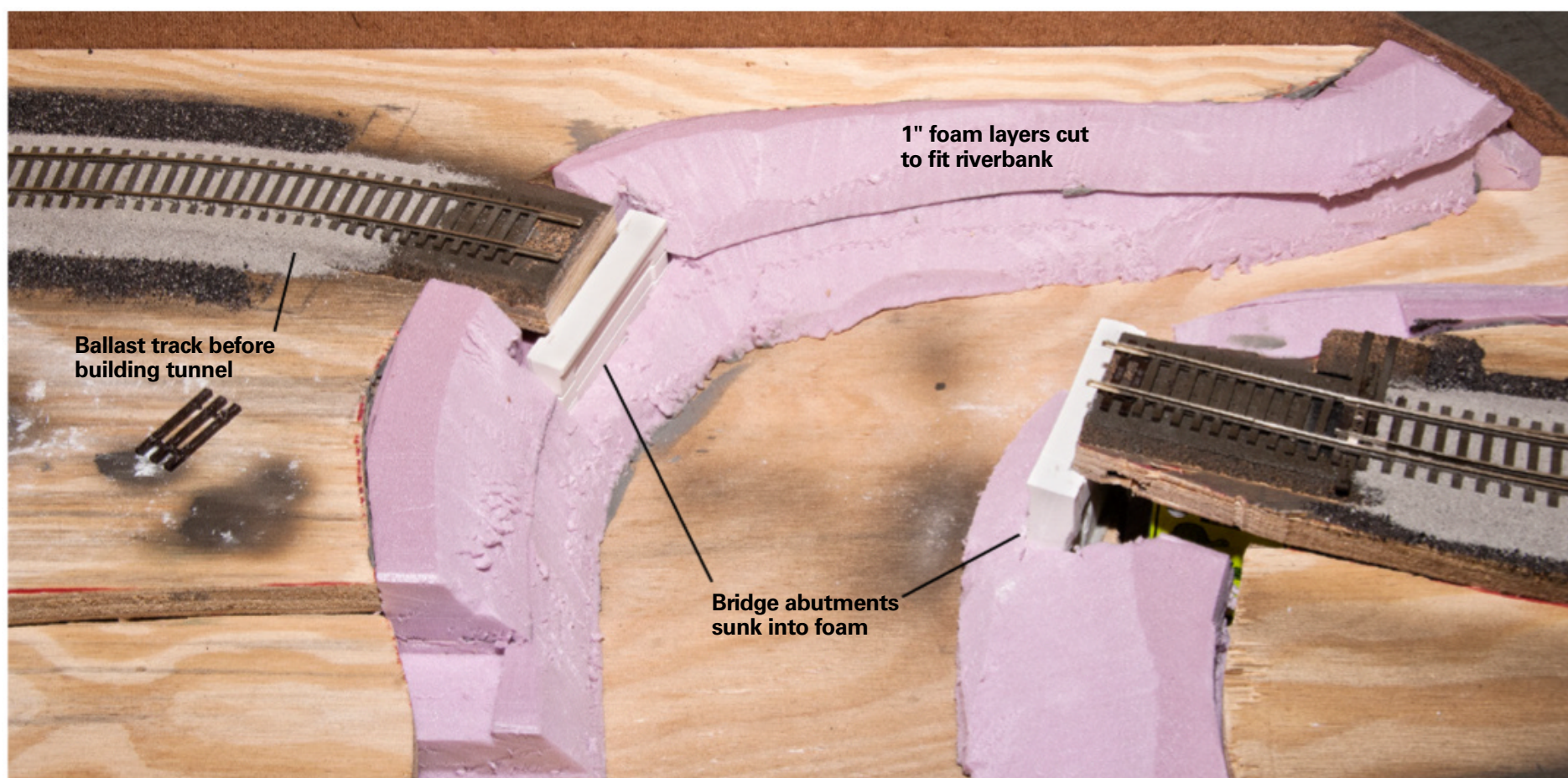
After gluing the abutments in place, David cut and fit strips of foam to form the creek's banks. He used DAP Dynaflex latex caulk to glue the foam and plaster scenery pieces together. Later, he smoothed the foam with a sanding sponge.

Tape protects track and ballast

Bridge abutment

After he installed the foam, David filled in the gaps with Sculptamold. This product is a mix of plaster and paper fibers and makes an ideal scenery base.

Here David uses Sculptamold to fill the gap between the levels of plywood subroadbed, forming a shallow embankment for the main line.

I started work at the lowest point on the layout, the creek bed. After installing the plaster bridge abutments, I cut strips of foam and layered them to form the banks. I use a long, flat wallpaper knife (sold by Olfa and others) to cut angles into the foam and do the final shaping with sanding sponges.

After I had the banks of the creek assembled, I started on the background hills. I made them by placing a section of foam on end against the fascia, tracing it, and then cutting the foam. I then laid in the next piece along the first, traced it, and made my cut. The cuts are all made at angles, so each successive layer is smaller than the first. The background hills are only 3" to 4" deep in most places, so it didn't take much foam to build them.

I glued the foam layers together with DAP Dynaflex, a household latex caulk. The caulk usually cures in 24 hours, but it's thick and sticks the foam together right away, allowing you to keep working. It also means you have some time to reposition the foam as you add new pieces to your hills. After the caulk cured, I sanded the contours smooth with a coarse sanding sponge.

After painting and ballasting the track, I built the tunnel. The tunnel started as a rectangular foam box built around the track, and I attached a Chooch no. 8320 concrete portal casting to the open end. The rest of the tunnel is built using more layers of foam laid on edge, similar to the background hills. As shown on page 46, the top of the tunnel is removable.

Once the foam was in place, I used Sculptamold to fill in all the gaps and smooth over the layers. This is a plaster and paper-fiber product that is easy to work with and produces little mess. As shown in the bottom photo, I also used the Sculptamold to build up the embankment along the main line. With that, everything needed a chance to dry for a few days before continuing on with the scenery.

In the next installment of this series I'll explain the rock work in detail, including casting rocks from plaster. I'll also add the river, trees, and the gravel roadway through the pulpwood yard. Why not take a moment to think about ways you might be able to expand your own layout by incorporating a portable branch line? **MR**
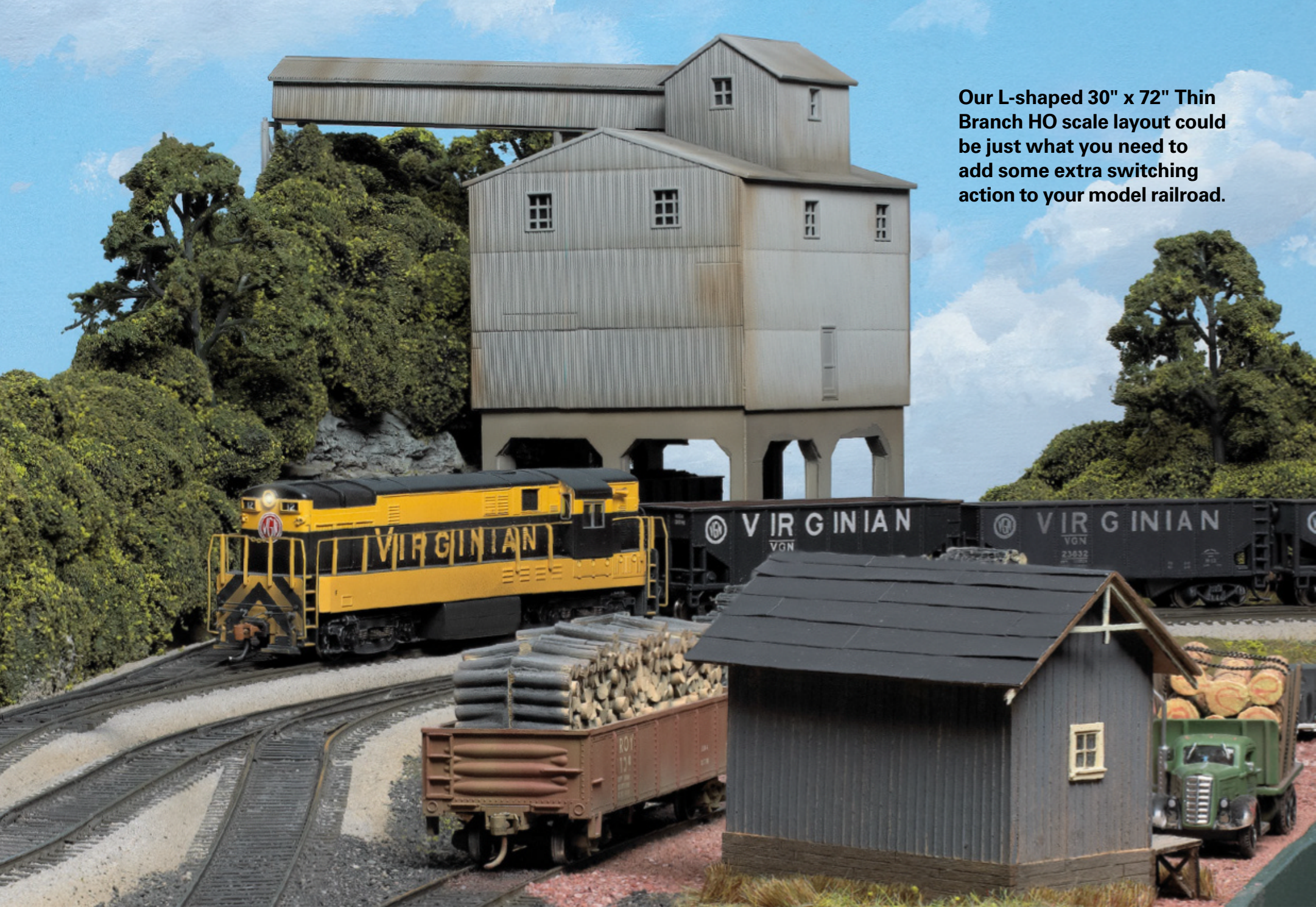
Build a portable
BRANCH LINE

PART 2

Part 2: We add rocks, rivers, buried track, and a lot of trees to our Thin Branch project

By David Popp • Photos by Jim Forbes and Bill Zuback

I f you're looking for a small branch line that you can add to an existing model railroad, you've come to the right place. As covered in part one, our Thin Branch project was designed to plug into one end of our HO scale Virginian project railroad, first featured in the January 2012 *Model Railroader*. We mounted the 30" x 72" branchline

addition on 2" casters so we can easily roll it out of the way when it's not needed.

In part one I explained how I built the benchwork and the foam scenery for this railroad. In this installment we'll pick up the scenery work with modeling rocks. We filmed nearly the entire construction process, and you can watch the videos by subscribing to MR Video Plus.

COMPANION VIDEOS

Construction of the Thin Branch was detailed in a series of how-to videos, which are available for streaming on Model Railroader Video Plus. To visit the website, go to MRVideoPlus.com

If you build enough model railroads, sooner or later you're going to need to make some rock outcroppings. On the original Virginian project railroad, I'd used Mountains in Minutes foam rubber rock castings. These rocks have great detail, are easy to work with, and best of all, they can be curved to fit the contours of your scenery. I had some good-sized pieces left over from that project, so I installed them in places that would benefit the most from their flexible properties, which included the area around the tunnel portal and the steep hills along the back of the layout.

However, I needed more rocks than I had leftover foam castings for, so I next turned to the old standby, making my own from Hydrocal plaster and rubber molds.

Hydrocal is a special plaster that dries much harder than ordinary plaster of Paris. It also has a very fine grain that captures the detail in the molds well. When dry, Hydrocal is lightweight, making it ideal for work on model railroads.

I used four different Woodland Scenics rubber molds to make my castings. First, I used a misting bottle to wet the molds with a light spray of wet water (tap water with a few drops of dish soap added). Next, I mixed the Hydrocal to a soupy consistency and poured it in the rubber molds. Hydrocal sets in about 10 minutes.

You can typically remove the soft Hydrocal plaster castings from a mold after about 25 minutes, which is great because it means you can use the mold twice in an hour. I used each of my four molds twice, making eight castings for the layout.

The castings need to be completely dry before you can use them in the next step, so I set them aside for a couple of days before continuing.

Cut and fit. One benefit of working with plaster castings is that they are easy to cut and shape, making installation a snap – literally! You can score plaster castings with a razor saw or knife and snap the sections apart, much like working with styrene sheet.

I started the installation by laying the castings on my workbench to see which ones seemed to work together the best. When building rock faces from more than one casting, you want them to look like they belong together, which is why I used each mold twice.

David had a few Mountains and Minutes foam rocks left over from the Virginian project railroad, so he added those around the tunnel. The rest of the rocks are Hydrocal castings made in rubber molds from Woodland Scenics.
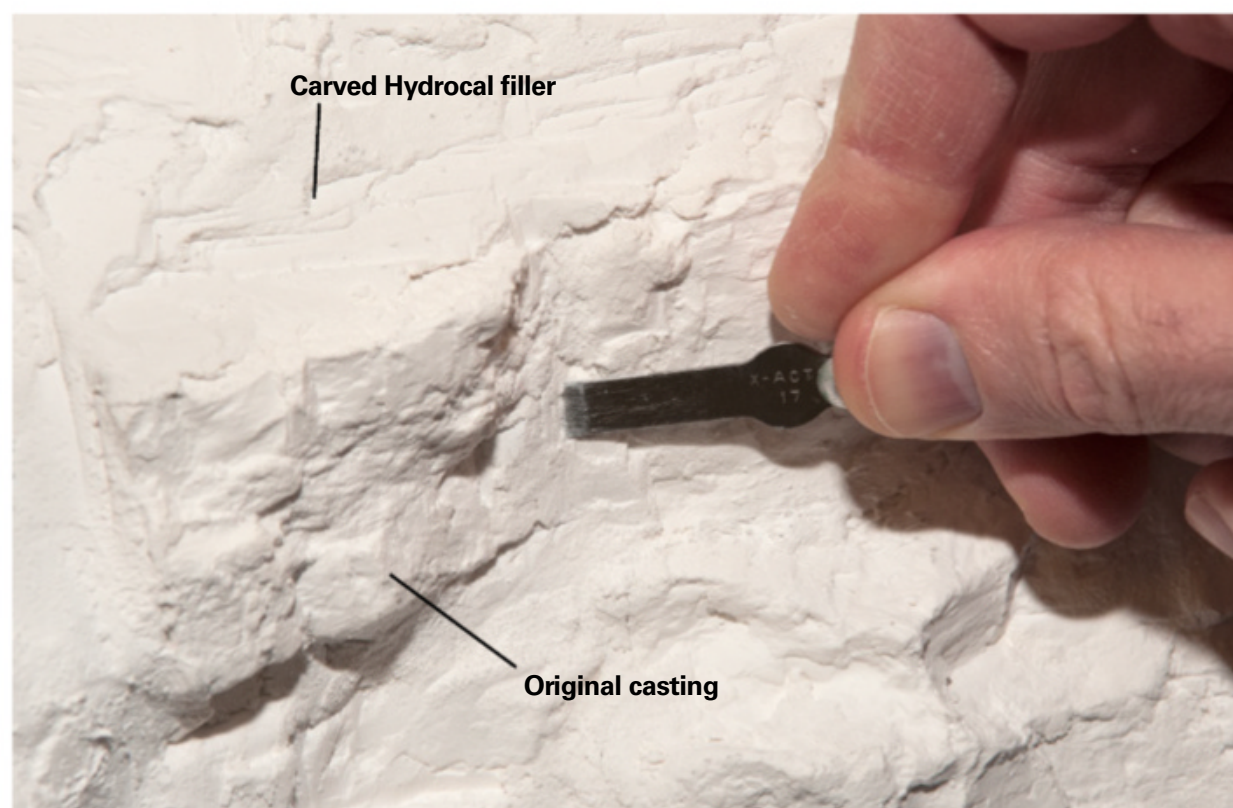
David used more Hydrocal to fill the gaps between the castings. While the plaster was still a bit soft, he carved and chipped detail into the filling material used a hobby knife with an X-acto no. 17 chisel blade.

After making my choices, I built the first rock face along the foam hillside by the tunnel. Working from the bottom up, I cut and stacked the plaster castings. I used a hobby knife and razor saw to make most of the cuts. I also used a sanding block with coarse sandpaper to smooth the backs and edges of the cut pieces.

To cement the castings to the foam, I used DAP latex caulk. I like this material better than white glue or Liquid Nails for Projects because the caulk is thicker and grabs hold of

the castings well. I used some pins to tack the castings in place until the adhesive set overnight.

Filling gaps. The cutting and fitting process always leaves some gaps between the castings. I used a thicker batch of Hydrocal to fill those gaps, but I used Sculptamold (a papier-mache-type product from American Art and Clay Co.) to blend the rocks into the surrounding scenery.

Why not use Sculptamold for everything? Hydrocal and Sculptamold

Foam rocks

Plaster rocks

David airbrushed the surrounding rocks with Polly Scale EL Gray. He then used a brush to paint the tunnel portal Polly Scale Concrete.

1" foam paintbrush

To accent the shadows in the rocks, David stained them with a solution of 1 part India ink to 19 parts 70 percent isopropyl alcohol. The ink stain dries lighter than it appears when applied, so David used two coats.

Once the ink was dry, David drybrushed the rocks with various Polly Scale colors to add highlights. He then added the surrounding soil and ground foam and Busch no. 1304 static grass weed clumps to finish the rock face.

dry with different textures, which is noticeable when you paint them. By using Hydrocal to fill the gaps between the castings, the finished rock face will look like it's made from one large casting once it's painted.

As applied, the filler in the gaps is smoother than the detailed rock castings. To fix that, I used a hobby knife with a no. 17 chisel blade to chip away some of the Hydrocal filler before it was fully dry. Once everything is painted, this added detail blends the castings together well.

Paint and stain. There are a number of ways to paint model rocks, but I needed to match those from our original Virginian layout. I began by airbrushing all the castings (both foam and plaster) with Polly Scale EL Gray, making a uniform base coat.

After the paint had an hour to dry, I applied a stain made from 1 part India ink to 19 parts 70 percent isopropyl alcohol. The alcohol evaporates quickly, leaving the ink stain in the crevices of the rocks, adding shadow details. It also darkens up the base coat. I let the ink dry several hours before starting the next step.

Drybrushing. The final rock-painting step uses a simple technique called drybrushing, and it produces the most dramatic results.

Drybrushing involves putting a small amount of paint on the tip of a soft brush, then brushing most of the paint off again before applying it to the work surface. You can wipe the paint on a paper towel, but I've found that a piece of cardboard works very well.

I started by enhancing the base color in the rocks with Polly Scale L&N Gray, particularly working the paint into the flat areas of the rock's surface. This is a warmer color than the base coat of EL Gray, and it helps bring out more contrast in the base coat with the ink shading.

Next, I applied Polly Scale Rust to select rocks in the face, following strata lines where possible.

Finally, I applied a very light coat of CSX Tan over the surface. This last application looks like sun highlights, bringing out the edge details.

Drybrushing gives you complete control over the amount of color you add to the rock face, as well as where it goes, and shows off all of the details molded into the rock castings well, as shown in the bottom photo.

Spur tracks that run through places that must also handle vehicle traffic are often buried in gravel. David used flextrack and two different thicknesses of cork roadbed to model the tracks buried in the pulpwood yard on the Thin Branch.

The buried tracks in the pulpwood yard use a technique that I first tried on my N scale layout with great success. Quite often, tracks that share industrial spaces with road vehicles are simply buried in dirt or gravel. Though you can model this by covering the track with plaster to the tops of the rails and then coating everything with gravel, that can produce operating headaches.

On the Thin Branch, I sidestepped the problem by having the rails protrude above the surface of the driveway. The base of the driveway is made with Midwest HO scale sheet cork. However, I cut a trench in the cork and filled it with N scale cork roadbed. The difference in height between the two materials is $5/64"$, which is roughly the height of the ties on Micro-Engineering flextrack.

Once the track was laid in the trench, the tops of the ties sat flush with the surface of the driveway. As shown in the photos, I filled the spaces between the ties with plaster. After the plaster dried, I painted the surface with brown latex paint and applied various colors of Arizona Rock & Mineral powders. With the rails above the surface, cars still roll smoothly.
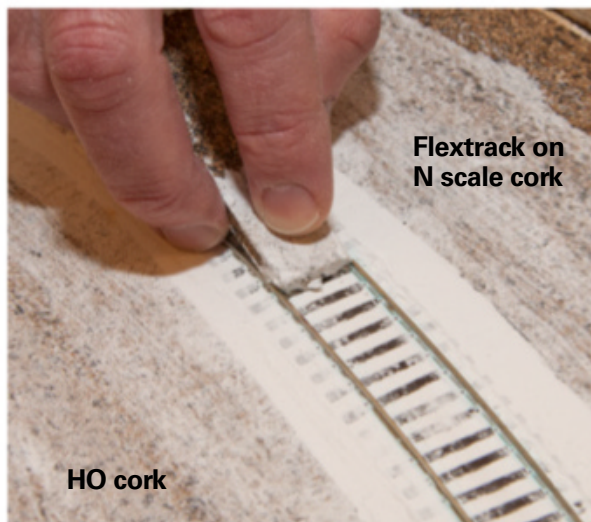
David used a piece of cork to clear the wet plaster from between the rails.

The track is embedded so that the tops of the ties are level with the ground.
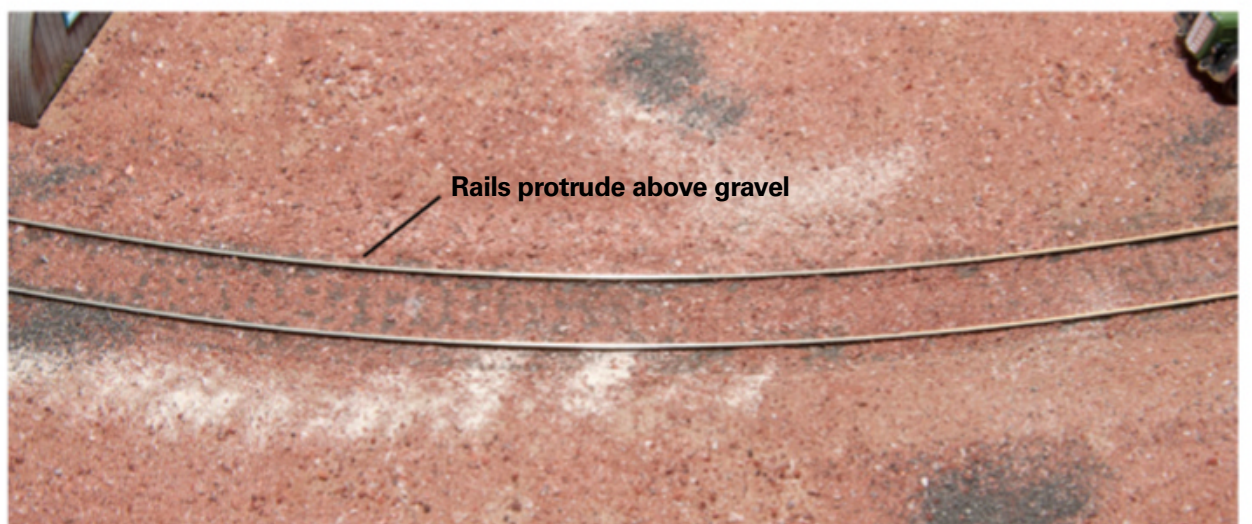
From above, with the gravel added, the track appears to be buried in the driveway. In reality, the rails sit above ground, making for reliable operation.

The bridge over Whistle Creek on the Thin Branch layout is a Campbell Scale Models kit. The water is made with resin.

After building the creek bed from foam and Sculptamold, David painted it with brown latex house paint. The rocks in the bottom are leftover plaster castings.
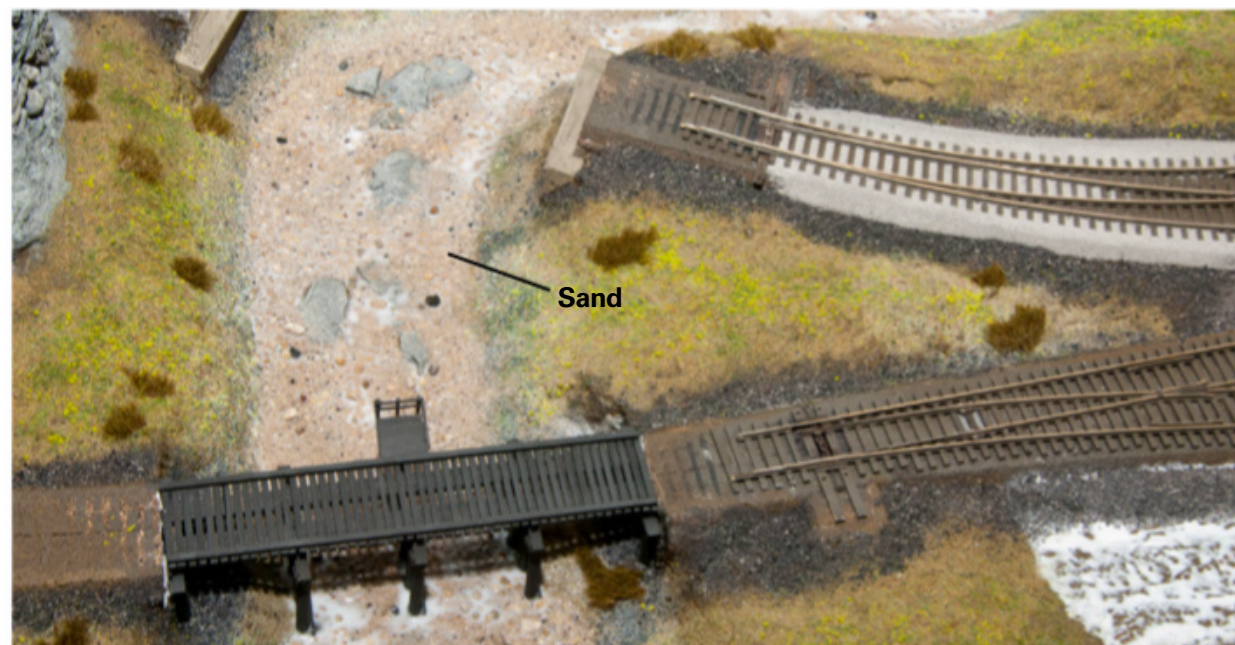
David coated the creek bed and surrounding banks with white glue and applied various scenery materials. The creek bed is filled with cheap home-center sand.

Water is perhaps one of the most dramatic scenic features you can add to a layout. There are a number of products on the market for modeling water, and any of them can yield great results with the right care.

For Whistle Creek on our Thin Branch project, I used Magic Water, a 2-part resin from Unreal Details (unrealdetails.com). But before I could pour the material, I had to finish the creek bed.

As shown on page 51 in the first installment of this series, I constructed the banks of the creek from layers of 1"-thick foam insulation board. While I was at it, I also installed the cast-plaster bridge abutments and the timber trestle. Once the foam work was complete, I smoothed everything out with Sculptamold, giving the banks a pleasing contour.

Creek bed. While you could simply paint the plywood at the bottom of the river at this point, I wanted detail to show through the water, so I modeled the creek bed.

I started by placing a few pieces of broken plaster rock castings in the bed and used latex caulk to hold them in place. I then mixed up a soupy batch of plaster and poured a thin layer into the creek, filling in around the rock castings and the trestle pilings. The plaster was just thick enough not to sit completely level, making a realistic variety of slightly deeper and shallower spots.

Scenery. Once everything dried, I painted the rocks in the river the same colors as the surrounding rock outcroppings. (See page 54.) I then applied a base coat of brown latex house paint, as shown in the middle photo on the previous page.

I applied the scenery to the banks and surrounding ground first, using a variety of ground foams, static grasses, and dirt. Then I turned my attention back to the creek bed.

While working on this project, I'd bought a bag of cheap sand to fill the sandbags we use as tripod weights for MR Video Plus. The material had different sized grains in it, and it seemed perfect for a creek bed, so that's what I used. I brushed the creek bottom with a coat of white glue, and using a spoon, sifted on the sand until I was happy with how it looked.

As a last scenery step, I misted the area with 70 percent isopropyl alcohol and soaked the banks and bed with Woodland Scenics Scenic Cement, as shown in the bottom photo on the previous page. I then let everything dry for a couple of days.

Water. Before applying the resin to represent water, I had to build a dam at each end of the creek. I taped strips of .040" styrene to the benchwork, then sealed the dams with clear latex caulk. The caulk sets up fairly quickly, so I was able to resume working after just a couple of hours.

The Magic Water resin is very easy to use. Following the instructions, I poured the resin and the hardener in a disposable plastic container. The material is cloudy until it's mixed, so I stirred it slowly with a stick until it turned clear. I then carefully filled the creek, pouring the resin in the center and letting it work its way to the edges.

The resin usually takes 1 to 2 days to cure.

Final work. Resin creep – material seeping into the surrounding scenery – is just a part of working with most water products. After the resin hardened, I touched up the bits of scenery affected by resin creep by brushing on full-strength white glue and sprinkling on more scenery material. You don't want to add too much Scenic Cement here, as it can seep under the resin and ruin it.

Finally, I used Woodland Scenics Water Effects paste to make some ripples, as shown in the bottom photo.
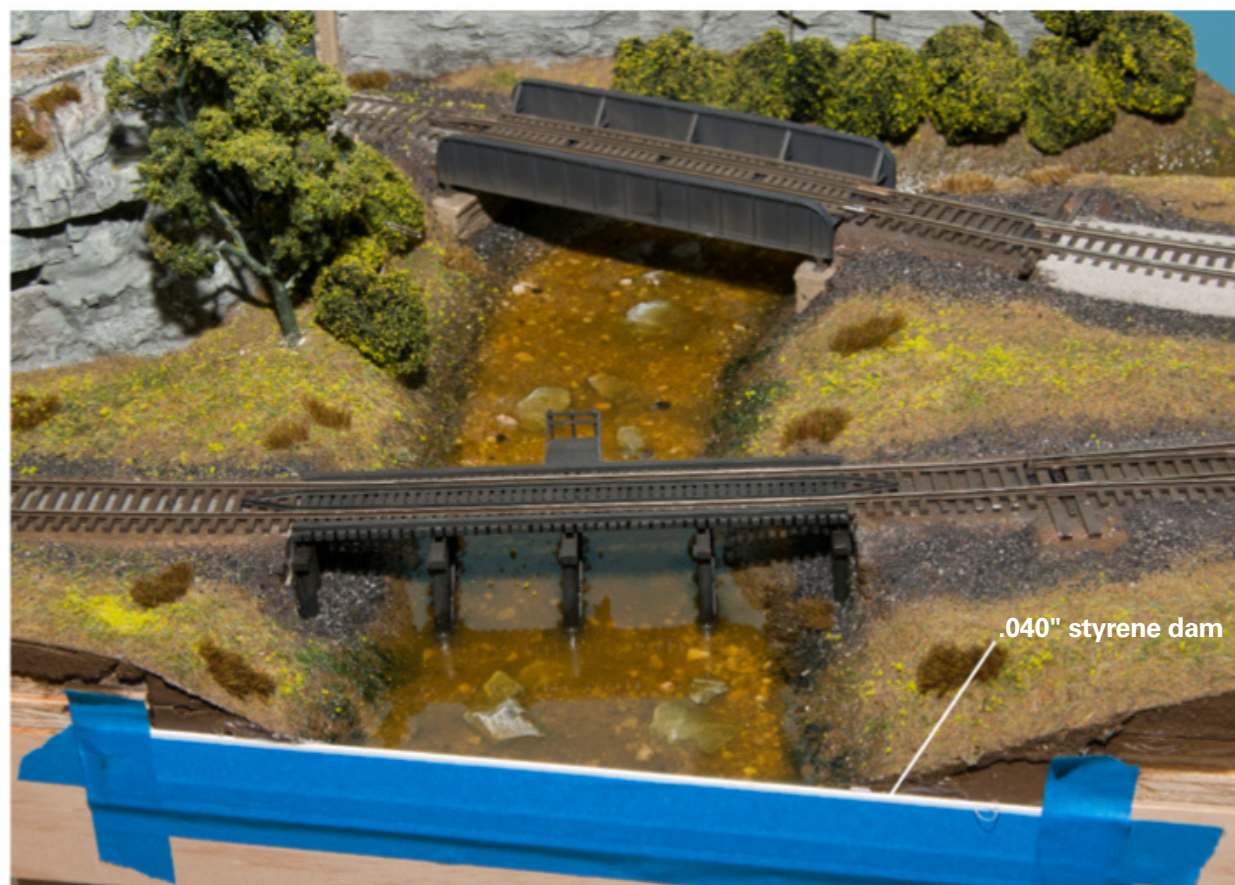
.040" styrene dam

Before pouring the resin, David installed styrene dams at each end of the creek. The styrene is held in place with tape and sealed with clear latex caulk.

Glue covers resin creep

The resin will creep into the scenery. After the resin cured, David repaired the scenery by brushing the "wet" spots with white glue and sprinkling on more turf.

Place rapids over sunken rocks
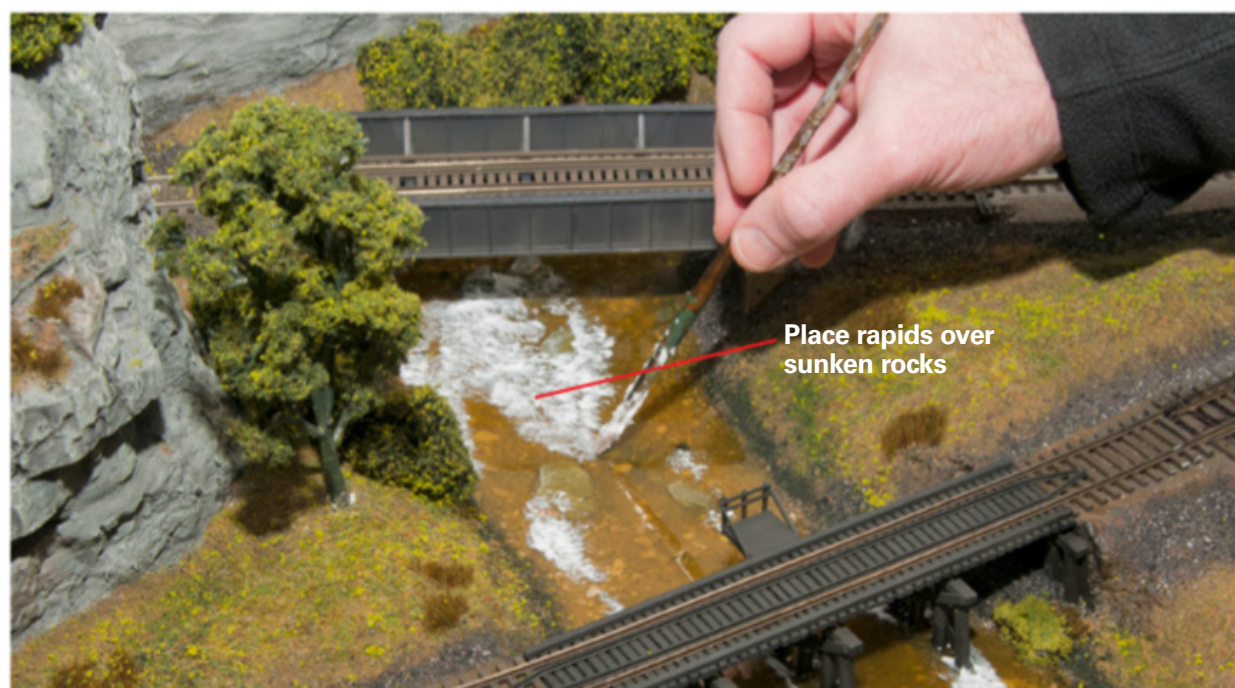
To give the water movement, David used Woodland Scenics Water Effects paste to model waves and ripples. The paste goes on white but dries clear.

Being somewhat round, puff-ball trees will roll away before the glue sets. To prevent this, David used pins to temporarily hold them in place.

Hero tree

In addition to the puff-ball trees, David added some "hero" trees, which were detailed with trunks and branches. He drilled holes in the scenery to plant them.

Scenery is a backdrop to the trains. By combining puff balls with a few model trees, the finished scene looks believable but doesn't require thousands of trees.

Tree-covered hillsides are a common feature of the Appalachian Mountains, and we were going to need a lot of trees even for our relatively small Thin Branch layout.

To fill the hills with model trees complete with trunks and branches would be a waste of time and material. During seasons where the trees have leaves, most distant tree-covered hillsides look like one large mass of treetops. Since the treetops are all that's seen, there was no need to model the rest of the tree, so I opted to use the puff-ball canopy method used on the original Virginian project railroad. (See the April 2012 issue of *Model Railroader*.)

Since former MR editor Neil Besougloff had done such a nice job on the hundreds of puff-ball trees he'd made for the original Virginian layout, I had him come back to make a few more batches for our branch line.

Neil's process is very easy. Using Micro-Mark's brown poly fiber, he first pulls out a small tuft of the material and rolls it into a golf-ball-sized clump. He then dips the clump into 50/50 mixture of white glue and water. After squeezing out the excess liquid, he reshapes the poly fiber into a ball.

Next, Neil rolls the wet ball into two colors of ground foam – Woodland Scenics blended green and burnt grass turf. The ground foam doesn't completely cover the ball, which is good because the dark poly fiber that still shows through creates shadows in the finished canopy.

As a final step, Neil lightly dusts the ball with Scenic Express light green foam. This technique simulates sun highlights on the top leaves, adding another layer of definition.

Planting. As Neil completed batches of trees, he and I attached them to the layout with white glue while they were still wet. The wet puff balls are pliable and easy to shape, and once the glue dries, the balls lock together. On sloped areas of the scenery, we used pins to temporarily hold the trees in place until the glue dried.

Later, I added a few "hero" trees. These are trees with complete trunk and branch armatures. I used JTT trees that I covered with the same ground foam as Neil's puff-ball trees.

The hero trees add needed detail to the finished tree canopy, making it believable that under each of the puff balls there's still a complete tree.

Because of its remote locale, there aren't many structures on the Thin Branch project railroad.

The pulpwood yard has an office, built by associate editor Steven Otte. He made it using a Bar Mills no. 742 H.J. Simpson Feed & Seed wood structure kit, following the instructions, then hand-painting it.

The pulpwood pile is a Walthers no. 933-3905 resin casting. Although the casting is finished, as shown in the top photo, I repainted it with acrylic paints to better match the layout.

The mine supply company is made from two buildings. The warehouse is a Walthers no. 933-3529 plastic kit. Retired senior editor Jim Hediger built the model and spray-painted it tan.

The office building is a Rix Quonset Hut. To elevate the hut to the level of the warehouse, I built a stripwood foundation under it. The stairs are made from stripwood, as well.

Since I couldn't find a suitable compact model of a coal tipple, I kitbashed one from parts of a Walthers no. 933-3062 Glacier Gravel kit left over from the Winter Hill quarry addition project. After looking at photos of several tipples, I made a template of the footprint and then cut and fit parts until I had a reasonable representation of a tipple. The legs are scratchbuilt from styrene. **MR**

Add scenery around bottom of casting

The pulpwood pile is a Walthers casting that David repainted. He applied the same ink stain he'd used on the rocks before gluing it to the layout.

Stripwood foundation

The mine supply warehouse has a Quonset hut attached to it. David built a stripwood foundation for the Rix model to raise it even with the warehouse.

The coal tipple on the layout is kitbashed from a Walthers Glacier Gravel kit. The concrete supports are painted styrene.

EDITOR'S CHOICE
DANA KAWALA
SENIOR EDITOR

A Western Maryland transfer run passes the Pratt Coal Co. and Oriole Millwork Co. in Highlandtown. Paul Dolkos describes how he developed this urban scene on his HO scale layout from mock-ups (inset) to finished models.

How to plan and build an
urban scene

Design and construction tips for a transition-era working-class district

By Paul J. Dolkos • Photos by the author

When planning a model railroad scene, you should think like a real estate developer. You should ask yourself what your objectives are and how to get the most out of your available space. As I began my HO scale Baltimore Harbor District layout, I had to switch gears from thinking about the bucolic New England scenes of my former HO Boston & Maine layout [This layout was first featured in the December 1995 *Model Railroader. – Ed.*] to the gritty industrial settings of an urban waterfront railroad. You can read more about my Baltimore

Harbor District in *Great Model Railroads 2021,* which reaches hobby shops and newsstands October 2020.

The first scene I completed on the layout was Highlandtown. On the track plan I'd drawn structures and sidings that included a millwork factory and a large meat packing plant. Located in an alcove somewhat isolated from the rest of the layout, Highlandtown would have operations similar to those of a small rural town, but with an urban flavor.

I'll show you some of the techniques that I used to plan and build this urban scene set in 1955.

Paul Dolkos is a frequent contributor to Model Railroader, Great Model Railroads, *and* Model Railroad Planning. *He also wrote articles for the special issue* How To Model Railroads of the 1950s, *available from KalmbachHobbyStore.com*

SEE IT IN ACTION

A video tour of Paul Dolkos' Baltimore Harbor is available under the Layout Visits tab at Model Railroader Video Plus. Visit MRVideoPlus.com.

Track plan for Highlandtown
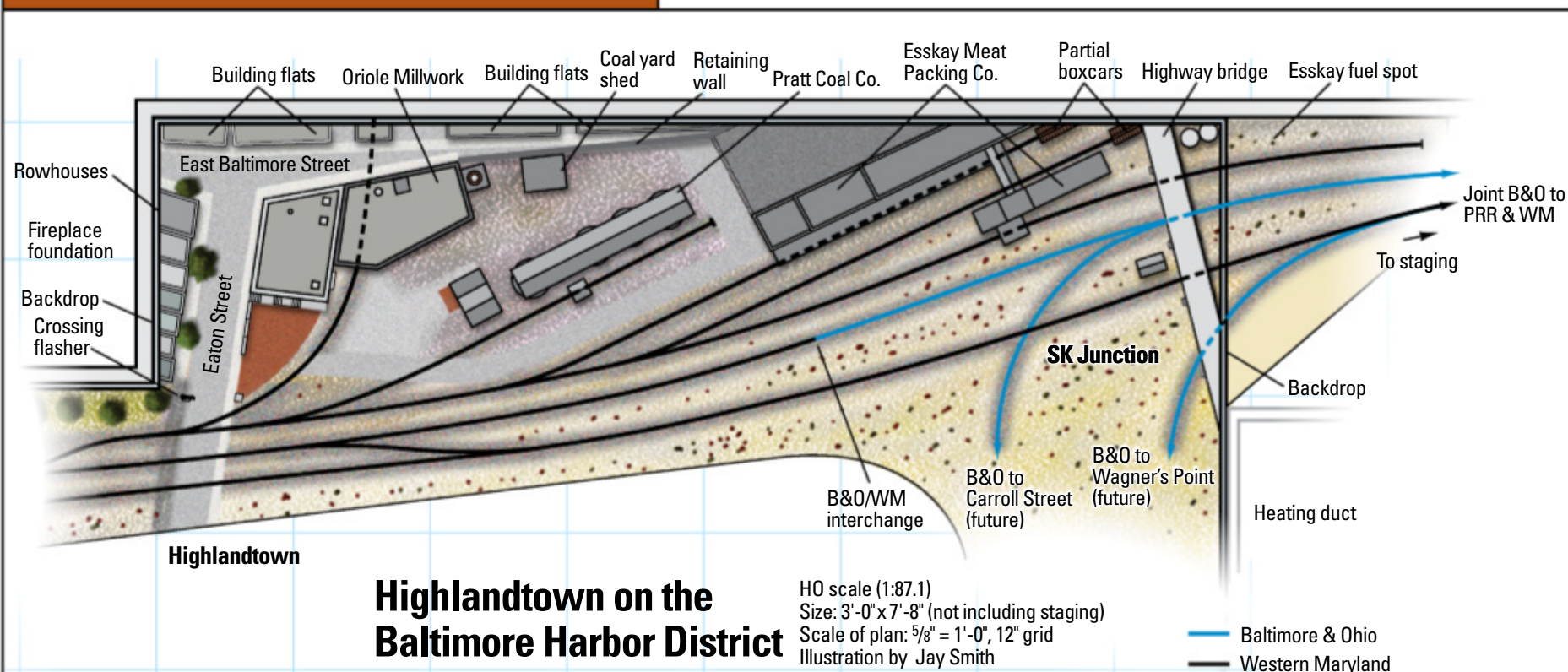
Highlandtown on the Baltimore Harbor District

HO scale (1:87.1)
Size: 3'-0" x 7'-8" (not including staging)
Scale of plan: 5/8" = 1'-0", 12" grid
Illustration by Jay Smith

Find more plans online in the ModelRailroader.com Track Plan Database.

Baltimore & Ohio
Western Maryland

Most of Highlandtown is in an alcove formed by a chimney base that protrudes from the wall and the corner of the layout room. Hidden tracks enter the scene from staging.

Because the main tracks could run in front of the chimney, it proved easier to have the spurs run toward the room corner. Running spurs the opposite direction would require either a switchback or a crossing.

I chose industries that would enhance operations. The Esskay Meat Packing Co. could be a destination for long strings of refrigerator cars. Inspired by a photo in the Baltimore Museum of Industry, I added a millwork factory to the scene.

Another "industry" I'd planned was a team track because it would provide a lot of switching in a small space and could host almost any type of car. However, as you'll see, plans can change once construction begins.

Building flats
Kit walls (millwork factory)
Spray paint cans (coal silos)
Cardboard mock-up (meat packing plant)
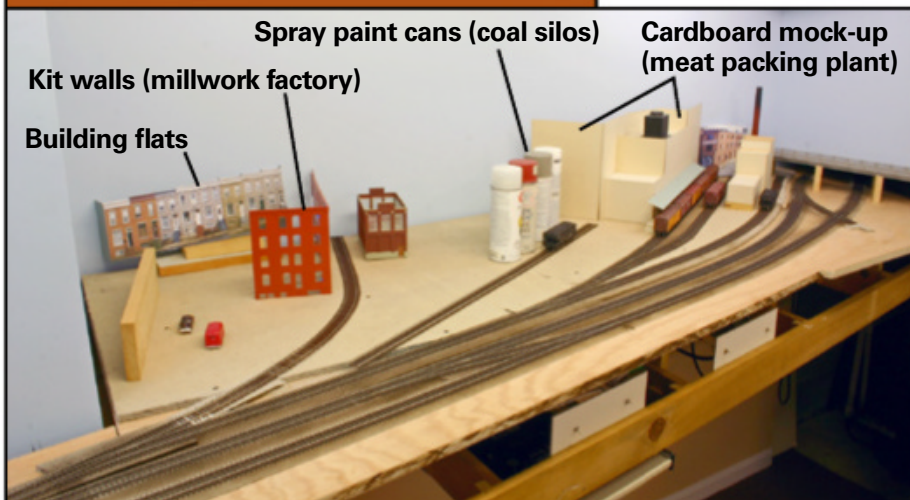
Including partial kits for the millwork factory and a cardboard stand-in for the meat packing plant, Paul used mock-ups to determine the size, shape, and placement of the Highlandtown industries. The spray paint cans represent the silos of a coal dealer, which Paul decided would look better in that location than the team track he'd originally planned.

Cardboard mock-up
Styrene wall of the future model
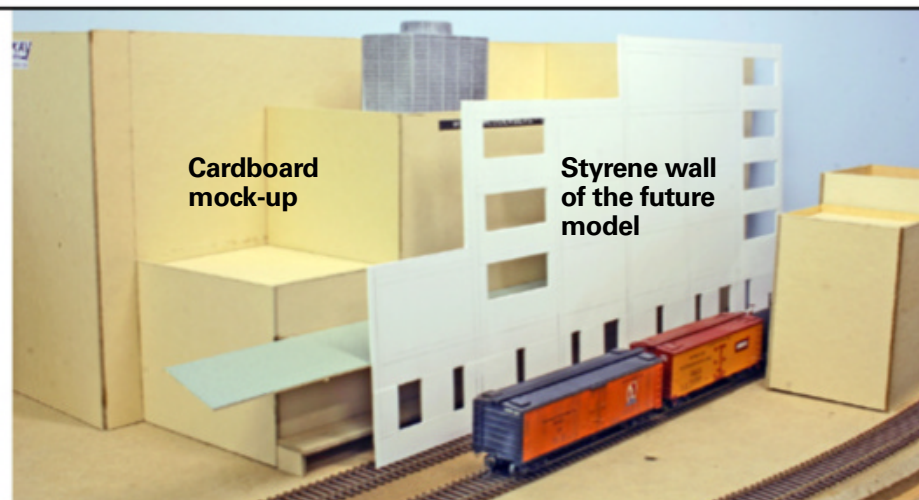
The meat packing plant is the largest and most complex structure in Highlandtown. To make sure that the spurs would work, Paul built a dimensionally accurate mock-up out of cardstock. His mock-up included not only the main structures, but also a roof that ran over the unloading platform. He would eventually scratchbuild the meat packing plant structures out of styrene.

Millwork factory
Paper template
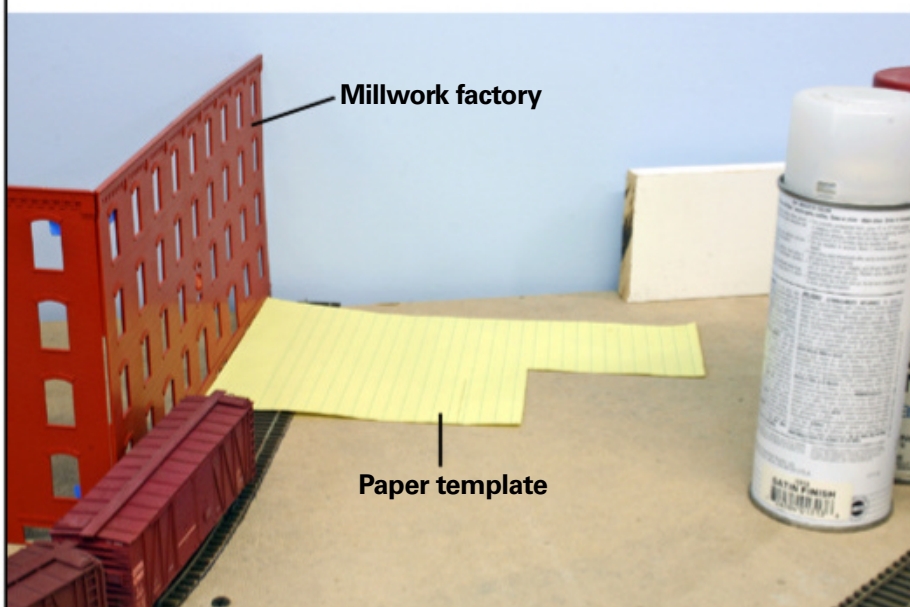
A simple paper template cut to the footprint of a proposed building can be a big help determining the best size and location for a model. Paul used the paper template above to check the size and placement of an addition to the millwork factory.

Pad stands in for Eaton Street
Partially built structures
Spur enters building

During layout construction, Paul frequently placed the partially built millwork factory on the layout to ensure that the sidings would fit. This was especially critical for the spur that entered one of the buildings. The note pad on the left represents Eaton Street.

As you move from layout planning to construction, you should ask yourself some hard questions. Is the track plan on paper really practical to model? How will all the structures, track, and scenery fit together to form the finished scene? Building mock-ups of structures or scenery elements helps answer those questions. Simply using a piece of paper cut to the footprint of a structure will help verify that the finished model will fit in the planned location.

For example, I had second thoughts about the team track after building mock-ups of the Highlandtown structures. The wall behind the scene is blank, and the team track left a large open space between the meat packing plant and the millwork factory. A multi-story building in this location would do a better job inhibiting the view of the blank wall. Instead of a team track, I ended up modeling a retail coal dealer with tall storage silos to act as a view block.

As you can see in the photos, I used anything that was the approximate shape of the envisioned structure or scenic element for my mock-ups. I used spray paint cans to represent coal silos and a pad of paper for a city street. This step gave me a preliminary sense of what worked and what didn't for the scene.

For the meat packing plant I first used two small Walthers structures as a mock-up. However, since the meat packing plant is the largest industry on the layout, I took the time to build mock-ups out of cardboard that were more representative of the large finished model I had in mind.

Mock-ups and pieces of flextrack helped me determine siding arrangements. During this design phase I improved access for manually uncoupling cars by reducing the length of one of the packing plant structures. I also angled the structures in relation to the main line, which made the models look like part of a larger complex.

