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SPECIAL 2020

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Tour Seth Puffer's jaw-dropping HO scale layout p.42

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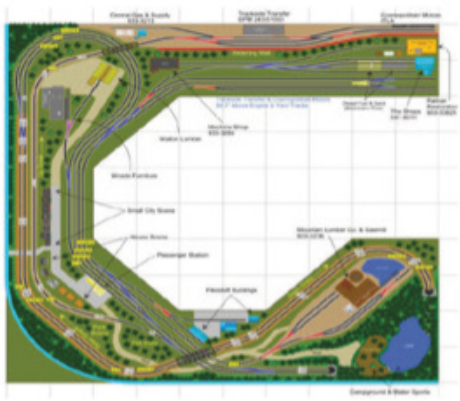

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THE ULTIMATE GUIDE 2020

Features

Departments

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Nearly finished
Jaw-dropping detail on Seth Puffer's HO layout

On the cover
Gerry Leone caught this shot, lens flare and all, of a train working the town of Newton on Seth Puffer's HO layout.

Even more Ultimate!

It's hard to believe the MRVP team is already bringing you the third installment of *Model Railroading: The Ultimate Guide,* but that is indeed the magazine you're holding in your hands! We hope our 2020 edition, with its exciting collection of free videos on MRVideoPlus.com, will inspire you to improve your modeling and maybe even try a few new things.

What can possibly be new in the hobby? Plenty! Here are just a few examples you'll find in this issue:

- Kathy Millatt shares a wealth of tips on one of the lesser-modeled seasons, winter. She's experimented with a host of products and gives you some of her favorites.
- Seth Puffer has added a new section to his highly-detailed HO scale layout, and we share it with you here with some great photos and video.
- Ben Lake offers an easy way to add a small computer to your layout so you and your friends can run trains with your smartphones.

If that's not enough, Aaron, Cody, Gerry, and the rest provide a host of great modeling tips and techniques using a variety of cool products for weathering, scenery, track laying, model building, and more.

And don't forget, every story has at least one free video at MRVideoPlus.com/TUG20, so you can read, watch, and learn all sorts of great modeling techniques from our cast of experts. I know I learned a lot just pulling this new issue together, and I think you will, too!

– *David Popp*

Cast selfies

David Popp
@St. Pancras Station, London 12/27/17 Just getting off the *Eurostar* from Paris
"First class train travel at 200 mph is the way to go!"

Gerry Leone
@Cape Horn, South America 01/22/17 Where the Atlantic meets the Pacific Ocean
"The land they call 'sur del mundo' – south of the world."

Kent Johnson
@Chicago Union Station 12/23/19 aboard Amtrak #30 *Capitol Limited* to Washington, D.C.
"Yet another On-board Adventure begins!"

MRVP TIP!
Take photos of your layout with your cell phone to check your work.

Ben Lake
@Cheyenne, Wyoming 5/3/19 Hanging in the UP steam shop with 4014 before its first run
"Yup, that's one big locomotive!"

CELL PHONE IMAGES BY BILL ZUBACK

Model Railroader video PLUS

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Kalmbach Media

Cody Grivno
@Mequon, Wisconsin 6/16/14 At Lakeshore Chinooks ball game with pro wrestler "Hacksaw" Jim Duggan
"This is soooo much better than the action figure!"

Aaron Skinner
@Norfolk, Virginia summer 2014 aboard CVN-71 *USS Theodore Roosevelt*
"Doing field research for work … really, I am!"

Jenny Freeland
@Negril, Jamaica 09/18 Life at the resort with new friends
"This little guy liked to follow us around all day – I feel right at home!"

Steve Sweeney
@Chicago Lunar New Year parade, 2019 Took Amtrak *Hiawatha* and CTA to get here
"Can you believe they have a panda?!"

Dana Kawala
@Zion, Illinois 10/19 With a Soviet Mi-24 Hind helicopter gunship at the Russell Military Museum
"Just like the ones in the '80s movies Rambo and Red Dawn!"

Kathy Millatt
@Train Street, Hanoi 01/13/18 Half an hour later, a train came barreling down this track – there's just enough room to press yourself into the wall.
"I'd love to model this …"

Steve Brown
@Chino Hills, California 01/20 out shopping for model railroad stuff
"My three favorite things - Cyndi, Starbucks, and Hobby Lobby!"

Seth Puffer
@My Layout, Minnesota 01/17/20 Standing next to Aurora Yard
"Travel? Nope. This is what I do for fun