Once I had the walls of a structure together, the partially built model would take the place of the mock-up. This was especially critical for the millwork factory, where a spur entered one of the buildings.
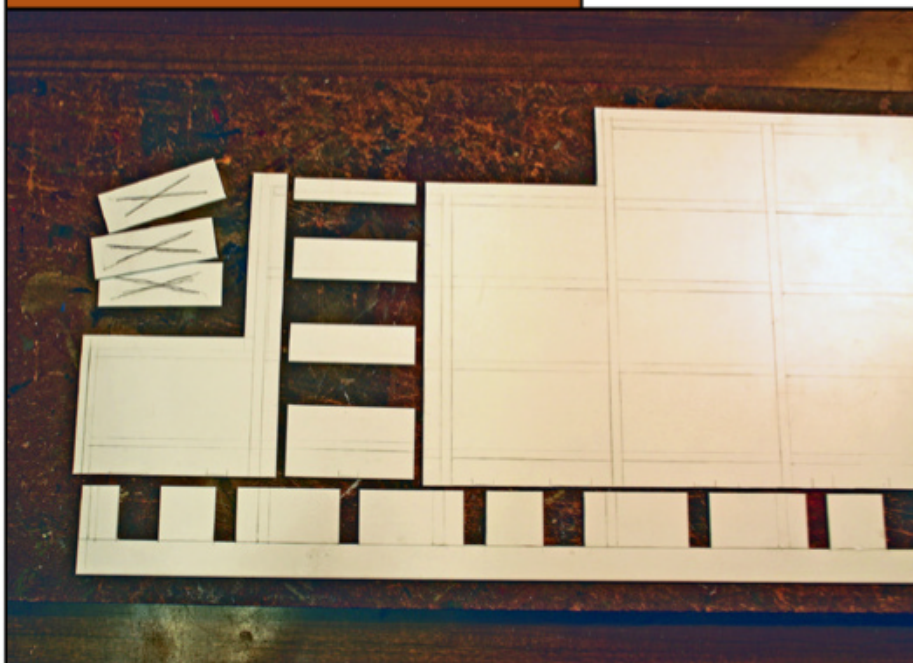
Paul laid out pieces for each wall section of the packing plant on .060" styrene sheet. He then cut out the pieces and cemented them back together to make the wall.
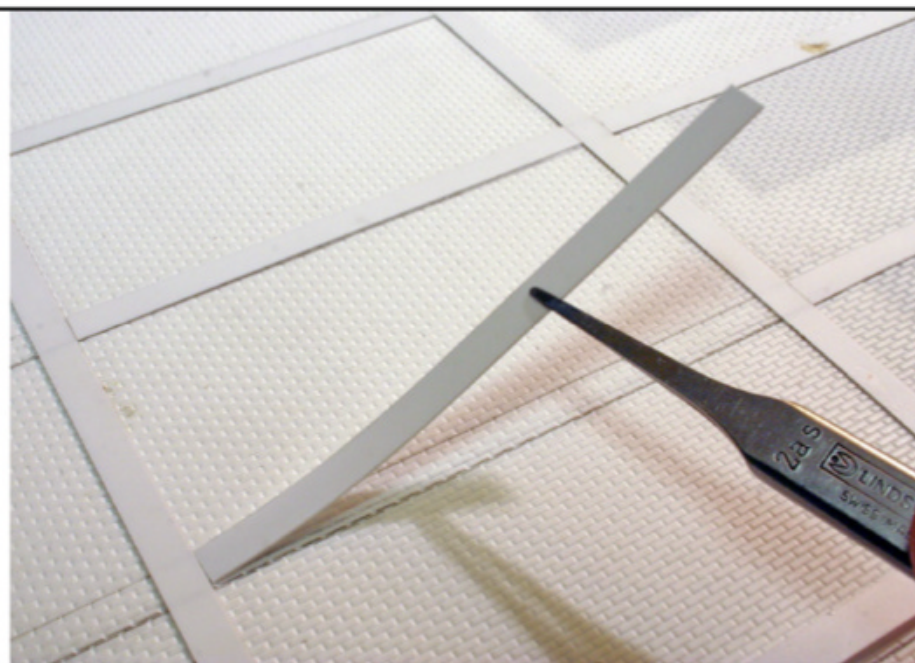
Paul laminated .020" styrene brick sheet to each wall section. He then cemented .010" styrene strip to the wall to represent a concrete frame.

Paul test fit the partially built packing plant before final painting and detailing. The angled walls of the model help it appear as if it's part of a larger complex that stretches beyond the backdrop. Once the final structure is painted, Paul will add window frames and glazing.

Stripwood cribbing

Before installing the coal company office, Paul glued down stripwood cribbing around the structure's footprint and applied scenery over the top of it. This step eliminated the gap between the finished structure and the scenery base, as you can see in the inset photo.

I used one kit-built structure in this scene, the Atlas Middlesex Manufacturing factory. That structure makes up part of the millwork factory. I would have used more kits, since they speed up construction, but I didn't find any more that fit my vision for Highlandtown.

The meat packing plant, coal dealer, and the rest of the millwork factory are made of styrene sheet and strips. For the brick surfaces, I use HO scale textured sheets from The N Scale Architect (www.thenarch.com). These sheets are available in several scales and are only .020" thick.

I started each structure project by laying out the interior walls with a pencil and straightedge on .060" styrene sheet. Following the lines, I used a hobby knife to score the styrene with several light passes, so I could then easily bend and snap it apart. As I glued the wall pieces back together minus the window panels, I found the process similar to assembling a jigsaw puzzle.

The next step was to laminate the brick to the outside of the walls. It's easy to cut out the window and door openings in the thin outer wall using the openings in the

.060" styrene core as a guide. Unless I'm building a particularly large structure, I don't need to add any additional interior bracing.

Whether kit built or scratchbuilt, a structure model needs to look like it's rooted in the ground and not just sitting on top of a Homasote sheet. A gap between the bottom of a structure model and the layout surface looks very unrealistic.

After tracing the perimeter of a structure on the scenery base, I construct a crib out of $\frac{1}{16}$" or $\frac{3}{32}$" stripwood. Following the structure's perimeter, I glued the stripwood to the scenery base. Then I spread ground cover, such as fine dirt or colored plaster, up and over the cribbing. I used scenic cement or diluted white glue to affix the ground cover.

This technique creates a shallow cellar that hides the gap between the walls and the ground when the building is installed. It looks like the building has an actual foundation. The ground material isn't attached to the structure, so the model can be easily removed when necessary.

Meat packing plant

Dark staging area

A Western Maryland transfer run passes the meat packing plant on its way out of staging. A highway bridge helps to somewhat disguise the opening in the wallboard.

However, the dark staging area seen on the right is a sharp contrast to the sky-blue backdrop and diminishes the realism of the overall scene.

Lighted staging area

Brick walls along backdrop

Highway bridge

Gravel pile

S K JUNCTION
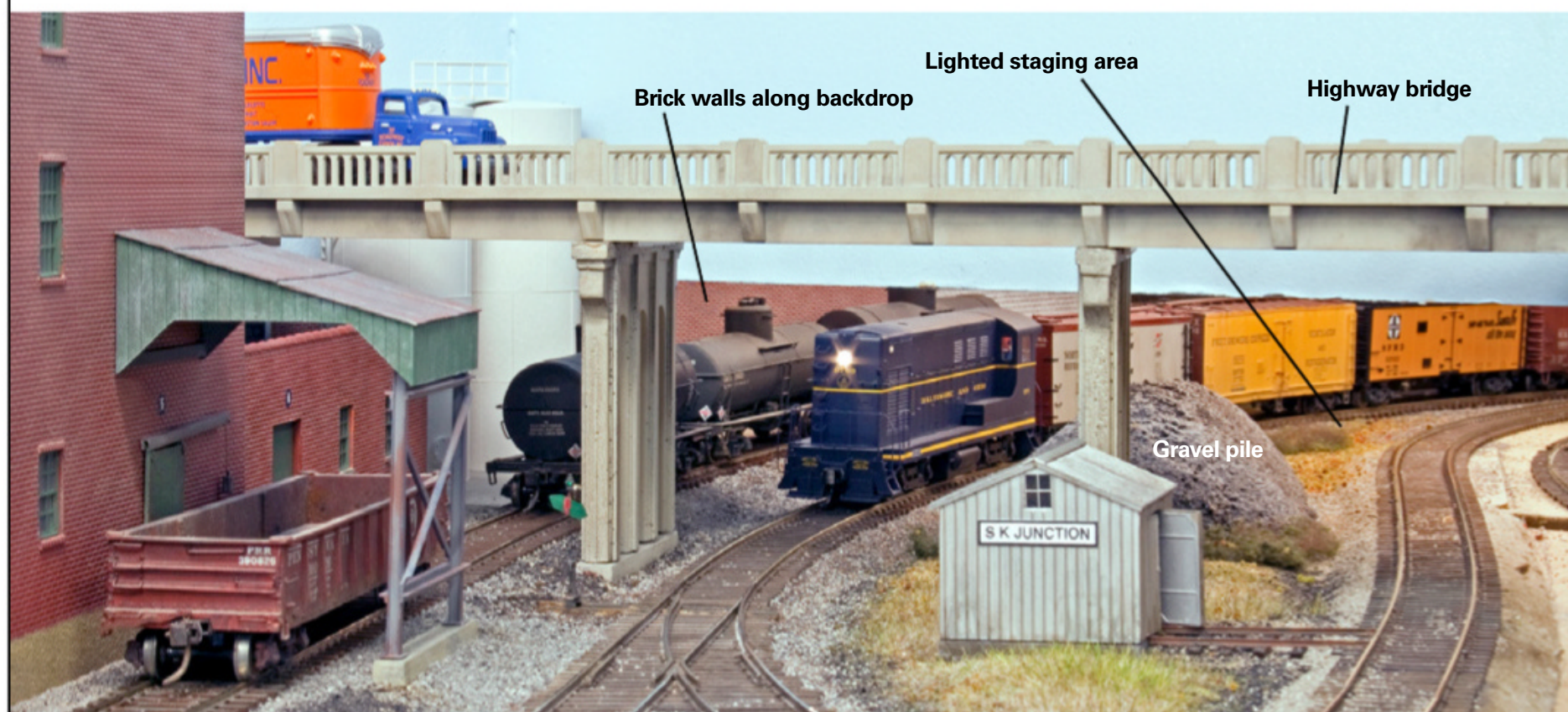
Even though the opening in the wallboard isn't ideal, keeping the staging area lit makes the scene look more realistic. Paul also added some brick wall sections to the backdrops in staging and a gravel pile that acts as a partial view block.

Three tracks and an additional track that will ultimately be hidden emerge from under the basement steps through the wall into Highlandtown. The view from the aisle is directly into the opening under the wall. Since I couldn't have a discreet entrance, such as a single tunnel portal, I took a different approach.

First I placed a long highway bridge across the opening. This structure helped, but you could still see under it. If I kept the space under the steps dark, that would limit what's seen beyond the wall. However, since

the tracks aren't coming out of a tunnel, this darkness makes the abrupt transition more noticeable.

Instead I lit the space under the stairs and added some details that made the visible parts of the staging area look like it was a continuation of the Highlandtown scene. I ballasted the tracks running behind the bridge into staging and added a gravel pile to act as a partial view block. The meat-packing plant's fuel spur extends into staging, so I've also added some brick walls to suggest structures back there.

Industrial bridge

Boxcar ends

Pipes
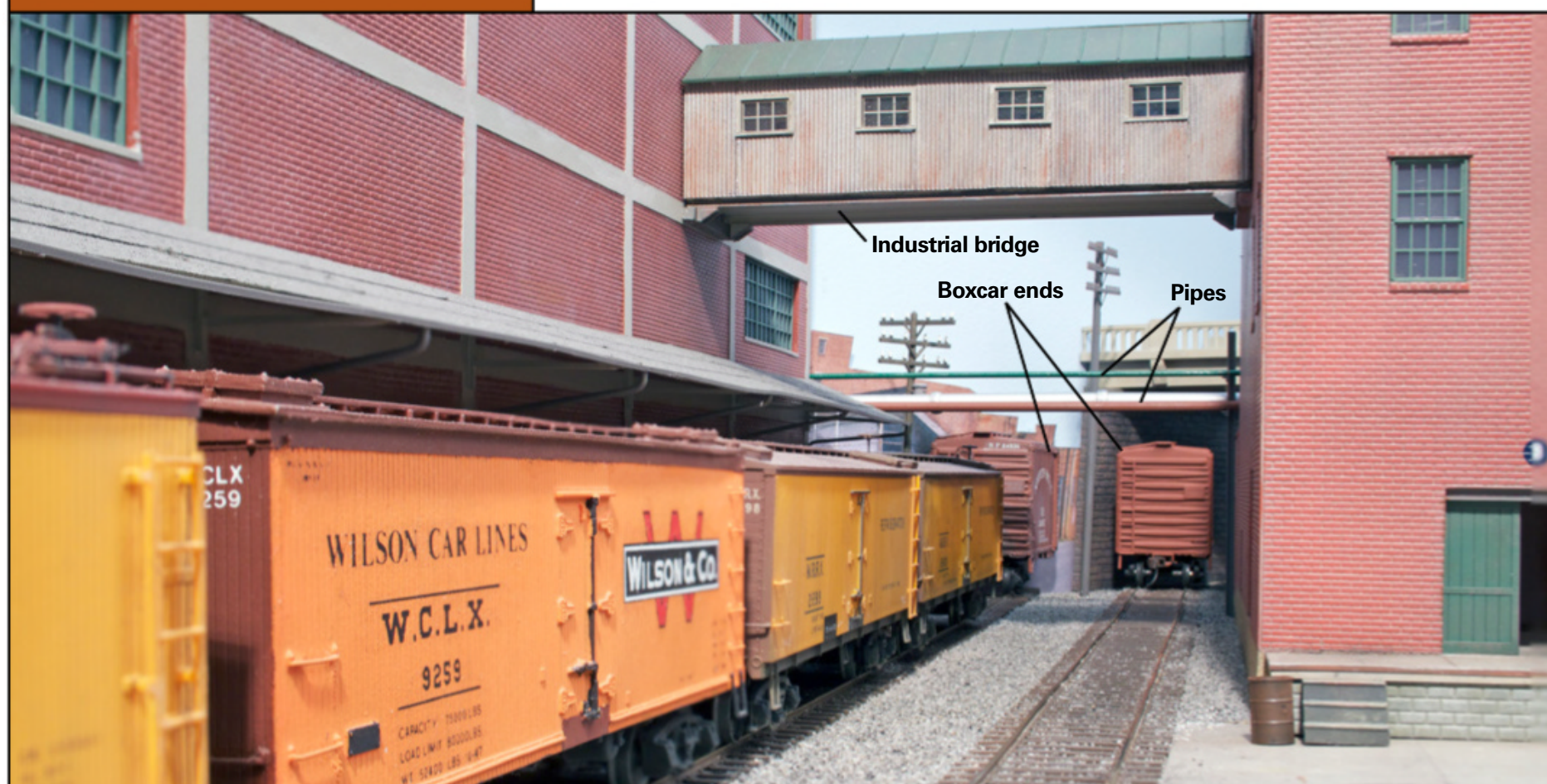
The packing plant spurs run between two buildings and end at the wall. The industrial bridge and piping act as a view block, while the photo on the wall and boxcar ends make the spurs appear longer.

Photo on backdrop

Boxcar ends cut at an angle

Abutment

Knuckle modified to prevent coupling
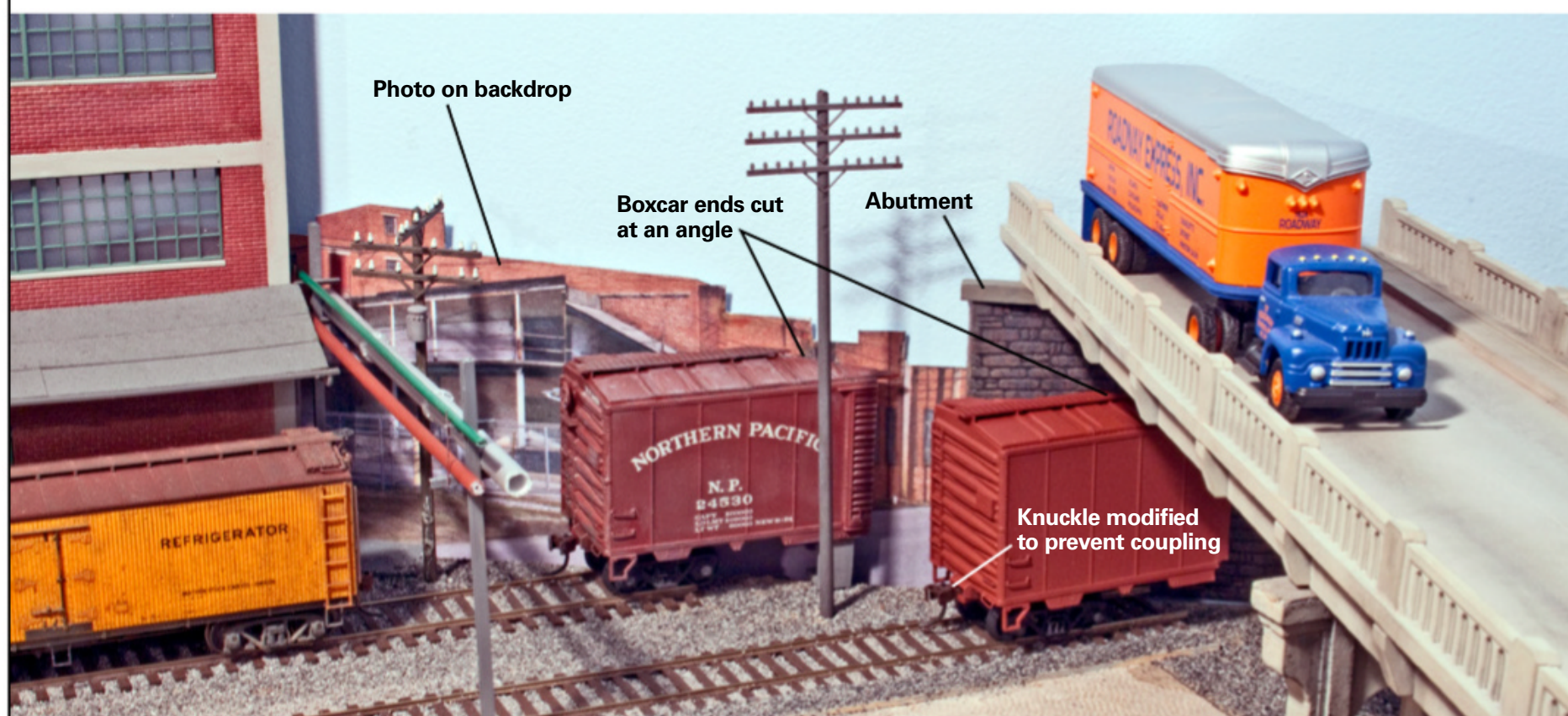
With the foreground building removed you can see how Paul cut the boxcar ends at an angle to fit against the wall. The highway bridge and abutment also help hide the ends of the spurs.

The meat packing plant spurs run between two buildings and end abruptly at the wall. While the viewing angle between the buildings helped operators work the spurs, the blank wall made it obvious that I had only partial buildings and track. Adding a mirror to the wall would have helped make the spurs and building appear longer, but it would also have reflected the movements of the operators and spoiled the illusion.

Instead I added an industrial bridge and piping that ran above the spurs and connected the two buildings. This approach helped but didn't create enough of a view block at the end of the spurs.

To make these tracks appear longer I used one boxcar to make two low-relief models. I cut the boxcar in half on an angle so each section would fit against the wall. Each model is painted differently and has the knuckle of its coupler removed. I didn't want my operators to inadvertently couple a reefer to one of the half boxcars.

A photo print along the wall and some utility poles help complete the illusion of a longer pair of spurs.

Stripwood forms
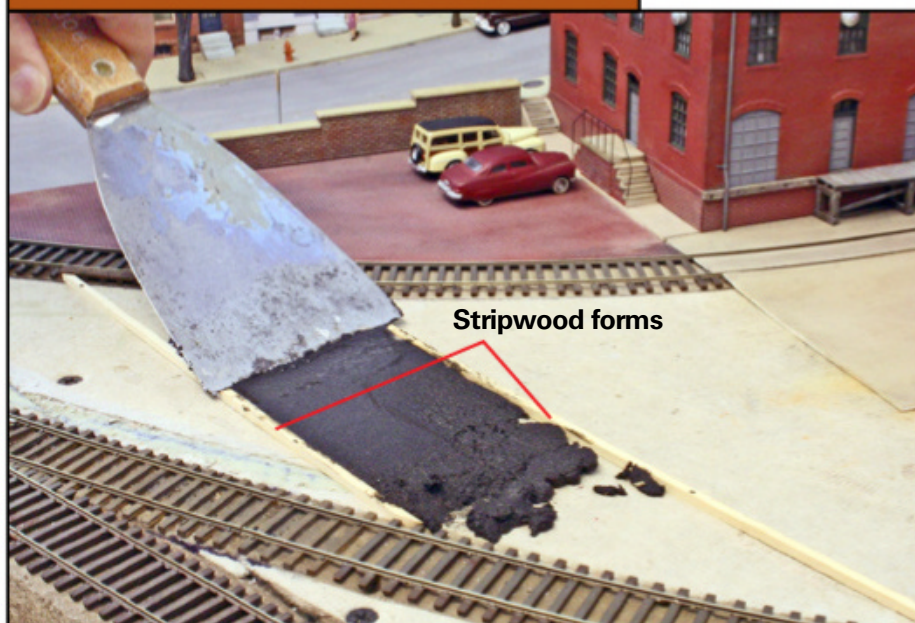
Stripwood forms mark the boundary of a driveway. Paul then spreads asphalt paving material evenly between the forms with a putty knife or trowel.

Driveway weathered with pastels
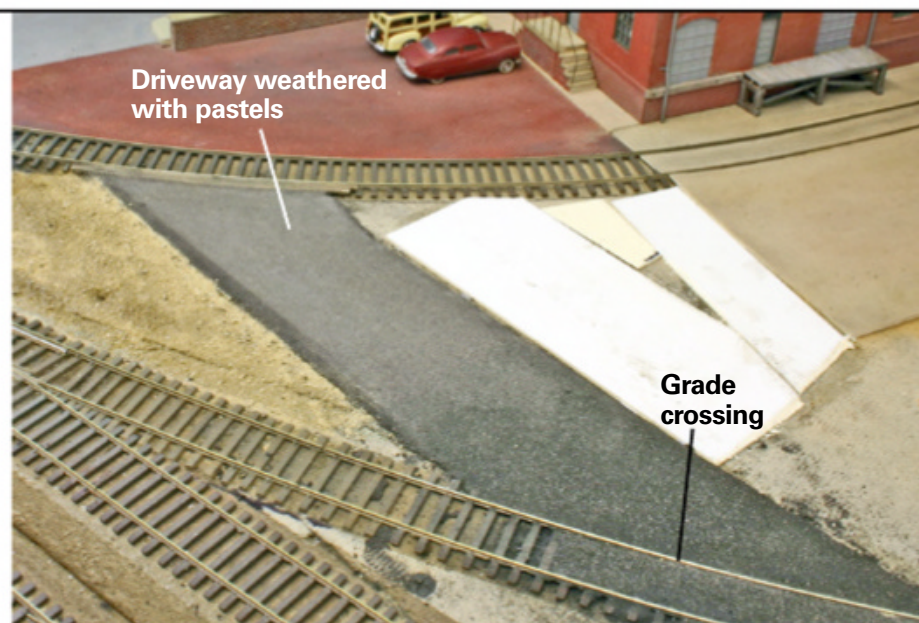
Grade crossing

Once it dries, Paul removes the forms and weathers the asphalt with gray powdered pastel. The asphalt paving material also works well for grade crossings.

BALTIMORE TOOL WORKS

Eaton Street and the sidewalks are made of styrene. This street is on a grade so Paul glued the styrene to Styrofoam blocks. He then sprayed both surfaces with an initial coat of Rust-Oleum Desert Bisque. This textured paint gives the styrene a gritty appearance.

Paul scratchbuilt the Eaton Street and pedestrian walkway grade crossings following prototype plans. He glued styrene shims to the tops of the ties before adding the wood. This step made the grade crossing slightly lower than the tops of the rails.

Roadways and sidewalks are a major component of urban scenery, and I used a couple of different techniques to model them.

For asphalt roads and driveways in the scene, I used Arizona Rock & Mineral Asphalt Paving Material (item no. 1030). I mixed this material, a fine black powder, with white glue and water until it was the consistency of joint compound.

I used stripwood forms to define the boundary of the asphalt roadways. After applying the paving material with a plastic spoon, I pulled a putty knife or trowel along the edges of the forms to level the asphalt. After the material dried I filled in any gaps or depressions.

This paving material also worked well for an asphalt grade crossing at the Oriole Millwork Co. spur. I spread the paving material between the rails and used an old freight car truck to make the flangeways. I leveled the asphalt with my trowel to make sure it wasn't higher than the tops of the rails.

As the material dried I kept checking the flangeways. If they were too tight, I opened the gap with the blade of a flat screwdriver.

The asphalt dries to a very dark gray that's almost black. This color is fine for a freshly paved road. However, a driveway exposed to the hot sun doesn't stay this color for long.

To weather the asphalt I start by lightly sanding the surface, which helps fade its color. Then I add gray powdered pastel. A light mist of clear matte sealant, such as Testor's Dullcote, will seal the pastel powder.

Eaton Street is plain styrene and the sidewalks are scored styrene stock from Evergreen Scale Models. For both surfaces I start by applying Rust-Oleum Desert Bisque, which is a textured paint that comes in a spray can. After that coat dried, I painted the street with Polly Scale *Pacemaker* Gray and the sidewalks with Polly Scale Aged Concrete. The subtle gritty texture from the Desert Bisque breaks up the smoothness of the styrene, making the surface look more like asphalt or concrete.

I scratchbuilt the wood grade-crossing panels at Eaton Street from prototype plans. The stripwood I had was too thin, so I added shims to the tops of the ties before gluing down the wood. The shims brought the top surface of the grade crossing to just below the tops of the rails.

Tree planting area
cut out of sidewalk

Etched-metal
sewer grate

Stop line

Etched-metal manhole cover

Paul added trees, manhole covers, pavement markings, and other details on Eaton Street.

This background building is made from a photograph that Paul took during a field trip to Baltimore.

Baltimore & Ohio no. 9709, a Fairbanks-Morse H10-44, hauls a transfer run across Eaton Street. The crossing guard figure and shanty and the crossing signals are era-appropriate details that help complete the scene.

I added planting areas for trees in the sidewalks along the street. You may be tempted to ignore trees in an urban scene, but they're commonly found in real cities and towns. Like their full-size counterparts on a city street, I think trees make an urban scene on a model railroad more inviting. I keep the foliage on these trees thin so they don't completely obscure the scene behind them.

Other scenery details include etched-metal manhole covers and sewer grates from Model Memories (ModelMemories.com). These parts are easy to paint and glue to the finished pavement. I also painted pavement markings appropriate for my layout's 1955 setting.

I used figures dressed in era-appropriate clothing, as well as vehicles that make sense for 1955. [For more information on choosing vehicles, see "Vehicles of the 1950s" and "Trucks drive home your layout's era" in *How To Model Railroads of the 1950s. – Ed.*]

Finally I added signs with the names of businesses that helped identify the layout with the city of Baltimore. Some of the names are businesses or streets that actually existed, while others simply sound plausible. The free-lanced Oriole Millwork Co. takes its name from the Maryland state bird and Baltimore baseball team.

Esskay was the city's largest meat packing plant, and though that structure has been razed, Esskay products are still sold. There also was a Pratt Coal Co., although I actually named the structure after Pratt Street. This street was a main downtown thoroughfare and the stomping ground for B&O's "Little Joe" 0-4-0T tank engines. I made these signs with a computer word-processing program and then printed them out on decal paper.

I also used my computer to resize photos for backdrop buildings. One of these photos has a large sign on one wall that reads Baltimore Tool Works.

From the outset of the project until the installation of the final scenery, careful planning made Highlandtown a successful scene. I used the same approach in building the rest of my Baltimore Harbor District. **MR**

WEATHER A
BRICK STRUCTURE

Brick structures show their age in ways that are easy to reproduce on our plastic models. Paint washes and airbrushing can give brick buildings a sense of age that makes them look well used and authentic.

This technique produces brick walls with a well-aged feel

By Steven Otte

Common in residential, commercial, and industrial districts alike, brick buildings are fixtures on model railroads of every era. And while buildings in the first two locations may appear well cared for, industrial structures often show their age. But what might reflect badly on a business looks great on our layouts, giving our structures a sense of realism and history.

Modelers over the years have used many techniques to weather their brick buildings, from drybrushing to airbrushing to paint washes to powders. I've used all of those methods, building up the weathering in layers depending on the material I'm working with and the effect I'm trying to achieve. In this case, I wanted a fairly heavily weathered industrial building, and was working with a plastic kit, so I used several paint-based methods.

I started with Walthers' HO scale Water Street Freight Terminal kit – or, specifically, the two-story half of it.

Walthers sells this part of the structure separately under the name "Brick Office Building." I bought the freight terminal kit because I originally planned to use the single-story half, but I soon realized that with a few modifications, the taller part could be a credible small industry on its own. Also, its height and lack of roof overhangs provided better opportunities for weathering. The warehouse half became a project for another day. Here's what I did with the brick office.

Step 1 Base colors

Steve's first step was to airbrush the entire building with Model Master Concrete acrylic paint. Though the upper part of the structure will be painted red later, this step provides an even base color on both the red kit parts and the white additions.

Steve masked the foundation, steps, and loading dock with blue painter's tape and sprayed the upper portion of the building with Model Master Oxide Red. The color may look unrealistically vivid now, but subsequent steps will tone it down.

After spraying the base brick color, Steve hand-painted the building's trim with Concrete, the same color as the foundation. This will give the structure a unified appearance. He later painted the roof and applied a gravel coating.

I could have assembled the structure as an office building. But using half of the loading dock from the freight house kit and replacing a pair of windows with a roll-up loading door made it into a more interesting rail-served industry. I also had to scratchbuild the lower half of the back wall where the warehouse was originally supposed to attach. So while I was doing that, I included a truck-loading door.

These modifications left me with walls that were part red plastic and part white, so I airbrushed the structure using Testor's Model Master Concrete acrylic paint. (For airbrushing, I thin Model Master paints about 50/50 with water and isopropyl alcohol.) Only the foundation would remain this color, but I sprayed it on the whole building as a primer coat. This ensured that the next coat would have an even base so my changes would not stand out.

I let the Concrete paint dry overnight, then masked the foundation, stairs, and loading dock with blue painter's tape. I next painted the top half of the building with Model Master Oxide Red. This is a fairly vivid color, usually seen only on decorative glazed brick, but I knew that subsequent steps would tone it down.

After removing the tape, I used a fine brush to touch up the Concrete paint on the foundation where the Oxide Red had seeped under the tape. I also hand-painted the building details, like the roof caps and windowsills, with the same color. This gave the building a unified look.

At this time, I also spray-painted the window and door castings with Scalecoat II Coach Olive, a fairly generic industrial color, while they were still on the sprue. I installed the window glazing and set the doors and windows aside for installation at the end of construction.

Step 2 Mortar

Steve flowed a wash made of one part Concrete paint, one part 70 percent isopropyl alcohol, and two parts water between the bricks to simulate mortar. Older buildings or those in the vicinity of steam locomotive exhaust might have darker mortar.

Some modelers like to brush powdered pigments into their brick work to represent mortar. I'd do that with a cast plaster or embossed matboard kit, but when I'm working with a non-porous material like resin or styrene, I prefer paint wash. I make my mortar wash from one part paint, one part 70 percent isopropyl alcohol, and two parts water.

Though your first instinct may be to reach for the Reefer White paint to mix your mortar, think again. Though it may look good close up, from a distance the effect may be a structure that looks pink. Even those buildings made with white mortar wouldn't stay that way for long. Use a light to medium neutral color, or for a particularly old or poorly kept

building, black. I used Concrete for this building to match the foundation.

The alcohol in the mortar wash cuts the surface tension and lets it flow freely. It's important to keep the brick surface level when applying the wash and while it's drying, to avoid puddling. Dip a soft paintbrush in the wash, touch it to the brick, and let it spread through the joints on its own.

Resist the urge to brush the wash around, as that will encourage it to dry on the surface of the brick, rather than in the crevices. If you find you've applied too much, tilt the model slightly and soak up the excess with a clean paintbrush or the corner of a paper towel. Don't wipe. Also keep in mind that the mortar will dry darker than it looks when it's being applied.

Step 3 Repointing

Dark mortar wash
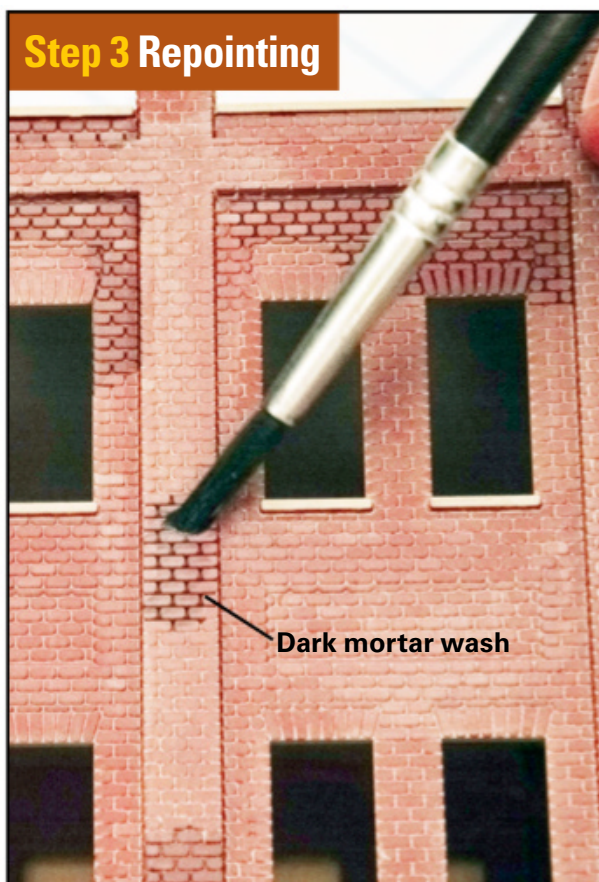
Mortar can deteriorate over time, especially older limestone-based mixes and those exposed to corrosive coal smoke. The process of scraping out crumbling mortar and troweling in new is called repointing or tuck pointing. Though a masonry crew may try to match the color of existing mortar, it's not always a concern.

The result, seen in many older brick buildings, is a patchwork of multiple mortar colors. Stains that may wash off the surface of glazed brick but stick to more porous mortar can also cause this.

After my mortar dried, I repointed random areas by dabbing small amounts of washes made from a few drops of Reefer Gray or Engine Black paint in a quarter teaspoon of isopropyl alcohol. The alcohol's low surface tension makes the wash spread through the cracks without discoloring the brick surface.

I installed the metal and wood loading doors at this point, drybrushing on streaks of Earth and Rust to simulate scrapes from repeated use.

Flowing random spots of different colored mortar wash in between the bricks simulates repointing, the process of replacing crumbling mortar on existing brickwork.

Step 4 Overcoating

Thinned Grimy Black

Rust streaks
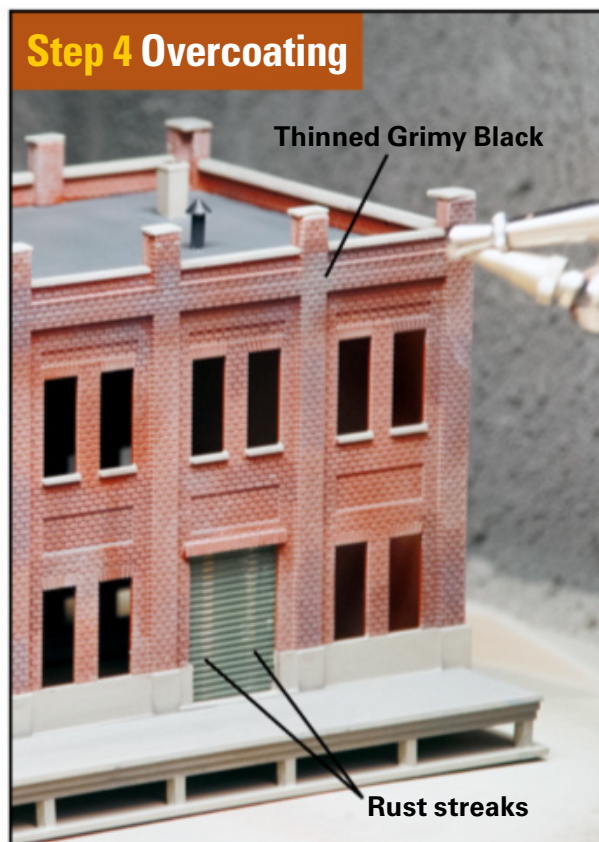
Structures in the steam era quickly acquired a coat of grimy soot from industrial smokestacks and locomotive exhaust. I simulated this on my structure with a light spray of thinned Grimy Black, which also served to tone down and unify the coloring. I diluted one part of Model Master acrylic paint with one part of 70 percent isopropyl alcohol and two parts water, then airbrushed it in light layers. I emphasized the top of the building, especially on the track side, and the vertical pilasters. I also darkened the concrete foundations, which would show more dirt than the darker brick.

Rain serves to wash dust and soot down the sides of a building. Interruptions in the walls, like windows, awnings, or overhangs, divert this flow, making vertical streaks. I airbrushed Earth paint, thinned with water and alcohol as with the Grimy Black, to simulate accumulated dust and detritus from deteriorating concrete windowsills. I also sprayed Earth along the base of the foundation, where more dust would be kicked up by passing traffic.

After the mortar and pointing, Steve unified the colors with a light spray of Grimy Black paint. He concentrated it near the top and on the loading dock side. Next, he sprayed Earth paint below the windows and along the foundation.

Step 5 Simulating a repair

Angle iron guard

Fresh brick and concrete
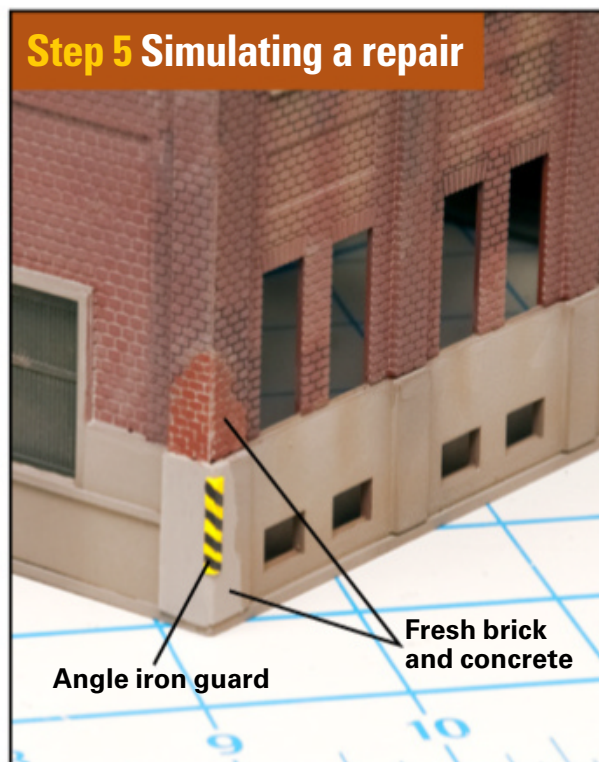
Even small changes to brick buildings are usually obvious. New bricks and mortar stand out against older masonry where a window has been plugged, a door added, or a damaged wall repaired. To give my structure an interesting narrative, I modeled a repair to the corner nearest the truck loading door.

I used the back of a hobby knife to scratch a crack into the concrete foundation, then painted the area on one side of the crack with fresh, unweathered Concrete. I also hand-painted several individual bricks above this area with Oxide Red and flowed in fresh mortar wash. Finally, I protected the corner from future truck damage with an angle iron (actually .080" styrene L-angle) hand-painted with Signal Yellow and Engine Black visibility stripes.

Next, I gave the loading dock the look of aged wood with washes of Grimy Black and Roof Brown, lightly sanding between colors. Finally, I installed the door and window castings and window glazing. MR

By repainting a section of brick and concrete with unweathered colors and a fresh mortar wash, Steve simulated a repair. He also added a metal guard with visibility stripes.

EAGLE
MOUNTAIN
RAILROAD

Build a trestle over a dry wash

A Kaiser Steel U30B leads an ore train onto the trestle on our HO scale Eagle Mountain project layout. Associate editor Steven Otte made the desert scenery and adapted the Blair Line trestle kit to fit the space. Bill Zuback, Steven Otte photos

A wood trestle adds interest to the HO scale Eagle Mountain RR layout

By Steven Otte

An empty layout corner outside of a curve is a great place for a terrain feature above or below track level, such as a hill, creek, or as in this case, a dry wash. On our HO scale Eagle Mountain RR project layout, the corner is crossed by a fiddle track leading off the edge of the layout. We made the scene more interesting by adding a wood trestle across a wash.

The base terrain on the layout is two 1" layers of extruded-foam insulation board. Associate Editor Eric White, who took the lead building the project, cut the basic shape of the wash into the top sheet of foam, giving us a 1" deep bed. Between the two ends of the roadbed on either side, he left a 6" gap, the length of my Blair Line trestle kit. I took it from there.

Since the bridge was designed for a deeper creek bed than our 1" deep wash, my first task was to adapt the trestle to our shallower wash. After assembling it, I turned to scenicking the wash and the surrounding area. Read on to find out how I modified the bridge and combined several natural products to produce our realistic desert ground cover.

MATERIALS LIST

Arizona Rock & Mineral
107 Desert Soil (red soil)
1090C Cumbres Earth (main soil)
1093 Cumbres & Toltec decomposed granite HO ballast (tan gravel)

Blair Line
167 open-deck timber trestle

Busch
1300 ground cover mat set

Highball Products
510 Real Dirt (coarse soil)

Woodland Scenics
1131 Fine-Leaf Foliage, med. green

191 Scenic Cement

Miscellaneous
Leveling sand, dried and sifted

Paper template from kit

¼" tile scribed styrene

.080" square styrene strip

Pre-stained stripwood

Top of pilings cut to fit

Trim ends to 1" height

Assembled bent

Stringer

End trimmed to meet fascia

Micro Engineering bridge track

Homasote roadbed
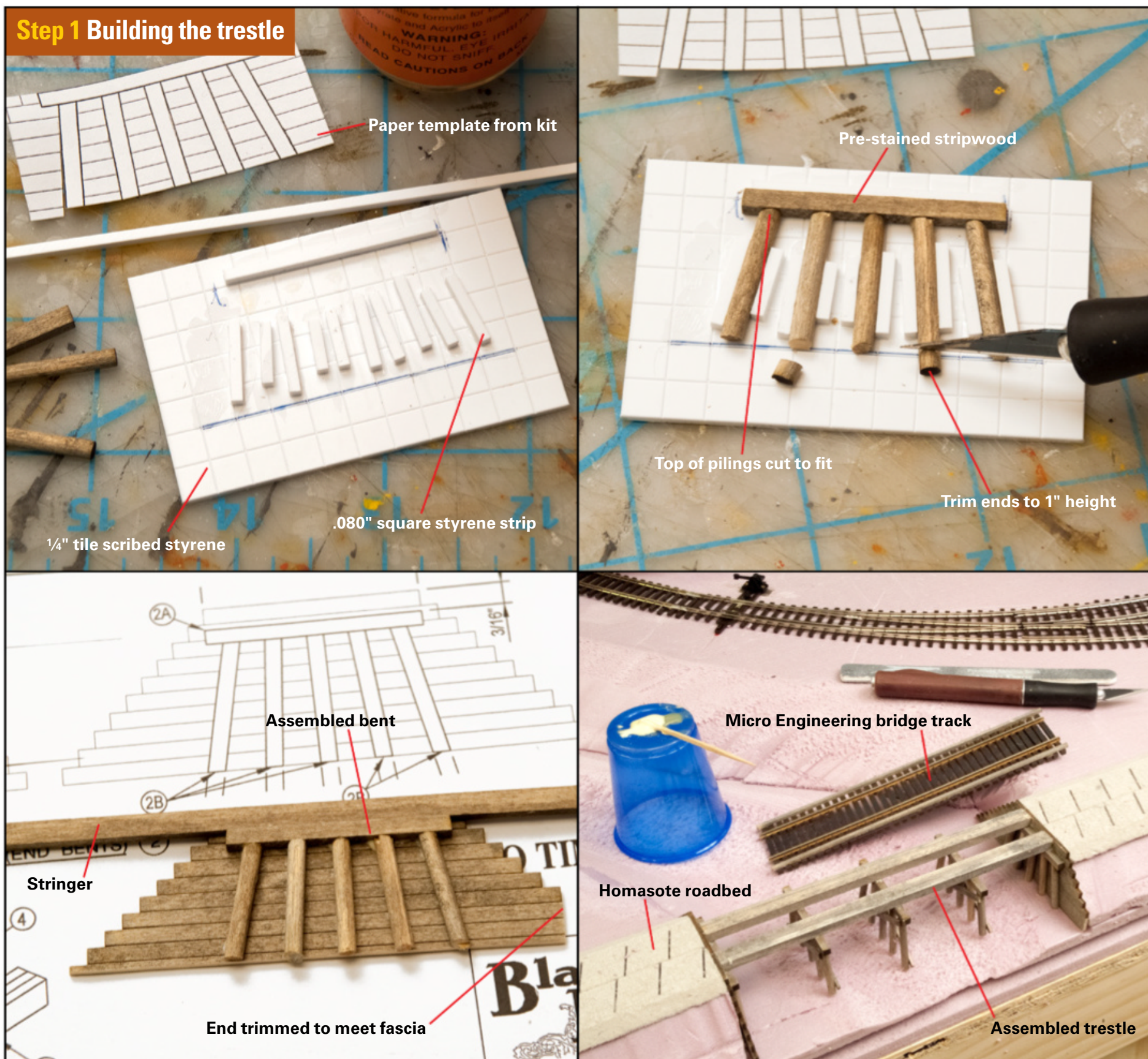
Assembled trestle

The first step in assembling the Blair Line open-deck timber trestle kit (no. 167) was to stain the wood, including the laser-cut end bulkheads. My homemade stain is about ¼ ounce of Model Master Engine Black paint in a pint of 70 percent isopropyl alcohol.

Next, I measured the space. Eric left me a gap of exactly 6" wide, which was the length of the trestle, so I didn't have to modify that dimension. The height, though, was different. The trestle is about 1¾" tall, while our dry wash was 1" deep. The Homasote subroadbed on either side of the wash was ³⁄₁₆" thick, the same as the height of the trestle's wood stringers, so my bents had to be exactly 1" tall.

The instructions with the kit include full-size diagrams on which to build the bents, but I built a styrene jig to assist me. I made a photocopy of the diagram from the instructions and taped it on a sheet of Evergreen styrene scribed in ¼" tiles, which help keep things evenly spaced and square. Using a hobby knife, I scribed through the paper to transfer the diagram to the styrene. I then glued

lengths of .080" square styrene strip to the sheet, following the scribed marks.

I used this jig to guide the angled cuts for the pilings and hold the pieces in place while the wood glue dried. Since the diagram's placement of the diagonal braces wouldn't work on my shorter bents, I eyeballed their position on the intermediate bents and cut them to length after the glue dried. I omitted them from the end bents.

Measuring the bulkheads against the height of one of my bents plus a stringer, I cut the bulkheads down to 1³⁄₁₆", then glued on the end bents. Since the trestle would be close to the layout's fascia, I also had to trim one end of each bulkhead by about ⅜".

I then assembled the trestle per the instructions, except that I didn't glue the included Micro Engineering bridge flextrack in place just yet, since the track on either side of the bridge hadn't been laid. Test-fitting the assembled bridge in place, I found that only a bit of sanding was needed to bring the top of the stringers flush with the Homasote roadbed.

Step 2 Lining the creek bed

Now that I knew the bridge would fit, it was time for the surrounding terrain and scenery. I used a Stanley Surform rasp and a coarse sanding block to take the sharp corners off the extruded-foam terrain and add some shallow channels in the bed. While this did a good job at shaping the land forms, it also gave the surfaces a rough texture. I wanted to line the creek bed and banks with Sculptamold, a light, papier-mache-like material.

Unfortunately, I chose the wrong storage tub, and accidentally mixed up a batch of plaster instead. No worries. I just added a bit more dry plaster to make the batch thicker, and smoothed it onto the rough foam terrain with a gloved hand. Once it cured, I sanded the drips and ripples, vacuumed up the dust, and it looked fine – likely smoother than it would have been with Sculptamold.

Plaster (not Sculptamold)

Keep plaster off abutments
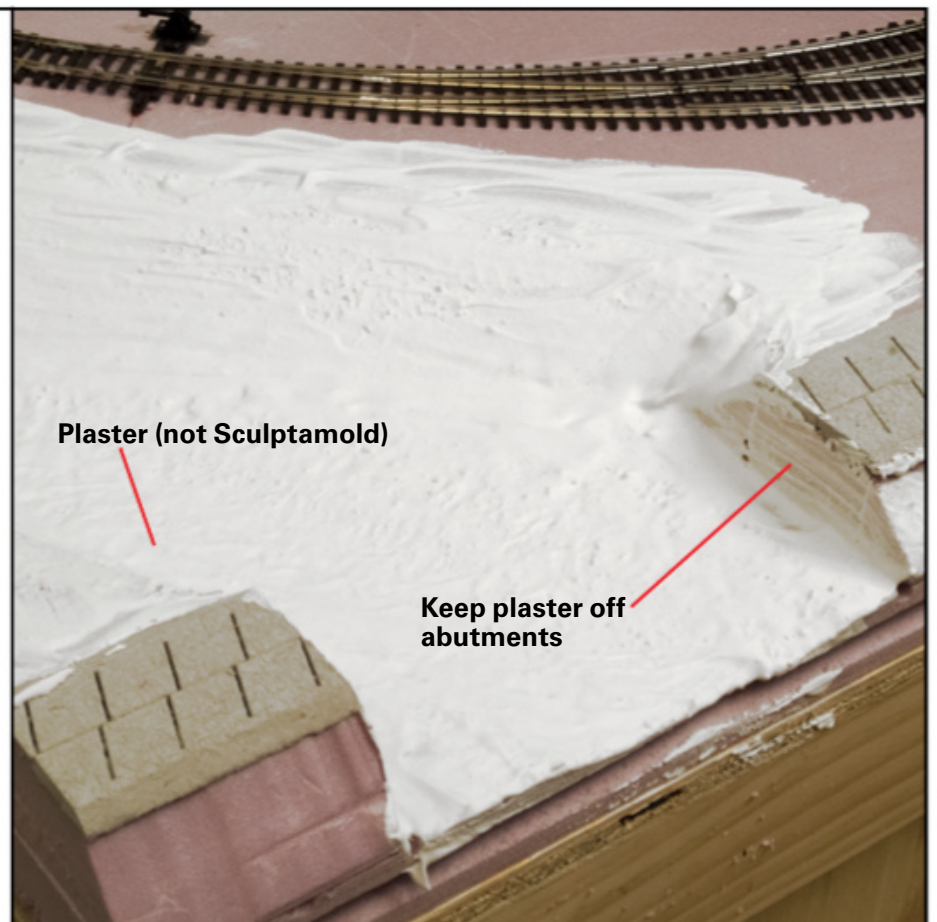
Step 3 Ground cover

Ground foam covers a multitude of sins, but since we're modeling the desert, I wouldn't have that luxury. So I used a variety of commercial and natural products to make our realistic desert terrain.

The first step was to make everything the same color, so no white plaster or pink foam would show through. I painted everything with a generous coat of Behr interior flat latex paint, in a color called Spice. While the paint was wet, I sprinkled in two fine soil products from Arizona Rock & Mineral. For the primary color, I used no. 1090C, Cumbres Earth; for the riverbed, I chose a reddish powder, no. 107 Desert Soil. Once the paint dried, I added more of these two products, fixing them with Woodland Scenics Scenic Cement.

Next came the fun part – embellishing the plain terrain with rocks and gravel. The modeling products I used are listed on page 71, but most of the rocks came from the hardware store. A while ago I bought a 48-pound bag of leveling sand, a product used to make a flat surface for brick pavers. It's a mix of particle sizes from fine powder to ¼" pebbles. At home, I dry it in the oven and sift it to separate the grades for different uses – dirt roads, ground cover, talus, and boulders. Most of the rocks in the scene are sifted from this leveling sand.

The final details in the scene were a few grass tufts pulled from a Busch landscaping mat, dead branches from Woodland Scenics Fine-Leaf Foliage, and a hand-lettered wood sign naming the area Coyote Wash. **MR**

Main soil, Arizona Rock & Mineral 1090C

Dry wash bed, Arizona Rock & Mineral 107

Place rocks and debris along banks

Keep path of water smooth, unobstructed
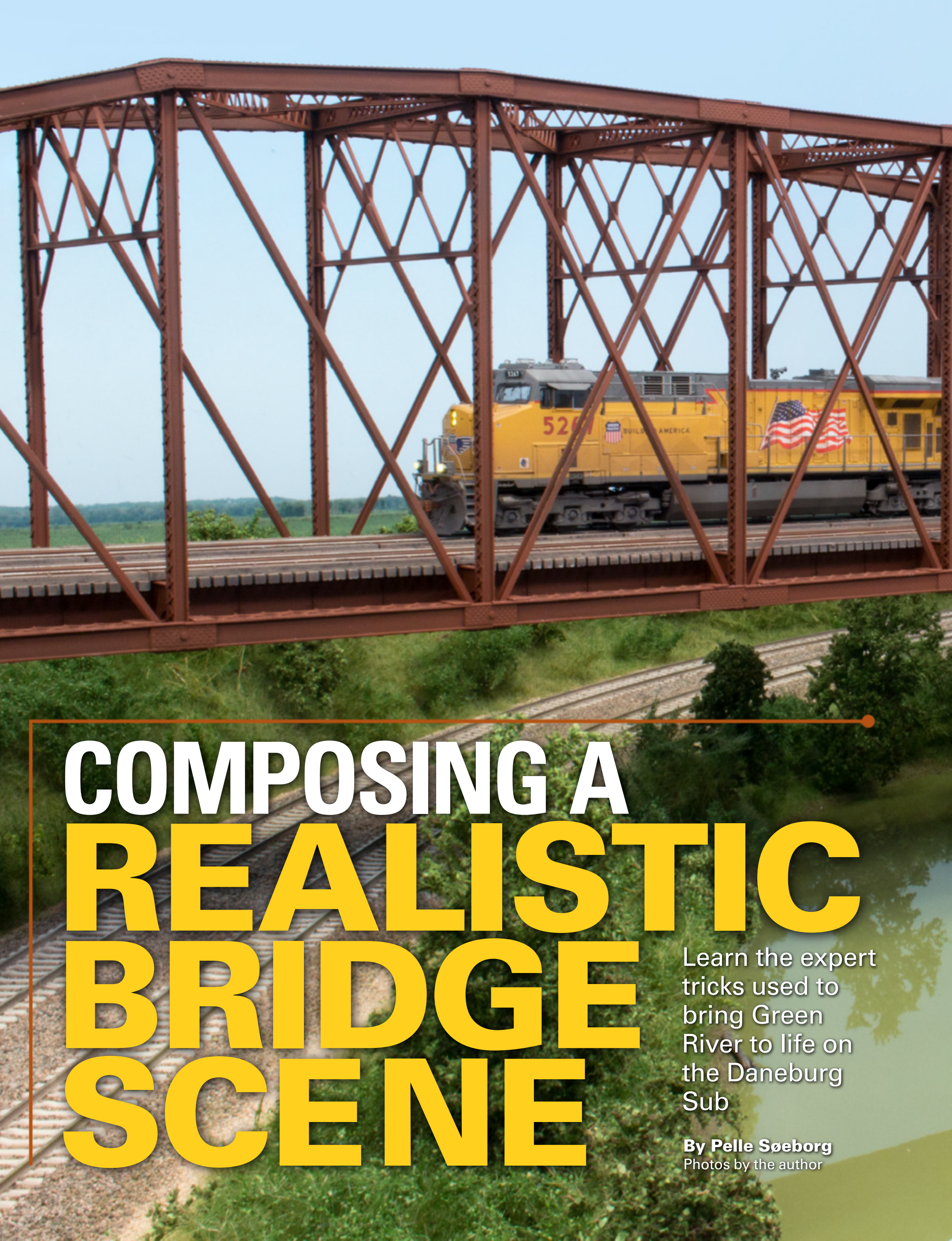
COMPOSING A
REALISTIC
BRIDGE
SCENE

Learn the expert tricks used to bring Green River to life on the Daneburg Sub

By Pelle Søeborg
Photos by the author

The bridge over Green River on Pelle Søeborg's HO scale Daneburg Sub shows how solving a problem can lead to a signature model railroad scene. The bridge provides a way for the main to cross over itself, while the landscape conceals where the lower line enters hidden staging.
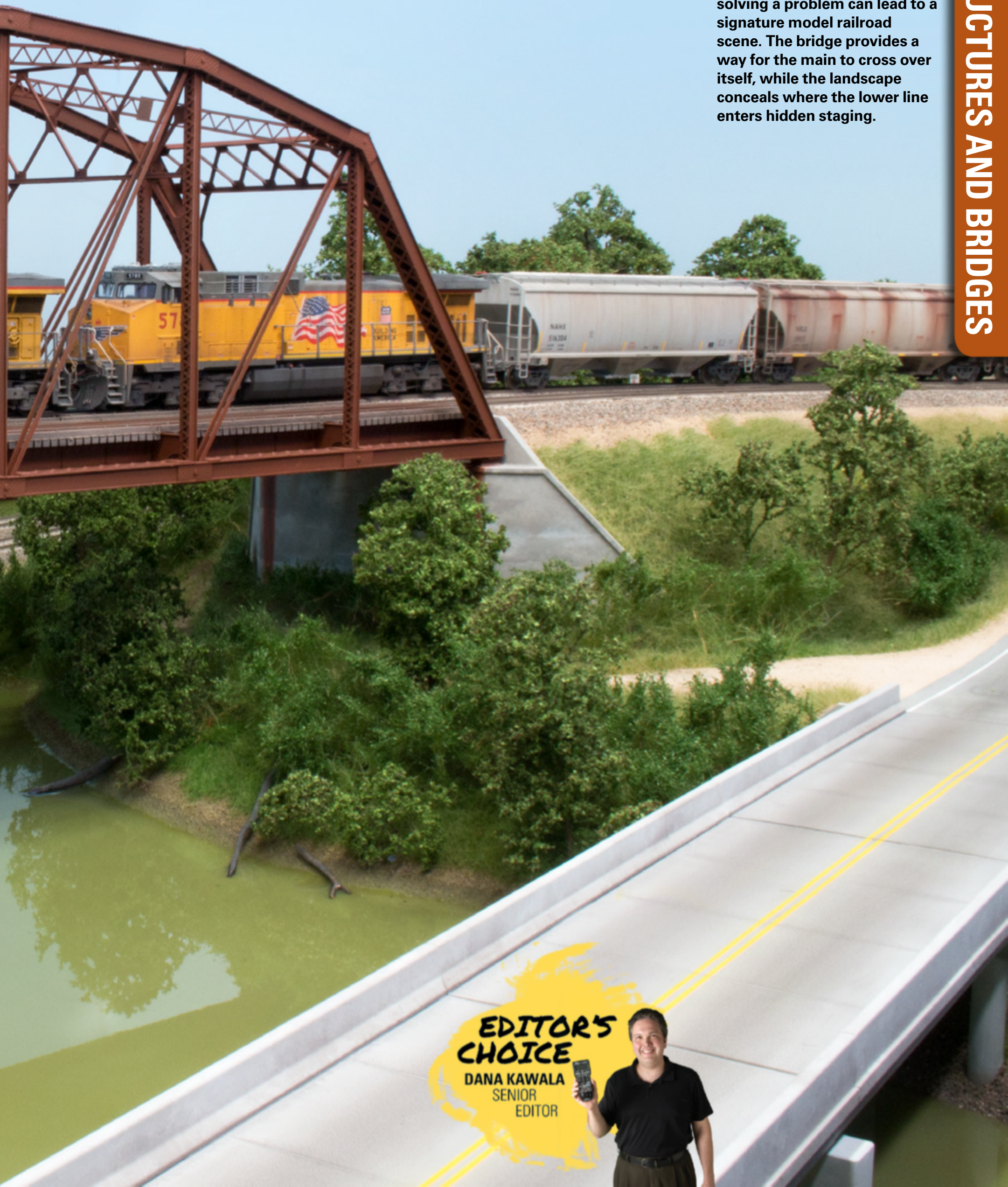
EDITOR'S CHOICE

DANA KAWALA
SENIOR EDITOR

Whether on a prototype or model railroad, there's something intriguing about watching a train cross a bridge. I made a railroad bridge the focal point of the Green River section of my HO scale Union Pacific Daneburg Subdivision sectional layout [See the May 2017 *Model Railroader. – Ed.*]

The bridge also serves a practical purpose, as it allows the main line to cross under itself and run behind the backdrop into a hidden staging yard. The surrounding terrain and scenery provided an effective view block to the opening in the backdrop.

The railroad bridge, made from Central Valley Works and Micro Engineering kits, is the star of the scene. To add to the drama, I installed a Rix highway overpass next to the railroad bridge. I built both bridges at my workbench.

The abutments for both bridges are scratchbuilt from styrene. It was easier to install the abutments and finish the scenery around them prior to installing the bridges on the layout.

I originally envisioned a scene where the lower tracks ran next to a river. However, I also needed to model a small forest between the track elevations to conceal the backdrop opening. The relatively shallow depth of the scene didn't allow for both of these scenic elements, so I had to end the river before the main reached the backdrop. This also forced me to make the water's surface smooth, more like a lake than a river. However, these are the compromises that we model railroaders have to make.

Even though I didn't add any ripples of current, crystal clear water where one could see all the way to the river bottom wouldn't work for this scene. Most of the water I've seen on my trips to the Midwest is murky green, and that's what I modeled.

Although I'm an HO modeler, most of the techniques that I describe would work in larger or smaller scales as well, including pouring resin water and applying static grass. Careful planning and a variety of commercially available materials made Green River a signature scene on my model railroad.

This photo shows Green River prior to scenicking. The double track main snakes under a temporary bridge and through a hole in the backdrop to a hidden staging yard.

FOAM SCENERY BASE

The layout scenery base is made of extruded-foam insulation board. I glued layers of foam board together with Unibond No More Nails adhesive **A**. [Always make sure the adhesive is foam-safe. – *Ed.*] To cut the foam into its rough shape I used a few tools, including a Woodland Scenics Foam Knife as well as a serrated bread knife.

Once I was happy with the rough shape of the terrain, I smoothed all glue joints and cut marks with coarse-grit sandpaper **B**. This step created quite a mess, so I kept my shop vacuum handy.

Next I filled any gaps between the foam with lightweight spackling compound **C**. This was especially important on the riverbank, where the foam terrain meets the plywood river bottom. I would eventually pour resin epoxy to model the river's water, and resin will creep through even the slightest crack.

After the spackling fully cured, I painted the scenery base with an earth-tone latex paint **D**.

A

B
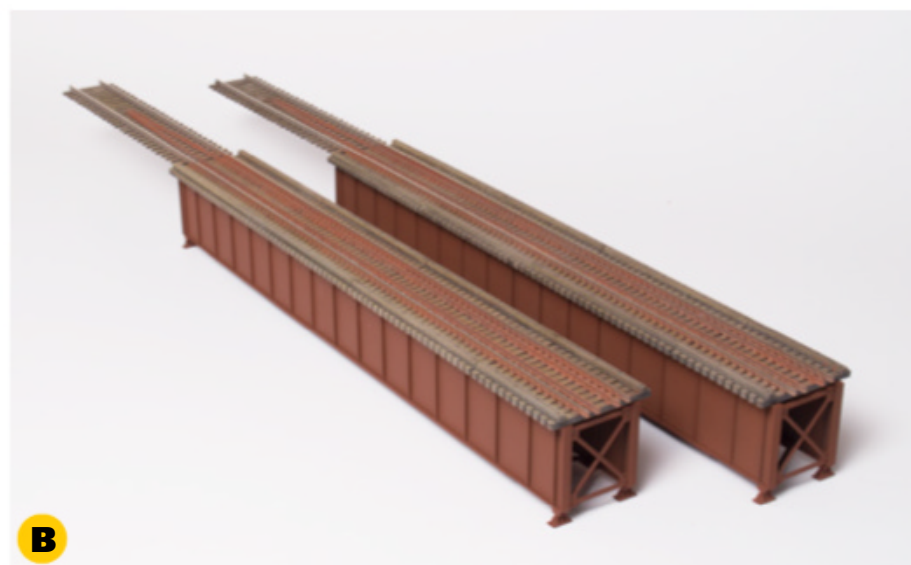
Concurrent with forming the scene's terrain, I built the railroad bridge. The bridge's main span is a Central Valley Model Works HO scale 200-foot double-track truss kit **A**. The only modification I made to the plastic kit was the addition of a walkway between the tracks that I made from a length of Plano Model Products .008" slotted stainless steel sheets.

I airbrushed the truss bridge with Model Master Burnt Sienna. It took a lot of paint to cover all the nooks and crannies of the various beams and other components. I appreciated that Central Valley molded the parts in black plastic, which made it easier to get good paint coverage.

I built two plastic Micro Engineering deck-girder bridge sections **B** to make up the rest of the span. These sections also received a few coats of Model Master Burnt Sienna.

All the bridge ties are from Central Valley. I painted the ties light gray followed by a brown-gray wash. I also painted the bridge rails brown. To finish off the bridge I weathered the rails and the tie plates with rust-colored powdered pastels.

A

B

C

D
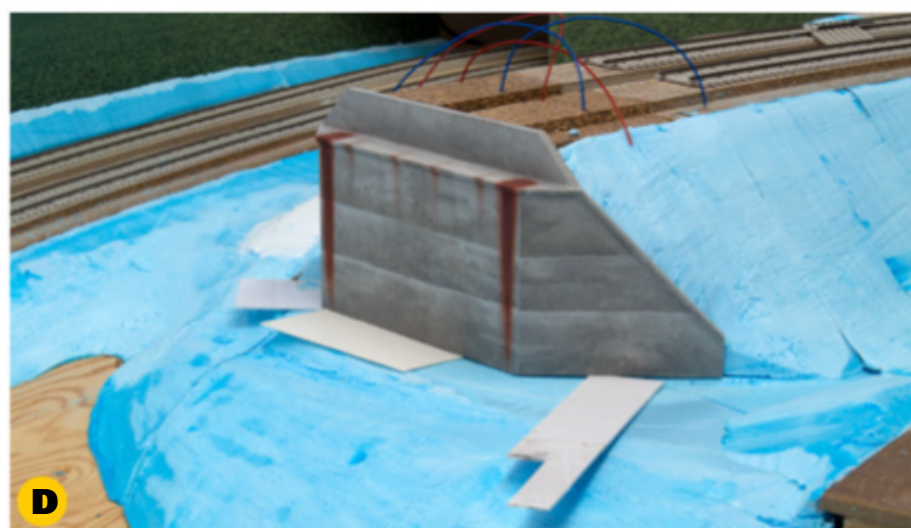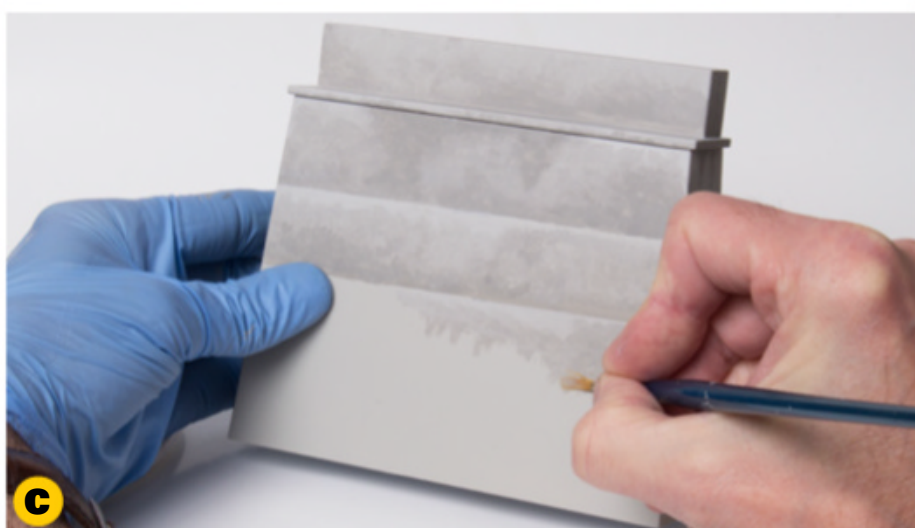
The bridge abutments A and pier **B** are scratchbuilt from .040" styrene. The scenery contours had to be completed first so I could accurately cut the parts.

The raised area on the pier compensates for the height difference between the bridge's truss and deck girder sections.

I gave the parts a base coat of Tamiya AS-16 USAF Light Gray applied from a spray can. I used a brush to randomly dab the sides and bottom of each part with Model Master no. 1732 Light Gray and a darker shade made by mixing no. 1732 with no. 2026 Dark Drab **C**. After allowing the paint to dry, I used rust-colored powder pastels

applied with a damp brush to simulate rust streaks.

I attached the abutments to the scenery with Unibond No More Nails adhesive. I used cardboard shims to hold them until the adhesive set **D**. I double-checked its position to the other components but didn't glue the pier until I painted the river bottom.

A

B

C
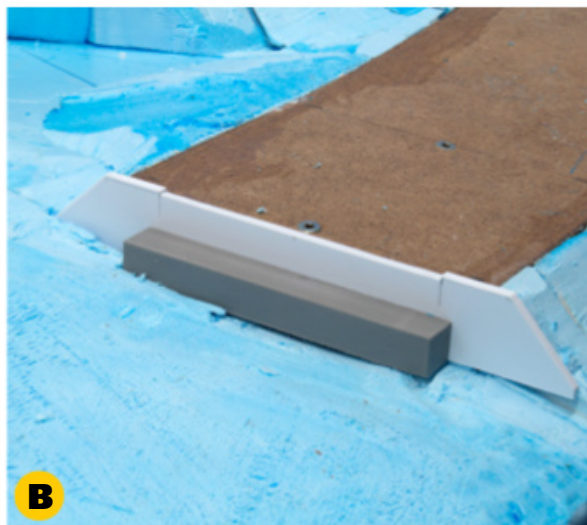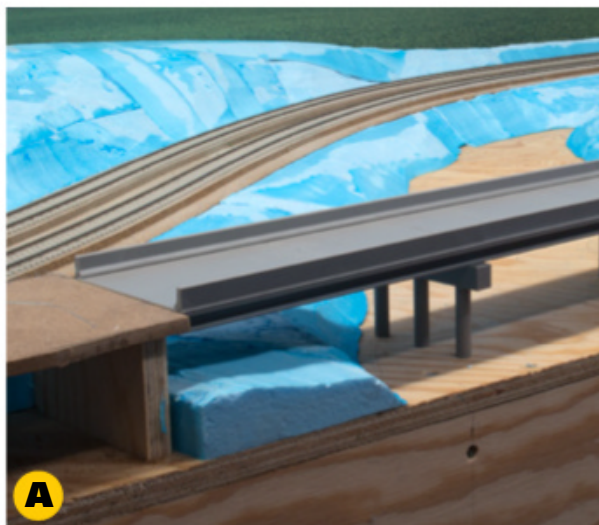
The highway bridge is a Rix Products HO scale Modern 150-foot Highway Overpass plastic kit **A**. I test-fit the model during scenery construction, but, like the railroad bridge, wouldn't install the span until after the scenery was finished. As with the railroad bridge, I installed the highway bridge piers after painting the river bottom, so that I could pour the resin water around them.

Using .040" styrene sheet, I scratch-built the abutments for the overpass and then attached them to the foam scenery using No More Nails adhesive. I also used some leftover bridge pier components from the Rix kit to make the support for the ends of the bridge deck (**B** and **C**). I would later paint all the parts gray using the same colors as the railroad bridge abutments.

A

B

C

D

Before applying any ground cover, I extended the paved highway to each abutment using Woodland Scenics Smooth-It plaster. I used a piece of styrene to evenly spread the material **A**. Once it was dry, I painted and weathered the road surface to match the rest of the highway. For more on my road-building technique, see the August 2015 *Model Railroader*.

I ballasted the track by first spreading Monster Model Works Diorama Dirt along the roadbed shoulders.

Then I used a ballast blend **B** of equal amounts of Arizona Rock & Mineral no. 130-2 Northern Pacific Gray Granite, and no. 138-2 CSX/Southern Pacific and ASOA no. 1411 *Diabasschotter* and no. 1710 *Gneisschotter*.

To affix the ballast, I used a pipette to apply wet water (water mixed with a few drops of isopropyl alcohol). Then I applied diluted white glue **C** (1 part glue to 2 parts water) over the area.

It's important to soak the ballast completely with glue, and don't forget to add a drop between each tie. If wet water isn't used first, the glue won't penetrate the entire ballast layer. The result is a crumbling shell at the surface with loose ballast beneath it.

With the highway and track ballast done, I turned to Green River. I wanted the river bottom to match the murky river water I'd seen on my Midwestern railfanning trips. I airbrushed the river bottom **D** with a 2:1 mix of Vallejo Model Air no. 71010 Interior Green and no. 71028 Sand Yellow.

A

B

C

D

Working in an area about 10 x 10 inches, I began by brushing the painted layout surface with diluted white glue. Next I sprinkled the area with dirt **A** until it was covered. I used sifted dirt from my backyard that I first baked in the oven to sterilize it.

After the area was covered with dirt, I used a pipette to drizzle wet water (water mixed with a few drops of isopropyl alcohol) over the freshly applied dirt. When using the pipette,

be sure to hold it close to the layout surface to avoid washing the ground cover away. Next, I filled another pipette with diluted white glue and drizzled that over the same area **B**. The wet water ensures that the glue penetrates the entire dirt layer.

While the glue was still wet, I applied a final thin layer of dirt **C**. Since it was supposed to model the dirt road, I used a lighter shade than the base color. My homemade dirt

applicator consists of a jar and a lid with a lot of small holes drilled into it. I have several lids, each with different size holes so I can easily adjust the amount of ground cover I apply. After the area was covered, I let it dry for a couple days.

To create the tire marks in the dirt road, I used a stiff brush **D**. I connected the road around the abutment to the access road on the other side of the main line.

A

B

C
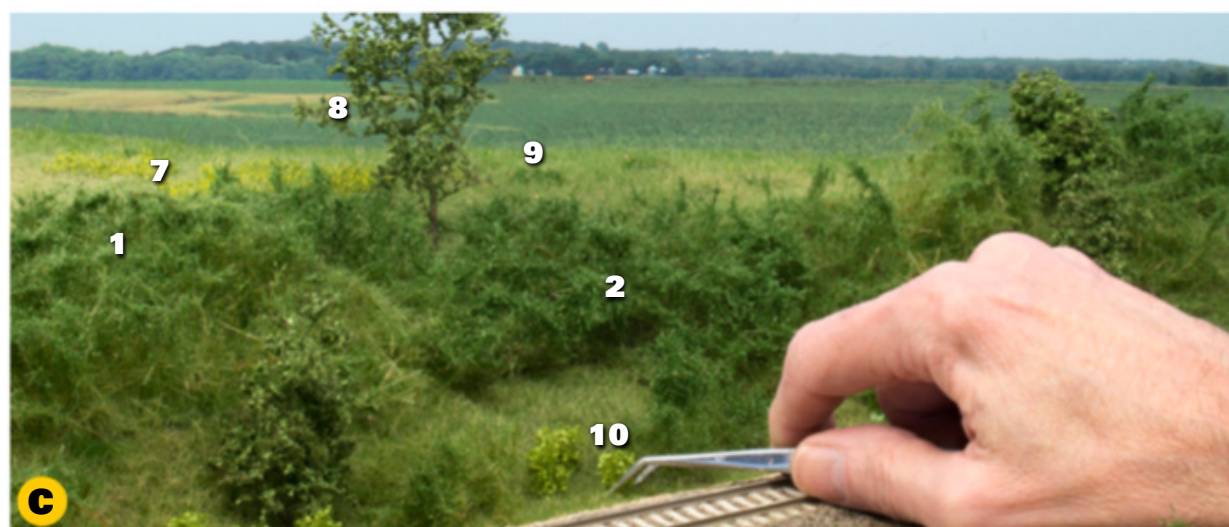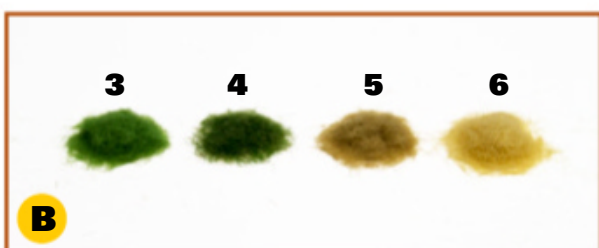
1. Polak Models Wild Bushes 5903 Autumn 2. 5902 Summer 3. Silflor MiniNatur grass flock 006-31 Spring 4. -33 Early Fall 5. -37 Beige 6. -35 Golden Beige 7. Polak 5979 Yellow Flowers 8. Noch 23100 Nature Tree with 07144 medium green leaf foliage 9. Silflor MiniNatur (725-21 and -22) Weed Tufts 10. Silflor MiniNatur 920-21 Beech Foliage (Spring)

For my bridge scene, I used materials from several European scenery manufacturers. These included 8 x 11-inch scenery mats from Polak Models **A** that I combined and trimmed to fit. I also used a variety of static grass flocking material in various lengths from Silflor MiniNatur **B**.

When choosing scenery materials, it's important to keep everything within the same color palette so that the grass, trees, bushes, and other vegetation blend together realistically. I was also careful to make sure the colors of the materials matched those of my photographic backdrop **C**.

A

B

C

VEGETATION AND STATIC GRASS

For the forest ground cover on the embankment between the upper and lower levels, I cut scenery sheets **A** to fit. I used Model Scene F603 Forest Base – Late Summer sheets. After moistening the sheets to make them more flexible, I attached them to the scenery base with white glue. Foam Nails from Woodland Scenics held the sheets in place until the glue dried.

Using white glue, I attached pieces of 5902 Summer and 5903 Autumn Wild Bushes from Polak Models (polakmodel.com) to the area around the bridge abutments. Then I brushed diluted white glue over the ground cover between the dirt road and the bushes.

While the glue was still wet, I added grass flock using a static grass applicator that I made from an electric fly swatter **B**. [Static grass applicators are commercially available from Woodland Scenics, Noch, and Peco, among other manufacturers. – *Ed.*]

The static applicator has a grounding needle connected to it that must be stuck into the wet layout surface in order to function properly. Then I filled the device's sieve with flock, turned it on, and shook it over the wet glue. The statically charged flock then stood on end, providing a realistic texture.

I used a variety of flock in different lengths and shades of green. See "Choosing Colors" on the previous page for a list of the materials that I used on this project.

I continued working my way down the riverbanks, applying more flock and Wild Bushes **B**. For all the vegetation, I used more lush-looking shades of green closest to the water's edge.

After allowing the glue to dry overnight, I vacuumed the area clean. I attached a piece of screen over the vacuum nozzle so that I could capture and reuse the loose flock.

I used white glue to install larger bushes and small trees along the riverbanks. For the trees I started with Noch Nature Tree armatures that I'd painted gray. These armatures are natural products similar to Scenic Express SuperTrees. Once the armatures dried, I dipped them in diluted white glue, then sprinkled on Noch medium green leaf foliage material.

To form the larger trees that would form my forest view block **C** along the embankment, I glued pieces of Noch Nature Trees armatures to larger Woodland Scenics plastic tree armatures. After dipping the armatures in diluted white glue, I sprinkled on the Noch leaf foliage in medium green and dark green shades.

As shown in photo **C**, the access road continues between the main line and the trees along the embankment. I also added a no trespassing sign, which I'm sure my HO scale railfans won't be happy about.

POURING RESIN WATER

A

B
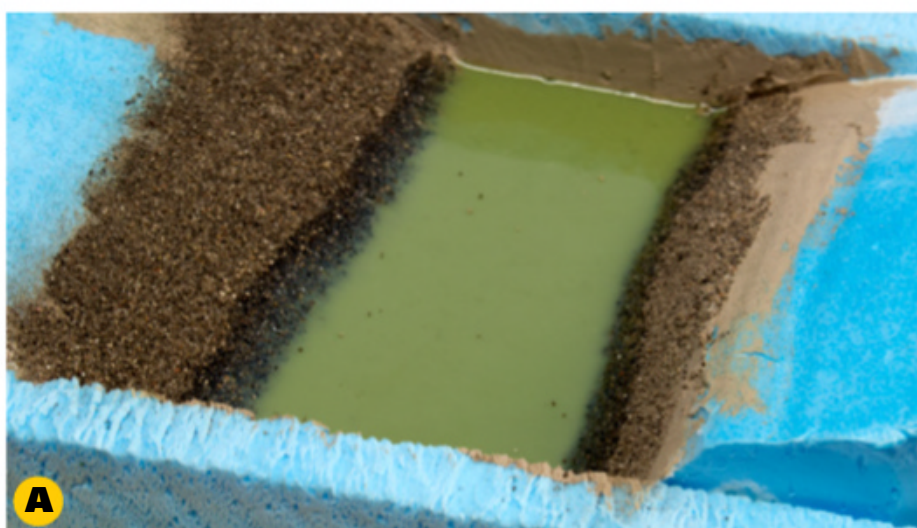
To realistically model water I used Permakote, a two-part epoxy resin made by Wessex Resins & Adhesives (wessex-resins.com). However, these techniques are appropriate for any two-part epoxy resin.

When working with resin, it's important to follow the proper procedures, such as wearing chemical-resistant gloves. Following the directions, I poured the proper proportions of resin and hardener in a mixing cup. Then I folded the two substances together (don't just stir!), scraping the sides and bottom of the container. I worked the material for 3 to 5 minutes.

The two parts must be completely mixed together. If there are small pockets of resin that haven't been combined thoroughly with the hardener, then there will be sticky spots on the finished surface of the water.

The resin can also be tinted using enamel paint. Simply add a few drops of paint to the mixing cup when combining the resin and hardener. For Green River I used a few drops each of

C

D

Humbrol 120 Light Green Matte and 94 Brown Yellow Matte to tint the resin.

After mixing, I placed the cup on top of a warm radiator for 5 minutes. This let the air bubbles rise to the surface. Placing the mixing cup on top of a jar of hot water would also work.

I made a small test area **A** (opposite) from scraps of extruded-foam insulation board covered with the same paint and dirt-ground cover I'd used along the layout's river banks. The test proved beneficial. In addition

to checking the color, I could see that the resin crept up the test riverbanks by ¼" as it cured.

To avoid this unwanted effect from happening on my layout, I brushed a coat of Vallejo Clear Matte Varnish along the riverbanks **B**. The varnish dried clear and sealed the ground cover so that the resin water would be contained within the riverbanks.

Next I mixed up another batch of tinted resin and poured it over the painted river bottom. The material has

the consistency of thick syrup, so I used a stick to help distribute it evenly across the river bed **C**.

I prefer to apply resin in a thin layer. That way, if I don't like how it looks, I can always add another layer.

I popped any air bubbles I found in the resin's surface by blowing on them through a drinking straw **D**. I changed the straw often, as saliva, like water, would cause the uncured resin to haze. Once the resin was smooth, I let it completely cure for a few days.

Opening to staging

A

Opening

B

After installing the railroad bridge, I soldered feeder wires to the bridge tracks **A**. Except for the two bridge shoes on the truss bridge that rest on the pier, the bridge isn't glued down.

Once I set the highway bridge span in place on its piers, the scene was

complete. I took the photo **B** with the adjoining layout section removed to better show the backdrop opening to hidden staging. From normal viewing angles, the main line looks like it continues around the bend instead of into a hole in the backdrop. **MR**

Horst and Markus Meier created this rusty auto junkyard using inexpensive car models and toy cars.

How to model
A RUSTY AUTO
JUNKYARD

Paint, weathering powders, and more make a realistic trackside scene

By Horst and Markus Meier • Photos by the authors

Auto junkyards, where damaged or abandoned automobiles serve as a source of spare parts, can be found most anywhere. Retired vehicles soon deteriorate and are quickly reclaimed by the outdoor elements. Before modern business practices were put into effect, the yards where these vehicles were parked were often overrun with grass, weeds, and bushes. Sometimes, this vegetation even grew on the automobiles themselves.

On model railroad layouts, junkyards are rarely found, even though they're common in the real world. Modelers tend to shy away from sullying expensive, highly detailed model automobiles.

But I've found that I don't have to use high-quality models to make a junkyard scene. Instead, there are many lesser-detailed models on the market that can be used as substitutes. After my son Markus and I applied some of our favorite weathering techniques, the derelict cars look suitably detailed on their own.

Vehicle sources

Since the automobiles will be cut apart, painted, and weathered, I looked for cars from various sources. One option I use is Ueberraschungseier toy cars. It's a brand of chocolate candies in my home country of Germany with small prizes inside. There are a few series of these treats with American automobiles inside, which are very close to HO scale.

Another inexpensive option is the toy train automobile sets from Bachmann and Life-Like. With a bit of luck you can also find the Alloy Forms Scrapyard Set (no. 2046) available from online dealers. This set contains five metal auto bodies molded to show some accident damage and rust. Walthers also sells junk cars.

Even though the vehicles will be dismantled and heavily weathered, make sure they're older than the era of your layout.

Dismantling the models

Most junkyards are full of car and truck bodies, but there are also many different parts of vehicles. As seen in **fig. 1**, it's easy to separate individual parts such as fenders, hoods, and doors by simply using a motor tool and a fine-tooth saw. Complete front halves like the cabs of pickup trucks can be made in this way too. I used this technique on models that can't be taken apart easily.

If you plan to remove any car parts, I recommend doing so before you paint them, so that the cut edges match. Once the car parts have been painted, they can

Fig. 1 Dismantle vehicles. Markus removed the doors of this truck with a motor tool for use as scrap pieces around the junkyard.

Fig. 2 Powdered pastels. Markus weathered some car parts with powdered pastels. He varied the weathering by using different quantities of powders.

Fig. 3 Painting rust. Using paint Markus applied additional weathering to the cars. He used both dark and light colors to show different levels of rust.

Fig. 4 Car placement. If a junkyard doesn't have a crane and there's enough space to allow it, the cars will be parked next to each other instead of stacked. Random car parts and different levels of vegetation are common in junkyards.

Fig. 5 Finishing the scene. After Horst added vegetation around all the vehicles, he placed a figure looking for a spare part to complete the scene.

be glued back together using cyanoacrylate adhesive (CA), which gives the models a "cannibalized" appearance. Engines can also be put beneath the hoods and items can be placed in the trunks.

To add rough patches to the bodywork, lightly scratch the surface with an X-acto knife. Once the model is painted, these marks give the impression of rust blisters or damage under the paint.

I also added some dents and scrapes to the vehicles so they looked like they've been in accidents, and I flattened some of the tires so it appears that the cars have been parked there for a long time.

Painting and weathering

I started with the unpainted Alloy Forms models. I first removed all the molding seams and ridges from the vehicles and then applied primer to the cars. Once dried, I applied the base color.

I then repainted the individual parts. This created the impression that the parts have been replaced at one time. The best subjects to repaint are the doors and fenders. Headlights and radiator grills can be painted at this stage too.

After all the parts were painted, I started weathering the model. I first used powdered pastels. As seen on **fig. 2** on

the previous page, I simply dabbed on the different powders with a soft brush.

Since the powders consist of small grains of pigment, the effect varies depending on the amount of powder used. The powder will collect in places where you've created accident damage or rust holes, forming rust spots just like those on real cars. Afterward, I used the powders to create a thin film of rust. I had to make sure that it wasn't so heavy that it covered the basic color of the car.

As seen on in **fig. 3**, Markus and I also used undiluted acrylic paint on the vehicles. We found it's best to start with dark colors, which simulate old, deep-seated rust. We then used increasingly lighter shades for newer rust. When doing this, we made sure that the newer rust didn't appear everywhere on the vehicle.

By mixing fine sand with the basic rust color, I created a rough, rusty surface on the car models. Here in Germany, a company called Waco sells a rough-grained acrylic paste for structural effects like this under the trade name "Structure." Its mud-brown shade, no. 9700 587, is very suitable as a basic shade for rust. Monroe Models Dusty Brown weathering powder, no. 3113, would also work.

Creating the scene

Before positioning the cars and parts on the layout, I needed to create a realistic junk lot. This consisted of sand, small stones, and flattened grass. You can see how this looks in real life in **fig. 4**.

It's important to simply place the cars next to each other on a flat surface. In smaller scrap yards the cars aren't stacked up, since there's no crane available and there's adequate space.

Once I positioned all the vehicles next to each other, I placed the separate car parts in between or leaned them against the vehicles. Certain parts, such as axles or doors, can be piled up in larger numbers.

Since some of our cars have been standing here for a very long time, I added thick tufts of grass and bushes between the cars and the parts. As you can see in **fig. 5**, a few human figures in the scrap yard complete the scene. These could be children playing or mechanics removing parts.

If you're looking to fill an open spot on your layout, get some inexpensive model vehicles and create a rusty auto junkyard scene. **MR**

The Depot Diner scene on the Milwaukee, Racine & Troy, *Model Railroader*'s HO scale club layout, was looking dated (inset). Steven Otte revitalized the area with a new restaurant, a paved parking lot, and extra details. Photos by the author

Revitalize an aging scene

A laser-cut wood structure takes center stage in this scene

By Steven Otte

Kalmbach Media moved into its Waukesha, Wis., home in 1989, and construction began on the current incarnation of *Model Railroader*'s HO scale club layout, the Milwaukee, Racine & Troy, shortly thereafter.

The Depot Diner was created to fill in a gap between the town of Big Bend, a section of urban scenery that had been transplanted from the former MR&T, and the new main line that looped around it. The diner was a clever kitbash for its day, modified from an IHC depot

kit with an added serving window and exterior dining area. But the structure and its surrounding scenery – like typewritten signs – were showing their age. It was time for an upgrade.

I could have tried to spruce up the existing structure, but there wasn't much I could do with it beyond a new paint job. Since today's laser-cut wood structures are far beyond the quality of that decades-old snap-together plastic kit, I chose a Blair Line diner to be the centerpiece of my upgraded scene.

In addition to replacing the restaurant, I also revitalized the scene around it. I poured and weathered a new parking lot, repainted the stone retaining wall behind the restaurant, and freshened up the faded ground cover. Vehicles, railings, figures, and other details completed what was essentially a new scene. I also chipped out and replaced the yellowed ballast on the nearby main line. If parts of your layout are showing their age, you might find these tips and techniques helpful.

Step 1 The structure

Scale 2 x 4s

Arrow-shaped sign border

"EAT" lettering

Carrier sheet used to maintain spacing

Seagulls, Preiser 10169

Sign positioned to face street
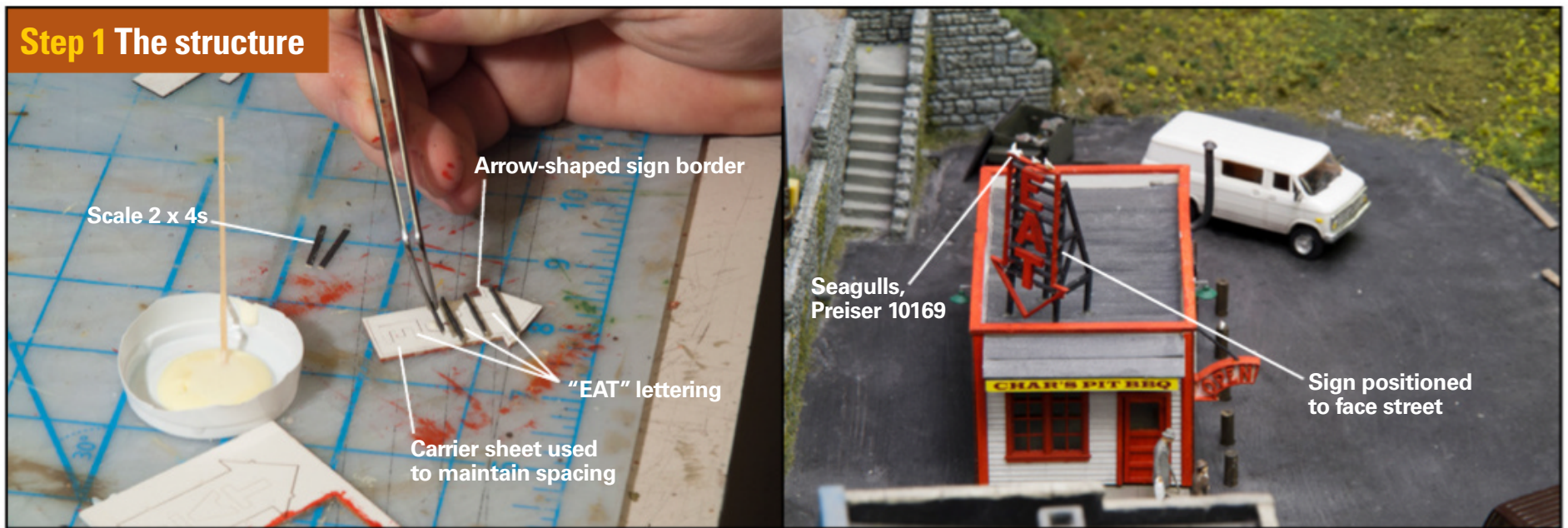
I started with a Fred & Red's Hamburgers kit from Blair Line. This is a fairly simple laser-cut wood kit featuring milled basswood siding, plastic window castings, and a footprint that would fit my space.

I wanted the restaurant to look fairly well-maintained, so I spray-painted the walls and trim parts on both sides with white auto body primer. This not only ensured even and consistent paint coverage, but the solvent-based paint seals the wood against future warping due to humidity. After the paint dried, I brush-painted the trim pieces with Polly Scale Caboose Red.

I deviated from the kit's directions only twice. First, I didn't glue the walls to the base, which represents the building's concrete pad, until later. I wanted to be able to

embed the foundation into the parking lot, a task that would be difficult if the restaurant was attached to it.

Second, I decided that although it made sense for the large, arrow-shaped EAT sign on the roof to face the street, where potential customers could see it, the back of the sign facing the aisle wouldn't be very interesting to look at. So rather than gluing the laser-cut lettering and arrow-shaped border to the solid backing panel, I substituted a supporting latticework of scale 2 x 4 stripwood. The completed sign is shown above.

Though the kit came with printed paper signs, I wanted my restaurant to be unique. I created new signs using my computer, designating the restaurant as a barbecue joint, and printed them out on a color printer.
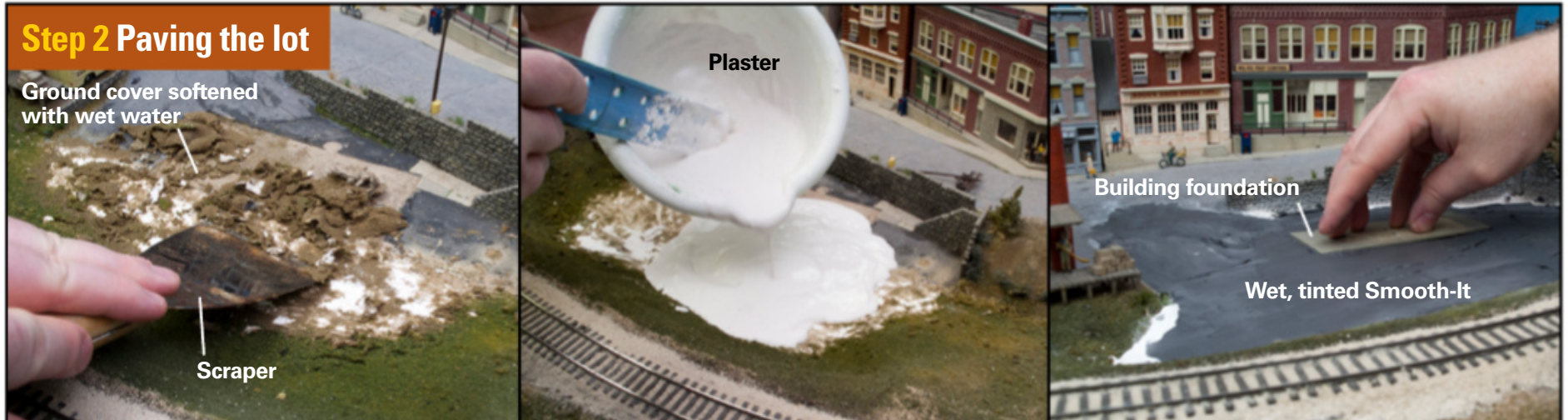
Step 2 Paving the lot

Ground cover softened with wet water

Scraper

Plaster

Building foundation

Wet, tinted Smooth-It

After prying the old diner off the layout, I found that half the base was plaster painted to represent blacktop; the other half had sand glued to earth-painted plaster. I wanted to replace the sand and some of the surrounding grassy area with a paved lot, so I sprayed the ground cover with wet water (water with a few drops of dish soap), let it soak in, and started scraping. The scenery material came up easily. I used a wire brush to loosen any remnants and cleaned the area with a shop vac.

After letting the terrain dry, I mixed up a batch of plaster and poured it into the area. I did what I could to make it level, but since I was expanding my lot beyond the flat center area, my lot had to slope up a bit at the sides. That didn't worry me too much, though, since I'd be able to compensate somewhat in the next step.

I then mixed up a batch of Woodland Scenics Smooth-It. This is a lightweight, plaster-like product that spreads easily. I mixed it with water as per the directions, but

added about a half-ounce of Woodland Scenics Asphalt Top Coat to tint it gray. This guarantees the color goes right through, making it easier to hide chips or cracks.

After spreading the Smooth-It over the plaster base, I pressed the restaurant's foundation into place. I troweled Smooth-It up to the edge to blend the foundation into the lot. Once the Smooth-It set, I used a sanding block to – well, smooth it, and feather the new paving into the adjacent street.

I wasn't very neat about keeping the plaster and Smooth-It off the nearby retaining walls, so I repainted them after the lot was finished. I brush-painted the stone with Polly Scale L&N Gray, darkened the shadows with a stain of Engine Black paint cut with 70 percent rubbing alcohol, and drybrushed the highlights with Undercoat Light Gray. I added some climbing vines by brushing on twisting lines of white glue and blowing green ground foam onto the glue from an index card.

Busch grass tufts and glue dot over mounting holes

Guardrail, Pikestuff 0013

AIM Products medium and light gray weathering powders

Painted lot surface

Wood rack

Scratchbuilt smoker

Catering van, Busch 44650

Trash bin, SS Ltd. 2461

Body, 5/16" styrene tube, .75" long with .030" end caps

Cast metal smokejack from scrap box

Lid edge scribed with razor saw

Wire grab iron handle

Shelf, .030" styrene

Mounting bracket, scrap box chair side

Wheeled base from SS Ltd. 3502

The ground foam around the restaurant had faded over the years, making the entire scene look tired. So I used a wire brush and a vacuum to remove as much of the old ground cover as possible. I then sprayed the area with wet water, sprinkled on several colors of Woodland Scenics and Scenic Express ground cover used elsewhere on the layout, and fixed them in place with Woodland Scenics Scenic Cement.

To further detail the parking lot, I assembled some Pikestuff guardrails. I mounted them by drilling holes into the pavement, placing a dot of glue and a Busch field grass tuft in each, then pushing the legs and the grass into the hole. The grass tuft conceals the hole and makes it look like weeds are growing up around the legs through the pavement.

Unfortunately, wet water overspray left discolored spots on the new parking lot. I protected the building foundation with blue painter's tape, then covered the water spots by painting the lot with a layer of Asphalt Top Coat. Though this took care of my water-spot problem, it left the pavement looking far too new-looking for my tastes. After the parking lot had dried, I used a soft brush to apply light gray and medium gray weathering powders from AIM Products. This lightened the dark surface and simulated traffic wear.

Since I chose to make my diner into a barbecue restaurant, I added a few details to reinforce that. First, most barbecue is slow-cooked over a wood fire. Using some leftover scribed siding from the kit walls' carrier sheet, I made a covered wood rack for the back of the building. I filled it with logs cut from twigs.

Next, I scratchbuilt a portable smoker that would be used for catering. I started with the base from a cement mixer I found in the scrap box (Scale Structures Ltd. part no. 3502), fashioned the smoker from 5/16" styrene tube, and joined them with mounting brackets made from scrap-box chair sides. I finished it with a .030" styrene shelf, a wire grab-iron handle, and a metal smokejack.

I then added some stained timbers to mark parking spots, planted some wooden posts to protect the building from backing vehicles, and parked a few cars in the lot. I replaced the molded-on lifting pockets of an SS Ltd. trash bin with square brass tubing and filled the bin with JL Innovative Design junk piles. A couple of Bachmann figures coming out the front door and some Preiser seagulls perching on the EAT sign completed the scene. **MR**

How to
weather wood structures

Simulating aged wood is an important part of realistic model building

By Russ Watson
Photos by the author

Simulating the effects of weathering on wood, paint, and other materials adds to the realism of older structures like Russ Watson's O scale water tank.

Weathering is one of the most important finishing techniques a modeler can learn to enhance the realism of a model. Many articles have been published about weathering, and many hobbyists tend to think of weathering as the last process before a model goes on a layout. However, my experience with wood structures has shown I get better results by adding various weathering techniques throughout the model's construction process.

The accompanying photos are of an O scale Banta Modelworks shortline water tank that follows a prototype that had only its tank painted.

These weathering techniques can be used in any scale when building a wood structure. By planning the weathering at the start of the project, it can be applied to all surfaces of the structure.

STEP 1 Find reference photos

Good photos of the actual structure serve as invaluable references to study and match colors during the construction and finishing of a model. I took this photo of a veteran water tank on the Cumbres & Toltec Scenic RR at Osier, Colo., in June 2011.

STEP 2 Apply texture and stain
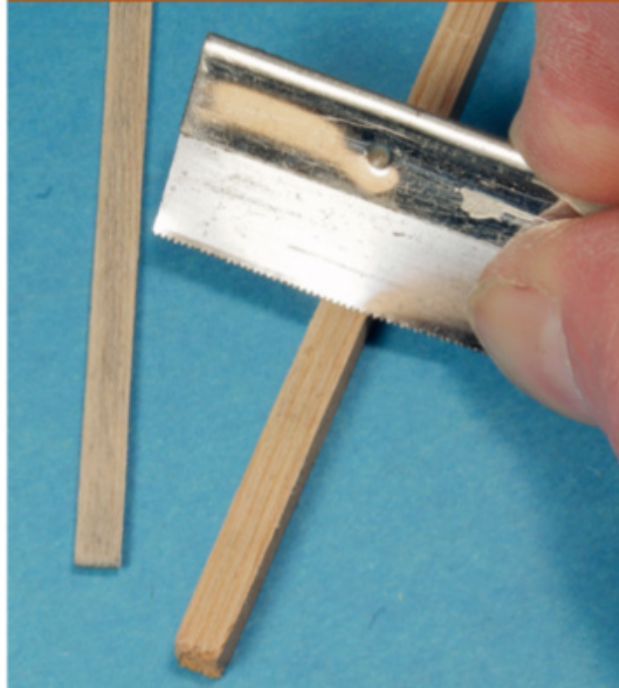
I started by scraping the stripwood lengthwise with a fine-tooth razor saw to add texture.

Then I used some 320-grit sandpaper and a fine wire brush to remove any wood fuzz before I cut the lumber to size and applied stain with a paintbrush. My stain is one part black acrylic paint thinned with 12 parts of water.

Next, I assembled the bents and applied additional coats of stain to darken the upper timbers that are protected from the weather by the tank. Then I used a sharp pencil to emboss nail heads into the bracing.

STEP 3 Apply random cracks

A sharp hobby knife worked well to scratch and cut random splits and cracks where the tank sides were more exposed to the weather. Then I used fine sandpaper and a wire brush to remove the wood fuzz in the same manner as **step 2**.

I painted the tank with light gray acrylic paint. When it dried, I applied a wash of the black stain, and used a small brush to dab very small areas of artists' oil paint on the upper parts of the tank. Then I used my finger to rub in the paint, working it down the boards. The amount of paint is determined by the severity of weathering desired. It's always easier to add more paint than it is to remove it.

STEP 4 Apply extra stain and oil paint

Horizontal surfaces, such as the deck on the supporting structure, receive the most weathering, so I used the same embossing, cracking, and staining method here. Then I applied more stain and oil paint.

Once the wood has dried, I find it best to use a drybrush technique, dipping the brush in the paint and removing almost all of it with a paper towel before applying it to the outer edges of the model's top deck. I didn't bother weathering the middle of the deck, as that portion would be covered by the water tank during final assembly.

STEP 5 Enhance the boards

By rubbing the sharp end of a small tweezers along each line in the scribed tank top, I was able to enhance the laser-cut board lines. I also used a hobby knife to notch matching board lines into the top edge. Then I finished the top using the same techniques as before.

STEP 6 Paint the metal parts

I painted the metal parts with rust-color acrylic paint. Then I mixed black acrylic paint and a little water with the rust color to form a dark rusty-colored wash. I applied this with a brush and rubbed some of it off with my finger to highlight the details.

The tank bands and tensioners also received a little red paint that I rubbed in with my finger. I used double-sided tape to hold the ends of the tank bands to a piece of cardboard during painting. I cut new tank bands from .005" styrene sheet instead of using the paper bands in the kit.

Double-sided tape works well to hold small parts that only require paint on one side. I applied the tape to a cardboard handle and attached the parts to the tape for painting. Then I used the darker-color wash to bring out the small details in each part.

STEP 7 Apply water leaks

Mineral stains left by water leaks appear as dry white streaks in random patterns on the sides of the tank. I used a small brush and white paint to drybrush these stains on the boards, working from the top down.

It's much easier to control the effect by applying several light coats of paint rather than one heavy one. It's also easier to handle the tank and apply the weathering before the tank is glued to the top deck.

The water in my railroad's locale isn't as rich in minerals as it is in Colorado (see the photo in **step 1**), so I made the mineral deposits on my tank much lighter. I also applied small random patches of mineral deposits anywhere leaks would let water run down the supporting structure. **MR**

Window displays, signs, and awnings made from photos of the real thing go a long way toward dressing up a realistic downtown scene. V.S. Roseman shows how he uses a digital camera, computer, and color printer to upgrade simple structures like those shown at left.

Add storefront details

Photos of real stores make effective signs, awnings, and window displays

By V.S. Roseman
Photos by the author

With more and more detailed urban structure kits coming on the market all the time, it's unfortunate that I see so many of them placed on a layout incomplete. Modelers can be forgiven for thinking that once they've used up all the parts in the box, the model is finished. But there's more to do if a storefront is to look realistic. Manufacturers of urban structure kits rarely include interiors or any but the most generic details. That way, the modeler can decide if it's to be a grocery, auto parts store, dry cleaner, or something else.

A number of good sign sets are available as aftermarket items, but not much has been made to fill in the gaping windows of the storefronts. This too often results in model buildings being placed on the layout with empty interiors.

For many modelers I've talked to, detailing storefronts is a task to be done some time in the future. I've found that I have a much better chance of actually finishing a building if I plan to do the detailing while it's still on my workbench. As you can see above, doing so will make a world of difference in the appearance of your towns.

Full interiors not needed

Of course, it's possible to add complete interiors to stores. Manufacturers including Woodland Scenics, Faller, and Busch offer figure and accessory sets suitable for store interiors. Even a few simple forms cut from cardboard or plastic will suggest a store layout. But there's an easier way. Most stores have window displays that screen the store interior from the street view. Giving your storefronts realistic window dressings is much easier than building full interiors.

I discovered this technique when I was a teenager, spending my money on HO scale trains. I had assembled a row of town structures, but they all had vacant windows. Then I came across a magazine photo of a store window that was just the right size for an HO structure, so I tried it in one of my stores. I found that if I curved the photo and attached the edges to the sides of the window, the image seemed to move as I passed by, as if it had depth.

Later, I bought one of Faller's city structure kits, which came with a large sheet of photos of various store windows. These were just what I needed. Faller's kits came with a white molded photo holder that also acted as a light diffuser. I didn't have a source of plain white styrene at the time, so I made some similar mounts for my other buildings out of clear acetate from the hobby shop.

Do it yourself

It was only in the 1990s that color copiers and printers approached photo quality, which made the price of using photos for store windows economical. Instead of relying on printed displays that come with some structure kits, you can photograph any storefront displays you like. I like to shoot after dark, when stores are lighted. This reduces reflections from the street, as seen in **fig. 1**.

Once you've had your photos processed, select the prints you like best and group them by size. Glue them to a sheet of paper and resize them as needed for your modeling scale on a color copier, and you'll be able to print out your own store window displays.

If you have a digital camera, a computer, and a color printer, you can do all the processing and scaling at home. Photo-editing software can also create all sorts of effects that were impossible just a few years back. For example, if a store window display that I photograph isn't wide enough to fill a large window, I can clone it, reverse it, and stitch it to the original, doubling the size of the image.

Fig. 1 Night shot. Shooting photos of prototype store window displays at night reduces distracting reflections from the street.
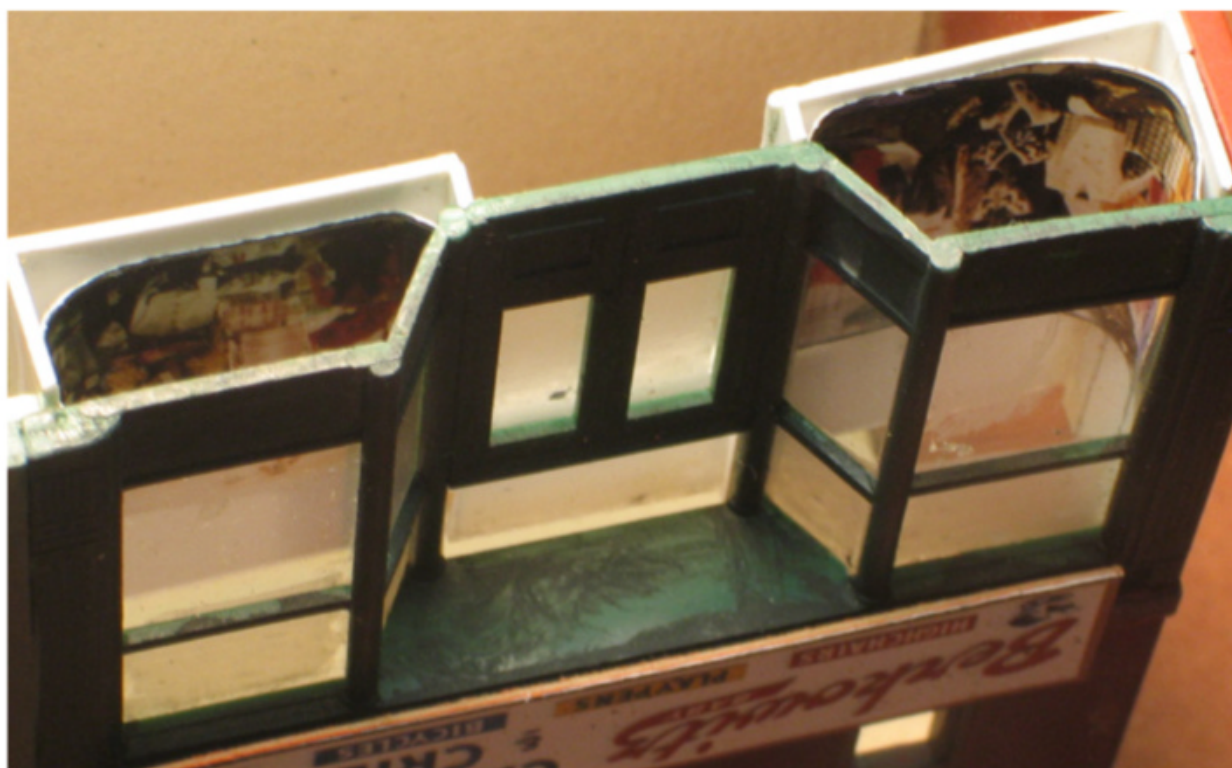
Fig. 2 Display case. Simple styrene frames installed behind store windows hold display photos, giving the impression of a complete interior. Stores with set-back entrances should have their displays recessed slightly behind the door for the most three-dimensional effect.

Whether you print your own window displays or cut them from commercial prints, I suggest protecting them from fading with an ultraviolet (UV) light protecting spray, such as Krylon UV Resistant Clear (sold at hobby and craft stores). I also recommend that if you do your own home printing, use the best quality paper you can, as it resists fading better than cheaper alternatives.

Presentation and lighting

I prefer to print my interiors on thin matte-surfaced photo paper. (The Epson paper I use is called "presentation paper," though other brands may have their own names for it.) The thin paper passes light from behind better than thicker stock, making it easier to illuminate.

To install storefronts in your structures, build a display holder about 3/16" deep out of sheet styrene attached to both sides of each window. Leave the bottom open to insert photos, as shown in **fig. 2**. Clear and thin white styrene work equally well. A single small bulb inside your building will then shine through the holder and the paper, illuminating your storefront realistically.

Simply slipping a photo into a holder behind your windows is sufficient from normal viewing distances. Even a display

Fig. 3 Music with depth. Cutting out the window display and placing it in front of a background photo adds depth to this music store window.

Fig. 4 3-D display. Reducing product labels on a copier and wrapping them around styrene shapes makes oversized novelty products for a realistic display.

Fig. 5 Open all night. Lighting your window displays from behind or above not only improves their visibility, but also makes a striking night scene.

that doesn't match the business (such as a clothing display for a hardware store) looks better than nothing. Most viewers won't notice the discrepancy unless the storefront is at the front of your layout.

If your models must stand up to close scrutiny, or are of a large scale, consider adding a second, cut-out layer to add depth to your displays. Make another identical print and cut out just the foreground items with a hobby knife. You can then mount these in front of the background photo to make the closer layer "pop out" at the viewer. Take a look at **fig. 3** to see how well this technique creates the illusion of depth.

An even more eye-catching technique is to make some oversized display products for your windows, as I did for my Rexall Drugs (**figs. 4** and **5**). I scale down real product labels, print them out, and wrap them around styrene strip or rod to make mock boxes and cans.

If you use multiple layers or 3-D items, you may want to mount a miniature fluorescent bulb (available in hobby shops or through the Walthers catalog) just above the window to illuminate the foreground objects. See **fig. 5**. Displays that overlap in layers will appear in silhouette if lit only from behind.

Everywhere, a sign

In addition to photographing and printing out store window displays, you can use the same methods to model business signs. I've always liked signs, and even when I was a teenager I knew there had to be a better way to make them than gluing alphabet noodles to cardboard. Some years back I started photographing real store signs for this purpose, like the one on the hardware store in **fig. 6**.

I was still shooting photos on film then, so I used a hobby knife to trim the signs I wanted out of my prints. I arranged the photos by size and glued them to paper with other similar sized signs. I enlarged or reduced the groups of signs as needed using a color copier at a copy center.

If you have a computer, you can scale your signs individually and put as many as you can fit on the same sheet of photo paper. Even if you need signs for only a few stores, you can fill the rest of your sheet with railroad signs, billboards, parking signs, and other graphics.

If you stand too close when photographing signs, the edges may be bent by the internal curvature of the camera lens, called "barrel distortion." Though this is correctable with some photo-

TURNING PHOTOS INTO AWNINGS

Support system. The wind has blown in the side panel of this retractable awning, giving a good view of the scissor-style folding supports on the end.

Show your work. Scissor-type supports for retractable awnings, fabricated from scraps of strip styrene, can be a realistic detail for your downtown scenes.

Modern awning sign. Today, awnings are often fixed in place on aluminum frames, rather than retractable, and serve as advertising signs as much as shelter.

On the model. After using an image-editing program to clean up the photo, extend it, and rename the shop, the author glued it to a styrene frame.

Though large canvas awnings intended to protect shoppers from rain or sun were common on storefronts in the old days, most modern store awnings are little more than decorative signs. Modeling awnings from photos isn't any more complicated than modeling signs or window displays. It's simply a matter of applying your photos to a 3-D framework.

The older type of awnings had a scissor-type frame, as in **photo 1**, that cranked down and out from the storefront and was usually retracted at night. Since it could obscure any sign over the window, wording such as the name, address, and phone number of the store was often printed on the front of the awning.

Scissor supports for the sides can be fabricated out of scraps of strip styrene, as in **photo 2**, and painted silver or black. Some retractable awnings also had side panels, which you can model easily by adding a triangle of paper printed in the same pattern or color as the awning.

You can support your paper awnings with brass wire bent into a square U shape and glued into holes drilled in the storefront. Alternately, you could glue the paper to a styrene form rigid enough to support the paper.

I don't recommend using too many awnings of the old retractable type, since they'll cover up your new store window displays. But retracted awnings or the modern, shallow ones make a colorful addition to stores.

In the 1970s and later, increasing numbers of fixed aluminum-frame awnings like the one shown in **photo 3** have been used, functioning more as store signs and ornaments than as protection from the elements. Nearly every store in a modern strip mall may have these, presenting a unified look for the commercial block. Fortunately, these won't obstruct your store windows as much as the older type.

Modern vertical awnings can be photographed head-on from across the street. You can simulate the aluminum frame by gluing your prints over plastic or wire ribs. As shown in **photo 4**, I make mine with a plastic panel for the back and bulkheads I cut from sheet styrene. I then glue on the paper awning photo. – *V.S. Roseman*

editing software, it's easier to stand back as far as you can – across the street, across a parking lot if possible – and leave space between the edges of the sign and the edge of the frame to minimize this curvature.

A little does a lot

It's not necessary to dress up every storefront with an elaborate display, but a few details can add a lot of realism to your model railroad's commercial block. By adding realistic window displays, signs, and awnings, you can create a very prosperous and busy-looking downtown section, even if you only have room for a few town structures. **MR**

V.S. Roseman of Brooklyn, N.Y., is a prolific modeler and writer who has published more than 130 articles. His article "Enhance figures with decals" appeared in the July 2020 Model Railroader.

Fig. 6 Give me a sign. Though many commercial signs are available for model railroad structures, it's hard to beat a photo of the real thing.

Modeling
Miami's Downtown Spur
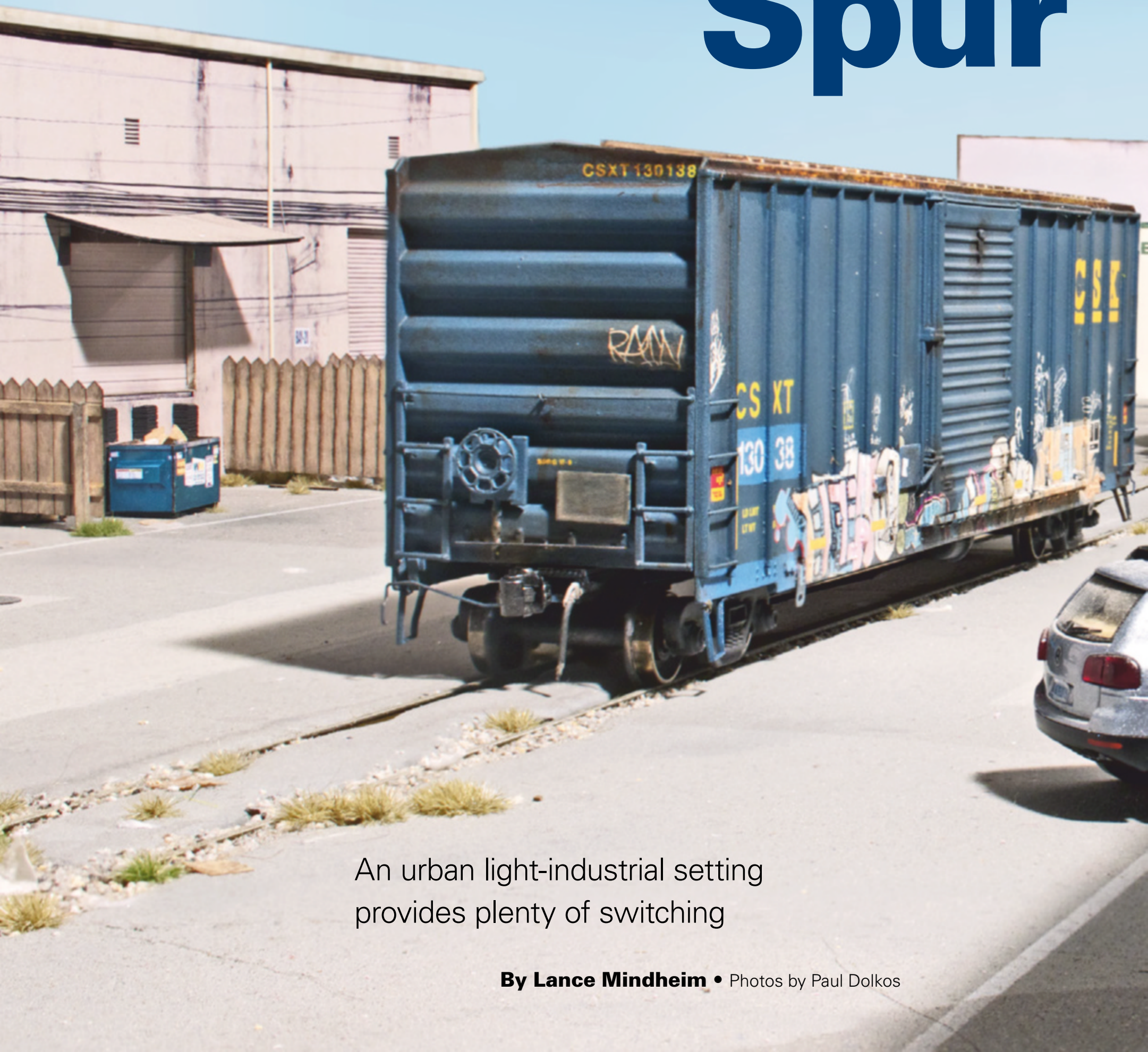
An urban light-industrial setting
provides plenty of switching

By Lance Mindheim • Photos by Paul Dolkos

1. The Miami Produce Center is an open-air courtyard operated in a team track fashion on Lance Mindheim's HO switching layout. Arriving carloads of fresh produce are spotted in the lot so customers can pull up and transfer the items into small box trucks or pickups.

2. Family & Son, a major importer and producer of Latin American food products, is one of the more active customers on the branch. This view shows the southbound local passing the concrete loading dock for the Family & Son warehouse.

The humidity is first thing that hits you as you step out of the front door at Miami International Airport. Weather statistics don't convey the shock of its impact the first time you walk into it, particularly if you're from up North. Second is the smell of the ocean air. As you cruise down 22nd Street, parallel to the industrial spur I model, palms and live oaks arc overhead. Latin music pipes out of the open doors of the dozens of produce warehouses, and numerous signs indicate English is a second language.

Not only do you have the sense of being in a place like no other, when it comes to the rail scene, you feel transported to times past. As in the bygone era of the 1950s, industries still routinely take single-car loads, team tracks are common, and street running still exists.

The Santeria religion is prevalent in the area, including the regular practice of "chicken in a bag" animal sacrifices via locomotive. In an attempt to ward off bad luck, a live chicken and a wad of cash are stuffed in a bag and draped over the rails. The belief is that once the locomotive squashes the bag and its contents, the believer's fortunes will improve for the better.

Something different

After modeling the traditional steam-to-diesel transition era for many years, I was ready to try something different. Miami serves up "different" in large

doses. I was also ready to try a new era and was intrigued by the idea of modeling the present. Whether it's 1950 or 2013, the methods of spotting a car haven't changed. If anything, it's more interesting today due to the added safety procedures employed. Getting accurate prototype information is also much easier in today's world.

Miami offers more than most cities in terms of the number of industrial parks that would make great modeling themes. Ultimately I decided on The Downtown Spur, a 3½ mile branch of CSX near the airport. It hugs the banks of the Miami River for a mile, and then makes a straight shot east toward downtown before the rails disappear into the pavement at Seventh Avenue.

This spur is switched regularly, sometimes with two shifts during good economic times, and it has a tremendous variety of lineside industries.

Sun Gas · Electrical panel · Produce Connection · **Family & Son Food Products** · Northwestern Meat · A&M Exporters

CBI International · River Park Trailer Court · 22nd Avenue · 2 · 21st Avenue · 22nd Street

Antillean Marine · Richard Shipping Service · **Miami Iron & Metal** (scrap yard) · **Ferrous Processing & Trading (scrap yard)** · 4 · *Miami River* · 3 · Miami Waste Paper · 17th Avenue

7

River Drive · 6 · Caribe Foods · 15th Avenue · **PanAm Frozen Food**

The "Pink" Warehouse · 14th Avenue

Entrance · 22nd Street · Pizzeria · Concrete column · Staging and CSX/Tri-Rail main line · "Jesus Saves" Building · GMP

Old main line · **Team Track** · Florida used pallets · D&E Argentinas · **Florida Bottling** · **Proveedora Jiron** · 11th Avenue · 12th Avenue · **Miami Produce Center** · Dade Tomato · Florida Beverage Distributor · Chicago Produce

37th Place · 36th Street · Junction switch · First Coast of Miami · 22nd Street · Cuba Tropical Produce

8 · Del Toro Signs · 10th Avenue Tires · A-1 Farmers Choice · Kinko's · 13th Avenue · CTP Truck Lot

Mac Edwards Produce · Miguel Alvarez Co. · 10th Avenue · Chavez used auto parts & junk yard · 5 · 11th Avenue · Gulf Atlantic Warehouse · Pepe-Banana Supply Filito's

Genaro Produce · Lowell Distributing · Rex Foods container stack · Sanchelima Dairy · Runaround track · Rex Food & Candy · Column · **Trujillo & Sons** · 12th Avenue

CSX Miami Downtown Spur

HO scale (1:87.1)
Layout size: 17 x 21 feet
Scale of plan: ¼" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Boldface names indicate railroad customers
Illustration by Rick Johnson

Find more plans online in the ModelRailroader.com Track Plan Database.

THE LAYOUT AT A GLANCE

Name: CSX Downtown Spur
Scale: HO (1:87.1)
Size: 17 x 21 feet
Prototype: CSX
Locale: Miami
Era: 2007
Style: walk-in
Mainline run: 89 feet
Minimum radius: 24"
Minimum turnout: no. 6
Maximum grade: none
Benchwork: hollow core doors along walls, open grid peninsulas
Height: 54"
Roadbed: none
Track: code 70
Scenery: extruded-foam insulation board
Backdrop: painted room walls
Control: CVP Easy DCC wireless

CSX main to Hialeah Yard · Route 112 Airport Expressway

Bascule bridge · Northwest 27th Avenue · Allapattah neighborhood · Northwest 12th Avenue

Miami Iron & Metal · Northwestern Meat

FP&T (scrap metal) · Sun Gas · Family & Son Produce · Pan Am Frozen Food · Chicago Produce · Trujillo and Sons

Miami airport · Antillean Marine · Exporters A&M (abandoned) · Miami Waste Paper · Caribe Food (abandoned) · Team track

Miami River · Northwest 20th Street · Florida Bottling · A-1 Farmers Choice

Northwest 22nd Avenue · Northwest 17th Avenue · Open-air produce market

CSX Miami, Fla., Downtown Spur
Not to scale

3. Ferrous Processing & Trading, know locally as FP&T, buys scrap metal and shreds it to a uniform size before the processed material is loaded into gondolas. In this view, the CSX local crew will pull the pair of loaded scrap gons.

4. Miami Iron & Metal is another scrap-metal dealer along the river corridor. Unlike its competitor, MI&M doesn't shred the metal, but the scrap materials are sorted into various categories before they're loaded. Miami Iron ships its outbound scrap loads in formerly utility-owned high-side coal gondolas.

The first mile of the branch serves a scrap metal business, a waste oil recycler, and a propane dealer. The balance of the line serves a variety of small food businesses that receive loads in boxcars, reefers, and vegetable oil tankers. Unlike the more modern structures we typically see trackside, those along the spur tend to be older, small, weather-beaten stucco affairs that only handle a car or two.

Pulling it off

Most modelers want to capture a miniature version of a place or time that evokes strong and pleasant memories. To effectively pull off this theatrical sleight-of-hand requires an understanding of the factors that contribute to a successful model and putting your efforts there. If you want to feel like you're actually "there" when you enter the basement, your efforts need to be focused on scene composition (particularly keeping elements far enough apart), correct handling of color, scenery, and a commitment to neatness. If you work from photographs and apply these principles, you'll get the visceral feeling you're after.

5. Numerous small family businesses, like Chavez Used Auto Parts, are scattered throughout the neighborhood between the railroad customers. Here, the local is crossing 10th Avenue as it heads north toward the CSX connection at 36th Street.

Even if your modeling is flawless, you can still fall short. Successfully capturing the feeling and mood of the area you're modeling entails sitting back for a moment to consider the area's defining features. A distinction has to be made between the common and ordinary elements that make a place what it is versus the typical model railroad approach of cherry picking all the extraordinary features. In "my" Miami planning, the signature elements are the palms, the river scene, and the unique structures.

Palm trees

Nothing says you're in Miami more than the ubiquitous palm trees. There simply isn't any hope to create a replica of the area without them.

I wasn't happy with the appearance of ready-made palms on the market. To me, taking the easy way out and using them

MODELING MIAMI'S STRUCTURES

The basic architecture of Miami's industrial structures is relatively easy to model, since most of it consists of masonry blocks covered with stucco. Construct a 4-wall cube, and the base structure is essentially complete.

It's the pastel surface coloring that's unique and a challenge to model. Hand-painted murals and signs are common. Over time, the original artwork begins to fade, peel, and occasionally gets covered with graffiti. Modeling this convincingly using traditional techniques is nearly impossible. Since I had access to the area, I opted to use a photo-lamination approach. I simply photographed the structure, cleaned up the image using my computer's image-editing software, and glued the finished photos to my styrene cube. Then, to add some visual depth to the flat walls, I added 3-dimensional details such as awnings, rain gutters, steps, and loading docks.

My article "Building a modern shelf switching layout" appeared in *Model Railroad Planning 2009*. It featured a look at this layout during the planning phases and included a number of prototype photos. At the time it was written, construction had not started. It's also important to note the plan shown here is different from the one in that article. – *Lance Mindheim*

6. The morning local is passing the Antillean Marine container yard, one of the larger shipping companies on the Miami River. Antillean Marine was served by rail until Hurricane Andrew seriously damaged some of the ports it serves in the southern Caribbean.

7. The lines of sight are obstructed approaching the 17th Avenue crossing, so the conductor often takes a position on the front platform as a safety measure while the locomotive crawls through the intersection. This precaution is commonly taken to watch for inattentive motorists even though the crossing is protected by numerous flashing signals.

would have been visually jarring and ruined the effectiveness of any work I did in other areas. High-quality palms are available from the Hart of the South website [hartofthesouth.com], provided you're willing to build tree "kits." Since the palms are such a signature element, I decided the time spent modeling them was well spent.

The river scene

It's really an odd feeling to be driving along a street with a 5-story-high ship gliding by a few yards away behind the tree line. Many visitors are unaware that Miami actually has two active ports. In addition to the large and more typical Port of Miami, the Miami River inland port serves a string of small shipping companies whose names tip off the destinations they serve: Antillean Marine, American Caribbean Terminal, Trans-Haiti Shipping, and many others.

The Miami River scene defies belief in terms of plausibility. At many points, the river is only a few yards wider than the ships that ply it. The vessels that thread upstream tend to be very short, 300- to 500-foot long container ships, barges, and ferries. Their hulls are streaked with rust and the ships seem to be a Frankenstein kitbash of whatever the shipyard could pick up on the cheap, including World War II landing craft. Given their short length and questionable seaworthiness, most of the ships primarily ferry vehicles and goods to nearby island

8. Here's the local backing slowly into a switchback as it crosses 22nd Street with a mechanical refrigerator car. The crew has to continue this move for about three blocks before it can spot the load at the Miami Produce Center.

nations of the Caribbean. Being able to work in some marine modeling with this layout is a welcome treat.

Structures and scenes

One of the great lessons I learned from my mentors is the importance of modeling the ordinary. As I decided which features made it onto the layout, I worked very hard to keep my emotions out of it. No consideration was given as

to whether a structure was rail-served or not, or whether it had interesting architecture. If a building was in the scene, I included it without judgment.

Miami's interesting culture and rail scene never cease to fascinate me. I can't visit the city as often as I'd like, but thanks to photography I've captured the spirit and flavor of the area enough that I feel like I'm taking a railfan vacation when I step into the layout room. **MR**

Build an N scale
cattle yard
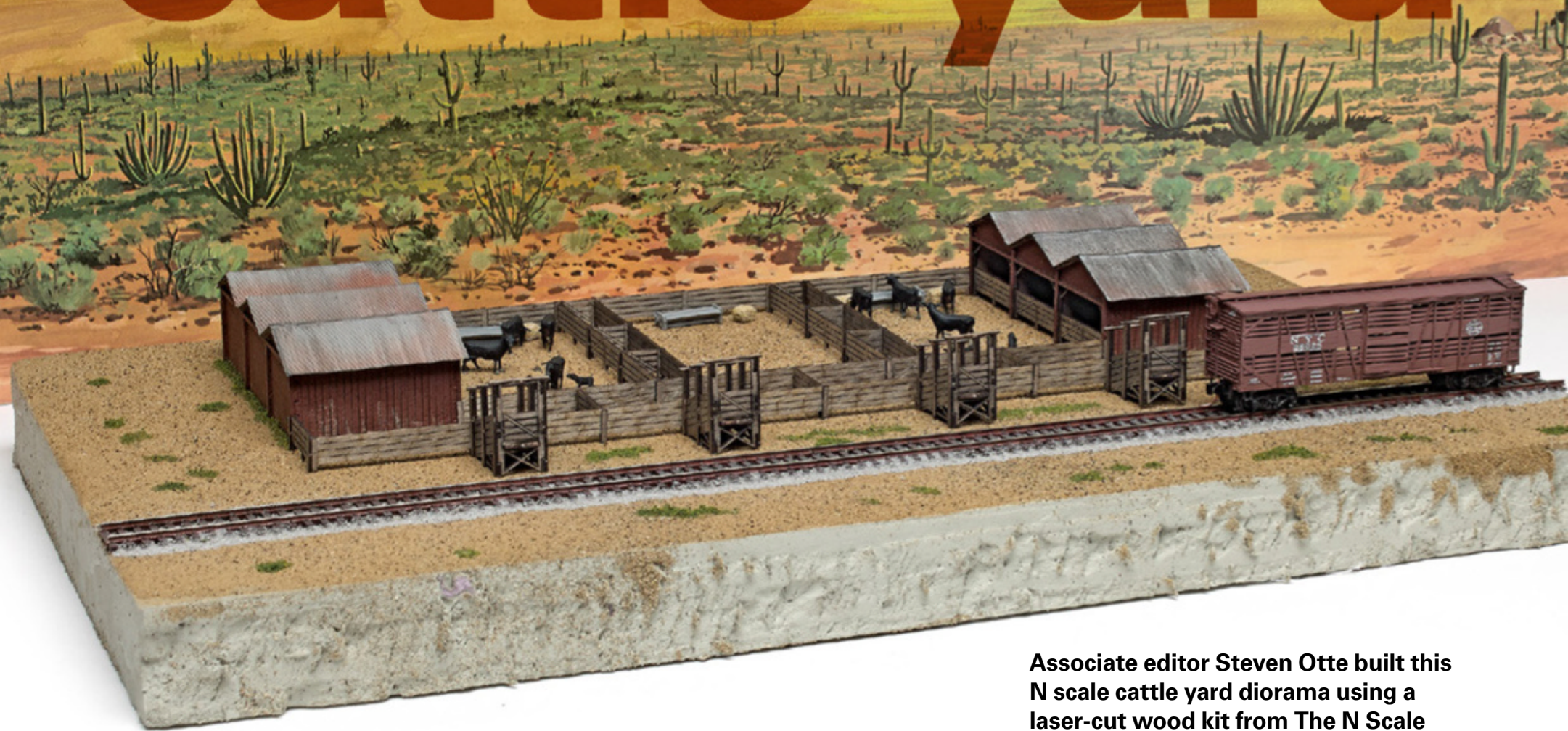
Associate editor Steven Otte built this N scale cattle yard diorama using a laser-cut wood kit from The N Scale Architect, a piece of 1" extruded-foam insulation board, and a length of track.

Practice new techniques by building a diorama

By Steven Otte • Photos by the author

Dioramas are an under-appreciated practice in model railroading. Building one is a great way to keep your hand in the hobby if you don't have the room, resources, or time for a full layout. They're great for displaying your rolling stock (and your modeling skills). They let you work on a scene that may not be in your usual era, locale, or even modeling scale. It's also a way to create scenes for your layout at your workbench.

The kit I'm using is Quality Meat Stockyard from The N Scale Architect [thenarch.com]. After preparing the extruded-foam insulation board base with a quick layer of ground cover, I got to work on the structure. Once it was done, I affixed it to the base and dressed it up with a few details. A stretch of N scale track completed the scene.

Consider building a diorama the next time you want to practice a new technique, experiment in another scale, or get a jump on a future project.

Step 1 Prepare the base

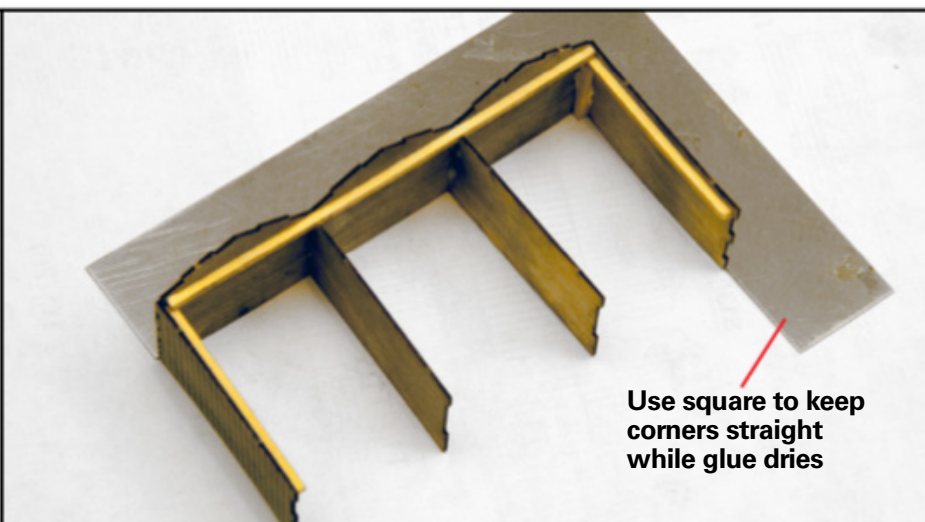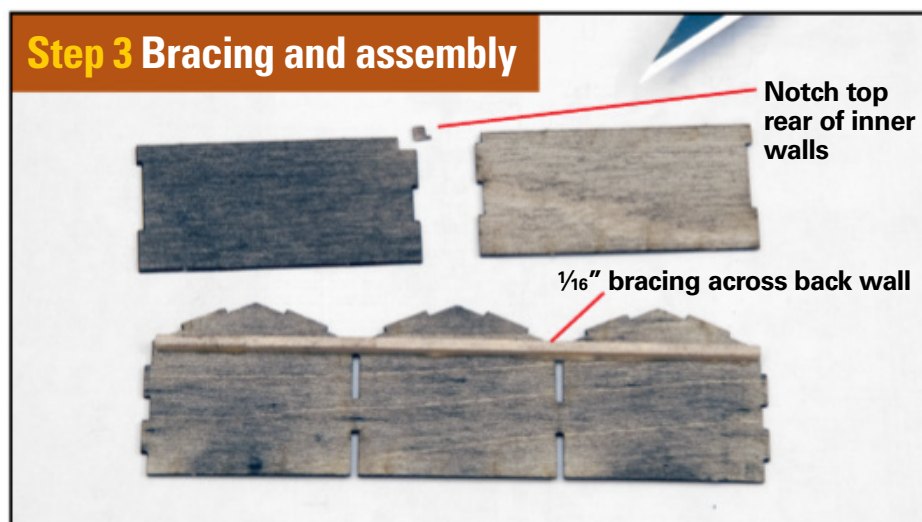Earth-tone latex paint

Real Dirt, Highball Products 510

I used a utility knife to cut my diorama base from a sheet of 1" thick extruded-foam insulation board. The model has a 5" x 10" footprint, so I cut my base 8" x 14". I painted the surface with earth-tone flat latex house paint, then while the paint was wet, sprinkled on Real Dirt from Highball Products. Though the paint adhered the ground cover well, I could see brush strokes in several places. So once the paint was dry, I wet the surface with a few sprays of 70 percent isopropyl alcohol, sprinkled on more dirt, and affixed it with Woodland Scenics Scenic Cement. This resulted in a realistic surface.

Step 2 Weathering the wood

Leave parts in carrier sheet while weathering

Dark gray weathering powder, AIM Products 3111

Rub powder into surface

When assembling wood kits, I usually weather the parts with a stain of black paint diluted in isopropyl alcohol. However, this can cause thin wood parts to warp, and since most of this kit is exposed fences, I wouldn't be able to fix it with hidden bracing. Instead, I aged the wood parts with dark gray weathering powder from AIM Products. I tried brushing the powder onto the wood sheets, but worried it would come off with handling during assembly. Ultimately, I sprinkled the powder onto the laser-cut sheets, then rubbed it in with a fingertip. This gave the wood a gray, aged look.

Step 3 Bracing and assembly

Notch top rear of inner walls

$\frac{1}{16}$" bracing across back wall

Use square to keep corners straight while glue dries

When you're dealing with parts as thin as $\frac{1}{32}$", even microplywood can warp, especially when it's scribed with board detail. To counter this on the two shelters that come with the kit, I added $\frac{1}{16}$" square stripwood bracing under the roof, where it won't be seen. Normally I'd use

$\frac{1}{8}$" bracing, but for walls this thin, $\frac{1}{16}$" was all I needed. I cut notches at the top of the inner walls to clear the long brace across the rear wall and also reinforced the back corner joints. I strengthened the more visible front wall joints with an extra fillet of glue.

Step 4 Painting

Boxcar Red paint, Model Master Acrylics 4881

Drag brush top to bottom, leaving some exposed wood
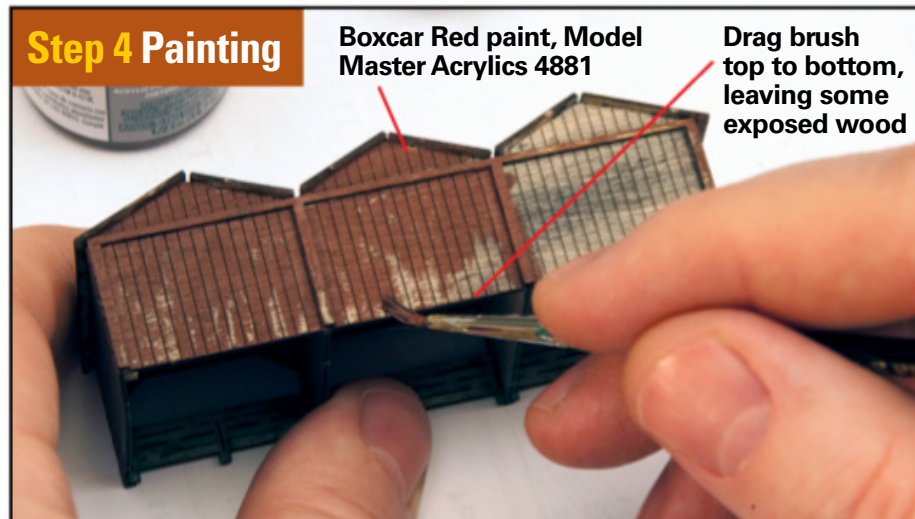
The fences in a cattle pen would simply be plain weathered wood, but the attached shelter/hay barn structures would be painted to protect them from the weather. I brushed on Boxcar Red from Testor's Model Master acrylic line. I dragged the brush in vertical strokes, parallel with the scribed siding, leaving random patches at the bottom uncovered to represent peeling paint.

Step 5 Roofing

Dark rust weathering powder, AIM Products 3105
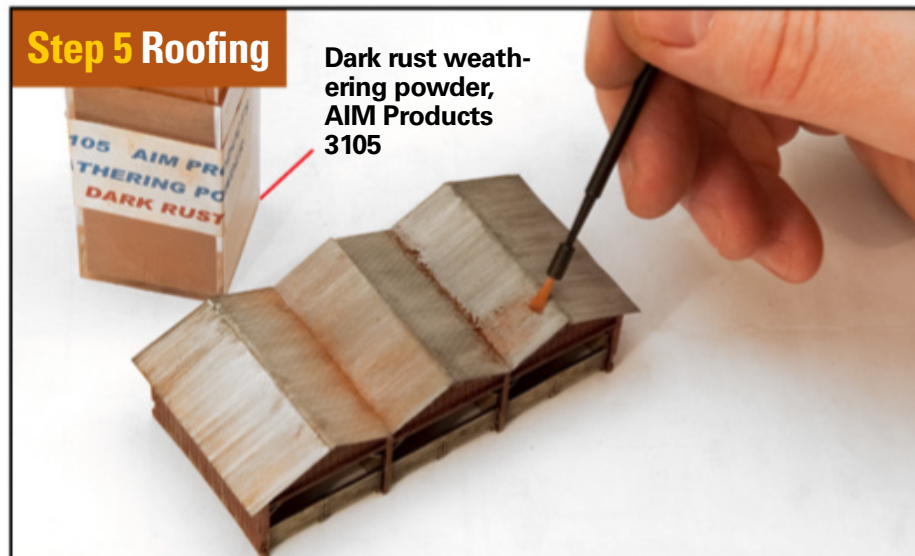
The kit comes with corrugated foil roofing, which was far too shiny for my tastes, even if I were modeling a new structure. To tone it down, I applied a wash of Model Master Grimy Black acrylic paint, thinned by dipping the loaded brush into my cup of wash water. Once that dried, I brushed on Medium Gray weathering powder from the peaks down, and Dark Rust powder from the eaves and valleys up. I left off the provided white-metal roof vents because I didn't like how they fit. With the shelters finished, I then completed the kit assembly, as per the included instructions.

Step 6 Installation
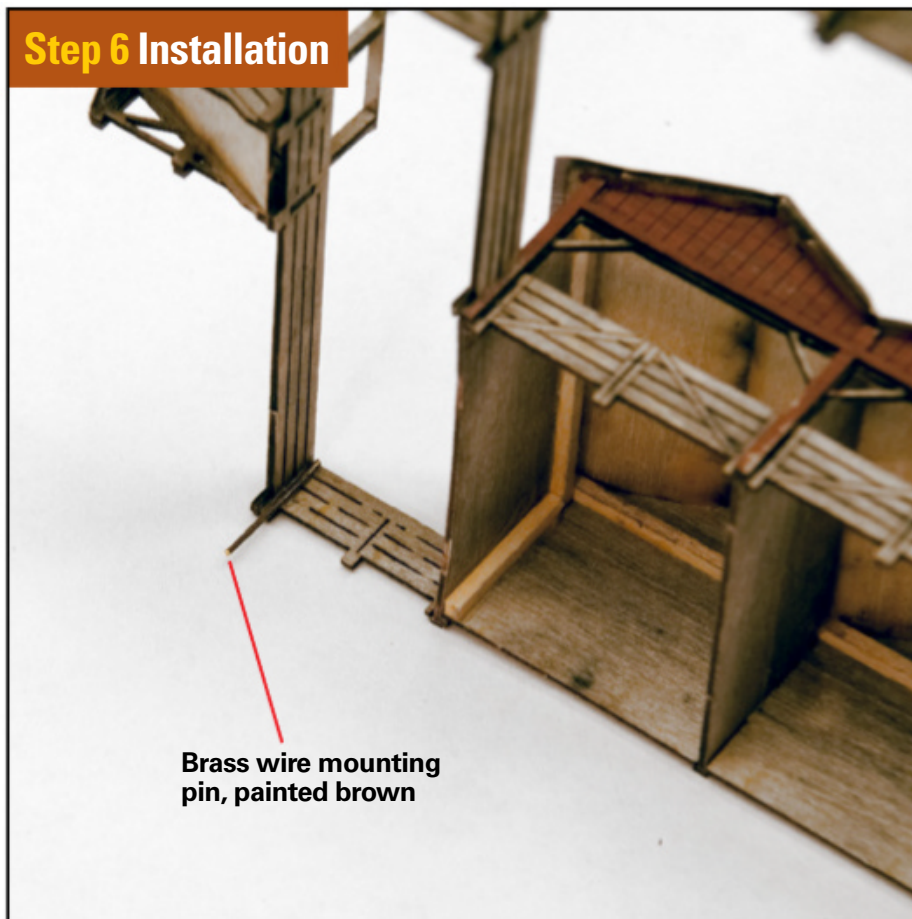
Brass wire mounting pin, painted brown

To attach the structure to the foam base, as well as to straighten some slightly curved fences, I cut a handful of mounting pins from brass wire I had in my scrap box. I painted the pins Roof Brown to help hide them against the weathered wood fences and glued them into selected corners using medium viscosity cyanoacrylate adhesive (CA). After the glue cured, I positioned the stock pen on the base, straightened the warped fences, and gently pushed the pins into the foam. I secured it by gluing the base of the shelters to the terrain with white glue, and sprinkled some green ground foam turf onto the wet glue to disguise the glue bead and represent weeds. I glued a few more patches of turf around the area, too.

Step 7 Track and ballast
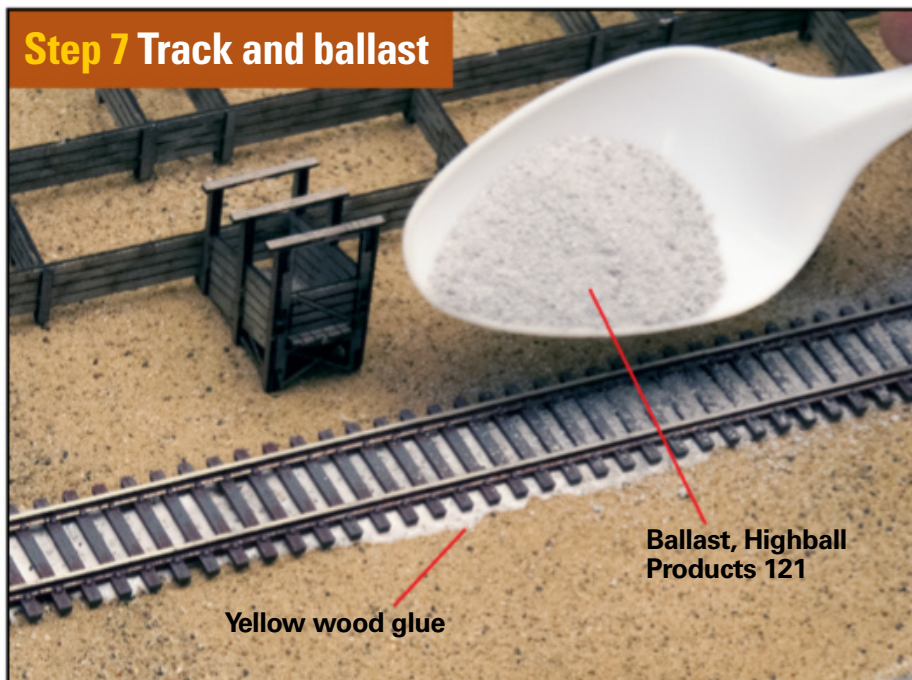
Ballast, Highball Products 121

Yellow wood glue

In our scrap box, I found an already weathered piece of N scale flextrack from a previous project. Since a spur alongside a cattle pen wouldn't be laid on a high bed of ballast like a main line, I didn't use roadbed. Instead, I glued the track directly to the base with yellow wood glue. While the glue was still wet, I sprinkled on the ballast. After the glue dried, only a thin layer of ballast stuck, but that produced the infrequently maintained look I was going for.
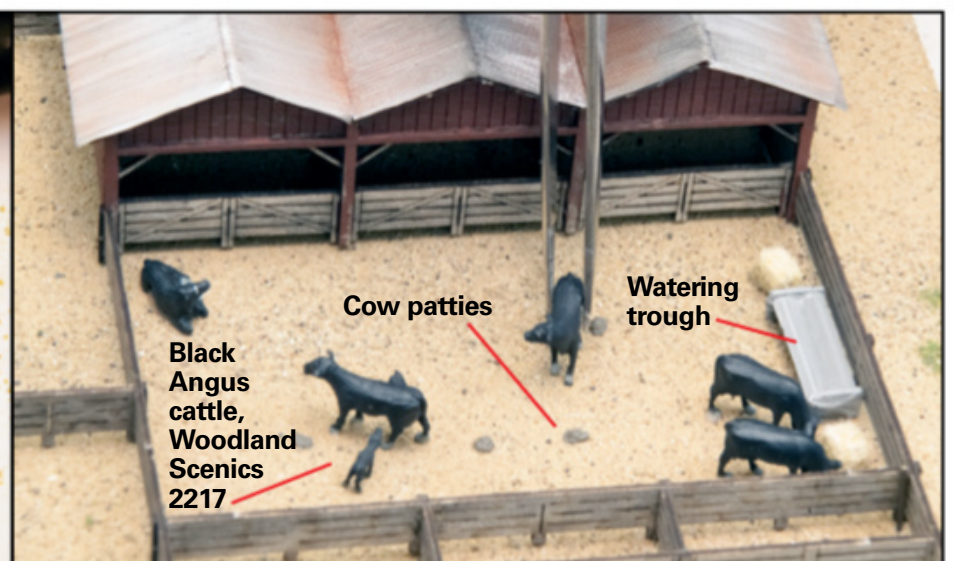
Step 8 Cattle and hay
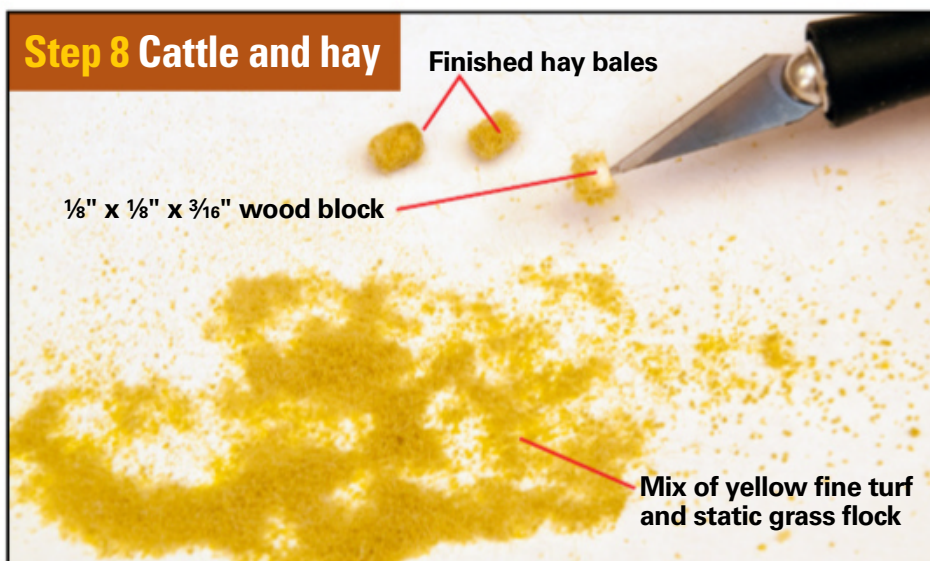
Finished hay bales

⅛" x ⅛" x ³⁄₁₆" wood block

Mix of yellow fine turf and static grass flock

Cow patties

Watering trough

Black Angus cattle, Woodland Scenics 2217

I made hay bales for the cattle to munch on while waiting for their train. I cut several ³⁄₁₆" long blocks of ⅛" square stripwood. Sticking my hobby knife into one side to make it easier to handle, I covered the other five sides of a block with white glue, then rolled it in a pile of fine yellow ground foam mixed with straw-colored static grass. The result was more of a fuzzy ball than a bale, but squeezing it between my fingers before the glue dried molded it into a rectangular shape. I glued a few of the hay bales into each of the pens. I painted the watering troughs included with the structure kit Reefer Gray and glued them in place. Finally, I populated the pens with two sets of Woodland Scenics N scale cattle, which came with a few scale cow patties for that extra touch of realism. **MR**

How to build retaining walls

A retaining wall made from railroad ties enhances the realism of this house scene on Lou Sassi's On30 Sandy River & Rangeley Lakes RR. He explains how to model the scenic detail one step at a time in this article.

This quick project adds visual interest

By Lou Sassi • Photos by the author

While working on my On30 Sandy River & Rangeley Lakes layout, I had my friend, Rich Cobb, build me two houses reminiscent of those seen in the vicinity of the prototype Strong, Maine, station in the 1930s.

One of them was a white farmhouse with attached two-stall carriage house/garage that was originally going on one end of the layout. Eventually, Rich built a kitbash of two Bar Mills hotels that is now located there instead. But what

to do with the original house?

Looking at the station scene at Strong, I decided placing the house behind the station would add more interest while giving the scene a more urban feel. One thing I noticed was that if I left the ground contours as they were behind the station, the house would be significantly higher than Strong Station.

This was all well and good, but just how could I make the sloping lawn from the house to the roadway in front look

not only believable but more visually interesting? Since the house was just behind the station, it would have been logical for the owners to have access to discarded railroad ties they could use to build a retaining wall for their front lawn. With that in mind, that's just what I did.

Step 1 Preparing the materials

S scale bridge ties

Razor saw

Ties held with tape while staining

I had a generous supply of Mt. Albert Scale Lumber Co. (now owned by Fast Tracks) S scale bridge and trestle ties, so I used some of them for the retaining wall.

I began by distressing a bunch of ties by drawing the teeth of an Atlas Snap Saw (any razor saw will work) across their surfaces. This simulates wood grain detail.

Next, I used a paintbrush to apply Minwax Special Walnut stain. Then I applied a wash that I made using 2 teaspoons of India ink mixed with 1 pint of 90 percent isopropyl alcohol. This combination of stain and wash closely approximates the look of old railroad ties commonly used in landscaping.

Step 2 Building the wall

Completed stair assembly

Cardboard base

Stagger ties
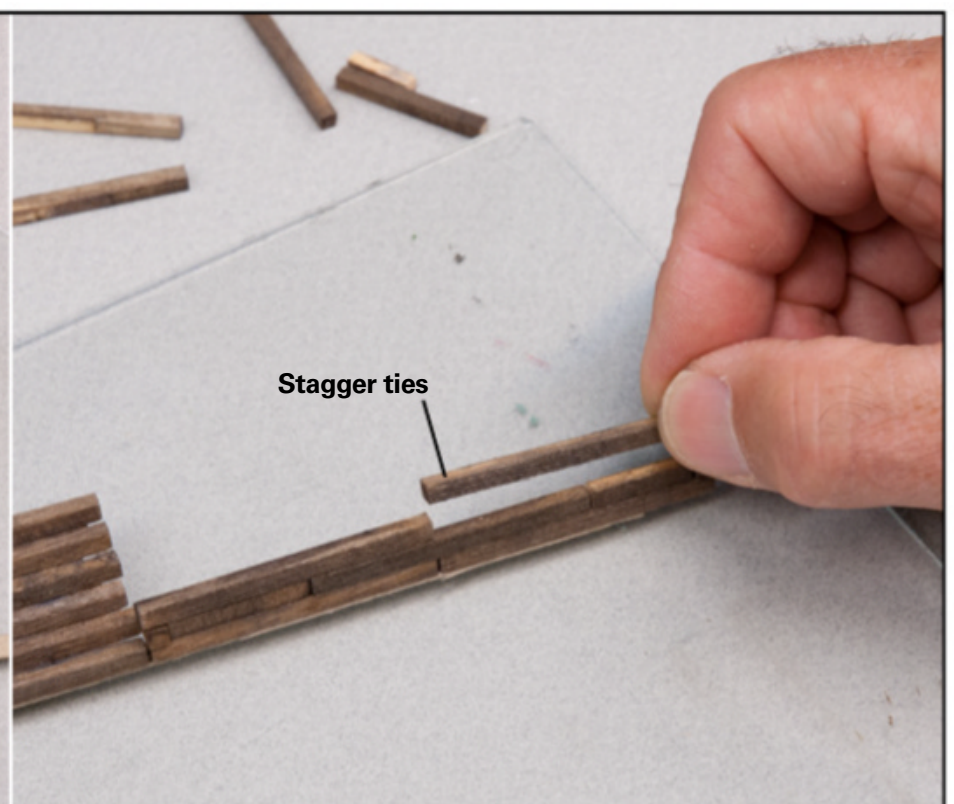
I built a stairway out of the stained and weathered ties by gluing two ties together side by side, then gluing these assemblies on top of each other, stepping back to leave one tie exposed per step.

After cutting a base for the wall assembly from a piece of cardboard, as shown at left, I glued the steps in place with Weldbond glue. Weldbond (weldbond.com) is a non-toxic, non-flammable universal glue sold at hard-

ware stores such as Ace and True-Value and Michael's craft stores. The glue dries in about an hour, but requires 24 hours to form a strong bond.

Next, I glued the retaining wall ties in place individually. I built up the wall level by level, as shown in the right image. Each row of ties is staggered so the seams between ties don't line up. The finished wall features seven courses of railroad ties.

Step 3 Preparing the site

8" extension to layout

Old scenery material

Build spackle up in ¼" layers

Retaining wall in place
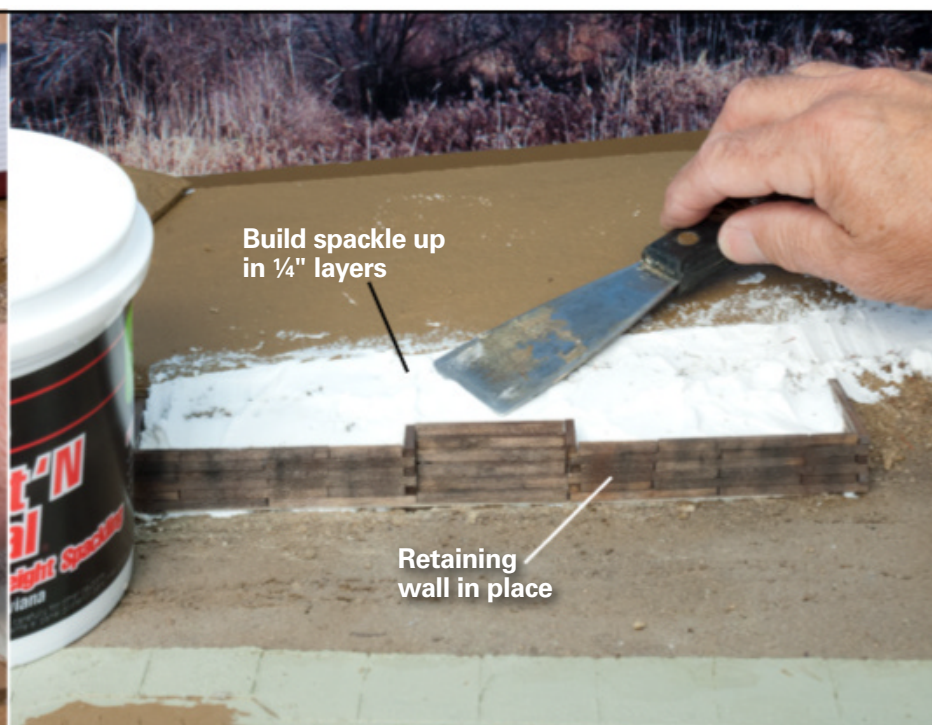
Once the steps and retaining wall were built and the glue had dried, I used a putty knife to scrape away any excess scenery material and dirt from the surface where the wall would go, as shown in the photo at left. I kept scraping until the wall would sit level.

With the surface prepared, I applied white glue to the bottom of the cardboard base from the previous step and set the wall assembly into place.

I used DAP Fast 'N Final lightweight spackling (quart tub item no. 12142, also available in smaller and larger

sizes) to fill the voids in the embankment behind the wall. I built the spackle up in ¼" thick layers, letting it dry between applications. I like the DAP spackle because it doesn't shrink, crack, or require sanding or priming.

I painted the spackle with flat, earth-toned latex paint. Once the paint had dried, I applied an ⅛"-thick layer of ground goop (see recipe at lower left). Ground goop has been in my bag of scenery tricks since 1978, when I first heard about it during a clinic by Ken Osen at the National Model Railroad Association National Convention.

Step 4 Stone walkway

Stones for walkway

I applied layers of fine- to medium-textured dirt over the goop with a spoon. Then I glued the dirt in place with a mixture of 1 part water to 2 parts white glue.

Next, I built a walkway from the top of the retaining wall to the porch steps using an assortment of small, flat stones left over from a well-drilling project years ago. I secured the stones with full-strength white glue. I then re-attached the front steps for the house, as seen in **step 5**.

Ground goop recipe

1 part Celluclay	1 part Elmer's white glue
1 part Vermiculite	About 1½ ounces
¾ part Pittsburgh Paints	concentrated Lysol
Tobacco Leaf Brown	

Step 5 Adding vegetation

Grass tufts

Once everything had dried for two or three days, I brushed a mix of three parts white glue to one part water on the ground. With the diluted glue still wet, I used a Noch Gras-Master to apply static grass on the yard. Since this scene represents early spring and the lawn would still be dormant, I used Scenic Express' autumn mix static grass.

I sucked up the excess static grass with a small vacuum cleaner. I attached a piece of mesh stocking over the nozzle, held in place with rubber bands, to prevent the static grass from entering the vacuum bag. This allowed me to reuse the fibers that didn't stick to the layout.

To complete the residential yard scene, I added a Berkshire Valley mailbox, a wire handrail for the railroad tie steps, and some grass tufts to simulate weeds growing along the base of the wall. These details can be seen in the photo on page 105. **MR**

Fences, such as the yellow picket fence behind the gas pumps in this scene on Mike Tylick's On30 Marshfield & Old Colony RR, have a lot of uses on a layout. Kits like Bars Mills' InstaFence make it easy to add these details to your model railroad.

GOOD FENCES
make good scenery

Wood kits can help divide scenes and make cramped areas seem larger

By Mike Tylick • Photos by the author

Good fences may not always make for good neighbors, but they certainly do make for good scenery design. In addition to being interesting detailing elements, fences can also be put to good use compressing perspective. Additionally, they can serve as a compositional line to lead a viewer's eye where we'd like it to go.

Model fencing is inexpensive and doesn't take a lot of time to build. Since my On30 Marshfield & Old Colony RR is quite small, space is at a premium and fencing can do all of the above while taking up almost no scenery space.

For these examples I used the Bar Mills InstaFence. Made of wood, InstaFence provided easy-to-weather

fencing that was fun to build and more versatile than I'd expected.

Building fences

My first project was to build a fence behind the station at Marshfield Hills. See **fig. 1**. Two dirt paths behind the station and a steep hill all appear on top of one another. The fence helps split the

Fig. 1 Splitting the scene. Mike needed a way to make the two dirt paths on either side of the rock wall seem more believable, so he added the fence on top of the wall.
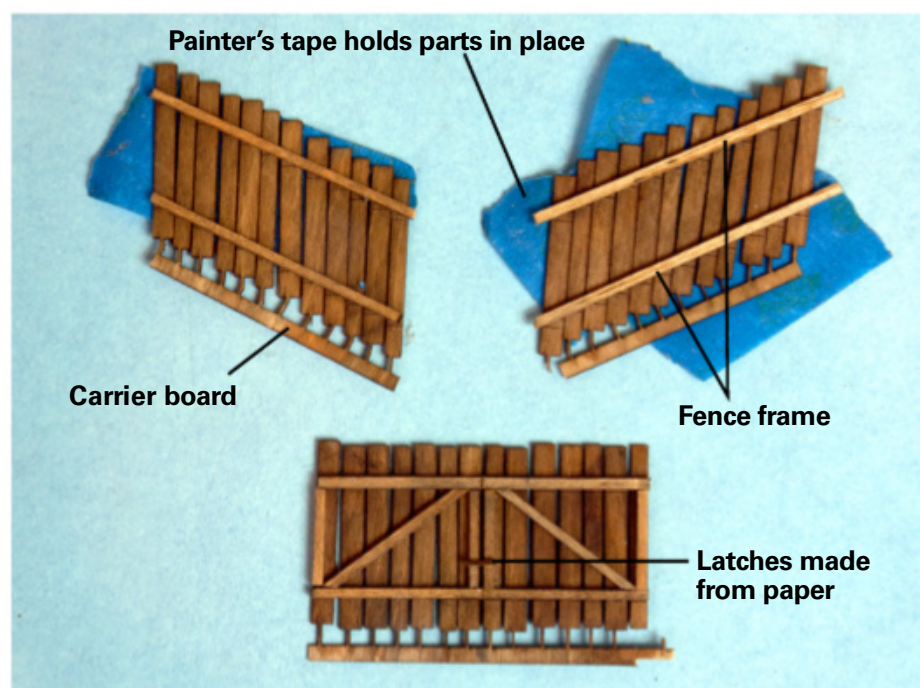

Fig. 2 Fence on a hill. Mike wanted to better define the scene at the coal trestle on his layout, so he built a fence with a gate on the hill next to the office.
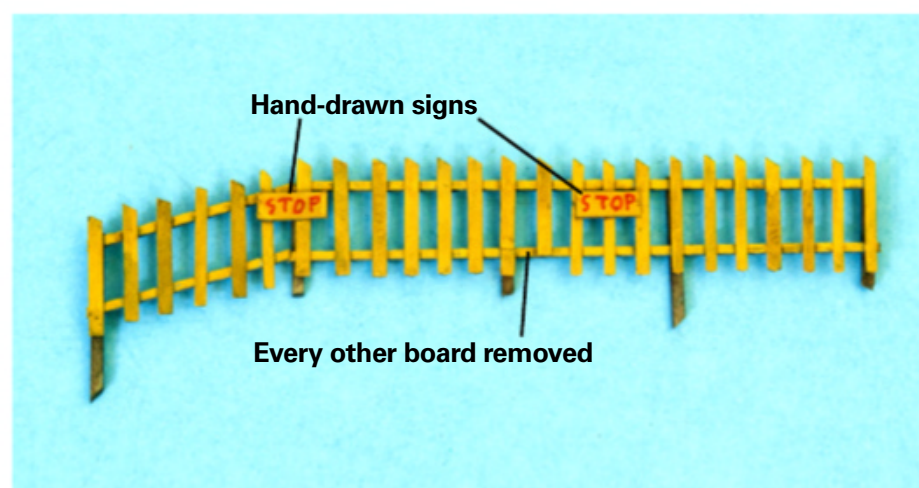

Painter's tape holds parts in place

Carrier board

Fence frame

Latches made from paper

Fig. 3 Tricks with sticks. Mike made a template of the area where he wanted a fence, then skewed the parts to fit.

Hand-drawn signs

Every other board removed

Fig. 4 Missing boards. Mike removed every other board to make a poor-man's picket fence for his garage scene.

scene. Because the fence hides the base of the hill, the scenery seems to be farther away than it really is.

The Bar Mills kit is available in four scales: N, HO, S, and O. I used the S scale fence here to force the perspective a bit on my O scale layout.

Elsewhere on the layout I have a coal trestle. An access road passes by the office and down below track level to the coal yard.

In order to break up the scene and reduce the apparent steepness of the dirt driveway, I added a fence and gate next to the office, as seen in **fig. 2**.

InstaFence made these projects simple. The boards are held by a carrier strip until a stripwood frame is glued to the back. The irregular placement of the boards adds character, and it's very easy at this point to further age the fence by removing, twisting, or breaking some of the boards.

I weathered the boards with a wash of India ink thinned with alcohol. The

frame and posts were then glued on the back and I could remove the carrier strip.

I applied a craft paint "whitewash" to the front of the fence with a stiff brush using drybrush techniques. Water color washes at the end help to bring out the texture. Small signs provide additional detail, but be careful not to overdo this effect.

The Bar Mills fence can easily be built to accommodate sloping ground. I cut a paper template to match the sloping terrain next to the coal trestle office and bent the boards on the carrier strip to match. The blue tape, shown in **fig. 3**, held everything in alignment until the glue dried. Sway bracing and a tiny paper "latch" completed the gates.

Other options

At another location there's a service station. I built a fence to discourage motorists from plunging to the tracks passing behind the garage at the bottom of a small slope.

By removing every other board from the carrier strip, I was able to replicate a type of board fence that was at one time a quite common poor-man's picket fence.

This S scale fence was painted bright yellow to draw motorists' attention (see **fig. 4**). The hand-painted signs are an additional safety feature. I drew them with a red fine-point marker, as a real garage would likely have hand-painted its own.

The versatility of the Bar Mills InstaFence made it easy to adapt to several different situations on my layout, and the wood construction made them easy to build and paint.

These quick projects went a long way in improving the appearance and believability of my layout. **MR**

How to model tall grass easily

The field behind this small lumberyard on the HO scale Winston-Salem Southbound layout was made using pieces of static grass mats made by Heki (light green) and Busch (dark brown). Bill Zuback photos

Modern static grass mats offer variety and ease of use

By David Popp

Not long ago the name grass mat conjured up frightful images of sheets of green paper and dyed sawdust used to cover acres of otherwise barren plywood quickly and cheaply. Fortunately, those days are behind us.

Modern static grass mats are something altogether different than their ancestors. These products are manufactured by attaching fibers to a substrate – the two most common are a flexible clear membrane or a poly fiber backing. Modelers then choose the grass mat that meets their application, cut or tear it to

fit, and cement it to the layout. The end result is lush, realistic model grass without the need to own an electrostatic grass applicator. You also avoid having to get the fibers to stand up or thicken.

Busch, Faller, Heki, Walthers, Scenic Express, and others offer static grass mats in an amazing array of colors, lengths, and textures. I've used many of them in scales from N to O, and the mats can be used to model tufts, patches, or entire fields.

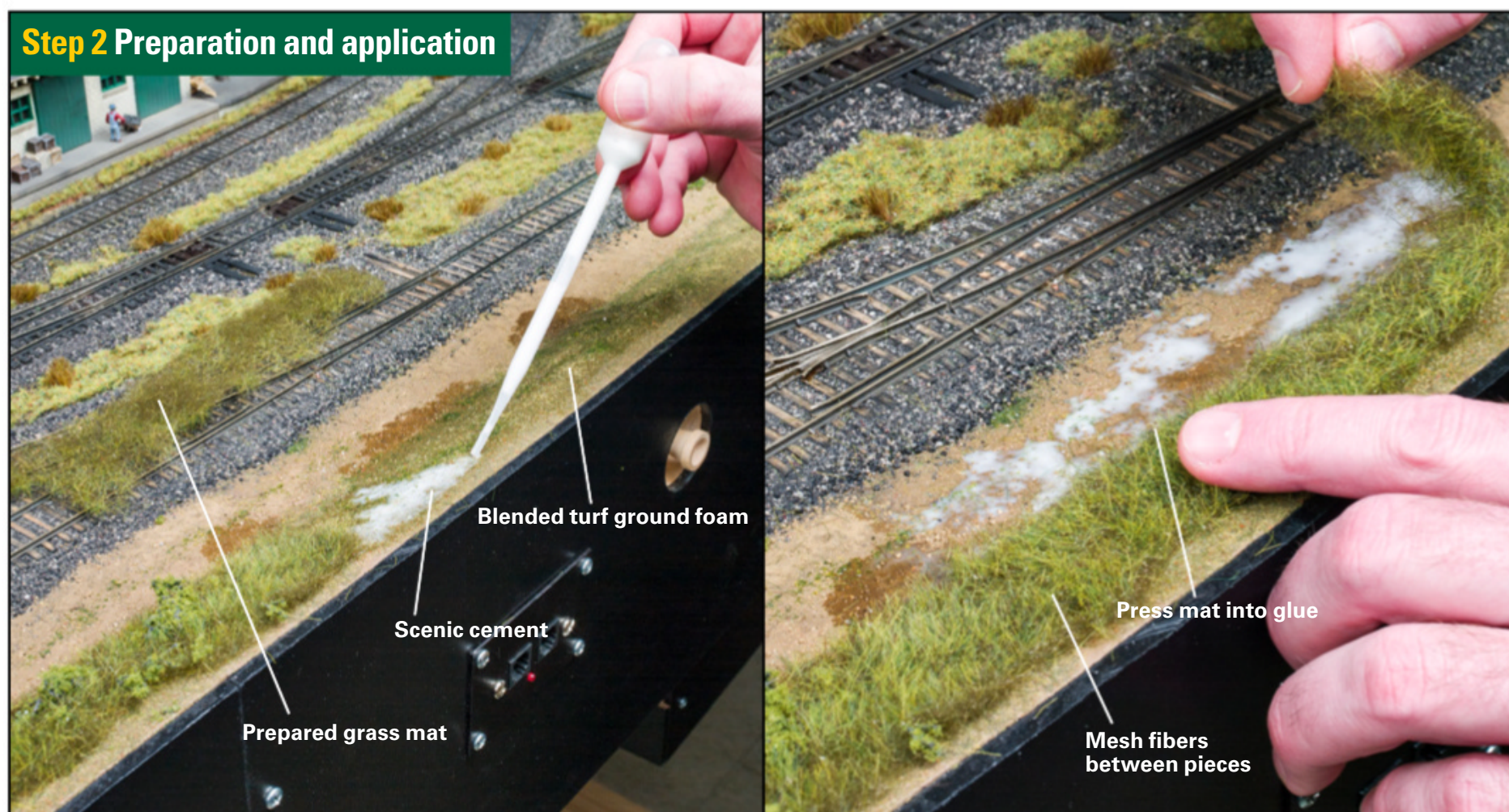For Model Railroader Video Plus' Winston-Salem Southbound project

railroad, I used several mats from Heki and Busch. Heki no. 1575 Meadow Grass Light Green proved particularly effective for modeling the tall grass found on embankments along the railroad right-of-way. The material is very easy to work with, and it took me less than an hour to fill the layout's unkempt scenic areas with grass that looks realistic to the eye.

If you haven't given modern static grass mats a try, you should. They're definitely worth a look. No, these aren't your father's grass mats – thank goodness for that!

Step 1 Cutting and shaping

Poly fiber backing

Heki no. 1575
Meadow Green
Wildgrass fiber

Tease gently

Installed mat

The Heki no. 1575 grass mat uses a green poly fiber backing, which is easy to cut with a sharp pair of scissors. I cut the material into short strips to make it easier to shape and apply to the layout.

Before applying the grass strips, I teased the ends of the material to eliminate the clean edge created by the scissors. Avoid overworking the poly fiber, as the grass fibers come off it easily.

Step 2 Preparation and application

Blended turf ground foam

Scenic cement

Prepared grass mat

Press mat into glue

Mesh fibers
between pieces

The Heki static mats look best when applied over a base layer of ground foam. I first applied some Woodland Scenics blended turf to the hillside, then soaked the ground with Scenic Cement. (For better control of the glue on steep hillsides, brush diluted white glue over the surface instead of using the Scenic Cement.)

With the surface scenery wet with cement, I carefully laid the grass mat into the adhesive. I started on the adjoining end, making sure the grass fibers meshed together with the previous section, then gently pressed the mat into the glue.

Step 3 Adding weeds

Woodland Scenics
Fine-Leaf Foliage

White glue

Place foliage into mat

Most open places with tall grass also have various weeds growing in them as well. I added a few weeds to the embankment using bits of Woodland Scenics Fine-Leaf Foliage. First I dipped the stems in full strength white glue, then I slipped them between the fibers of the grass mat.

Step 4 Realistic tall grass

Tufts torn from
Busch clear
membrane mat

Shorter Heki
no. 1590 poly
fiber mat

Longer Heki
no. 1575 poly
fiber mat

With the grass installed, the Tar Branch local has arrived to work the town, and the crew wonders when the maintenance department is going to cut the embankment. The shorter grass along the other side of the tracks was made with similar techniques, but using Heki's shorter no. 1590 grass mats instead. **MR**

How to make trees from a natural kit

A group of SuperTrees populates the hillside by Artz Lumber Co. on the HO scale Milwaukee, Racine & Troy. Cody Grivno explains how to make realistic trees using the Scenic Express kit. Photos by Bill Zuback

SuperTrees are a realistic, versatile, and inexpensive scenery option

By Cody Grivno

If there's one thing our HO scale Milwaukee, Racine & Troy club layout can use more of, it's trees. The 28 x 54-foot model railroad has some areas that are densely wooded, matching the layout's Badger State setting. But there are other locations where the ground meets the sky-blue backdrop with nothing to mask the harsh right angle.

Over the years, we've used a variety of trees on our model railroad. We've planted commercial trees from dozens of

manufacturers (January 2013 *Model Railroader*), used kits featuring plastic and metal armatures and ground foam (not the subject of a story, but there are a lot of them), and even turned to scratch-building trees using wooden dowels and furnace filter material (see page 118). This time, we gave Scenic Express Super-Trees a try.

In the ready-to-run world of model railroading, SuperTrees provide a versatile, hands-on alternative for scenery.

You get to make the trees to the size, shape, and color you want, and you can rest assured you won't find an identical tree on any other layout. And for around $1 each (not counting the flocking material), the trees are a good deal.

So get some SuperTrees, diluted matte medium, paint, and leaf flock, and get ready to make some trees. If you work in assembly line fashion, you should be able to knock out more than 30 trees in two evenings' time.

Step 1 A quarter bushel of trees

I used the Scenic Express SuperTree value pack for this project. Inside the package is a quarter-bushel of dried plant material from the Arctic tundra of Scandinavia (according to the packaging, the plant is a distant cousin to western sagebrush). The kit contains enough material to make approximately 30 trees ranging in height from 5" to 8". The kit retails for $34.99, so that's about $1 per tree. Leftover pieces can be used for bushes and undergrowth, so there's little waste.

In addition to the plant material, the kit also includes a sample pack of Scenic Express SuperLeaf multi-textured flake material. Our kit contained dark green, but the firm offers its leaf flake material in other shades of green; various autumn colors; and white, pinks, and purple for modeling flowering trees.

There's also a packet of concentrated Täk-E-Glue. The product, which needs to be mixed with warm water, is a tacky yet flexible model scenery glue.

SuperTrees straight from the box

Concentrated Täk-E-Glue

SuperLeaf material

Step 2 Clipping and dipping

The clumps of dried plant material need to be broken apart to make individual tree armatures. Do this with care, as the material is very brittle.
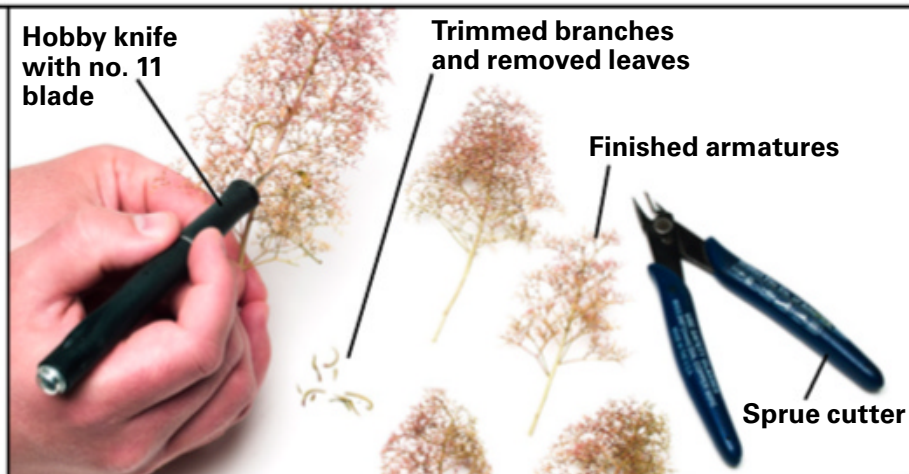
Once I had the armatures separated, I used a hobby knife with a no. 11 blade to remove any leaves from the stems. I also used the knife and a pair of sprue nippers to trim the branches into realistic looking trees, as seen in the top photo at right.

With the armatures shaped, I soaked them in diluted matte medium (1 part Mod Podge matte to 7 parts water) for one to two minutes. I soaked the armatures in a plastic food container, as shown in the middle image, but any container deep enough to submerge the armature will work. The soaking time depends on the thickness of the plant material.

Why is this necessary? The natural plant material absorbs the matte medium. This preserves the trees, making them less attractive to bugs and other critters that may want to munch on them. The matte medium also makes the trees more resilient, allowing them to withstand light bumps without breaking.

After soaking the armatures in diluted matte medium, I shook off the excess liquid in a garbage can and hung them upside down on a drying line with clothespins. If the armature has a bent trunk, attach a pair of self-closing tweezers to the tip as a weight to help straighten it out. A clothespin would also work, as shown at lower right.
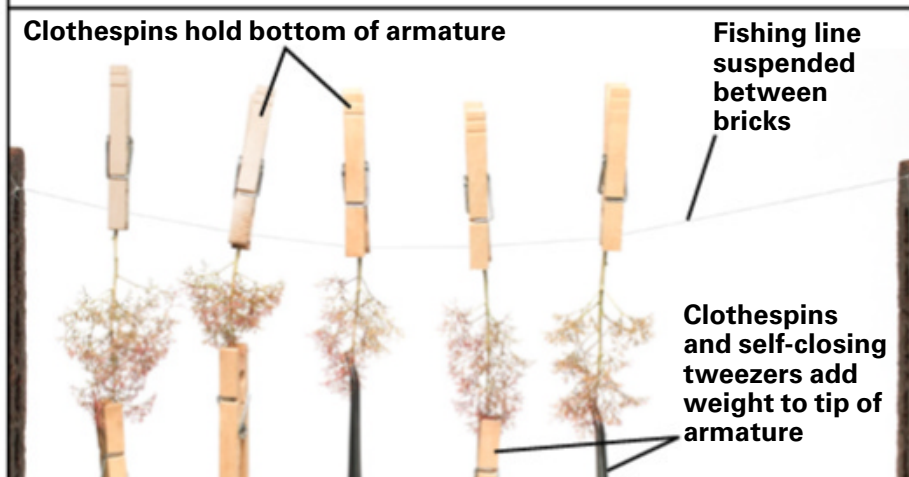
The matte medium should dry within a couple of hours, unless the humidity is high, in which case it will take longer. The instructions suggest working outside on a warm, sunny day to speed up the drying time.

Hobby knife with no. 11 blade

Trimmed branches and removed leaves

Finished armatures

Sprue cutter

Make sure entire armature is soaked

Diluted matte medium in plastic container

Clothespins hold bottom of armature

Fishing line suspended between bricks

Clothespins and self-closing tweezers add weight to tip of armature

Step 3 Painting the armatures

Armatures painted with Rust-Oleum Painter's Touch 2X Flat Gray Primer

Armatures painted with Rust-Oleum 2081 Light Gray Primer

After the matte medium had dried, I sprayed some of the armatures with Rust-Oleum 2081 Light Gray Primer and the same firm's Painter's Touch 2X 249088 Flat Gray Primer. The former is good for maple trees, while the latter is suitable for oak and hickory trees.

You can add some warm tones to the armatures by misting on some brown or rust-colored paint. But please, don't paint the entire armature brown. I have yet to see a real tree trunk that's solid brown.

In addition to spray-painting the armatures, you may also apply acrylic or organic solvent-based paints with an airbrush or paintbrush. No matter what technique you use, you'll get good results.

Step 4 Adding leaves

Apply SuperLeaf material from the top using a spoon

Work over a box to collect excess material

I let the paint dry for at least 24 hours or until there was no discernible paint odor before proceeding. Then I applied the Scenic Express SuperLeaf material introduced in **Step 1**.

I used four colors of Scenic Express SuperLeaf: Dark, medium, moss, and olive green. On the tree shown here, I first dipped it in matte medium before I applied dark green SuperLeaf material.

After a couple of hours, I came back and dipped the tree in more matte medium before adding medium green. This captures the look of sun hitting a tree, where the leaves on the shaded branches are darker and the outer leaves are lighter.

Step 5 Planting trees

Use clothespins and self-closing tweezers to hold trees upright while glue dries

Once I had a sufficient number of trees to populate the scene, I added them to the layout. A T-pin, awl, and small (1/8" and smaller) drill bits were all I needed to make the holes in our plaster gauze-and-cardboard scenery.

After I positioned the trees so their best sides faced the aisle, I secured them with a small amount of white glue. I used clothespins and self-closing tweezers to keep any stubborn trees upright while the glue dried. MR

A twisted tree sprouts from a rocky outcropping on Ross Katz's HO scale model railroad. Ross enhances natural wood trunks with caspia branches and ground foam to model his organic-looking trees.

Windswept trees
from natural materials

Twisted trunks and caspia branches capture a rugged look

By Ross Katz • Photos by the author

During the cool winter months, I enjoy hiking in the Sonora Desert near my home. A few years ago, I noticed many broken branches and twigs scattered about. The weathered wood was a marvelous shade of gray; the twists and turns of it were reminiscent of the old and twisted trees of the American West. I pocketed a few of the twigs and experimented with them when I got home.

I came up with a method that makes model trees as individual as living trees. These modeling techniques will duplicate the appearance of trees growing in extreme climates.

With experience, I've gotten the construction time for each tree down to about 10 to 15 minutes. The work seems to flow better when I do them in batches of a dozen or so.

The samples pictured in this article are for my HO scale layout, but can be adapted to any scale, depending on the size of branch or twig used. I use these trees to highlight prominent locations. Just a few, when properly placed – at the border of a forest, on a rocky outcrop, in a crevasse, on a shoreline – are sure to be admired by your visitors.

Preparing the trunks

In the winter, I collect interesting twigs, roots, and sticks. I only pick up what's already dead and lying loose on the desert floor. When hunting for material, I look for good trunk and root details, different trunk styles, and shapes that will fit specific locations on my layout. I always look for some taper in the trunk diameter, fat on the bottom to skinny on top.

I soak the collected material in full-strength bleach. Bleach produces toxic vapors, so always work in a well-ventilated area; I work outside. Wear a filter mask, eye protection, rubber gloves, and clothes that won't be ruined by a splash of bleach. If you do splash yourself or your clothes, rinse well with water.

I like to soak the trunks for a week. Not only will this soften and bleach the wood, but it will kill any bugs or their eggs that may be lurking inside. After bleaching, I soak the wood in fresh water for two or three days, changing the water daily. This will remove the bleach that's soaked into the wood. After soaking, I use a firm toothbrush to scrub off any loose bark and debris, then rinse the trunks and let them dry in the sun.

When finished, the bleached wood will look as if has been beaten up by Mother Nature for a long time. For a

dramatic effect, I use a fine paintbrush to apply some dark brown stain to selected strips of trunk. When completed, the trunk will look like a natural tree, with dark areas of living bark and lighter areas where the bark has been stripped.

Tree construction

I use caspia for my branches and basic foliage support. Caspia is a fine flowering plant often used as a filler in floral arrangements, like baby's breath. Stores like Michaels or Jo-Ann Fabric and Crafts usually have a good selection.

I like to buy several bundles of unstained caspia and cut the big branches into individual scale-sized branches. I make three or four piles, large to small, until I have enough to make 10 or 12 trees. Use only the best branches from the areas that still have some of the plant's natural flower. Try to use only straight branches. Even though you're building trees with twisted trunks, don't use curved branches, as they just don't look right on the finished tree.

By this point, I always have a location on the layout in mind for each tree. Once a location is selected, I can decide in which direction the trunk best fits the terrain. The front will always get the best branches. You can save construction time and material by not applying branches to the side that won't be seen.

Next, I randomly drill holes in the trunk for the caspia branches. I drill more holes than I plan to use, because this allows for more random branch placement. Later, when I install the branches, I often add even more holes where I think a branch will look good.

On a real tree, as the lower branches age, they grow heavy and droop down from where they attach to the trunk. As you work your way up the trunk, the branches are lighter and will grow out level. The newest branches nearest the top will angle up slightly. To simulate this, after leaving the bottom third to half of the trunk bare, I mentally divide the rest of the tree into thirds. I angle the holes for the largest branches on the bottom third down slightly. In the middle third, I drill the holes straight into the trunk. The top third will be angled up just a little.

Holding each branch with forceps, I dip the end in gel cyanoacrylate adhesive (CA) and insert it into the hole. If you don't like the angle, bend it slightly. I start at the bottom and work up, using the longest branches first and shortening them as I approach the tree's apex. Set the branches in an irregular pattern.

A number of trees are lined up on a foam board base while the glue holding their caspia branches cures. Even before the trunk stain and foliage are applied, these trees look more realistic than the straight dowel-trunk tree at far right.

Ross applies caspia branches from the bottom up. He gives the larger bottom branches a slight droop and angles the smaller, higher branches up a bit. After ground foam is carefully glued to the branches, the tree is ready to be installed on the layout.

Adding foliage

Before adding the foliage, I protect the lower part of the trunk with a low-tack masking tape. To adhere the foliage, I use Elmer's spray glue, which is available at many hardware stores. I use a large cardboard box to catch any overspray. I also wear a filter mask and disposable vinyl or latex gloves.

When spraying, I direct the glue to the underside and top surface of the caspia foliage. Try to avoid the trunk when applying the glue and the foliage.

Once glued, sprinkle the branches with fine ground foam. First do the underside, then the top surface. Remember, don't heap on too much foam. Use a darker shade of green for the underside. I frequently top it with a dusting of a dark earth-colored foam to simulate discoloration of some of the foliage.

I work over a plastic tray to catch any spilled foam. This may be recycled into this or other landscape projects.

Planting

These trees look most realistic when planted in the parts of your layout that would be subject to the most severe climate conditions. I use them on tall mountains, rocky outcroppings, and other noticeable areas of the layout. A few trees along the perimeter of a forest or on the slope of a rocky mountainside will give the illusion of many more.

When planting, blend the roots or trunk into the scenery in a natural manner. Plant those with twisted bases on boulders and cliff edges. If you have any leftover trunks, use them as dead trees, either standing among the good trees or fallen to the forest floor.

I hope you try this technique to make unique and natural-looking trees. Have fun with it! **MR**

Make conifers the quick and easy way

All of the trees in this wooded scene were scratchbuilt by Group Technical Editor Cody Grivno. Follow along as Cody explains how he used air filter material and dowels to model these conifers. Photos by Jim Forbes and Bill Zuback

Air filter conifers are a simple weekend project

By Cody Grivno

Our HO scale Milwaukee, Racine & Troy measures 28 x 54 feet, so it's not surprising that we've planted a lot of trees on the layout. Over the years, we've used commercial trees from Bachmann, Grand Central Gems, JTT Scenery Products, Scenic Express, Timberline, and Woodland Scenics, among others. I'll show you how I added variety to the vegetation by making conifers from dowels, air filter material, and coarse turf.

For this project, I used a 1" thick cut-and-fit filter from AAF International. I selected this filter because it's dark green (I didn't have to paint it) and it's big (20" x 30"). NaturalAire also makes filter material, shown at right. I didn't use this brand because the filter material was too bright green for my taste. However, if you painted the filter first, it could be used to model conifers.

Since most modern furnaces are designed to use cartridge-style filters, you may have to do some hunting to find cut-and-fit filters. I'd recommend checking at well-stocked hardware stores, heating and furnace suppliers, and farm supply centers.

It's likely that you already have the rest of the supplies necessary to model air filter conifers: a razor saw, miter box, wood stain, and hair spray. Before you raid your wife's hair care products for the last item on the list, make sure the hair spray is unscented. You don't want your conifer forest smelling like flowers or fruit.

I've found that it works best to make air filter conifers in assembly-line fashion. I start by cutting a batch of trunks from two or three dowels. Then I cut the filter material into squares ranging from ¼" to 1", as shown in **step 2** on the

opposite page. After I assemble the trees and trim the filter material, I add the clump foliage.

If you're looking for a quick and easy weekend project, try making some air filter conifers. Not only will you get the satisfaction of building trees for your layout, it gives you a reason to do some good old-fashioned modeling.
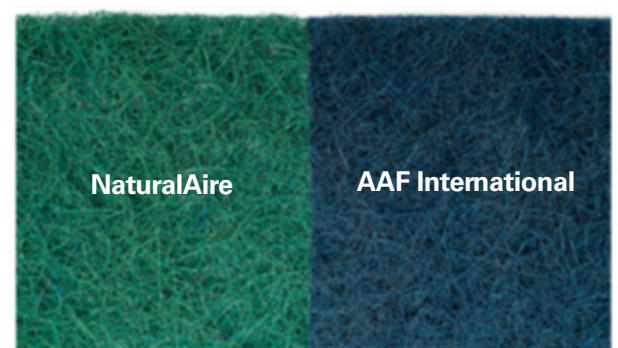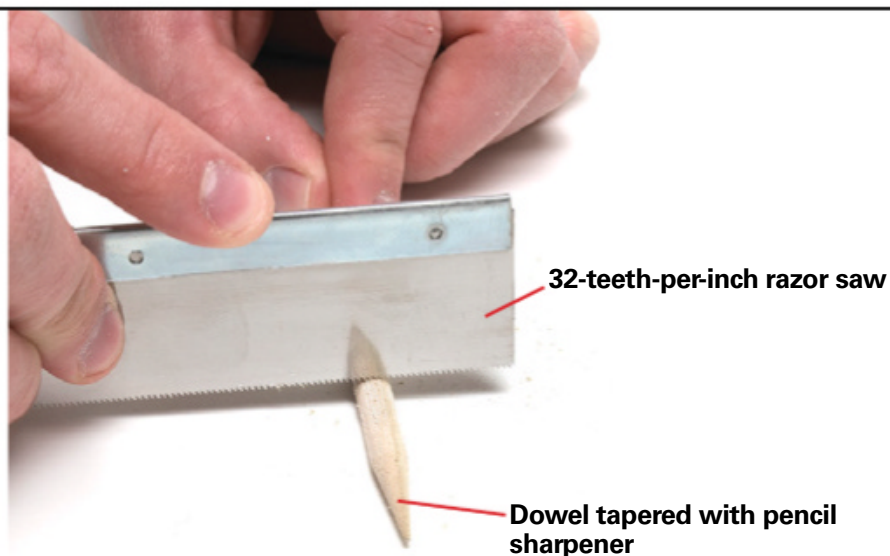

This photo shows the color difference between the AAF International (right) and NaturalAire filter material.

Step 1 Tree trunks
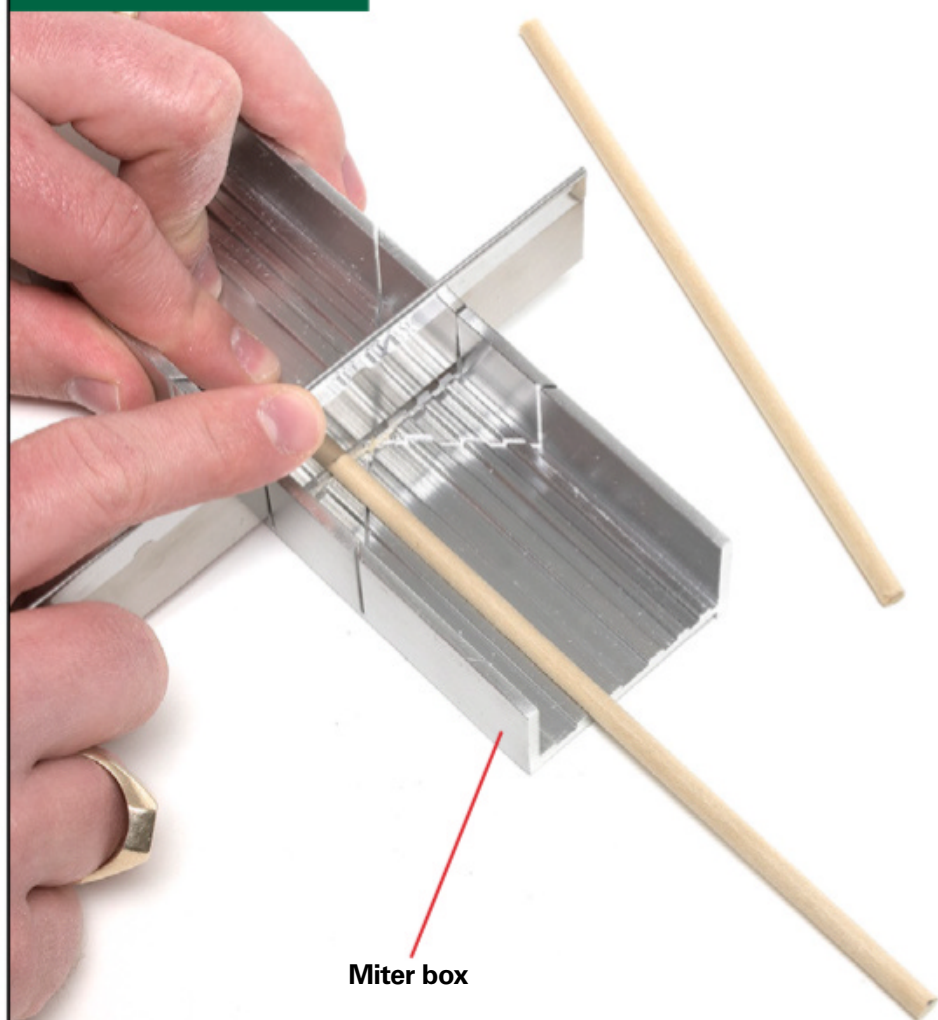
32-teeth-per-inch razor saw

**Dowel tapered with pencil sharpener**

Though most of the dowel will be covered with foliage, enough will be visible that I decided to add some bark-like texture. I scraped the dowels from top to bottom using a 32-teeth-per-inch razor saw. For the best results, apply even pressure to the saw and slowly rotate the dowel.

Vinyl gloves keep weathering stain off hands

Miter box

I used ³⁄₁₆" and ¼" wood dowels for the tree trunks, but bamboo barbecue skewers would also work. I cut the dowels in several sizes between 20 and 55 scale feet using a miter box. After I cut the dowels, I tapered the top end with a pencil sharpener.

Even after cutting, shaping, and scribing the poplar dowels, they still didn't look like tree trunks. I resolved this by applying light, medium, and boxcar brown weathering mixes from Hunterline. When used together, these three colors approximate the gray-brown look of tree bark.

Step 2 Furnace filters

1" **¾"** **¼"**
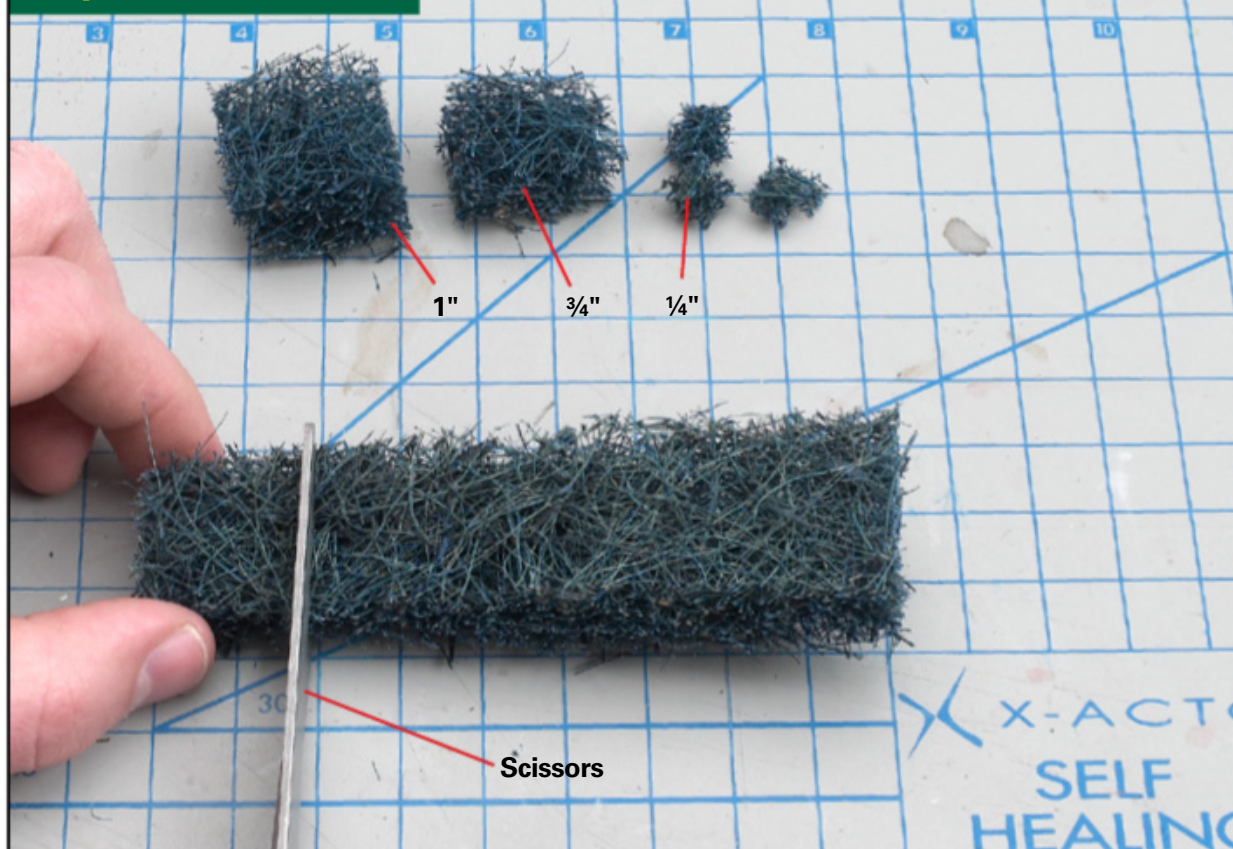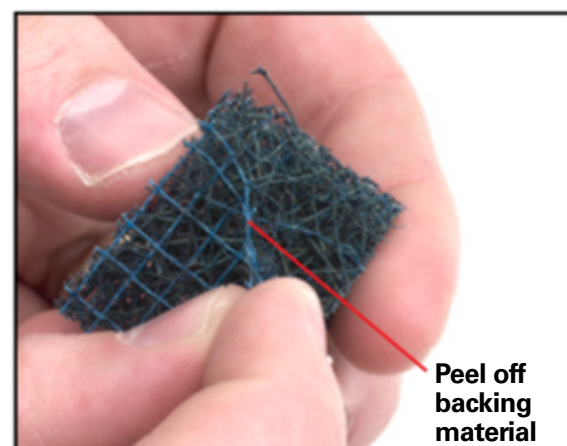
Peel off backing material

Scissors

Next, I cut the strips into squares. Since the filter material I used was fairly dense, I carefully peeled each square into two or three layers. If your filter has a plastic backing material, as shown above, peel it off.

Air filter material works well for modeling coniferous trees because it doesn't disintegrate while being cut and shaped. I started by cutting the filter into strips ranging in width from ¼" to 1".

Step 3 Taking shape

Assembling the trees is a fairly quick and easy process. I pushed the filter squares onto the pointed end of the dowel and slid them toward the base. Most of the trees I assembled were small to medium height, so I used ¼", ½", ¾", and 1" filter squares. For taller trees, you'll need larger pieces at the bottom.

I was careful to leave small gaps between the layers of filter material. Once the coarse turf is added (see the next step), the tree will look much denser.

¼"
½"
¾"
1"

A few divots are good for texture
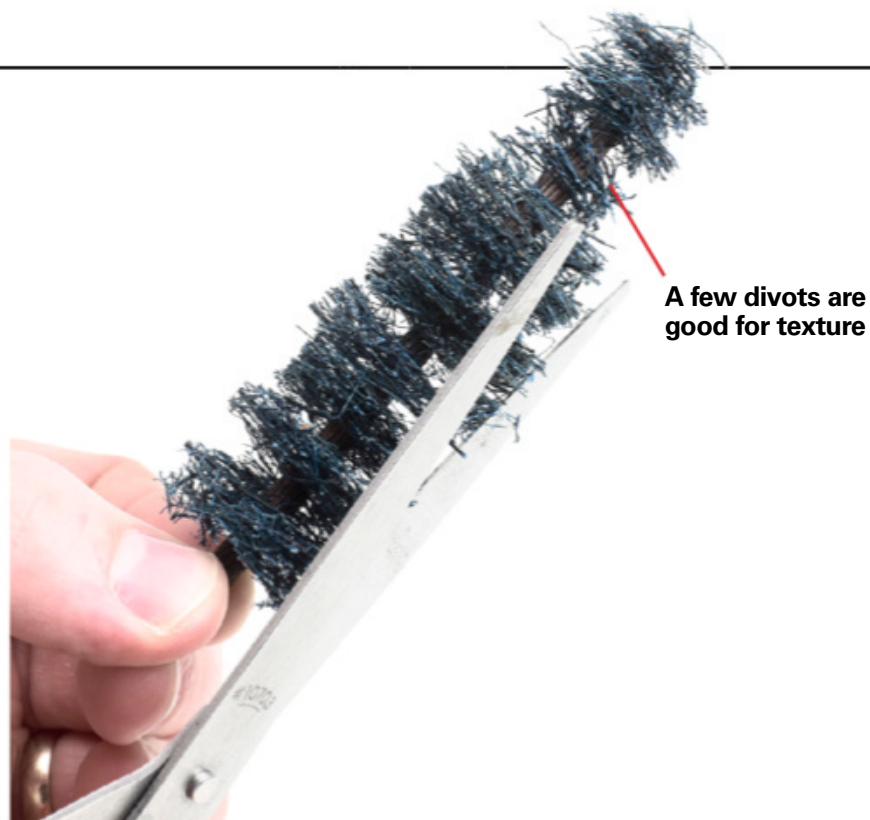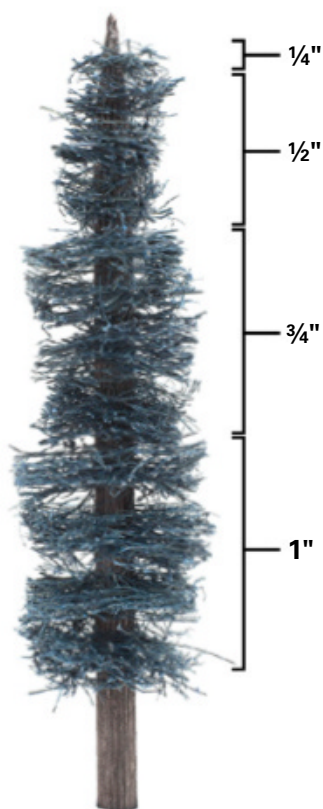
I eliminated the blocky shape of the tree by cutting off the square corners with scissors, working from bottom to top. Then I snipped bits of filter material away from the layers so the trees wouldn't look perfectly symmetrical. It's OK if there are open sections in the trees.

Step 4 Adding foliage

Unscented hairspray

Shellac and matte medium are two options for adhering ground foam to the filter material, but I used unscented hair spray. The hair spray doesn't soak into the filter material like shellac or matte medium, and it's not as messy.

Box collects excess coarse turf

With the hair spray still wet, I applied the coarse turf. I used Scenic Express hazy and conifer green and Woodland Scenics dark green. Applying the turf can be messy, so work over a cardboard box to collect the excess material.

Trunk grooves

³⁄₁₆" dowel

¼" dowel

Here are examples of the finished trees. I used a ³⁄₁₆" dowel for the trunk on the left tree, and a ¼" dowel on the right tree. I planted the trees by drilling holes into the layout. You could also put mounting pins in the trunk. MR

Tony attached the spring to this trunk with cyanoacrylate adhesive (CA). It's mounted in a tight hole drilled through the finished scenery and ¾" plywood.

Using springs allows vulnerable trees with plastic trunks to literally be bent right over by an elbow, yet they'll pop right back up when they're released.

All of the trees planted near the aisle on Tony Koester's HO railroad are mounted on soft springs so they'll give if they're bumped by anyone. This reduces potential tree damage as Tony's engineers walk along following a train.

TREES THAT BEND
without breaking

Concealed coil springs help trees mounted along the edge of a layout cope with pesky elbows

By Tony Koester • Photos by the author

To provide a safe place for the occasional derailed car or locomotive to land, and to keep stray elbows away from trains, I allow a 6" cushion of space on my layout between the track closest to the aisle and the fascia. Often as not, that margin includes the right-of-way up to a farmer's field. But in wooded areas, I've planted deciduous trees including maples, oaks, and sycamores. However, many of them have been damaged by stray elbows.

Most of my aisles are relatively generous, but when 16 to 20 people are moving around trying to get their "jobs" done, there will be numerous meets and passes between them, so scenery along the aisles will suffer the consequences.

My first thought was to remove the trees between the main line and the aisle, but this gave sections of the railroad that should have been wooded a rather barren look. What I needed were more resilient trees that would take a punch and stand back up, like they were mounted on springs.

Exactly!
I happened to come across a Micro-Mark ad for a coil-spring assortment, so I bought one. When the box arrived, I tried fitting various sizes of springs onto the nubs on the bottom of ready-made commercial trees. Some spring-trunk-mounting pin combinations were perfect matches. Where the mounting

pin had broken off, I drilled as large a hole as possible into the base of the trunk and used cyanoacrylate adhesive (CA) to hold the spring inside.

The next task was to mount the tree spring in the scenery base. Some of the lower deck and all of the upper deck of my layout is built from ¾" plywood, and I kept the upper deck as thin as possible to avoid intruding on the lower deck. Here I simply drilled a snug hole into the plywood to hold the spring.

In areas where the railroad is on a fill, I had used a layer of plaster-impregnated gauze over aluminum screening to make the landform. This thin sandwich wouldn't provide enough support for the spring, but the ⅛" hardboard fascia was screwed to the ¾" plywood benchwork. I glued a short length of plywood to the inside of the benchwork to double the thickness wherever trees were desired.

I plan to employ this same spring-mounting technique to help protect line poles and perhaps even signals.

One caveat: some coil springs aren't strong enough to support a tall tree. Here I used a second spring that fit over the first to double the stiffness.

There's no such thing as a perfect solution, but I think this will cut down on the number of times a guest causes me to add to my between-operating sessions fix-it list. MR

Model realistic rapids

Things are finally moving on Turtle Creek, now that we've poured the resin water and installed the mighty Turtle Rapids. You can easily add neat water features to your layout with off-the-shelf products. Bill Zuback photos

Cool water scenery is fun with some simple commercial products

By David Popp

When done well, a water feature on a model railroad attracts a lot of attention. Thanks to some great new products, modeling water on your layout can be a lot easier and more enjoyable than you might think.

While I've made rivers, lakes, and ponds for various layouts over the years, I'd never tried my hand at modeling fast-moving water, such as rapids. The mine branch extension for our Turtle Creek project railroad, built by former managing editor Jim Kelly and featured in the January through April 2005 issues of *Model Railroader*, had a pleasant stream on it. However, the stream was only partially complete, making it ideal for my project.

While my finished river looks the part, modeling the Turtle Rapids wasn't without some trials.

In all fairness, for me, learning something new by trial and error has always been one of the appealing aspects of model railroading.

Follow along as I explain the steps and products I used (as well as a few modifications I made along the way) to capture the look of whitewater on the Turtle Rapids. With just a few evenings of work, you can have a great water scene on your layout, too.

STEP 1 Stream bed preparations

Shallow areas: Concrete

Stream bed: UP Dark Gray

Sepia ink wash

Rocks made from broken Hydrocal castings

Jim had already prepared much of the stream bed for me when he'd built the mine branch several years ago. The techniques he used can be easily duplicated to make other streams and rivers like the one shown here, and I've used something similar to make ponds.

Jim used the plywood benchwork top as the base for his stream. After completing the surrounding scenery, he poured a thin layer of plaster into the bottom of the stream to make a smooth, even surface and cover up the plywood's grain.

Once the plaster was dry, Jim painted the stream bed Polly Scale UP Dark Gray. He used dark paint to give the river the illusion of depth. Though black would also work, river water tends to be muddy, so the gray serves to make the modeled water look dirty.

Once the paint was dry, Jim glued broken pieces of leftover Hydrocal rock castings to the bottom of the stream in anticipation of making rapids. He painted the rocks light gray. At this point, Jim needed to deliver the mine branch to MR's offices (he'd built it at home) so it could be photographed for the series in the magazine. As a result, the Turtle Rapids was never finished.

To complete the stream bed, I started by augmenting Jim's work. I drybrushed Polly Scale Concrete along the river banks and around the rocks to represent shallow areas but left the gray for the deeper places. I then stained the rocks with a mixture of two teaspoons sepia ink in one pint of 70 percent isopropyl alcohol. Two applications of the ink stain brought out the fine texture of the Hydrocal rocks.

STEP 2 Dam that river

Scotch-Blue painter's tape

.040" sheet styrene

Smooth bead with finger to make a clean edge

DAP clear latex caulk

Caulk goes on white but dries clear
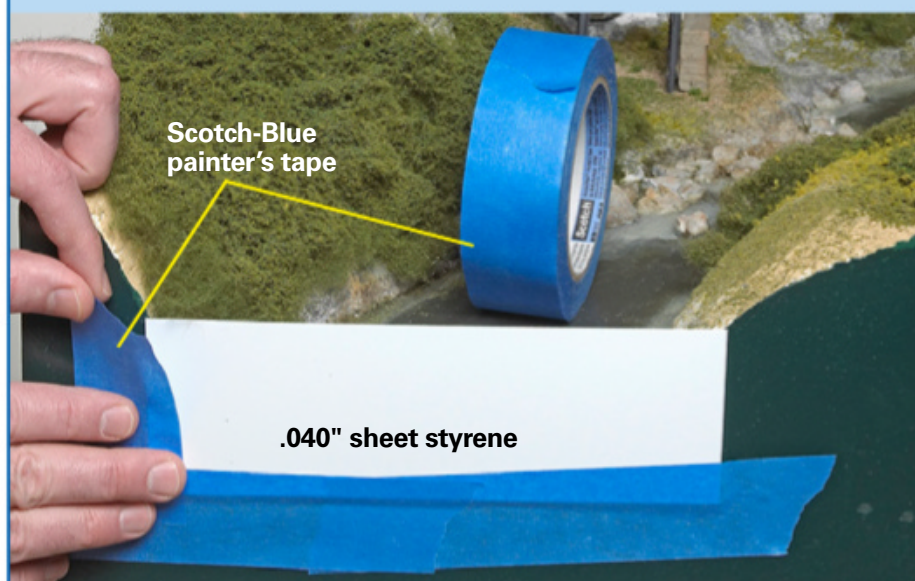
Before pouring the resin, I needed to dam the ends of the river to contain it. I used .040" sheet styrene to make the dams. As shown in the photo above, I taped the styrene to the layout's fascia using Scotch blue painter's tape. This tape has a low-tack adhesive that will easily hold the dam in place but won't damage the fascia when you pull the tape away later.

As far as leaks are concerned, resin is just like water. It will find any hole it can to escape. To seal the ends of the river, I ran a bead of DAP clear latex caulk along the styrene dam and the stream bed. I then smoothed the caulk with my finger, making sure to seal all edges. Once the caulk is dry (overnight) you can pour the resin. When

the resin is set, peel away the styrene from the fascia. The clear caulk becomes part of the finished water.

On previous water projects, this technique has proved effective to keep the resin in place. This time around, however, I had a bit of trouble. The resin found a gap between the scenery and plywood top. It then seeped its way to the edge of the layout where the fascia meets the benchwork and leaked out between the two. Fortunately it wasn't a fast leak, or it could have drained the entire stream before the resin set.

Next time, I'll also run a thin bead of caulk along the banks where the scenery meets the stream bed. The caulk is paintable, so I'd recommend applying it to the banks before you finish the surrounding scenery.

STEP 3 Mixing and tinting

Disposable container

2 parts resin to 1 part hardener

Cloudy when you begin mixing

Clear when it's ready to use

Resin with 4 drops Floquil Railroad Tie Brown

I used Magic Water two-part casting resin from Unreal Details [unrealdetails.com] to make the water. The product is very easy to work with, and I'd used it before with great success. However, instead of making clear lake water, this time I wanted to try tinting the resin to get the look of a muddy river.

I started by mixing two parts of resin to one part of hardener in a clean plastic container. As shown above, when you first combine the two parts, the resin turns cloudy. I stirred the material with a short length of brass

tubing for about 5 minutes. As shown in the inset photo at left, the resin turns clear when it's ready to use. At this point you can color it before you pour it into the stream.

Magic Water can be tinted with organic-solvent (oil) based paints. I used Floquil Railroad Tie Brown for my stream. Since I'd never done this before, I wasn't sure how much paint to add to the resin, so I worked slowly, starting with four drops of paint. As I'll explain in the next step, that turned out to be too little. After some trial and error, seven drops was just right. Don't feel rushed, as you have several hours of working time with the resin.

STEP 4 Pouring, again and again

New batch too dark

Stick guides resin

Wear gloves!

Test batch too light

At last, just right

Before you pour the resin, put on a pair of protective gloves. It's very easy to get the stuff on your hands and it doesn't come off well. (Yes, I know that for a fact!) Use a dowel or a stick to act as a guide and pour the resin down the dowel to the stream bed as shown in the photo. Remember, you're working over finished scenery. The dowel will help you control where the resin is distributed and keep it from splashing, dripping, or flooding onto your hard work.

As mentioned, tinting the resin took some tweaking. As shown above, the resin in the stream (my test batch with

four drops of paint) was too light. On the layout it looked like watered down iced tea. Instead of pouring any more of that batch, I added another 10 drops of paint to it and tried again. In that same photo I'm in the process of pouring the second batch into the middle of first. As you can see, it proved to be too murky to see the rock detail.

Fortunately, you can dilute the resin directly on the layout. I mixed a clear batch and poured it into the middle of the tinted batch already in the stream bed. I then used my guide stick to mix the clear and tinted batches together. The end result was perfect. I let the resin dry over the weekend before proceeding to the next step.

STEP 5 Rapid development

It's always a bit nerve-wracking when you need to write a magazine article about a project that you've never tried before. Making the rapids fell into that category for me, so I started by looking at just about any photo of rapids I could find on the Internet. Google Images was a great place to start. The photographs gave me a good idea as to how water looks as it moves through the rocky patches of a river.

To make the Turtle Rapids, I used Woodland Scenics Water Effects. The material is a white paste that can be applied to most surfaces and dries clear in a couple of hours. A single coat of Water Effects can be used to make small ripples and shallow waves, or you can apply the paste in layers to make rapids.

Rapids tend to be foamy white, so I practiced a couple techniques on a sheet of clear styrene. Ultimately, I settled on applying a layer of Water Effects paste that I later drybrushed with Polly Scale Reefer White over the top of the waves. I then added a second coat of Water Effects paste, giving the churning water depth.

After establishing that the water in my scene would flow from the back of the layout to front, I applied a coat of Water Effects with a ¾" paintbrush. Wherever there were rocks above or just below the surface, I added the paste, working in a stippling motion with the brush. I left the open water in the center of the rapids smooth, which is a feature I'd seen in several photos and liked a lot.

Where the water flowed away from individual rocks at the bottom of the rapids, I tapered the churning water down to a point – something else I'd noticed in the photos. This effect gives the sense that once through the Turtle Rapids, the water settles down to a placid stream.

Once the water work was finished, I removed the tape from the styrene dams at each end of the river. Then, using a sharp hobby knife, I carefully cut the caulk seam so I could peel the styrene dam off of the layout.

Next, I added the final details. I reinstalled the railroad bridge over the rapids. I also added a fisherman and his tackle. After all, the Turtle Rapids looked like a great spot to fish and watch trains at the same time! **MR**

Calm waters at the head of the rapids

Water with first coat of Water Effects

Waves around rocks

Wave trails

Calm water returns after the rapids

Final layer of Water Effects applied over paint

Water after painting white highlights

White paint drybrushed over waves

Fisherman adds interest

Finished rapids
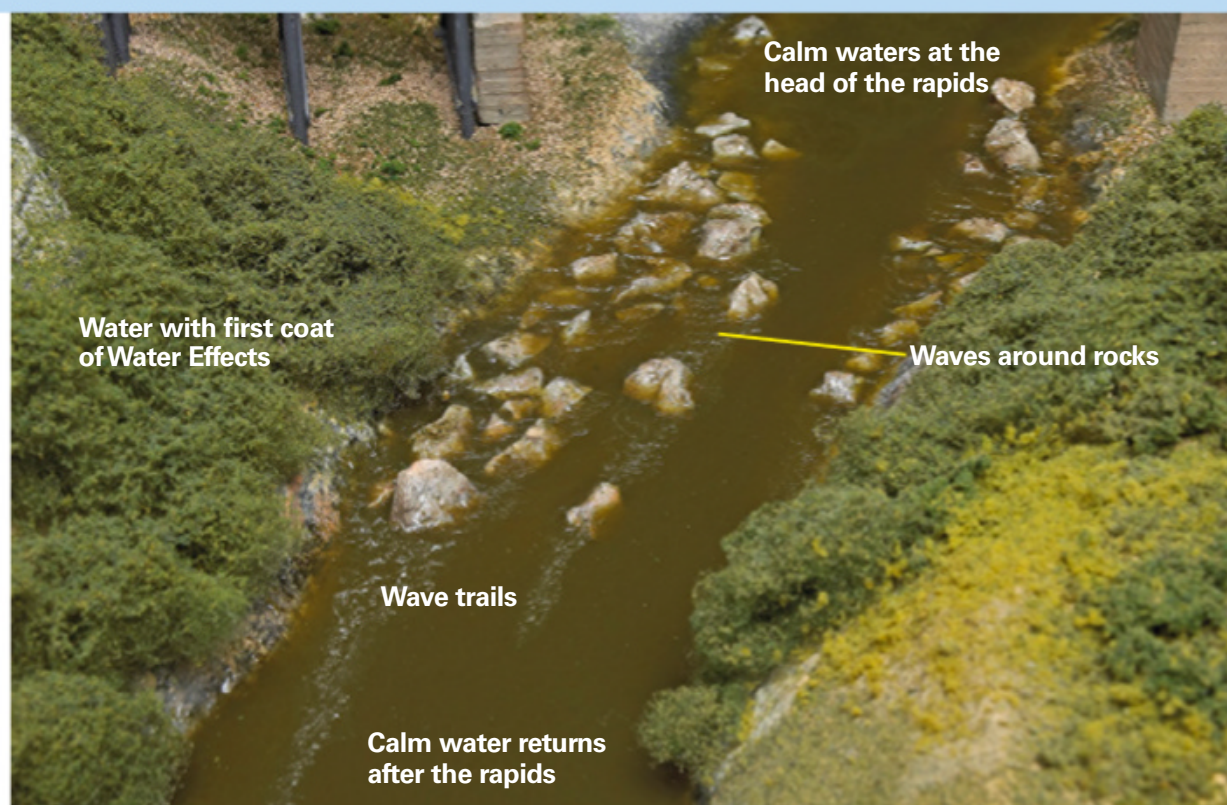
3BIG SCENES
for a small space

Dramatic dioramas fit western vistas
into a 7 x 12-foot HO scale layout

By Pelle K. Søeborg • Photos by the author

I've seen my fair share of model railroads, but I'm always amazed when I discover a builder who has the ability to fit an extensive, yet uncluttered layout into a seemingly prohibitive space. My friend Flemming Ørneholm is indeed one of those skillful builders.

Flemming's keen talent previously appeared in the July 2005 issue of *Model Railroader* magazine, featuring his HO scale 8 x 14-foot Eaglecreek & Northern Ry. But since dismantling that layout and moving back to Denmark after living many years in Sweden, Flemming continued to hone his skills while erecting a 7 x 12-foot HO scale layout.

Although the railroad lacks some of the space afforded by Flemming's previous efforts, three separate scenes compose a small layout that makes a very big impression. Upon entering the small 7 x 12-foot layout room, viewers observe an expansive western prairie set along one long wall, a rugged mountain village set along the other, plus a unique railroad junction that can only be seen through a viewing slot in a false wall built to conceal a room window.

Dramatic dioramas

Much like his previous Western-themed layouts, Flemming uses these three scenes or dioramas to compose a layout that looks and feels much bigger than it actually is. While the hand-painted backdrops and careful detailing help frame each diorama, Flemming also knows how to present his layout in the best light possible. The only lighting in the room is specifically targeted on the scenes.

"After experimenting with various types of lighting on my layouts, I ended up with a combination of fluorescent tube lighting and spotlights," Flemming explains. "I use full-spectrum fluorescent tubes as general lighting. But because the room has a high ceiling, it was possible to add incandescent spotlights in strategic locations. These spotlights give the lighting the warmth of a sunny day."

In addition to highlighting the scenes, his light setup worked remarkably well for taking pictures. In fact, I didn't need any additional lighting to capture the images presented here.

1. Massive articulated steam locomotives and rugged mountain ranges aren't what most would expect to find on a small layout, yet Danish modeler Flemming Ørneholm has dramatically combined this and other expansive scenes on his new 7 x 12-foot HO scale layout.

2. The mountain scene on the layout also highlights the town of Long Neck Creek. Flemming's willingness to recycle, reuse, and renew scenery and structures, including the Fine Scale Miniatures depot seen here, helped speed the construction on the fourth version of his Eaglecreek & Northern layout.

3. Top: A heavy ore train crosses Long Neck Creek as it meanders through the center western prairie scene. Bottom: Flemming made the prairie grass for this area using artificial fur. After gluing the fur to the terrain, he rubs various paint colors into it. To give the grasses a windswept appearance, he applies a heavy coat of inexpensive hair spray.

Backstage access

While his previous layouts also featured dramatically lit scenes framed with fascia and valance boards, Flemming wanted something more from this layout. Despite allotting less space for his new layout than any of his previous efforts, he was determined to include a functional and easily accessible staging yard. That's a tall order in a room that barely affords enough space for 2 or 3 viewers. So rather than press the limits of the train room, Flemming looked outside the four walls and installed a staging yard in an adjacent bedroom.

Flemming remarks, "It took a little negotiating with my wife to get permission to place the staging in our bedroom." But by placing the staging yard on top of an 1'-10" x 10'-0" custom-designed wardrobe, he was able to retain essential bedroom storage space beneath the trains in the staging yard.

Although a room wall separates the staging yard from the rest of the layout, Flemming installed two connecting tracks through a hole concealed by a tunnel. "The turnouts in the staging yard are electrically operated," he explains, "Because the wardrobe prevents access below the tracks, I had to mount my Tortoise [by Circuitron] switch motors to the top of the scene. I've hidden the machines inside buildings and connected them to the turnouts via rods."

But even though the staging is behind the other scenes, Flemming still gave the

THE LAYOUT AT A GLANCE

Name: Eaglecreek & Northern Ry.
Scale: HO (1:87.1)
Size: 6'-8" x 12'-0" plus 1'-10" x 10'-0" staging yard
Prototype: Union Pacific
Locale: western United States
Era: 1955
Style: around-the-walls
Mainline run: 85 feet
Minimum radius: 28"
Minimum turnout: 30" radius
Maximum grade: 2 percent
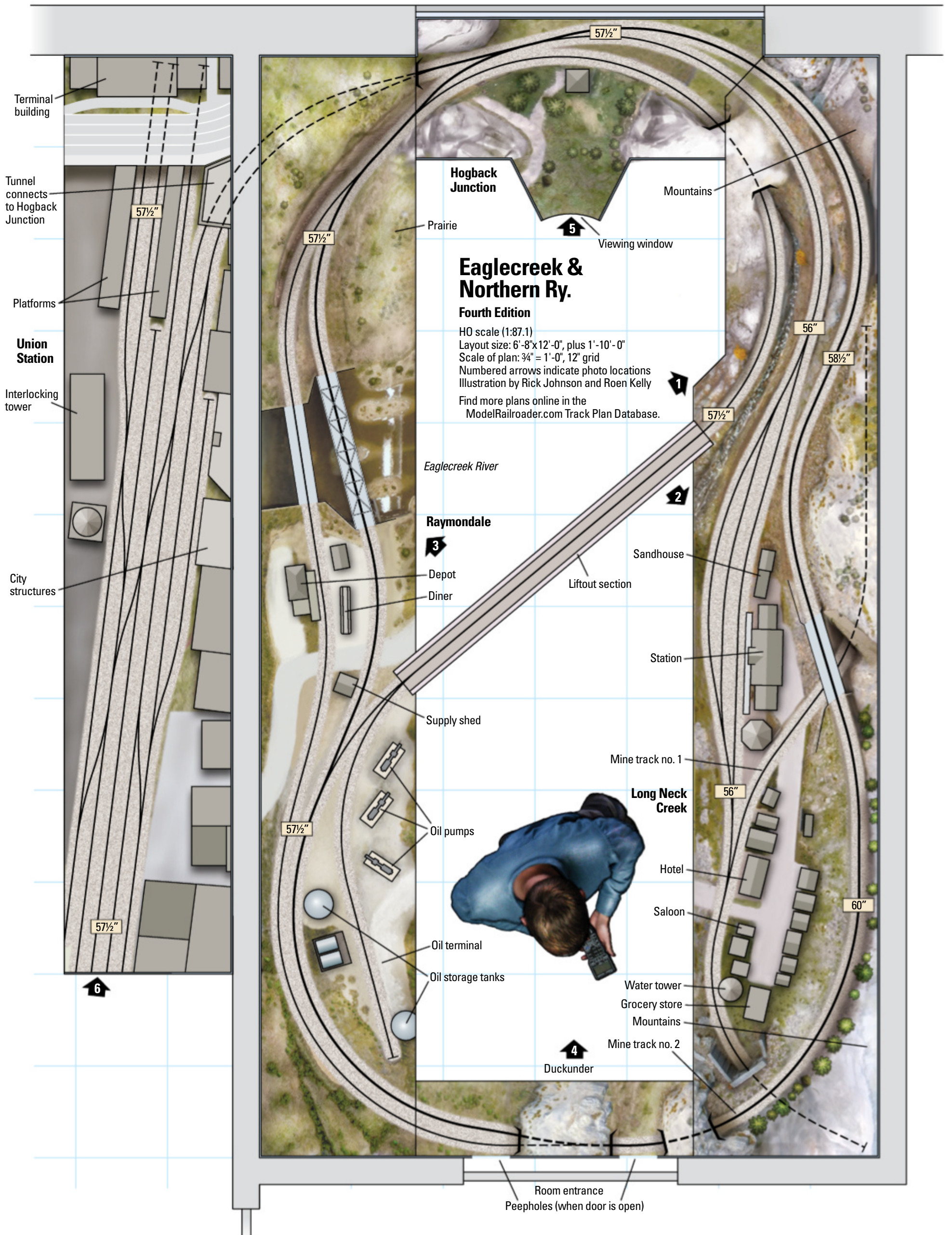**Benchwork:** open grid
Height: 57½"
Roadbed: foam rubber, auto body sound insulation, and cork
Track: Peco code 75 flextrack
Scenery: extruded-foam insulation board
Backdrop: painted hardboard
Control: Lenz Digital Command Control

Terminal building

Tunnel connects to Hogback Junction

Platforms

Union Station

Interlocking tower

City structures

57½″

57½″

57½″

6

Hogback Junction

Prairie

Viewing window

57½″

Eaglecreek River

Raymondale

3

Depot

Diner

Supply shed

Oil pumps

57½″

Oil terminal

Oil storage tanks

Eaglecreek & Northern Ry.

Fourth Edition

HO scale (1:87.1)
Layout size: 6'-8"x12'-0", plus 1'-10'- 0"
Scale of plan: ¾" = 1'-0", 12" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson and Roen Kelly

Find more plans online in the
ModelRailroader.com Track Plan Database.

1

2

Liftout section

5

Mountains

56″

58½″

57½″

Sandhouse

Station

Mine track no. 1

Long Neck Creek

56″

Hotel

Saloon

60″

Water tower

Grocery store

Mountains

Mine track no. 2

4

Duckunder

Room entrance
Peepholes (when door is open)

BUILDINGS BEYOND THE BACKDROP

These two photos show Flemming's city without (left) and with (right) the printed photo backdrop placed between the model buildings.

Flemming didn't think that photographs of actual city structures suited the appearance of his DPM buildings. To produce a closer match, he simply took photos of his own model buildings and processed them on his computer. After editing and sizing the images, Flemming used a color laser printer to produce a backdrop photo printed on standard copy paper. He used spray adhesive to permanently attach the printout to the backdrop. – *Pelle Søeborg*

4. This overall photo captures most of the 7 x 12-foot room and three key scenes that compose Flemming's layout. Upon entering the room, visitors see a prairie scene on the left, a mountain scene on the right, and a junction scene directly ahead.

area a scenic treatment similar to the rest of the layout. He laid out the scene as a big-city setting, including a bustling Union Station and tall buildings against the backdrop. When the layout isn't in use, blinds cover the city diorama and protect it from dust.

Practical prototype

When selecting a specific railroad or region to model on a small layout, not many would settle upon western segments of the Union Pacific known for large steam and diesel power. But that's precisely what Flemming did.

He explains, "If you're going to build a model railroad in such a limited space, don't start with picking a specific area or railroad. I started with defining what

5. This quaint junction and a majestic mountain vista Flemming painted on a hardboard backdrop are visible only by peering through the small viewing window at the back end of the layout room.

6. With limited space in his layout room, Flemming put his staging yard in the adjacent bedroom. Set atop a wardrobe, this big-city scene has the tracks flanked by downtown buildings Flemming assembled from DPM modular components. The tunnel to the right of the train leads to the rest of the layout.

FLEMMING ØRNEHOLM

Flemming Ørneholm retired from a career in the cell phone industry. Flemming moved from Sweden to reside in Denmark in order to be near his son, daughter-in-law, and his two grandsons.

type of trains I wanted to run. I like articulated steam locomotives and classic diesels, and I wanted to be able to run both passenger and freight trains. I also wanted to run fairly long trains and have a passing siding so I could run more than one train at the time."

With this criteria in mind, he established specific requirements, including a 28" minimum curve radius. Soon after that, he began drafting a track plan.

Although Flemming developed a track plan, he didn't have any specific

plans for his scenery when he started building the benchwork and installing track. "I began by defining which scenes I wanted to see on my layout – something urban, a prairie, mountains, and a small town," Flemming says. "But rather than attempting to plot out each scene, I simply improvised along the way to fit in as much as I could."

Improvised schemes and scenes

Flemming has the knack for improvisation, which has helped him excel through the initial stages of construction.

"On my previous layout I used several sound-damping materials to build up the roadbed and track ballast," Flemming comments. "I was able to reuse all of the track from my previous layout, and that saved me a lot of time."

Finished roadbed consisting of three layers – one layer of foam rubber topped

by auto body sound insulation and cork – and ballast secured using diluted latex caulk may sound extreme. But in addition to its sound-damping qualities, Flemming's roadbed is quite flexible. This made it easy to remove with a bread knife and reuse, intact, on his new layout.

Flemming, however, did insist on starting fresh when he painted the backdrops for each diorama. The colors of the hand-painted backdrop closely match the palette selected for the foreground scenery. In many places it's difficult to tell where the scenery ends and the backdrop begins. "Years ago I took a course in landscape painting to be able to paint better backdrops," Flemming says. "I must say that the money on that course was well spent!"

Running the railroad

It can be challenging to include prototypical operation on a small layout. Fortunately, that's not Flemming's primary objective for his railroad. "My layout design is far better suited for observing than it is for operation," Flemming states, "I enjoy watching the trains roll by more than anything."

But even though he enjoys railfanning his own railroad, the layout does include some provisions for switching. Additionally, Flemming used an aluminum bar to install a removable reverse loop across the aisle.

As with the previous versions of his Eaglecreek & Northern layouts, clever design and careful attention to details has once again helped Flemming succeed in capturing the look and feel of a big layout in a modest amount of space. **MR**

DIG THOSE DITCHES

How to model realistic-looking trackside drainage ditches

By Tony Koester • Photos by the author

EDITOR'S CHOICE

CODY GRIVNO
GROUP
TECHNICAL
EDITOR

Elevating the main line above the Midwestern farm fields and prairie grasslands with drainage ditches along both sides adds visual interest to what could otherwise resemble a billiard table on Tony Koester's HO scale Nickel Plate Road.

Spectacular scenery is one of the reasons that modeling mountain railroading is so popular. Yet mentioning the flatlands of the Midwest in the same context as "mountain scenery" can elicit some very strange looks.

Not all of America's granger country is flat, as river valleys still require tall viaducts. But let's acknowledge that a lot of farm country is indeed tabletop flat.

The concern then becomes modeling flat country in a manner that provides more visual texture than simply laying track across a Ping-Pong table.

Frank Hodina and I designed my Nickel Plate Road to maximize the mainline run that supports timetable-and-train-order operation. So I wound up with about eight scale miles – nearly 500 linear feet – of main track. Towns and four lengthy bridges help break up the monotony of a single-track main loping across the prairie, but most of the railroad is flat as a pancake.

My challenge was to find an effective – and quick! – way to model typical Midwestern terrain. It's still not the Appalachians, but my method effectively represents the terrain typical of the agricultural belt. Frankly, I'm relieved that I found a way to create the needed drainage ditches and to cover a lot of ground.

As any railroad civil engineer will tell you, the three keys to good roadbed are drainage, drainage, and drainage. More simply put: Ditches rule!

STEP 1 PROTOTYPE CROSS-SECTION
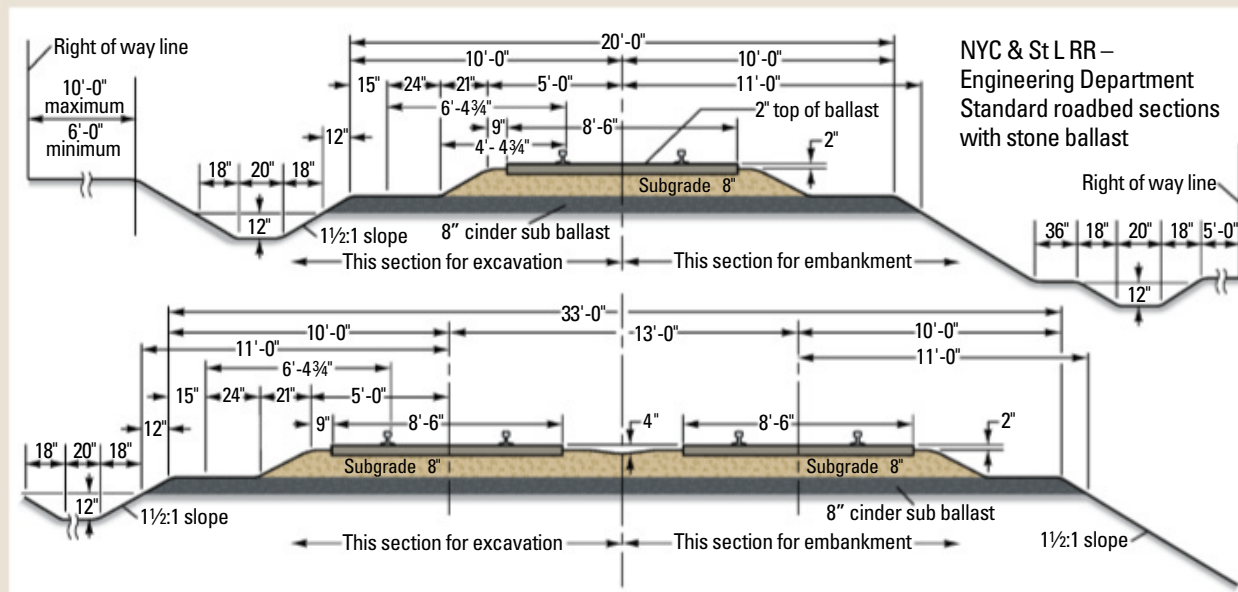
The Nickel Plate Road's roadbed cross-section drawing reproduced here shows how the railroad tackled the problem of keeping the roadbed relatively dry. Note the depth of the ditch is a minimum of 24" deeper than the bottom of the ties. In HO scale, that's just over ¼", so my first concern was to raise the track at least that distance above the ¾" birch plywood subroadbed. I used a ½" elevation for mainline tracks and ⅜" for unballasted sidings and spurs.

STEP 2 HANDLAID TRACK

This before view shows the need to build up the open terrain on either side of the elevated roadbed to create sufficient depth for realistic drainage ditches.

I initially planned to hand-lay a lot of track, and I prefer to use Homasote, which does a great job holding onto spikes. I used ½" Homasote in the yards glued to ¾" birch plywood, but opted to use California Roadbed's Homabed elsewhere.

I first glued down a ¼"-thick layer of unbeveled Homabed, then glued another ¼" layer of 45-degree beveled Homabed on top of that, thus achieving ½" total depth – sufficient to allow for ditches on either side of the track.

The track forms one side of the ditch, but how could I raise the terrain to form the field side of the ditches and then taper that down to align with the top of the fascia, which is essentially flush with the plywood subroadbed? (Raising the top edge of the fascia wasn't practical, as it would get in the way of realistic viewing from the aisle and, more importantly, low-angle photography.)

STEP 3 A SIMPLE SOLUTION

I tried several approaches – using plaster gauze over screening, shaped mounds of decomposed granite, and carved ceiling tile – before stumbling onto the easiest one: ⅜" insulation board. It's sold in a 50-foot bundle of accordion-folded sheets each measuring 2 x 4 feet. At each fold, the board pinches down, forming a rounded edge that can be easily aligned along the fascia.

Fan-folded ⅜" insulation board, sold at big-box or hardware stores, offered an easy fix. Tony cut strips to fit between the track and fascia or backdrop and stapled them in place using ⁹⁄₁₆" staples to fasten the foam along the outer edge.
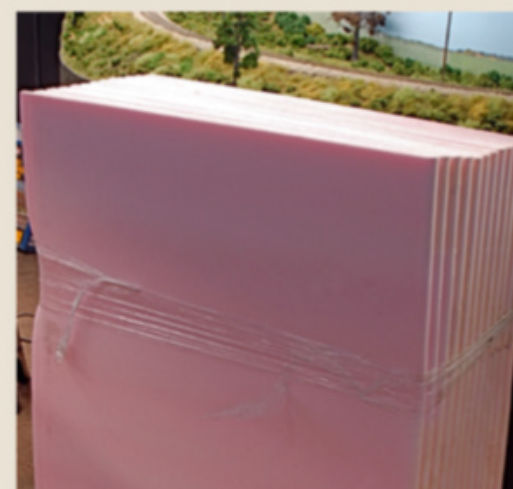
STEP 4 HO DITCH TEMPLATE

Tony laminated an HO scale photocopy of the Nickel Plate Road's standard roadbed and cross-section drawing to a piece of styrene. Then he trimmed off the bottom edge to make a stiff template to guide his ditch installations.

To ensure that I left adequate margins for the ditches, I made an HO scale copy of the Nickel Plate Road's roadbed cross-section drawing from step 1, glued it to a piece of styrene, and cut out the bottom profile. Then I used this template to mark the outer edge of each ditch line along the roadbed edge. This provides an accurate line that makes it easy to trim the insulation so the ditch comes out parallel to the rails.

In the transition era, most major railroads used a grading machine called a Jordan Spreader to clean the ditches and restore the proper roadbed profile.

STEP 5 FITTING THE FOAM

Tony relied on his eye to initially judge the ditch width as he stapled the insulation board in position. However, his ditches looked too narrow so he trimmed off more of the foam board to match his roadbed profile template.

I used a new blade in a utility knife to cut the individual 2 x 4-foot foam sheets apart and then to cut them into strips. One strip fits between the roadbed and the fascia, while the other goes between the roadbed and the backdrop. On curves, I sketched the arc of the backdrop onto the foam, cut it out, and trimmed it for a close fit. Then I positioned the panel tight against the backdrop and over the track so I could press it down hard to make an indentation of the rails. This made it easy to cut the track edge of the foam to the proper curvature.

STEP 6 SHAPE THE SUBROADBED
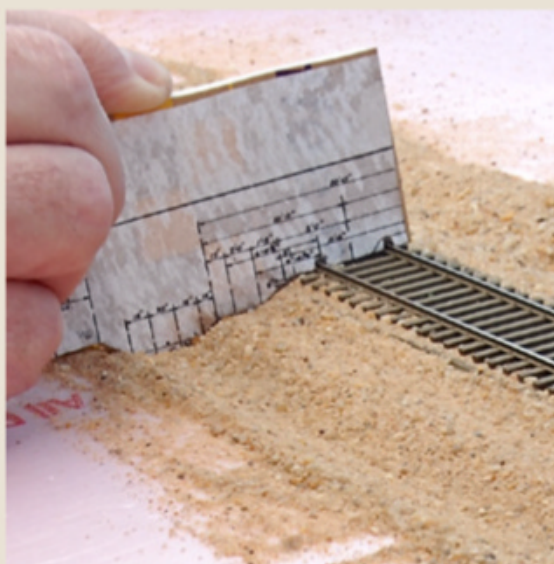
Tony used fine sand to fill in the ditch before shaping it with his plastic template. Then he brushed any remaining sand off the ties and other areas that would receive the finished rock ballast scenery later on.

With the basic level landform scenery in place on both sides of the track, I spooned some inexpensive fine sand into the ditch as a filler material. The sand blended the foam board smoothly into the edge of the subroadbed along the track.

Then I used the plastic template as a scraper to shape the loose sand into the proper ditch profile.

Finally, any areas along the ties that would receive the finished rock ballast were gently cleaned off using a dry foam paintbrush.

When this step was finished, I had smooth ditch profiles running along both sides of the track.

STEP 7 STABILIZING THE ROADBED

Tony used gentle sprays of rubbing alcohol to give the loose sand a good soaking (ensure good ventilation!) and followed that with diluted white glue.

To keep the loose sand from moving and losing its proper profile, I gently applied multiple light sprays of rubbing alcohol until the sand was thoroughly soaked. At that point, I switched to a 50-50 mixture of white glue and water that I applied by dribbling it on the saturated surface. I held the glue container as close to the sand as possible so the fine drops of glue landed without moving the wet sand out of place. The glue was absorbed almost on contact. (Note: alcohol fumes are flammable and evaporate quickly, so good ventilation is a must).

STEP 8 CINDERS AND BALLAST

As the glued filler sand ditch profile hardened, Tony applied a layer of cinders, wetted and glued it down, and then added the final layer of limestone ballast.

As the glue began to harden, I used a plastic spoon to apply a thin layer of cinders along both sides of the track. That evening, I added the limestone ballast using Arizona Rock & Mineral no. 138-2 (CSX, Southern Pacific, Wabash) to represent the NKP ballast. A dry foam paintbrush worked well to level the rock ballast, push it off the tie tops, and shape the shoulder cross-section. Then I glued the ballast layer in place.

STEP 9 GROUND COVER

Here are some samples of the Busch Wildgras-Teppich grass mats of various colors. They have a flexible backing so they can be glued down.

Tony trimmed each mat to fit and secured it with white glue or matte medium and a few staples (which were removed later).

The Heki Wildgras Waldboden sheets don't have any backing material, so they can be stretched to cover more terrain.

On the field sides of the ditches, I applied various colors and types of Busch and Heki ground cover to represent pastures or low crops.

Busch also offers grass and crop mats in various sizes.

For cow pastures, I installed fence posts made from .060"-square

styrene painted a weathered gray. I then punched a small hole in the foam and inserted each post with a drop of cyanoacrylate adhesive (CA).

STEP 10 FENCING AND CULVERTS

Using a ruler as an alignment and spacing guide, Tony punched small holes in the foam base an inch or so apart, slipped a fence post into each hole, and secured each of them with a drop of cyanoacrylate cement (CA).

Water flowing along the ditches has to pass under roads, and metal culverts are easy to fashion from expandable drinking straws painted aluminum.

While the field grass mat's glue was drying, it was easy to erect a pasture fence line in the foam terrain. I made the posts from short bits of .060"-square styrene painted a weathered gray. While I was at it, I also fitted the appropriate angled corner bracing that keeps the wire fencing tight. Similar bracing is also found at gate openings.

Some railroads also fenced portions of their right-of-way using steel-wire fencing and concrete posts for maximum durability.

A variety of culverts are used to keep the water flowing through the ditches and under the roads that cross the NKP main line. Most of the small to medium-size rural culverts are made of corrugated steel pipe that I simulate with flexible plastic straws painted aluminum.

Important county and state highways may have larger concrete box culverts designed to let branches and other large debris pass through with the fast-flowing storm water during heavy weather. **MR**

This photo of the finished scene shows how the different colors and textures naturally blend together with this Midwestern scenery technique. Perhaps the best part is everything in the photo was started and finished in one day.

Author Horst Meier uses Modur foam to model the sandstone of the American Southwest, like that seen in the inset.

Carving realistic stone from foam

Lightweight, easy-to-shape material is a breeze to work with

By Horst Meier • Photos by the author

The first material that comes to mind when building rocks for a model railroad is plaster, a useful, versatile, though somewhat heavy and messy choice. To achieve impressively realistic model rocks, plaster must be carefully molded or artistically carved, which can be a great deal of work. And plaster isn't the best material to model

sedimentary rock like the sandstone of the American West. Most commercially available molds represent a coarse, fissured stone structure, and carving plaster with a knife produces a similarly chipped, fractured texture.

To model the soft contours of wind-carved sandstone, I've taken a liking to Modur, a dense, rigid foam made by the

German manufacturer Puren. Busch sells it under the name "Rigid Foam for Model Building." With this light, easy-to-carve material, it's fast and simple to model your own rocky landscapes.

STEP 1 Stacking the foam

Modur foam is a thermosetting plastic, specially developed for modeling. The foam is so light and porous that it can be carved easily with an ordinary pocketknife or kitchen knife. It can also be shaped with a hobby knife, fine-toothed saw blade, wood rasp, sanding block, or even a screwdriver or chisel. It can be further textured with a file, sandpaper, or wire brush.

The blocks can be quickly glued together using adhesive caulk or even hot glue. I make small hollows in the center of the rigid foam blocks and set points of hot glue in these. Then when I press the blocks together, no glue oozes out at the sides.

STEP 2 Carving rocky cliffs

The real advantage of this material lies in the ease of modeling natural-looking rock formations. Before attaching the foam to the layout, or even afterward, you can roughly carve a rock face or single rocks using a knife. You can then carve details with a hobby knife, screwdriver, or bevel-edged chisel. Be sure to wear eye protection against flying chips during this step.

The smaller your modeling scale, the smaller the blade you should use. Insert the tip just a little way under the surface and pull the tool outward. Depending on the depth and angle of the blade, larger or smaller pieces are chipped away. The resulting pitted structures represent rocky cliffs amazingly well. Varying the surface between deeper and flatter areas gives a natural, irregular look. Turning the tool from side to side avoids a too uniform surface. You don't need much practice. Experiment on the chunks left over from shaping edges and corners.

After preliminary shaping, rework any smooth edges so that they blend with the surroundings. Scrape the edge of the blade from side to side across the smooth areas to chip off small bits and make a rough texture.

STEP 3 More detail

I give rounded rocks, eroded by wind and weather, their shape first with a hobby knife and sandpaper before forming clefts and breaking bits off with the tip of the blade. I then match the individual rocks to one another with a few strokes of a file across their surfaces.

Gouges, crevices, and fissures can also be cut into the foam. Fine details can easily and smoothly be worked using a hobby drill fitted with a shank cutter, or a nail, or even a needle. Following the rough edges with the drill set at high speed creates typical rock clefts.

You can achieve further rock detail by tapping the surface with a brass wire brush. This forms tiny pits in the surface, giving the whole block an eerily realistic rock structure. For sedimentary rocks, I also draw the brush across the surface in the direction of the strata, which quickly unifies the look of the rocks.

STEP 4 Cleaning and sealing

The foam's soft surface must be sealed in some way before any color or other finish is applied. Otherwise, the details you've just carefully carved into the surface will be destroyed by the paintbrush. The protective coating serves to stabilize the surface, but not fill the pores. First, use a soft brush or a spray of compressed air to remove any loose bits of foam left by the previous texturizing steps. Then, carefully apply a layer of thinned white glue (about 4 parts glue to 1 part water) with a soft-bristle brush. If needed, this process can be repeated.

STEP 5 Filling gaps

One disadvantage of foam is it comes in square blocks, and seams are often visible. It's not easy to hide the joints between these pieces, as straight edges tend to catch the eye. Trying to cover these joints with plaster or Sculptamold will fail during the subsequent painting steps, because the different materials absorb paint differently, making the joint patches stand out.

The solution is to create a filler paste from finely shredded pieces of foam (cut off during the shaping steps) and white glue. You can apply this material with a spatula, like plaster. With this filler, all obvious joints and tool marks can be concealed.

STEP 6 Color comes into play

To color the foam, use thinned acrylic paints applied with a soft, flat brush. If your rocks aren't yet fixed to the layout and will fit into a spray booth, you can use an airbrush. Either way, the paint should be thinned, because you don't want to fill your carefully carved textures with thick paint.

I like to work with two shades of paint at the same time, one lighter, one darker. In this way, a little of the color range found in nature can be achieved. If you add the second shade while the first is still wet, flowing transitions can be made. Start with the lighter shade and quickly shift to finishing with the darker color.

After everything has dried, take a critical look to check that paint has reached into every little corner. It's easy to miss painting in cracks, the undersides of ledges, and other difficult to reach places.

STEP 7 Giving depth

At this point, don't worry if the color on your rocks still looks a bit patchy and too bright. This is actually what you want, because this step and the next, which enhance the feeling of depth, will soften and blend the bright colors.

The first step is to imitate the shadows in the depths of crevices and hollows. For this, use a shading paint of your choice thinned with water and with a few drops of dishwashing liquid to make it more free-flowing. Water-soluble acrylic paint sold in tubes at artist's supply shops is suitable here, as its pigments are finer than craft paint. Mix about 2" of paint from the tube in about ¾ cup of water and a few drops of dishwashing liquid.

It's essential to test the intensity of this weathering solution on a trial area before applying it to your rocks.
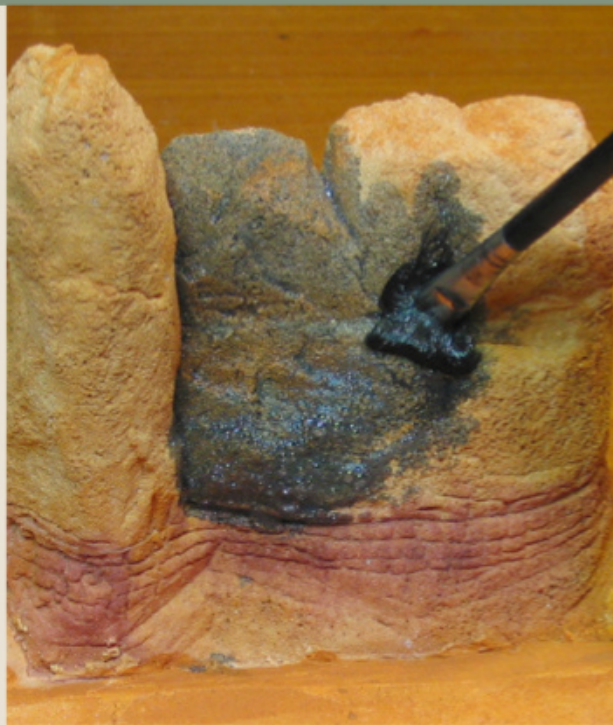
As seen in the photo on the left, when first applied, the weathering shade seems much too strong. But once the liquid has properly spread and sunk into the cracks and crevices, it becomes much lighter. On my rock outcroppings, I further enhanced the shadows by airbrushing the deeper cracks and fissures very lightly with thinned black paint.

STEP 8 Finishing the paint

Now that you've finished with shadows, add highlights by drybrushing. This technique requires some patience, as it's tempting to apply the color too heavily, which ruins the effect.

I use bright, full-strength acrylic paint here. White paint is too harsh. I use the basic shade of the rock, which I mix with white to lighten. I then pick up paint with the whole brush and sweep it repeatedly across a rough, absorbent surface like cardboard until the brush leaves barely a trace. Then I lightly rub the brush over the rock surfaces without exerting any pressure. You will notice that a very tiny amount of bright paint will stick to projecting surfaces, simulating highlights. For transitional areas with patchy-colored ridges or very strongly shadowed areas, repeating this step will help soften and correct previous coloring mistakes.

STEP 9 Adding stones and boulders

The rocks are now finished, but to blend them into the surrounding area, you'll want to add smaller stones and boulders. Pillars of rock common to the American West are surrounded by cones of rubble that have broken off over thousands of years and accumulated below.

You could use rocks sold by hobby scenery suppliers, but I've also used gravel sold for use in fish tanks. You may need to tint the pieces gravel to match your rocks by dunking them in some matching paint in an old coffee can.

When positioning the rocks, proceed along the slope of the surface and paint the area with white glue. Position the largest pieces carefully with tweezers to achieve the basic cone shape of a natural slope. The next smaller rocks are simply strewn around these, and so on with ever-smaller stones, until finishing with rocks the size of sand grains. The slope favors the natural fall of the small stones. It looks good if the larger rocks half disappear in a heap of sand, just as in nature. Fix them in their final positions with thinned white glue. MR

Making mountains

Eagle Mountain RR no. 1037 pulls a mixed freight while a truck climbs the mine road on *Model Railroader*'s 2016 project railroad. Eric White explains how he built the mountain on the mine side of the layout.

Making mountains for *Model Railroader*'s HO scale Eagle Mountain project layout using plaster gauze on a cardboard web

By Eric White • Photos by William Zuback

Mountains are popular features on model railroads. Whether you're modeling a specific prototype that calls for mountainous terrain, or if you're freelancing, mountains show up on a lot of layouts.

Mountains add drama and can be important design elements. They're a way to hide track that would otherwise have to reappear unrealistically after a turnback curve at the end of the layout. They can disguise a place where the

track needs to go through a backdrop, and of course, they help set the scene.

What would a coal-hauling Appalachian layout be without the mountains of West Virginia? Where's the drama of the Denver & Rio Grande Western without the Rockies?

So, now that you've decided you want a mountain on your layout, how do you build it? There are many choices, and they each have their pros and cons. What we used on the Eagle Mountain

RR, *Model Railroader*'s 2016 project layout, is a tried-and-true method of plaster gauze over a lattice of cardboard strips.

The advantages are quick construction, ease of modification, and relatively low cost. The main disadvantage is the potential mess of wet plaster. Since our workshop has hard-surface floors, and we have a solid tabletop under our mountain, the mess wasn't a big issue.

Follow along as I take you through the process, step by step.

Step 1 Preparing the area

Before I started construction, I made sure the track that would be hidden by the mountain was finished. In addition to painting the track, Cody Grivno ballasted the areas that would be unreachable, yet visible, when the mountain was finished.

The next step was to cut strips from sheets of cardboard we had in the workshop. I cut with the corrugations, making pieces for the web about ½" to ¾" wide.

To build the cardboard web, which is secured with hot glue and staples, I needed something to secure it to. I hot-glued wood strips to the backdrop, since I knew it would be difficult to drive staples into the tempered hardboard. I also glued the strips to the extruded-foam insulation board layout surface. The wood is a little grippier than the foam would be.

I stapled strips from the edge and the surface of the layout to the backdrop to start. Then I started weaving pieces in from the ends. Where they crossed, I stapled them together for strength. I made the grid about 4" x 4".

I had to finish the tunnel portal and cast and paint a plaster liner before I could complete the web. Once those two scenery items were installed, I hot-glued the ends of the web to the plaster castings.

Back of backdrop

Track painted

Backdrop

Wood tacking strips

Cardboard web

Stapled joint
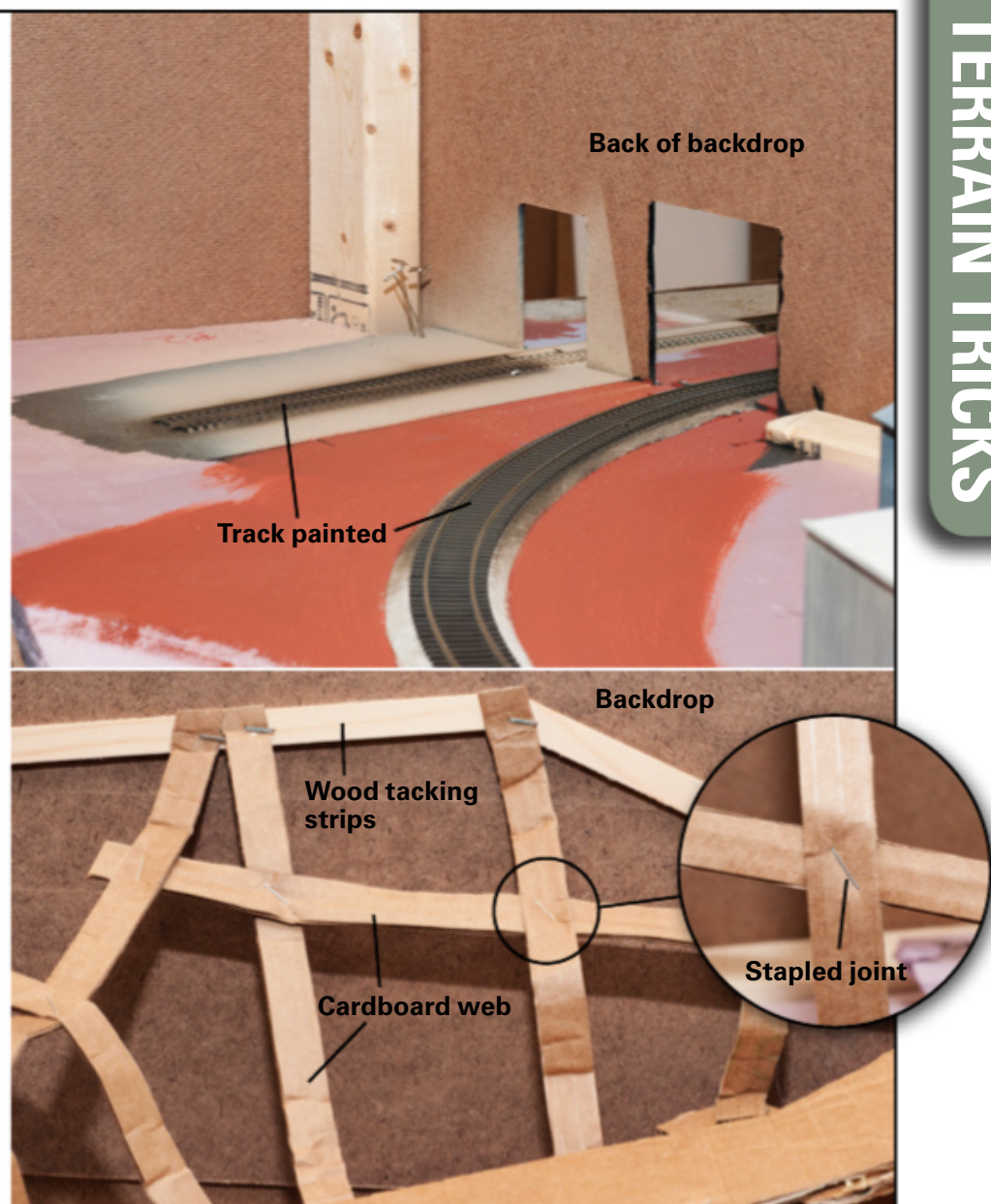
Step 2 A road up the mountain

Roadbed

Steep slope

Cardboard supports

Layout surface

Webbing cut away

Roadbed cut

New curve

Gentler slope

To break up the expanse of mountainside, and to add visual interest, I added a road going from the site of the ore loader up and over the mountain. The base of the road is a piece of cardboard. The top is stapled to the wood strips on the backdrop, and the bottom is hot-glued to the foam layout base.

In the middle, I made cardboard supports to get the roadbed to hold the shape I wanted. Once I was finished, I realized the road was too steep. An advantage of this construction method is the ease of making changes.

I cut out the curve in the road and some of the webbing around it. I cut a new curve for the roadbed, then pushed and prodded the cardboard into a more realistic shape. Once I had the roadbed in a location I liked, I filled in the areas around it with more webbing strips. My only losses were a couple inches of cardboard webbing, a few staples, and the time it took to make the change.

Wood supports hold web at backdrop

Approximately 4" grid

Tunnel portal
placed temporarily

Old, steep roadbed

Plastic bowl

Gauze strips

Track covered

Two layers of gauze

Overlap gauze

Mask under
mountain
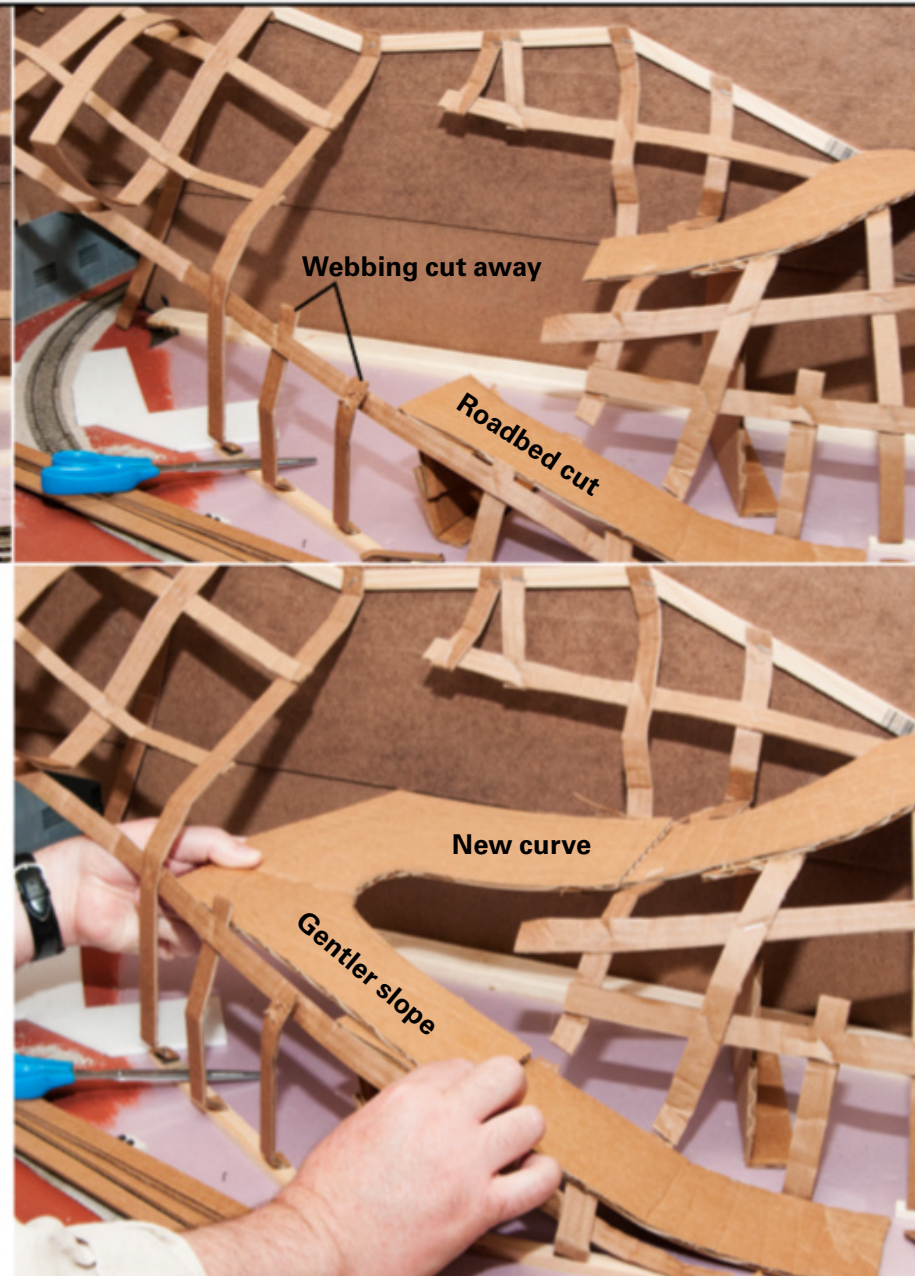
With all the webbing in place, it was time to start applying plaster-impregnated gauze. Since this is messy, I covered the track with masking tape. I also used pieces of paper to protect the areas under the mountain that would be accessible through a hatch I made in the fascia. This wasn't really necessary, but I wanted to keep it as neat as possible under there.

Plaster gauze is easy to work with. We used Woodland Scenics plaster gauze, which is a good size for model railroading. However, I did cut the pieces in half, since I was building a relatively small mountain.

I used a flexible plastic bowl filled with water to soak the gauze strips. After dipping the strips in water, I shook off the excess, then placed the strips over the cardboard web. I overlapped the pieces as I went along and added a second layer before the first had set up. I smoothed the gauze as much as possible with my wet hands.

An alternative to plaster gauze is paper towels or newspaper soaked in Hydrocal. The process is similar, but you have to mix a soupy batch of Hydrocal to soak your paper in. Cut the paper into usable sizes, soak it in the plaster, and apply the same way as the gauze.

Using a flexible bowl makes cleanup easier. Once the plaster dries, flex the bowl and it'll flake right off. Don't rinse the bowl and wash the plaster-laden water down the drain, unless you enjoy unclogging drains.

I used up the excess plaster by brushing it over the gauze after it had set up a bit. The steep sides of the mountain were covered with plaster rock castings. The gentler slopes were covered with Sculptamold, a papier-mache product. It's useful for covering stubborn folds in the gauze material and for blending the rock castings into the surrounding terrain. I'll describe both processes in the next article. **MR**

EAGLE MOUNTAIN RAILROAD

How to cast and color plaster rocks

Rock outcroppings are a prominent feature of many mountain scenes. There are several methods for creating rocks on model railroads. This time, we'll show you how we cast plaster rocks in place using rubber molds.

Realistic rock faces made simple thanks to plaster rocks cast in commercially available rubber molds

By Eric White

In another article, I explained how I built the mountain on the mine side of the Eagle Mountain RR, our 2016 project layout. This time, I'll explain how to use rubber molds to cast plaster rocks in place, blend them into the scenery, and color them realistically.

I like to apply the castings wet so they can conform to the shape of the terrain. To aid in coloring the rocks, I used photos gathered from the internet and backdrops from Backdrop Warehouse.

Our mountain is replicating the landscape in Southern California's Riverside County, near Joshua Tree National Park. Although the rocks on our layout are set in a desert scene, the techniques are the same no matter what environment you're modeling.

Follow along and I'll show you how to have fun and get the results you're after.

Step 1 Mixing it up

Mixing stick doubles as putty knife

Flexible mixing bowl eases cleanup

Lightweight Hydrocal

Pancake batter consistency

Before I began casting, I gathered my molds and placed them on the locations I wanted covered with rocks. This helped find molds that, either singly or in combination, fit the areas. Also, it helped me avoid reusing the same mold next to itself. I had enough different molds to cover the areas I wanted to, but to increase variety, you can flip molds over, turn them vertically, fill part of a mold, and overlap them.

To start the process, I mixed up a batch of casting plaster. I used lightweight Hydrocal, which is ideal for rock castings because it's strong enough to withstand having the rubber molds pulled from the casting, and it's thin enough to reproduce all of the details in the mold.

I started with the dry plaster, then added water until I had a consistency like pancake batter. I found it easiest to mix enough plaster for one mold at a time, but it took me a few tries before I got the quantity of plaster right for just a single mold. I used molds from Woodland Scenics.

The plaster set in about 30 minutes, but it got difficult to pour in about half that time, so I had my work site ready before I started mixing plaster.

I used a paint mixing stick, both to mix the plaster and to help spread it in each mold and on the mountainside; a spray bottle with water; and of course the rock molds. A small cup with clean water is helpful too, as well as some paper towels or rags.

Step 2 Pour it on

Dampen mold

Woodland Scenics rock molds

Protect track

Previously placed castings

Dampen scenery surface
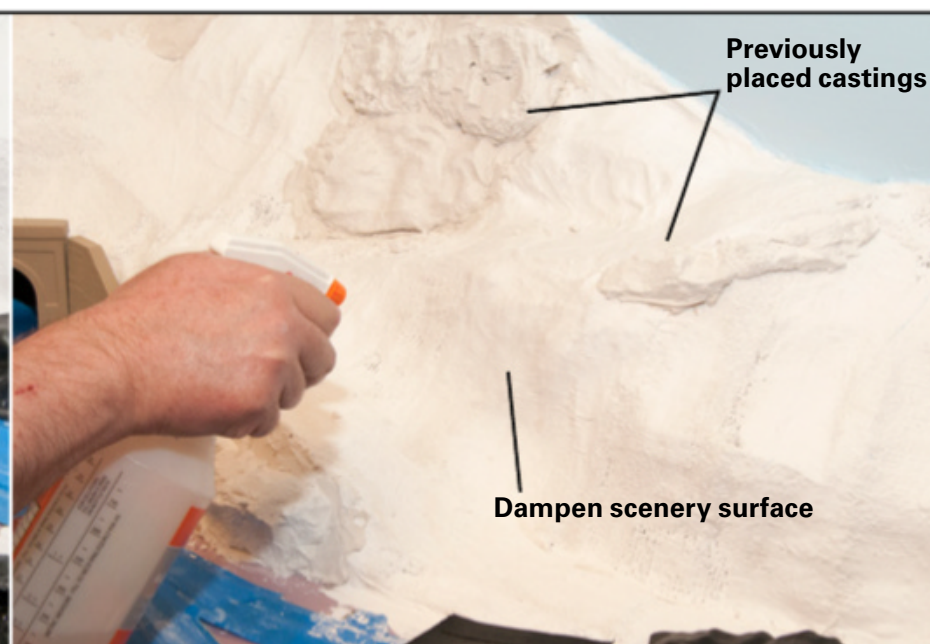
With a selection of rock molds ready, I started by spraying one mold with water. This helped the plaster fill all the details in the mold.

I poured the plaster in the mold. If you have enough plaster left over, fill another mold, but plan to adhere it some distance away from your first casting. You can place castings over each other, but you have to remove the rubber mold first!

I used my leftover plaster to level the surface for my casting. I started by wetting the surface with a spray bottle. The cast rocks will stick to the plaster gauze scenery if the scenery is dampened first.

I used the mixing stick to apply a layer of plaster over the scenery base. The plaster layer needs to be a little

larger than the rock casting and reasonably, but not perfectly, smooth. This helps fill in the folds and gaps in the plaster gauze and to adhere the mold to the scenery.

The amount of time it took to slather plaster on the scenery was about enough time for the plaster to begin to set in the mold. You can tell the mold is setting up because the plaster turns from a shiny to a dull appearance. There may also be small cracks in the plaster. That's nothing to worry about.

With the plaster in the mold ready, I picked up the mold and placed it on the scenery where I had applied the plaster layer. I held the mold in place for 2 to 3 minutes. (This is another reason it's easier to cast one mold at a time.)

Level in mold
with stick

Thick plaster

Smooth excess
plaster on scenery

Let plaster
begin to set
in mold

Mold area covered
in fresh plaster

Plaster in mold set
enough to stay put

Casting will stick in place

Remove mold when
casting is warm
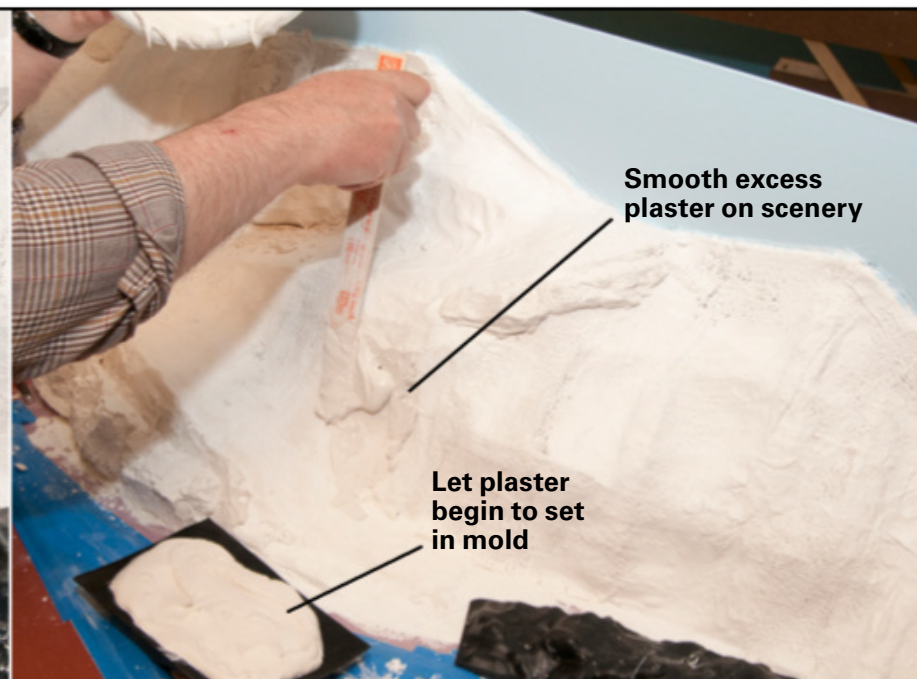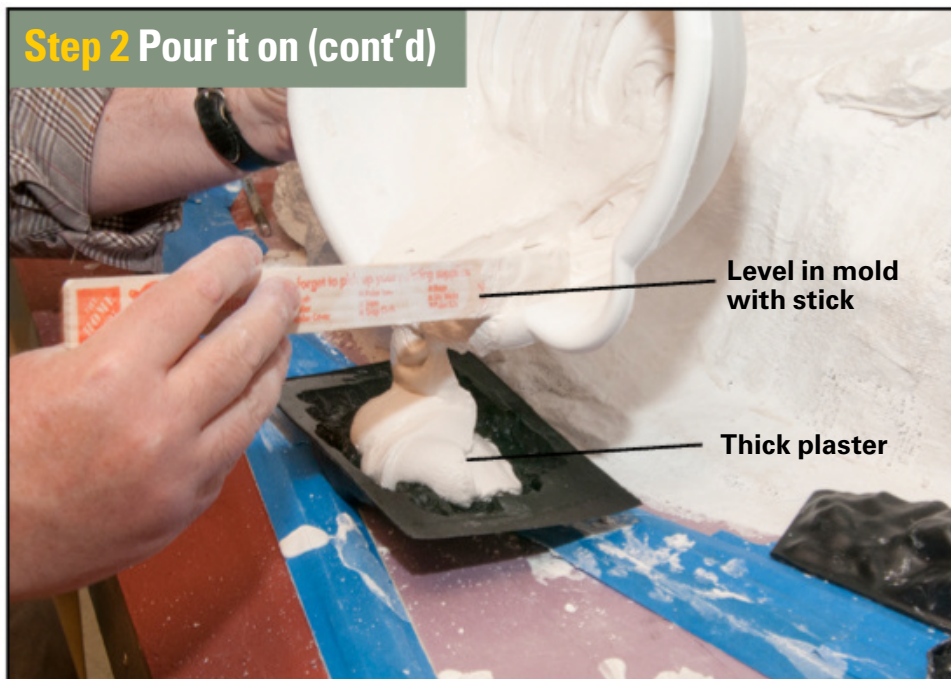
I held the casting in place until it stayed there by itself.
You might feel the mold start to get warm. That's a normal
part of the curing process of plaster. Once the mold gets
warm, it's safe to remove the mold from the casting.

After I removed the mold, I applied the next casting
adjacent to the first. It was easier to carve and shape the
castings together before they both fully cured.

A hobby knife with a no. 17 chisel blade is a good tool
for this. By gently pushing the blade into the plaster, then
flicking it away, I could flake off layers of plaster, leaving
behind a rough, rock-like surface. When Hydrocal is fully
cured, it's difficult to carve.

Hobby knife with
no. 17 chisel blade

Mold recently
removed from
casting
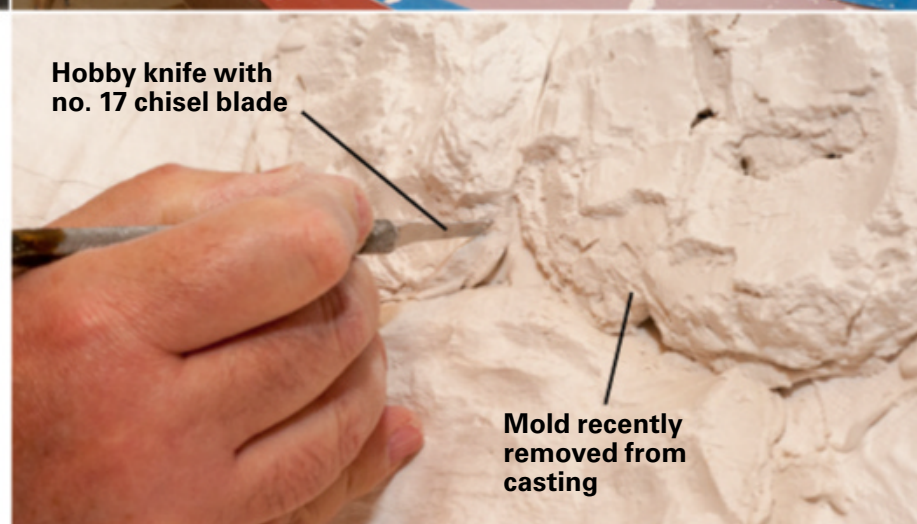
Step 3 Blending it in

When I finished casting the rocks, it was time to
blend the rock faces into the surrounding scenery.
Sculptamold is excellent for this. It's a papier-
mache product, so it sticks well to a plaster gauze
scenery base and the edges of the plaster rocks.

I put some Sculptamold into a mixing bowl and
added water until I had a thick, damp mixture. This
will be much stiffer than the Hydrocal and will be
about the consistency of oatmeal.

Again, I started with a spray bottle of water and wet
the area I was going to work in. Using a damp putty knife,
or my dampened fingers, I pushed and shaped the
Sculptamold around the rock castings to blend them into
the mountainside. The water on the knife or my fingers
kept the plaster from sticking.

Dampened
putty knife

Covering folds
in plaster
gauze

Spray bottle with water

Mixed
Sculptamold

Cup with water

Woodland Scenics Earth Colors

Mixing cups

Test casting

Photo from
the internet

Preliminary wash

Backdrop section

1½" paintbrush

Burnt umber wash

Thin wash
of color

Black wash

Apply second
wash while
first is wet
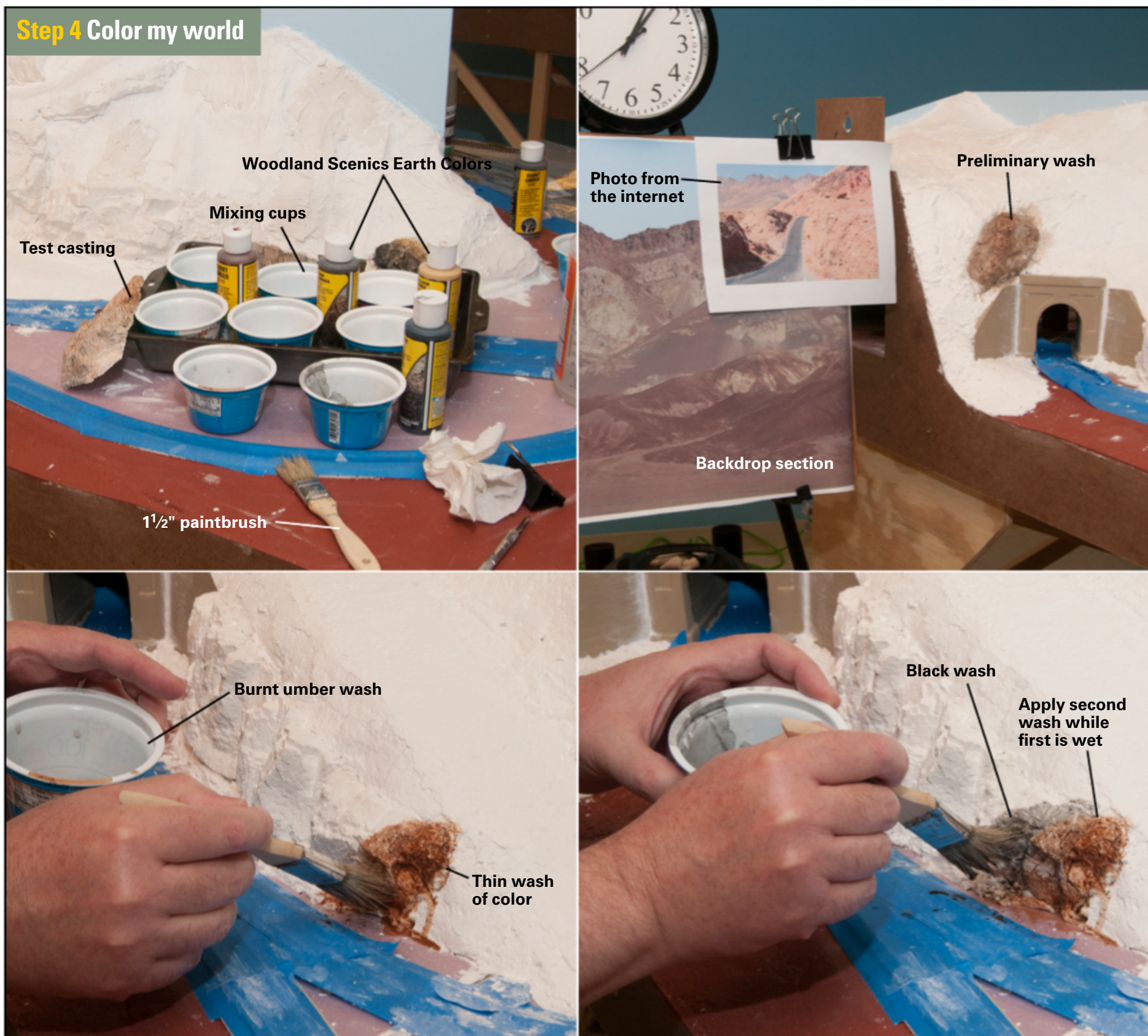
With all that plaster work done, I needed a rest, which worked out well. I let the plaster sit overnight to cure. Once there were no cold or damp spots in my rocks, the plaster was cured.

This is the part of the process where I needed some reference materials. To color the rocks on the Eagle Mountain RR, I printed images I found on the Internet of the area we're modeling for reference. I clipped the prints and the backdrop images we purchased for use on the layout to an easel so I could easily refer to them and keep them out of the way of spattering colors.

I used Woodland Scenics Earth Colors pigments diluted with water. Empty, clean yogurt containers made good mixing bowls for colors. I used Black, Burnt Umber, Raw Umber, and Yellow Ocher to color my rocks, but you may need different colors to match the area you're modeling.

I used a 1½"-wide paintbrush to apply the colors. A cheap, coarse brush is fine. The goal is to stain the castings, and to work quickly, applying colors over each other while the colors are wet so they blend at the margins where they meet.

I used some of my early, failed attempts at rock molds to get a feel for how the colors would look. In some cases, I applied a black wash first to create some shadows, but I didn't do that on all of the rocks to create some variety.

I also stuck with just one or two colors on most of the castings. If the colors looked too jarring, I went back after they were dry and applied a thin black wash to tone everything down.

The practice rocks were put to good use, too. After they dried, I broke up the castings with a hammer, then dumped the pieces into resealable plastic storage bags and added some thinned pigment. After doing a shake-the-bag routine, I laid out the colored plaster bits on layers of paper towel to dry. Finally, I piled the chunks at the base of the mountains to represent talus, the broken rock that falls from the cliffs above.

With the rock castings done, it was time to move on to adding a bridge. Turn to "Build a trestle over a dry wash" on page 71 and follow along as we continue construction of the Eagle Mountain RR. MR

How to build a
DEEP ROCKY RAVINE

An impressive scenic feature greets visitors

By Thomas Oxnard • Photos by the author

Boston & Maine 2-8-0 Consolidation no. 2360 leads a local across a deep ravine in New Hampshire's White Mountains. It's heading for Bristol on Tom Oxnard's Boston & Maine layout.

As my retirement approached, I realized I was going to need a new project to work on for my layout. At the time my New Hampshire Division of the Boston & Maine RR (B&M) was in the dreaded state of being nearly finished and I'd run out of space in my basement. (See "Modeling the main line of the Minutemen" in the December 2009 *Model Railroader.*) I'd already replaced most of the early structures with better ones built from craftsman kits, scratchbuilt many others, and redone much of the scenery to higher standards.

Participation in a National Model Railroad Association regional convention and operating on several layouts

inspired me to find more real estate to expand my layout. All it took was moving a freezer and tearing down a small wall to clear the way for an 8-foot extension of my shortest peninsula. This addition proved to be a major improvement

for my model railroad, and it even gave me a wider aisle.

Planning goals

I wanted an impressive scene visitors would see as soon as they entered the layout room. In particular, I was looking for a river flowing through a deep rocky ravine with a mountain behind it.

My plan was to have a 2-span deck girder bridge in the middle of the scene to carry trains across the ravine. The view up the river beyond the bridge would lead the eye to a pair of impressive scratchbuilt New England-style mill buildings in the distance. Both of these structures feature wood construction.

In designing the mountains, I had to think in terms of the cubic space that was available from side to side, from

This is the view that greets visitors when they enter Tom's layout room. The deep rocky ravine scene featured in this article is visible on the left side of the photo.

the track to the rear wall, and how high they could go. The ultimate height was determined by how steep or precipitous I wanted to make the front slope.

My mill building was only a foot from the wall, so I reduced the overall height of the mountains to 20", which is about a foot below the ceiling. This reduced the angle of the slope for more realism.

The ravine starts at a 52" elevation and descends 11" on its way down through the scene.

Once my planning was complete, it was time to move into the construction phase, which follows step-by-step.

Plywood spans
L girders under pier

Ravine drops down
between L girders

STEP 1 LOCATION

Positioning a deep ravine in the benchwork is important, as it affects how the benchwork is built. I wanted my ravine at the end of an aisle near the room entrance, so I was able to locate it between the L girders in the benchwork. I've found Linn Westcott's book *How To Build Model Railroad Benchwork* (Kalmbach Books, 1990) is an invaluable resource that I often refer to.

I placed my first joist 12" in from the fascia so it could become a reference point for the depth of the ravine. I wanted my two-span bridge to sit on a stone pier that was more in keeping with typical B&M railroad practices, and that also helped to determine the depth of the ravine. At this time I also decided that most New England waterfalls are much shallower than a cascade all the way to the floor, so I reduced the height of this feature. Instead, I turned the course of the river into a shallower stream that flowed from a mill pond down to the edge of the fascia.

Stacked foam cut
for future tunnel

Plywood
roadbed
cut out for
bridge

Mill mockup
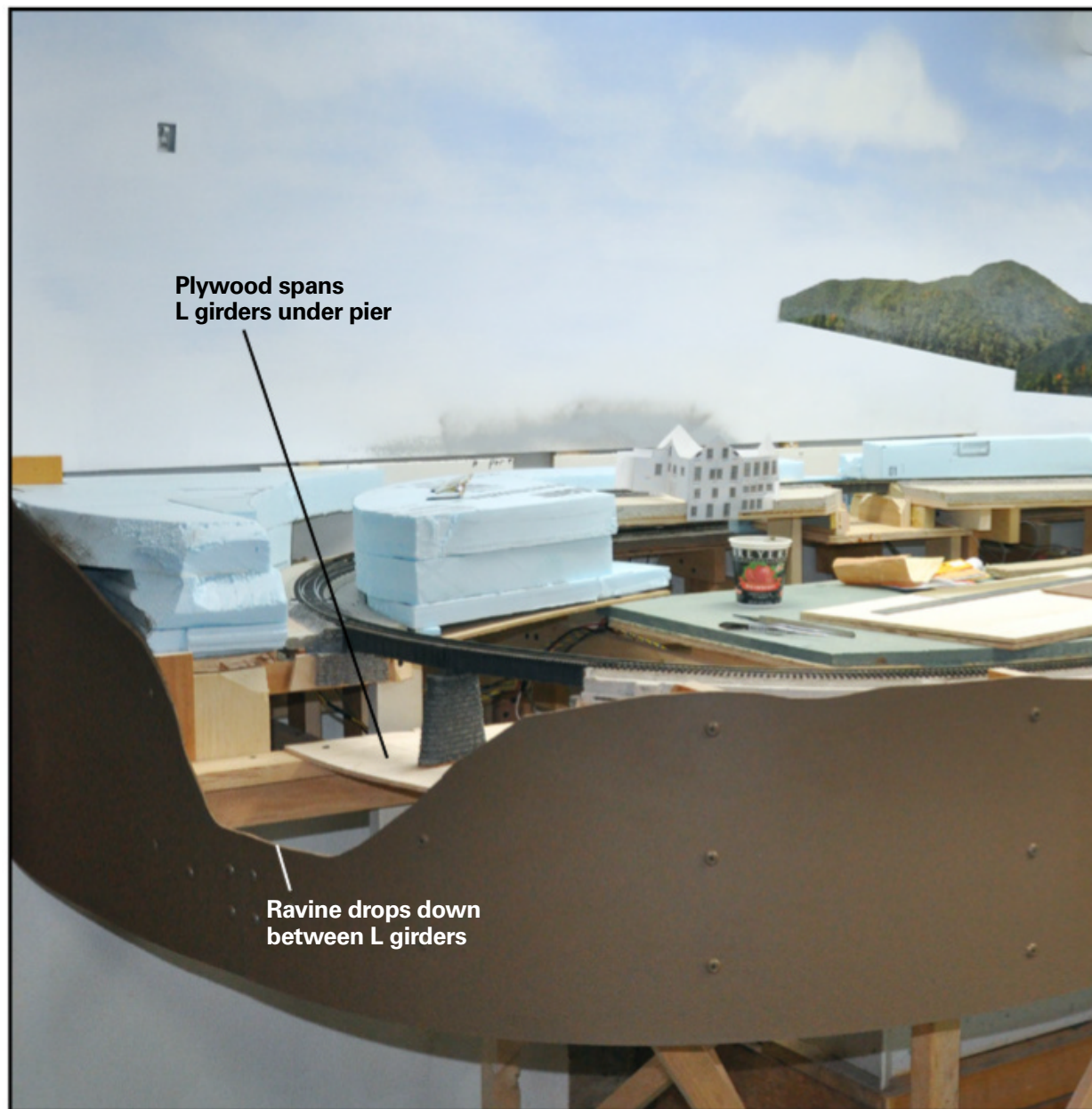
STEP 2 TRACK SUPPORT

I installed the subroadbed as a continuous piece of ½" plywood and Homasote through the bridge site. Then I added the necessary risers and cleats to support both banks and ensure perfect alignment of the bridge approaches at each end. Finally, I made the cuts to open up the 14" space for the bridge in the middle of the curve.

At this point I cut a piece of ¼" plywood that spanned the tops of the L girders and formed the bottom of my ravine. This panel is sized to support the bridge pier and both stone abutments.

I finished painting the stone pier and matching abutments, scratch-built the two-span deck girder bridge, and handlaid the code 83 track through the site. Then I fit and installed the fascia and trimmed it to define the shape of the river bottom.

I test-fit cardboard mock-ups of all the major structures included in the scene and began fitting blocks of shaped foam board for the tunnel.
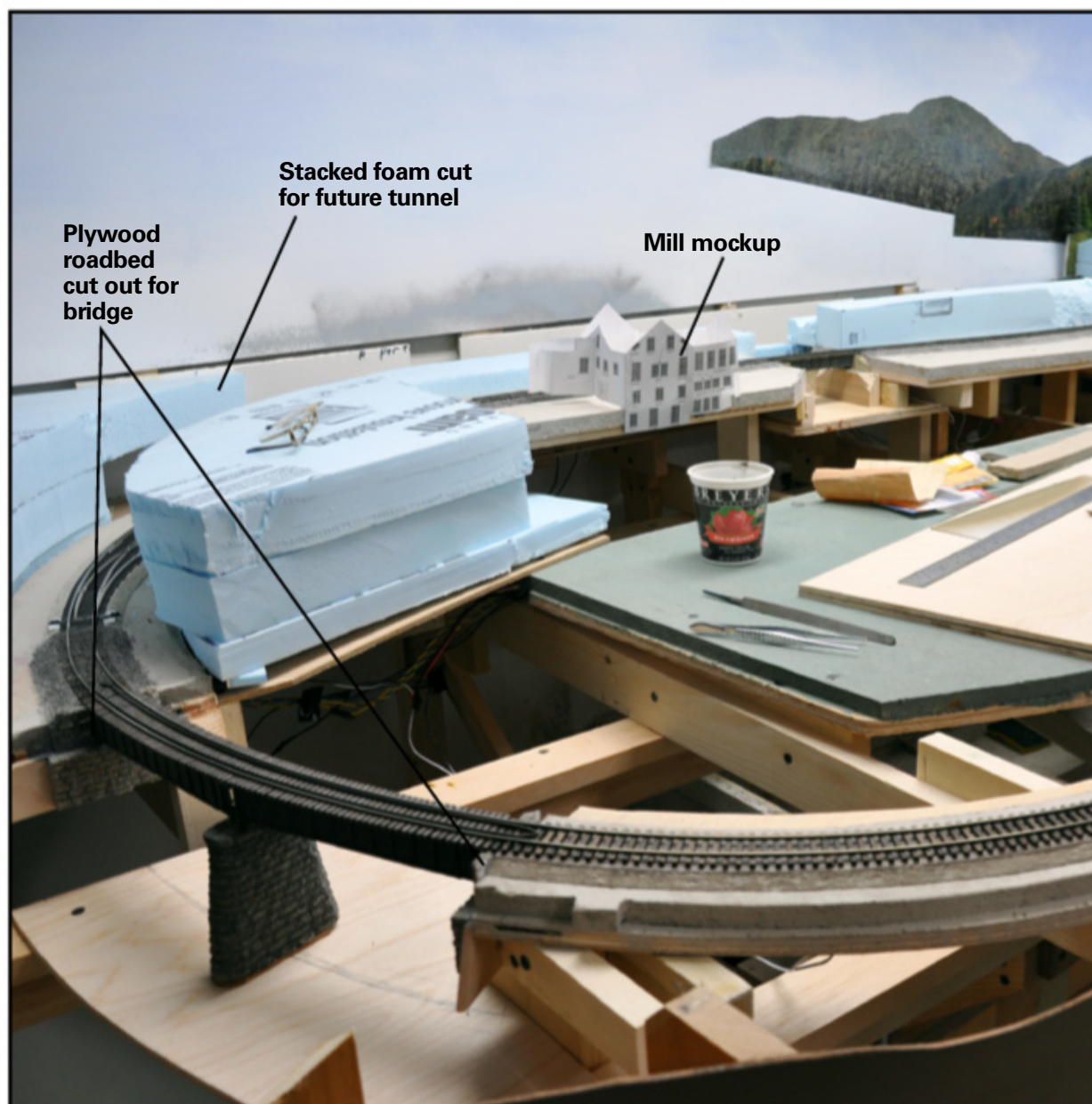
STEP 3 STACKING THE SCENE

To support the scenery, I stacked up roughly contoured layers of 1" and 2" extruded-foam insulation board and glued the pieces in place with Liquid Nails brand Projects & Foamboard adhesive (no. LN-604). This adhesive requires some time (usually overnight) to cure, and setting weight on top helps make the bond more secure.

I filled in both banks of the river up to the mill dam with additional layers and scraps of foam that I cut to fit – essentially creating a long U-shaped riverbed. The 3" riverbed widens to 7" at the fascia. I also installed plywood foundations for the buildings around the dam.

The mills and track in that area are 2" above the dam. Below the bridge, I was able to work a further 3" drop into the riverbed between the plywood edge and the end fascia. I also had to trim another inch out of the fascia to lower the water level so it matched the revised, deeper shape of the riverbed.

Mill pond behind dam

Portal inset into stacked foam

Steps in gorge
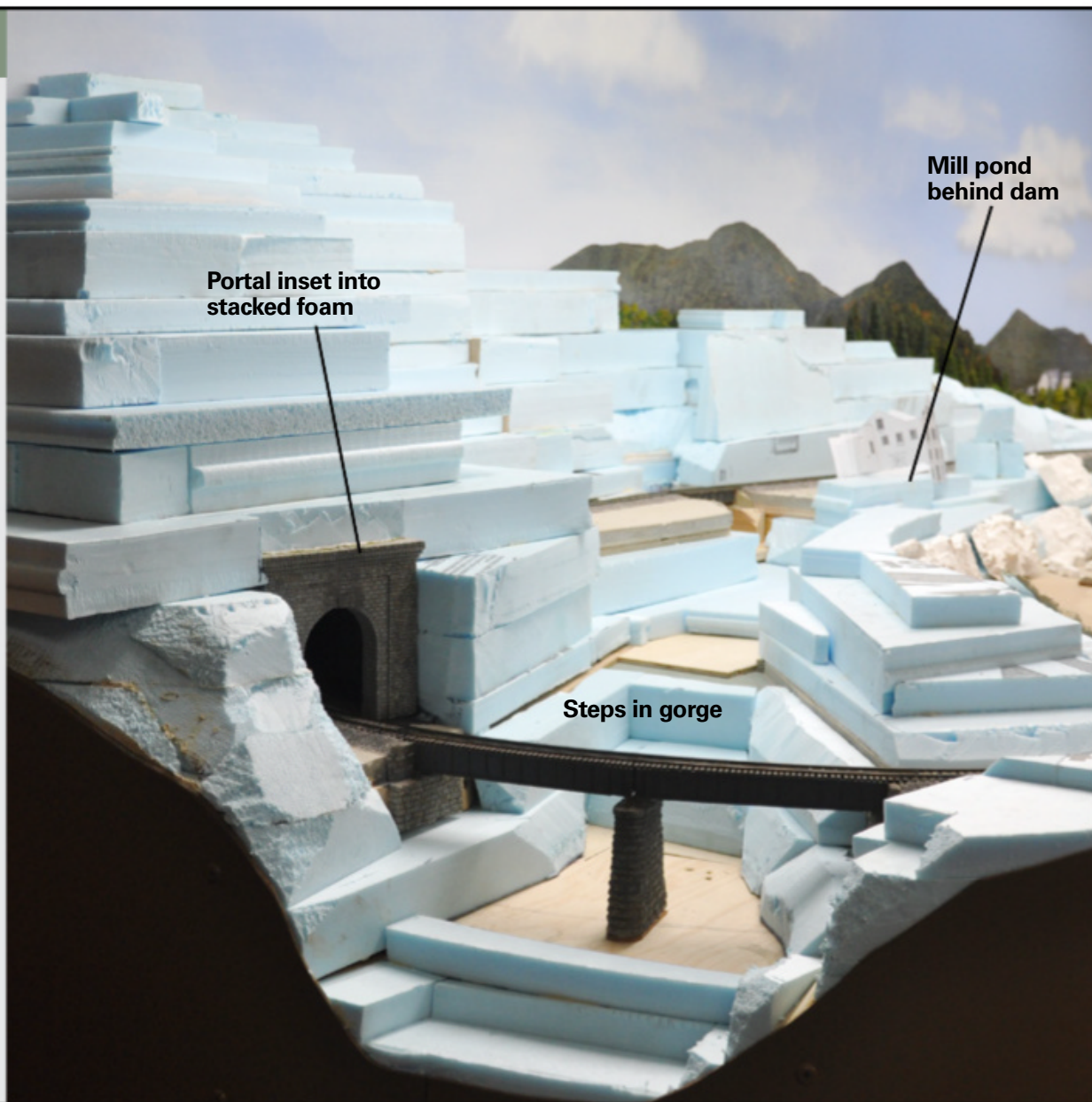
STEP 4 ROCK DETAILS

I carved the mountainsides and blended in all of the stacked foam corners and edges using a variety of cutting tools, a wood rasp, and coarse sandpaper. At the same time, I began making dozens of castings using Hydrocal in rock molds.

Once I'd made a good supply of castings, I stained them all with New Hampshire granite colors I mixed from Woodland Scenics liquid pigments including Stone Gray, Slate Gray, and Concrete. After they dried, I laid all the castings out in trays so it would be easier to see their details.

I started placing the castings along the mountainside (top) above the future mill locations. Whenever my rock combinations looked right, I secured them with more Liquid Nails. Next, I added more rock castings along the riverbanks (bottom), notching the banks and trimming the castings as necessary on a bandsaw. Once the adhesive had set overnight, I applied Sculptamold to blend the rock castings into the foam surfaces.

Hydrocal rock castings glued on mountainside

Rock castings blended in with Sculptamold

Future water course

Mill mock-up

Town

Finished mill

Rapids
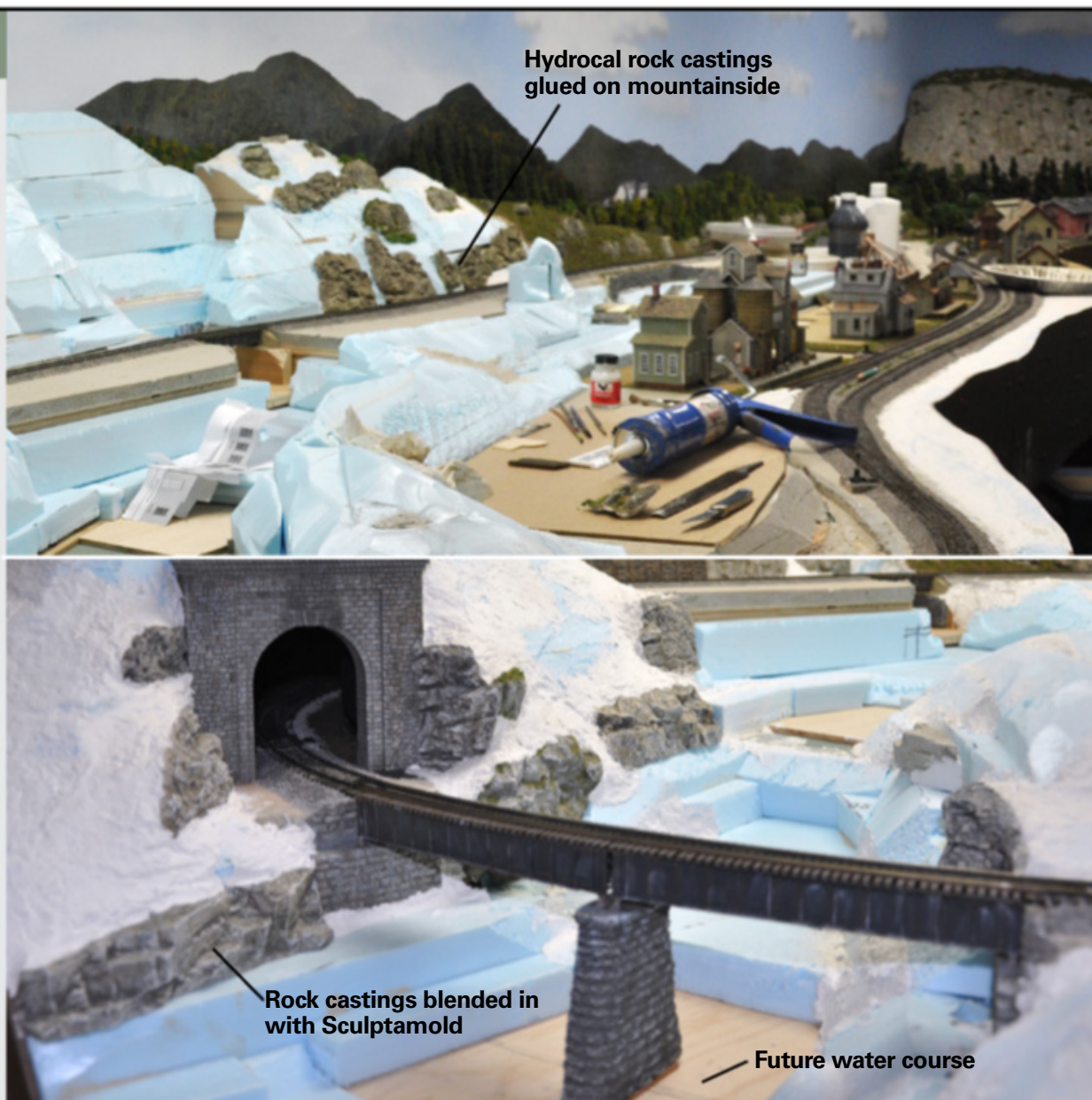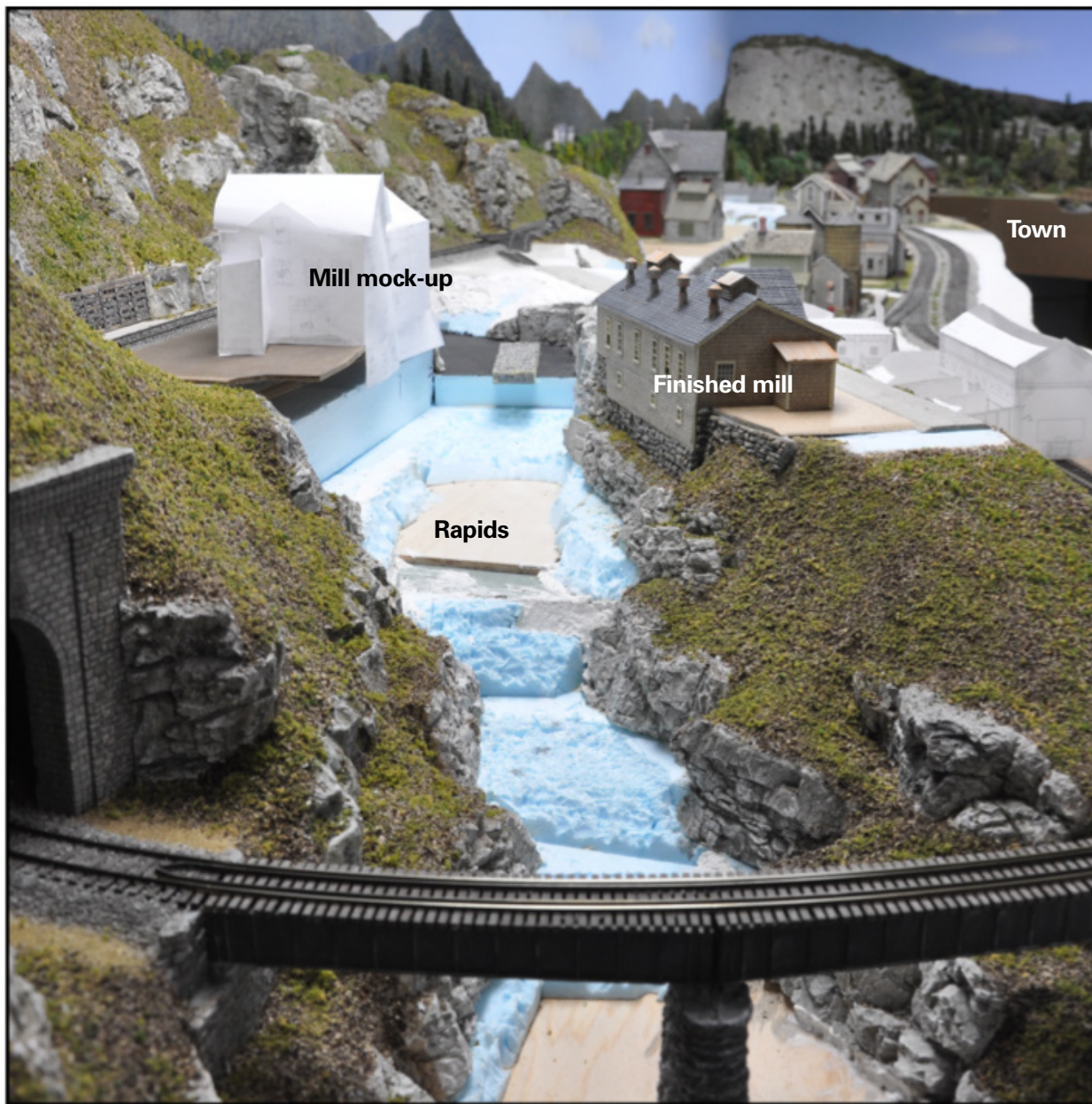
STEP 5 ROCKY BANKS

I narrowed the riverbed to create a steeper watercourse as I worked upstream toward the mill dam with the rock castings. I also angled the faces of the individual rock castings slighty toward the aisle along both banks when looking upstream. Next I made rough cardboard mock-ups of my future structures to help visualize the finished scene.

Then I took a break from the rock installation work to build and finish some of the other details, like the stone retaining walls and the mill dam. I scratchbuilt the large wooden mill buildings for both river banks. By then, the adhesive had set and the rock castings were secure, so I moved on to filling in any gaps with Sculptamold and applying the finished scenic texturing to everything adjacent to the ravine.

In preparation for the next step, I carefully checked the entire watercourse to make sure any open gaps between the stacked foam blocks were sealed.

First riverbed pour

Second riverbed pour

Third riverbed pour
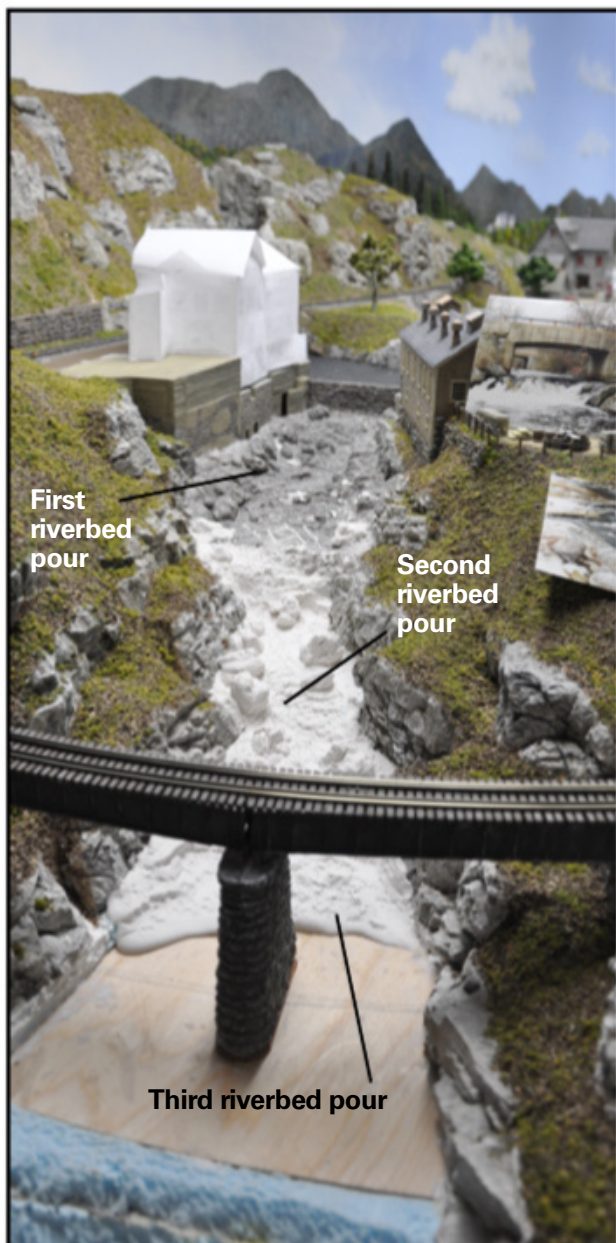
STEP 6 CREATING THE RIVERBED

Mixing and pouring a plaster riverbed that "flows" down and around the rocks was my next step. Regular plaster will work, but I chose Hydrocal for a harder surface. My riverbed is 40" long and required far more Hydrocal than I could work in a single batch. Therefore, I divided my finishing pours into 12" segments.

I let each pour set for 20 to 30 minutes before I began carving rock details with a ¼" chisel. The idea was to carve the riverbed into rocks that looked like they came off the mountainside. In the process, I tried to create channels for the water to flow and places where it could pool.

As I carved the details, I removed the chips with a ½" paintbrush and a shop vacuum. I sprayed the area with a diluted India ink wash to bring out the details. If I wasn't happy, I went back and carved more. When I was done the ravine had five flat areas and five cascades (waterfalls) using the tiers that were built in during construction.

STEP 7 REAL DETAILS

As a finishing touch I gathered small stones, ¼" to ¾" in diameter, from my gravel driveway to simulate more of the loose debris that comes off the mountainsides. I stained all of these natural stones with diluted Polly Scale Concrete paint to give them more of a granite color. Then I placed them in the riverbed and secured them with white glue. When the painted gravel was mixed in with my carved plaster rocks, I found it hard to tell them apart.

Next, I sifted some finer gravel from the driveway into the riverbed and secured it all with diluted white glue. As it dries, the white glue turns clear and disappears.

The spring thaw brings high water to the ravines that carries all sorts of dead branches and small brush that washes off the steeper slopes. I simulated this debris with broken bits of dry twigs gathered from my shrubs. I glued these into places where the branches would get caught between the rocks.

Mixed natural and plaster rocks in riverbed

Twigs simulate debris

STEP 8 ADDING WATER

I simulated water with Enviro-Tex acrylic finish, making three separate pours above the dam and let them set for three days. Starting at the top, I poured "water" below the dam and worked it into the outflow areas with a clean disposable paintbrush.

As I poured the Enviro-Tex I could see how far it flowed downhill until it was stopped by the rock formations and rose in the riverbed. I brushed the material evenly around the other rocks and into the side channels within each area. Next, I poured the middle section down by the bridge and similarly used a fresh disposable brush to work the Enviro-Tex in and around these details.

Before my last pour, I made a dam using clear plastic tape along the fascia to prevent an overflow. Then I poured the lower end of the stream with enough Enviro-Tex to just reach the tape. Once it hardened overnight, I went back and embellished areas with simulated falling water and filled in any empty pools. **MR**

Finished mill buildings

Enviro-Tex "water"
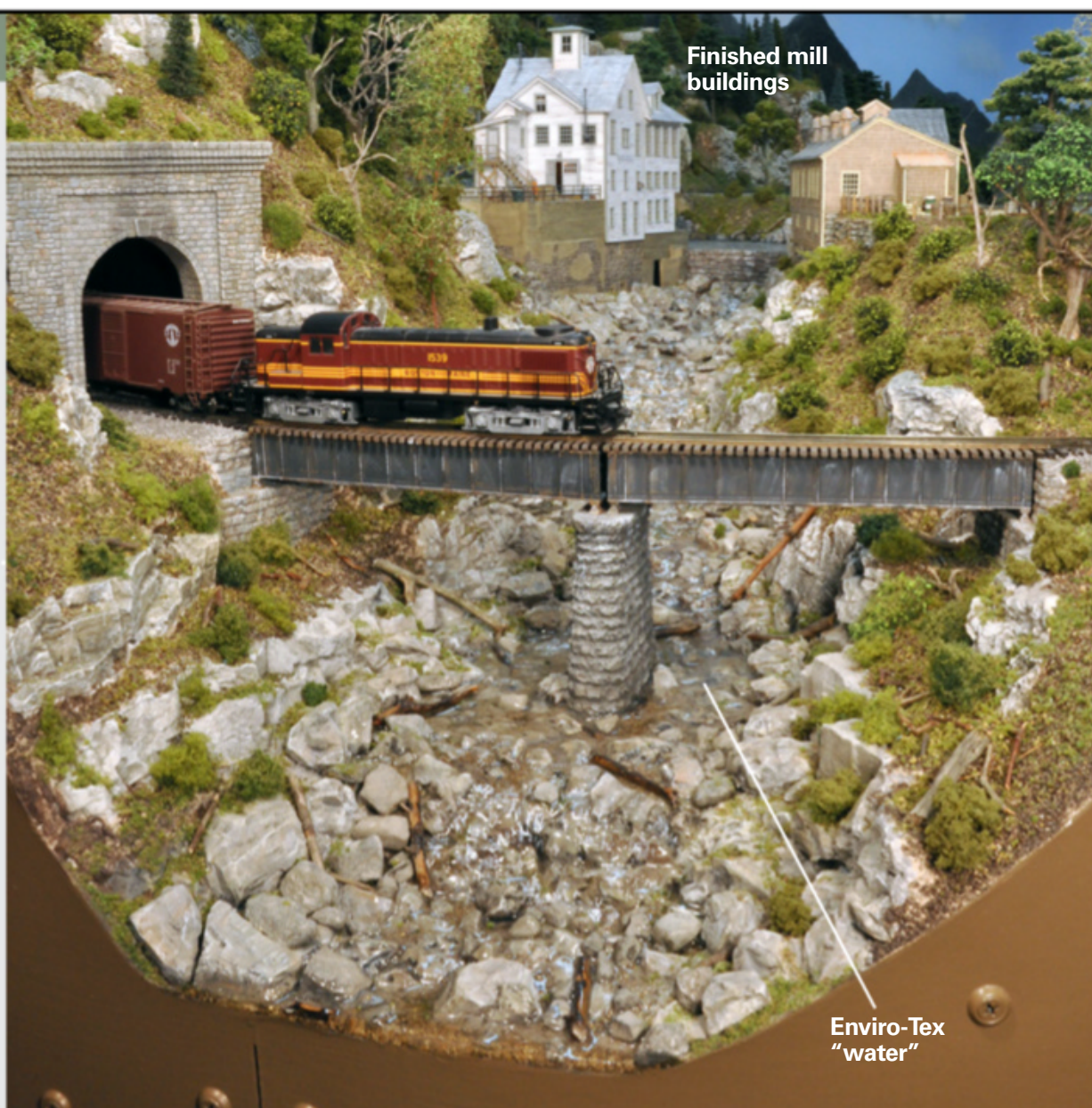
Build an animated grade crossing

The gates are down and the lights are flashing as a freight train rolls through the grade crossing near Daneville on Pelle Søeborg's HO scale model railroad. Photos by the author

Automatic lights and gates add realism to a modern railroad scene

By Pelle K. Søeborg • Photos by the author

Grade crossing safety is a high priority for railroads throughout the country. Though rural crossings may be protected with a simple x-shaped crossbuck mounted on a post, most crossings on heavily traveled roads have automatic lights and gates. I used the latter approach for a crossing on the outskirts of Daneville on my HO scale Union Pacific layout.

I used products from a variety of manufacturers for this project. The cantilever crossing signals are from Wm. K. Walthers Inc., the gates from N.J. International, and the operating hardware consists of a Tortoise switch motor by Circuitron and a Logic Rail Technologies Grade Crossing Pro circuit (www.logicrailtech.com/gcp.htm).

Though grade crossings add to the scenic realism of a model railroad, they can also enhance operations. You'll want to run at realistic speeds so your train doesn't get to the crossing before the gates are down. If your locomotives have sound, make sure the engineer blows the proper whistle or air horn signal (long, long, short, long) for the crossing. Also make sure your train crews don't block crossings for extended periods of time. Many communities have ordinances that limit the amount of time a train can block a crossing.

If you model the modern era, this grade crossing will be right at home on your model railroad. These techniques can be adapted to other scales, eras, and other brands of grade crossing equipment.

Step 1 Crossing gates

Red lenses • Brass bar • Piano wire • Brass tube
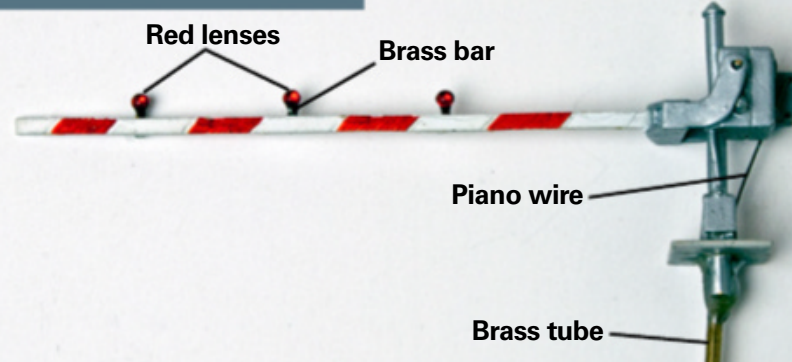
The N.J. International crossing gates I started with are non operational. However, with a little bit of work, I was able to make them functional.

First, I drilled a hole in the counterweight and another through the base for a length of piano wire. I then soldered a piece of brass tube to the underside of the gate's base. The brass tube serves as a guide for the wire. I slid the wire through the brass tube and connected one end to the counterweight by bending the end of the wire at a 90 degree angle.

I didn't like the cast warning lights on the N.J. International crossing gates, so I snapped them off and made new ones from small pieces of flat brass bar and red lenses from M.V. Products.

Step 2 Activating the gates

Pin from switch motor

Cut notch in square carbon fiber tubes

Gray styrene screwed to base

Mounting ears removed

.19" x .19" square carbon fiber tube
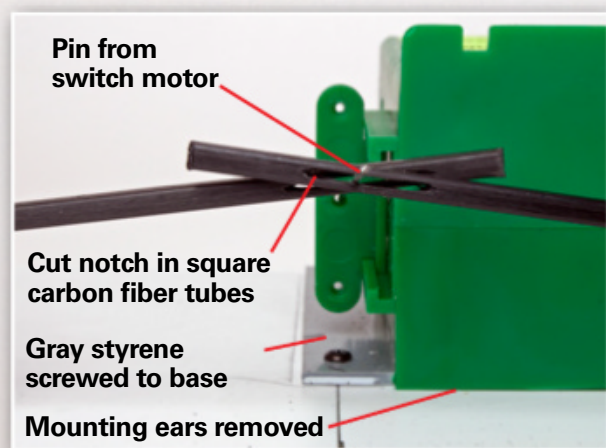
Switch motor glued to gray styrene

.125" x .156" styrene strip spacer

Screw

1¼"

1¼"

.080" styrene sheet

5⅜"
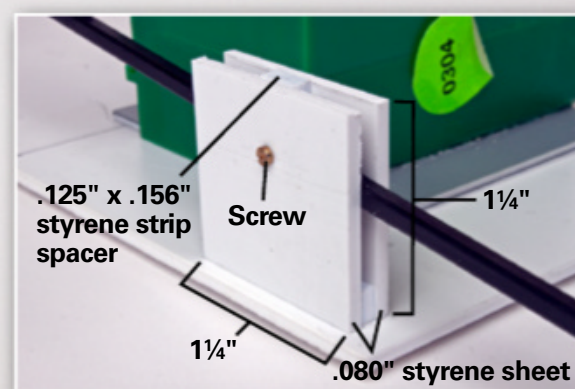
I used a Tortoise by Circuitron switch motor to operate the gates. I made the motion arms from square carbon fiber tubes (brass or styrene would also work), cutting notches in each one for the switch motor pin. The pin should move smoothly in both arms.

Next, I made support brackets from .080" styrene sheet. To ensure the arms would move freely, I placed styrene strip spacers between the sides of the bracket. Then I attached the motion arms to the brackets with small screws.

Step 3 Photocells

Cantilever crossing signals, Wm. K. Walthers Inc.

Gate, N.J. International

Photocell

The grade crossing is triggered by photocells placed in the middle of the track between the ties. If you operate your layout in low-light situations, Logic Rail Technologies also offers the Grade Crossing Pro system with infrared sensors.

The grade-crossing controller is assembled on a printed-circuit board, and each photocell has a sensitivity adjustment. Once adjusted for ambient room light, the Grade Crossing Pro's built-in logic produces the proper bidirectional crossing protection.

I mounted the gate mechanism under the grade crossing. Then I attached the wires from the counterweight to the motion arms. Here you can see the gates lowering for an oncoming train.

Step 4 Crossing panels

Cut panels in half

No. 11 blade

Attach panels to self-adhesive paper

Custom-mixed gray
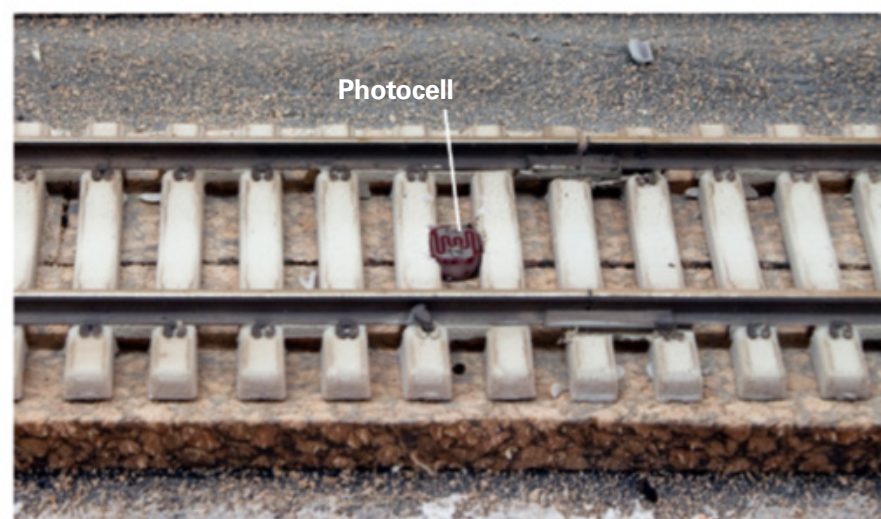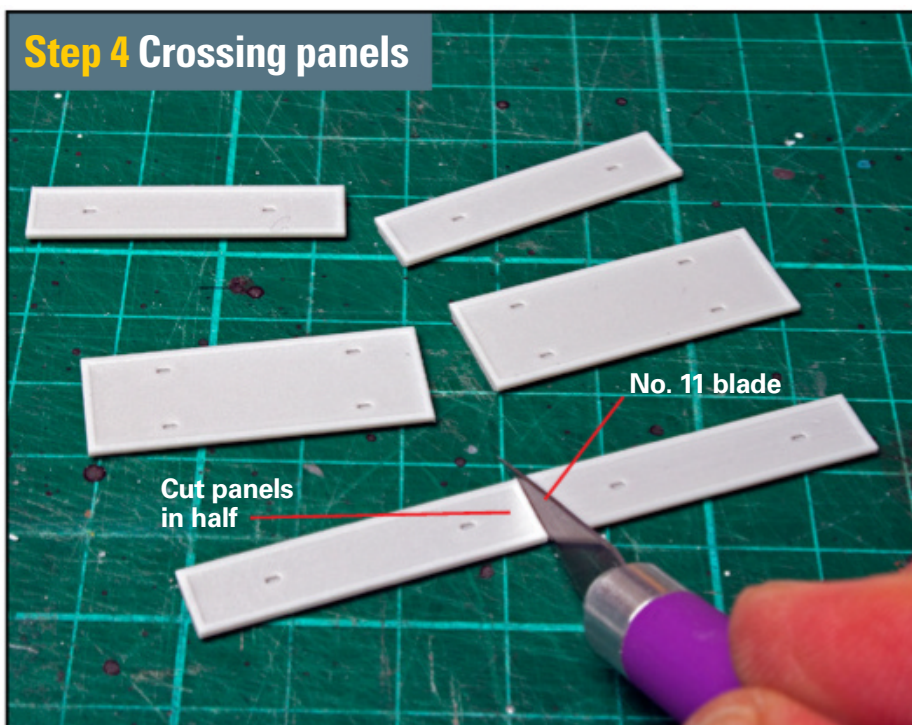
Since I model the modern era, I used BLMA's concrete panels for the grade crossing. The panels are molded in pairs, but I separated them into individual pieces with a no. 11 blade.

The grade crossing panels are molded in light gray plastic to look like concrete, but they look better once they're painted and weathered. Since the panels are small and hard to handle individually, I attached a piece of self-adhesive paper to cardboard with 3M Spray Mount. Then I removed the protective film and placed the panels on the self-adhesive paper.

As seen in the upper right photo, I used an airbrush to paint the panels a concrete color that I mixed using equal amounts of Model Master Flat Gull Gray, Sand, and Flat White.

When the paint dried, I brush-painted the frame of each panel. I first masked the two long sides and painted the frame a dark brown color. Then I repeated this process for the short sides. On new crossings, the frame has an orange color due to the protective coating. To make the panels look like they've been in place for a while, I weathered them with a dark gray wash.

Paint panel edges dark brown

Apply dark gray wash with paintbrush

Step 5 Installing the panels

Clean ballast granules off tie tops
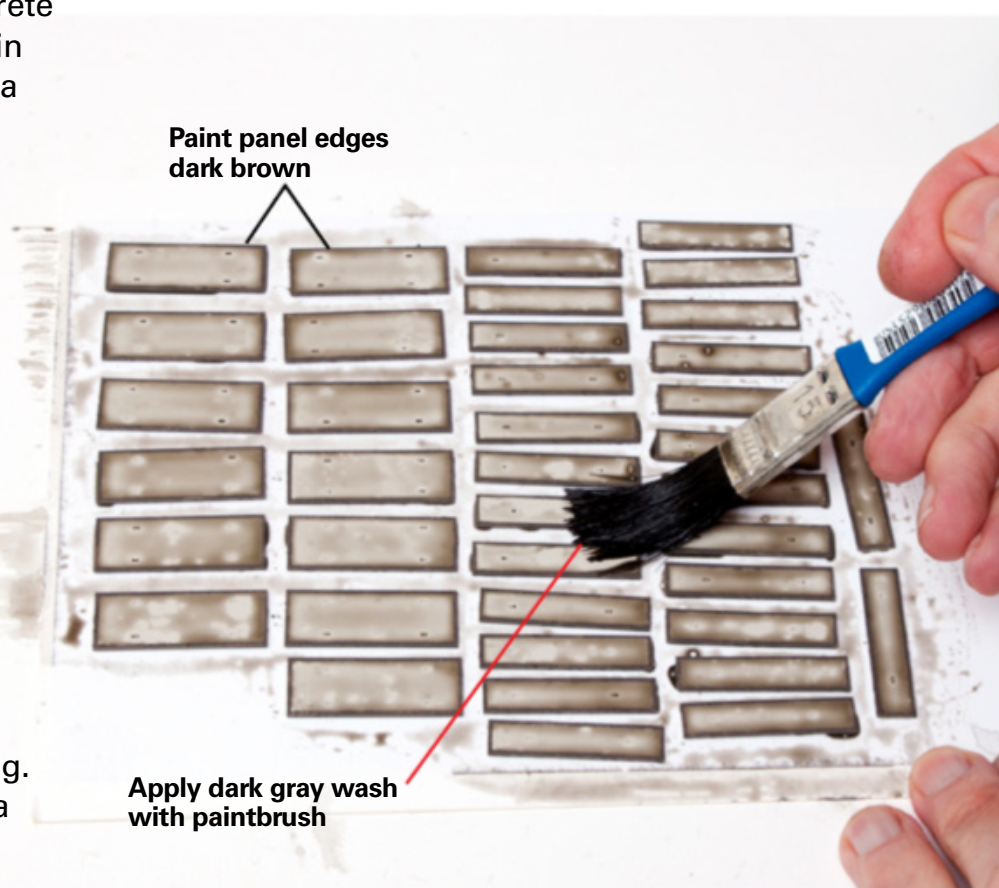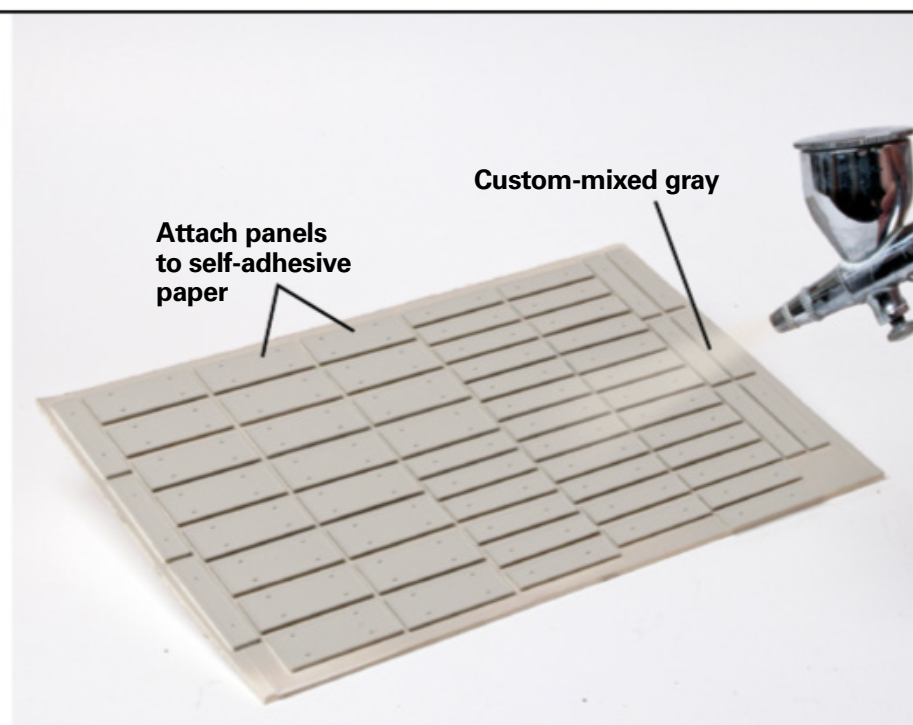
Brown and black powdered pastels
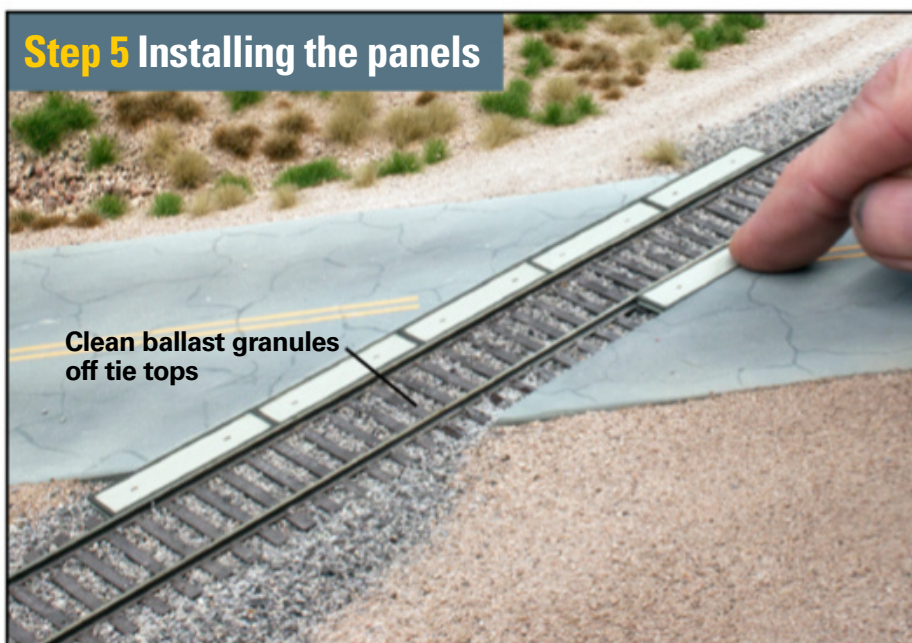
Before installing the panels, I cleaned any ballast granules from the tie tops. Then I secured the panels to the ties with full-strength white glue. Cyanoacrylate adhesive can also be used to secure the panels to the ties.
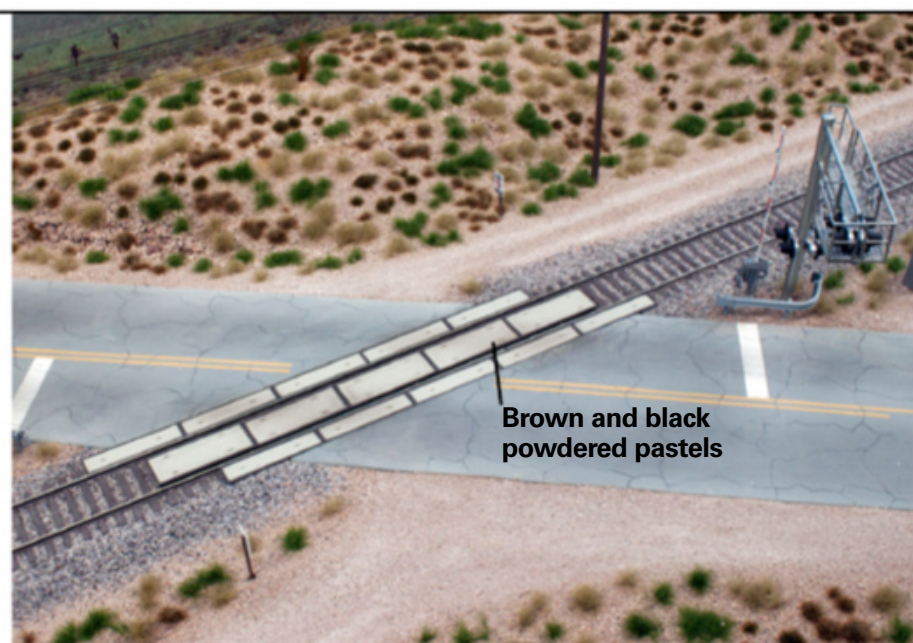
Once they were installed, I weathered the crossing panels with brown and black powdered pastels to match the weathering that I'd already applied to the road. After I gave the rails one last cleaning, the crossing was ready for rail and vehicle traffic. **MR**
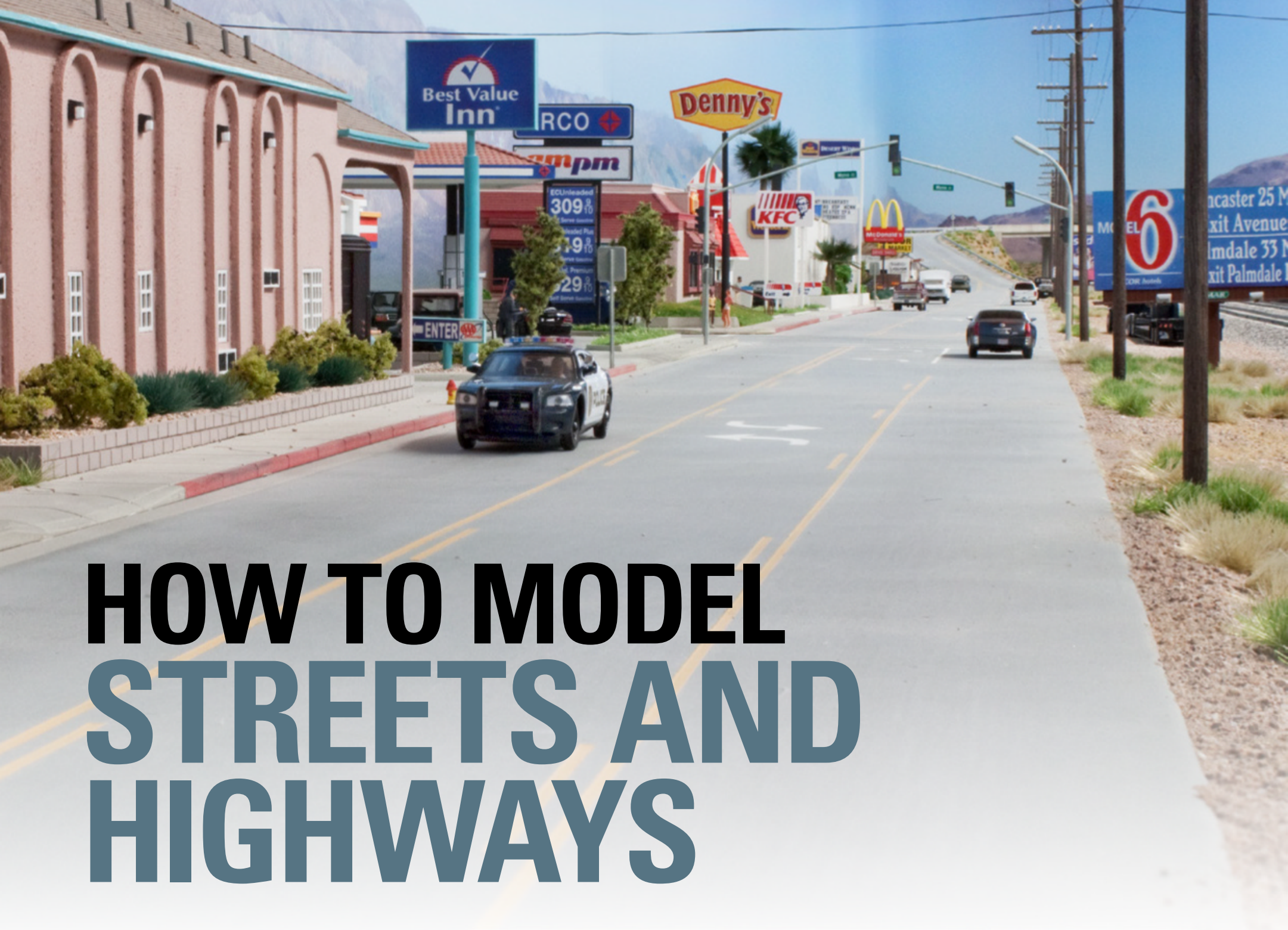
HOW TO MODEL STREETS AND HIGHWAYS

Add realism to your layout by giving the vehicles on it some accurate roads

By Pelle K. Søeborg
Photos by the author

Streets and highways can be an important part of a model railroad. In this article, Pelle Søeborg shares his techniques for modeling them.

In my opinion, streets and highways are the second most important things on a model railroad layout after track. When modeled properly, roads can be used to add realism, create viewing lines, and divide scenes.

My old HO scale Union Pacific Daneville Subdivision was covered with roads. The widest road was Main Street in Daneville. The three-lane street was nearly 14 feet long. Some people couldn't understand why I devoted that much space to a street instead of adding more track. The explanation is simple. The restaurants and hotels lining the

street are important scenic cues that give Daneville the look of a city in the American West.

Then there are highways. One goes over the track and creates a great scene divider. Highway 41 parallels the main line for more than 22 feet before crossing the track and fading into the distance. I also modeled service roads that parallel almost every inch of mainline track.

I prefer to finish my streets and highways completely before I apply any scenery materials. Then I don't have to worry about getting the scenery dirty with sanding dust or spilled paint.

I have a passion for streets and highways. Whether they're paved, dirt, or simple trails, I've followed roads on all my railfanning adventures. I can't imagine a model railroad without roads.

STEP 1 A SOLID BASE

¼" medium density fiberboard

Secure with glue and wood screws

Attach roadbed to these risers first

Secure base of ramp with screws
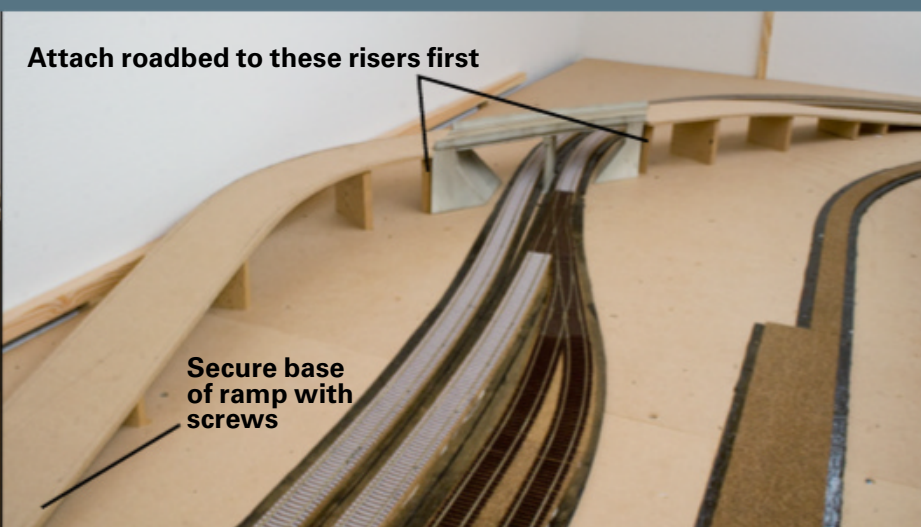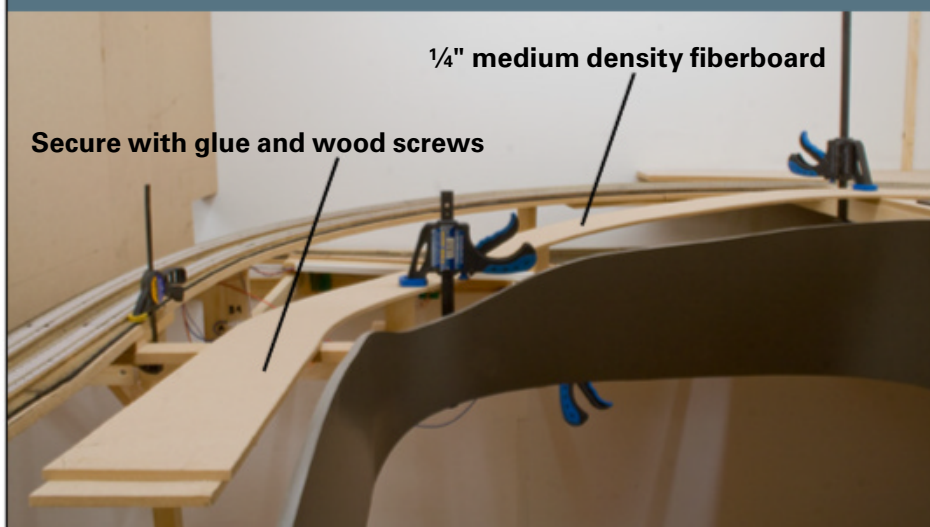
To get an idea of how the highway would look, I cut pieces of cardboard and taped them together. Once I was happy with the look of the road, I used the cardboard as a template for the ¼" medium-density fiberboard (MDF) subroadbed. I attached the subroadbed with wood glue and screws. It's a good idea to wear a respirator and work in a well-ventilated area when cutting MDF. It generates a lot of dust when cut.

I had to raise the subroadbed to the height of the overpass at the west end of Daneville (see the December 2011 *Model Railroader* to learn more). I made the risers from scrap pieces of MDF. First, I attached the subroadbed to the riser closest to the bridge. After the glue dried, I applied glue to the rest of the risers and pressed the subroadbed down. I fastened the opposite end of the ramp to the layout with screws.

Foam insulation board

Ramp

Riser

MDF

Roadbed for track

Road surface must be level with rails

Cut in road surface where it meets track roadbed
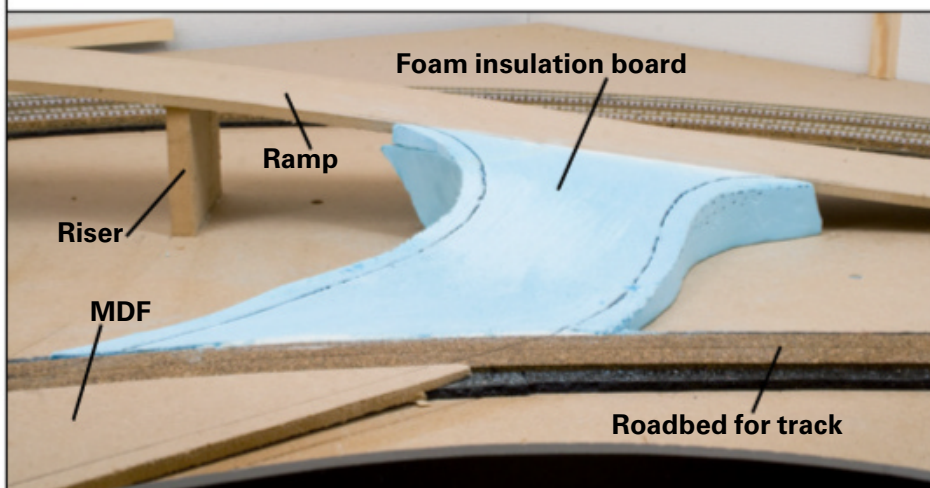
Though I used MDF for most of the project, I used a piece of extruded-foam insulation board for the ramp at the highway 41 junction. It was easier to cut and shape the foam than laminate and taper pieces of MDF. After cutting the foam with a serrated knife, I marked the outside edges of the road with a marker. These marks served as my guide for applying the Paving Tape, shown in **Step 2**.

I use cork roadbed under my secondary tracks. This material is thinner than the roadbed I use on my main line, so I had to trim the MDF at the grade crossings to keep the road surface level with the rails. I made fillet-like cuts in the MDF with a sharp no. 11 blade, though a retractable utility knife would also work. Making several light passes reduces the chances of the blade slipping.

STEP 2 PAVING THE WAY

Paving Tape

Highway is 24- to 26-scale feet wide

Paving Tape

.040" styrene strip
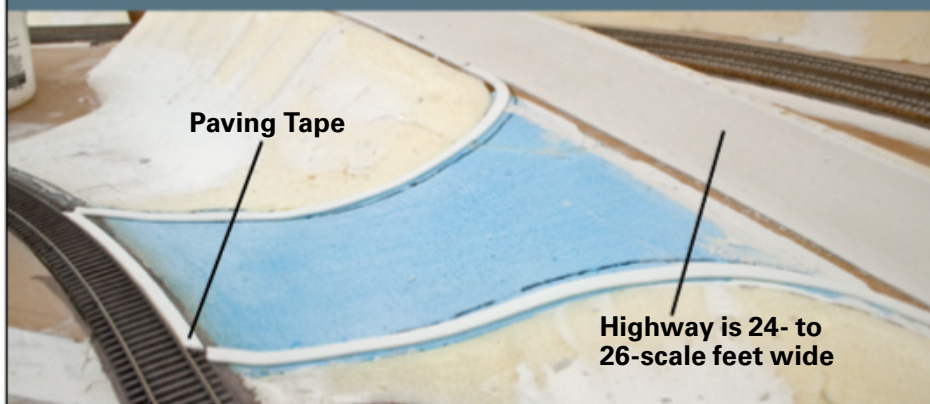
I used Woodland Scenics Paving Tape for the streets and highways. I first applied the tape to the outside edges of the area I wanted to fill with the same firm's Smooth-It. I made the highways 24 to 26 scale feet wide, which is close to prototypical width. Though the highways eat up space, they look better than roads that are too narrow.

I used a slightly different approach on the streets. On the side closest to the backdrop, where the businesses are located, I used latex construction adhesive to attach strips of .040" styrene strip. I'll attach the sidewalks to the styrene strips when I install the businesses. I used the paving tape on the opposite side of the street.
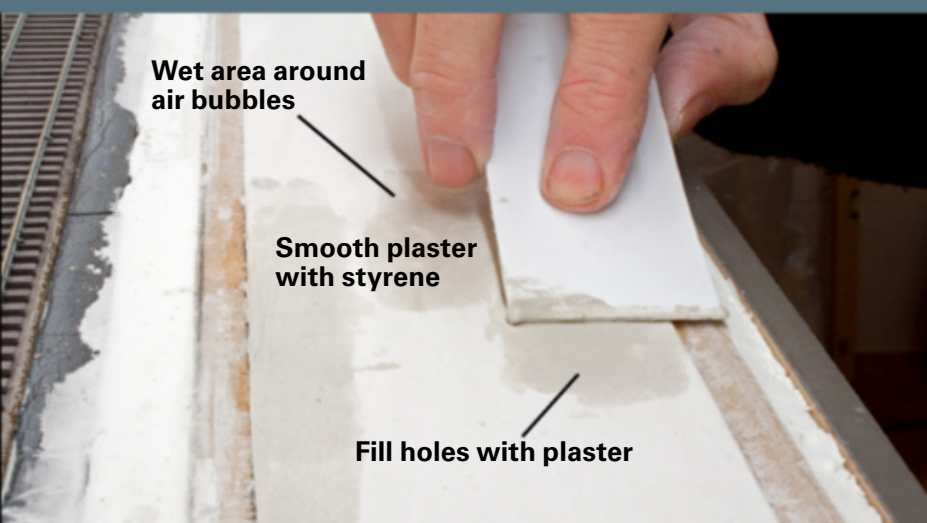
STEP 2 PAVING THE WAY (CONT'D)

Stir Smooth-It until lumps are removed

Stick makes it easy to guide plaster when pouring

Paving Tape

Wet Smooth-It

.080" styrene screed
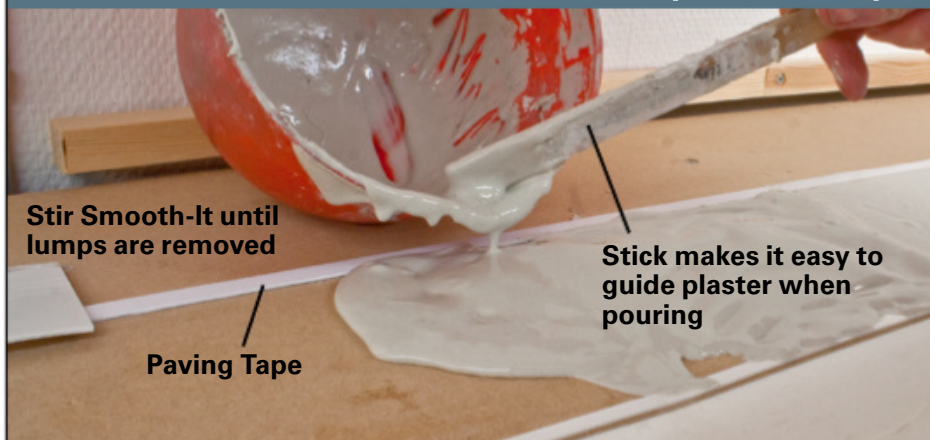
With the styrene strip and Paving Tape in place, I mixed a batch of Smooth-It in a bowl. I stirred the plaster material carefully until it was free of lumps. Don't stir the Smooth-It too vigorously, though, as this will create air bubbles, which will be nearly impossible to remove.

I then used a scrap piece of .080" styrene as a screed to level the wet plaster. After I'd spread the first layer evenly and let it set up, I poured a second, thinner layer of Smooth-It. I used a putty knife to clean up any excess material before it dried.

STEP 3 SMOOTHING AND PATCHING

Hand-held sander

Keep sander moving

Wet area around air bubbles

Smooth plaster with styrene

Fill holes with plaster

I let the plaster dry completely (about two days) before I removed the Paving Tape. Then I used an electric sander to smooth the surface. I learned that you have to keep the sander moving constantly to avoid damaging the plaster. If you're not comfortable using an oscillating sander, a sanding block with 400-grit sandpaper will also work. No matter which sander you choose, don't use coarse sandpaper, as it will leave gouges in the Smooth-It.

Sometimes sanding reveals small holes caused by air bubbles (remember the part about not stirring too vigorously?) To repair these holes, I first wet the area. This prevents the dry plaster from soaking the moisture out of the fresh, wet material. Then I filled the holes with a little plaster and smoothed the repairs with a piece of styrene. After the plaster dried, I lightly sanded the patches to blend them in.

Hobby knife

Steel rule

Make cut with back of blade

Groove

I trimmed the roads at the grade crossings to make sure the BLMA modern grade crossing panels would fit. This is best done before painting the plaster. First, I used a pencil to mark the width of the panels. Then I used a sharp hobby knife to cut the plaster, using a steel rule to get a straight line. I checked the spacing with one of the panels, and trimmed off more plaster if the fit was too tight.

On the streets, I used the back edge of a hobby knife to cut a shallow groove ⅛" from the edge where the sidewalks will be. The groove simulates a concrete curb.

A steel straightedge works great for cutting grooves parallel to the future sidewalk. You'll want to use a circle template or a food container lid as a guide for the curved sections of curb.

Apply enamel paint with brush

Apply paint parallel to road

Mask curbs

Custom-mixed concrete color
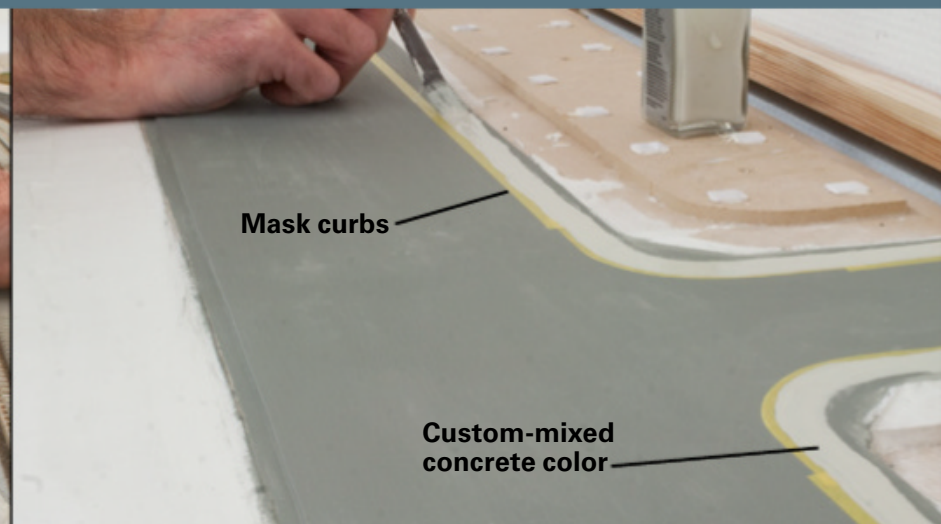
You can paint the Smooth-It with acrylics or enamel paints, but I find the latter soak into the surface better and dry flatter. I painted the highway and streets a warm gray color made by mixing equal parts Humbrol Gull Gray and Radome Tan. For new pavement, I applied at least three coats. Older pavement received two, and very old roads

got a single coat. In many cases a less uniform finish looks more realistic.

For the streets, I masked the outside edge of the curbs and brush-painted these areas with a concrete color that I mixed from equal parts Model Master Flat Gull Gray, Sand, and Flat White.

Crosswalks

Stop line

Masking tape

Cardboard template

Plate glass
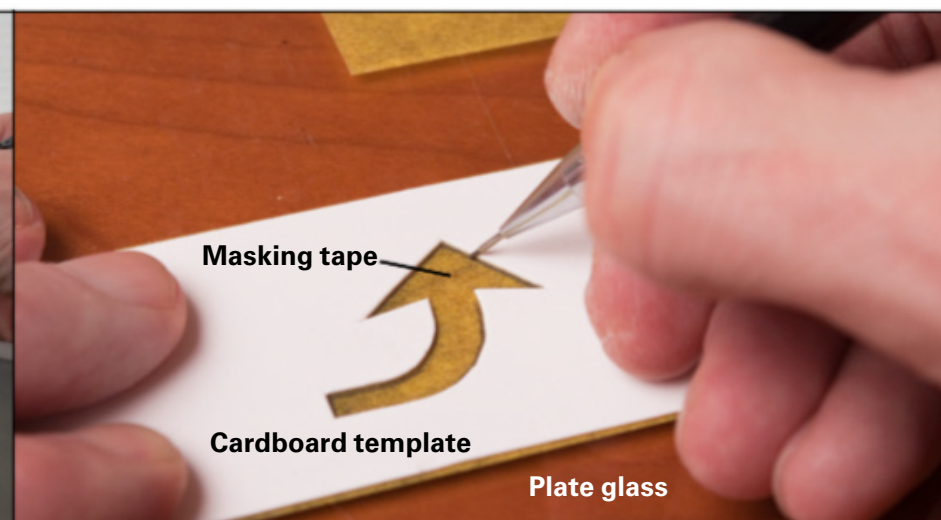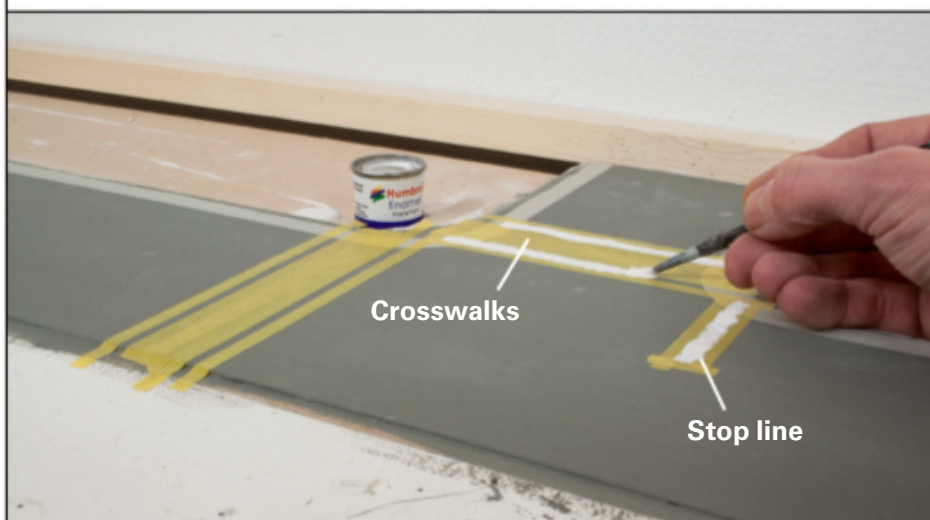
I let the paint dry thoroughly (24 hours, or until there was no discernible odor) before applying the road markings. For the streets, I started by adding the white stop lines and pedestrian crossings. I masked these areas and burnished the edges of the tape with my fingernails to prevent paint from bleeding under it. You can find the dimensions for pavement markings in the *Manual on Uniform Traffic Control Devices* (mutcd.fhwa.dot.gov).

To ensure all of the turn arrows were identical, I made a template from a piece of cardboard. I traced the outline of the arrow on a piece of masking tape, as shown in the photo at right.

Then I cut the masking tape with a sharp no. 11 blade, carefully following the outline. It's best to do the cutting on a hard surface, like a piece of plate glass, so the knife blade doesn't tear the masking tape.

Paint turn arrows white

Paint stripes yellow

Make cutting template for "X" and Rs
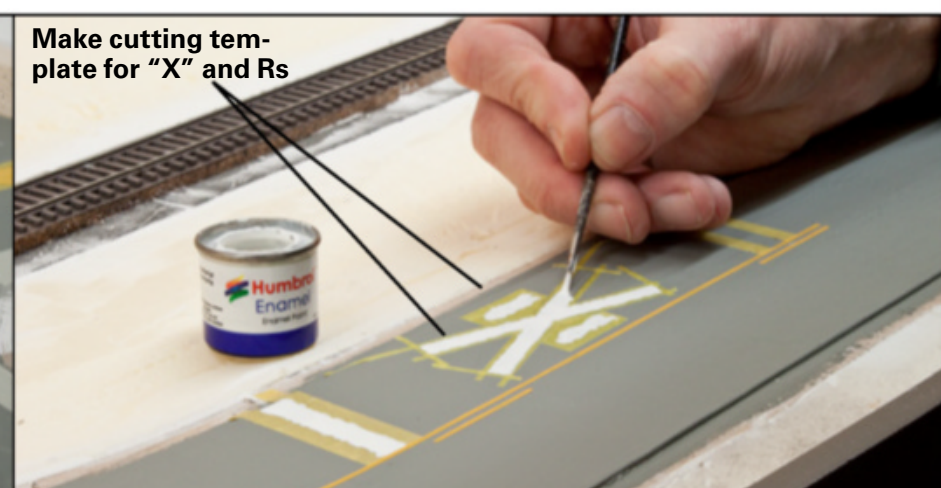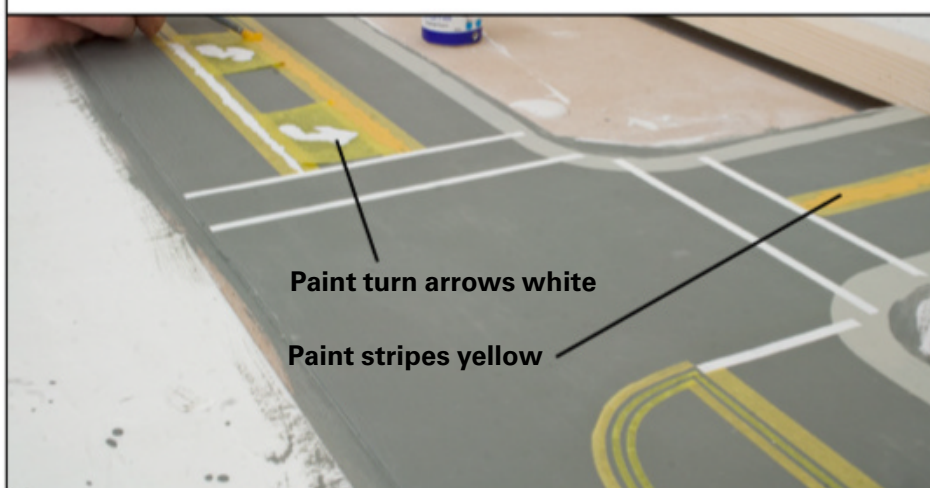
After I applied the masks for the turn arrows and the rest of the road stripes, I brush-painted the markings with Humbrol paint. I painted the arrows white and the stripes yellow or white, following information in the *Manual on Uniform Traffic Control Devices*. As with the road color, you can make the stripes look old or new depending on how many coats of paint you apply.

I also used templates to cut masks for the railroad crossing markings. I marked the "X" on the pavement with a pencil and masked along the outside edges. I cut the two Rs on the plate glass I used for the turn arrows.

I later learned that Summit Customcuts released decals for highway markings. You can learn more about the decals at summit-customcuts.com.

STEP 4 PAINTING AND ROAD MARKINGS (CONT'D)

White stripe at road's edge

Double-yellow for no passing zones

Pull tape back and away from stripes
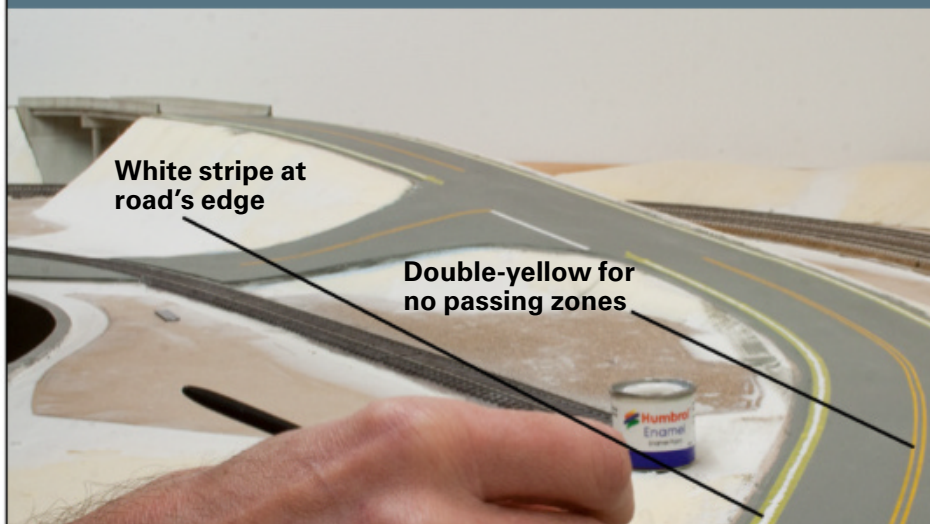
The highway striping isn't as complex. I started by masking the double yellow center line and painting it with one coat of Humbrol Yellow. Then I masked the stripe along the edge and painted it with one coat of white. Neither color covered evenly, but it looked realistic to me.

Be careful when removing the masking tape so it doesn't lift the gray paint. I found it works best to slowly pull the tape back and away. You can minimize the likelihood of exposing the white plaster by tinting the Smooth-It with gray acrylic paint.

STEP 5 WEATHERING AND DETAILS

Sponge

Black powdered pastels down center of each lane

Airbrush

Sand

The last step was to weather the streets and roads and add details like guard rails and highway signs. I started by using a cosmetic applicator sponge to apply black powdered pastels down the center of each lane. Don't apply too much powder, though. I wiped the sponge on a sheet of paper after I dipped it in the pastels. It isn't necessary to seal the pastels, as the powder sticks well to the porous road surface.

Next, I used an airbrush to apply a light coat of Model Master Sand to the edges of the highway. Make sure the room is ventilated and your wear proper safety equipment during this step.

The Sand color helps blend the shoulders of the road with the surrounding desert scenery. If you don't model the desert southwest, replace Sand with a color more appropriate to the area you're modeling.

Thinned dark gray

Paintbrush

Patched cracks

Rix guardrails
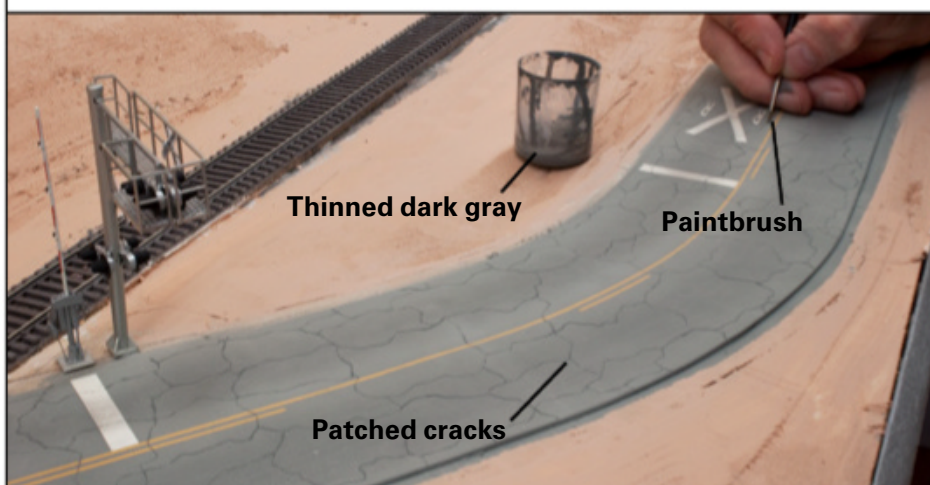
I later got inspired by a photo I took along old Route 66 that showed a web of patched cracks in the road. To simulate this, I used a fine brush (the size doesn't matter – just pick one that looks suitable for the job) to apply dark gray paint that I thinned 50 percent with thinner. This effect looks best on older, secondary roads. Newer roads would have fewer patched cracks.
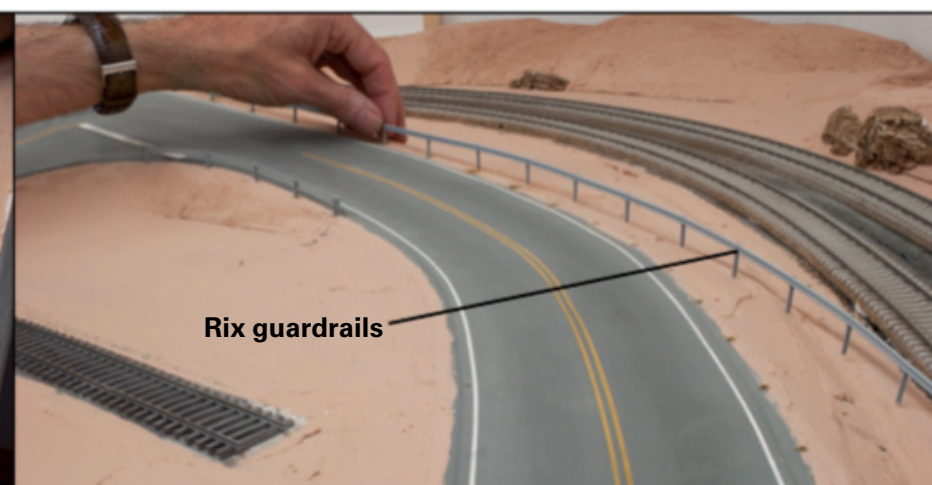
On sharp curves, I installed Rix Products highway guardrails. After assembling the plastic kit, I painted the rails Model Master Light Ghost Gray, followed by a dusting of the same firm's Cam Gray. The latter is a lighter gray that gives the guardrails a weathered look.

I installed the guardrails before adding the scenery, as it's easier to drill holes on an unscenicked surface. **MR**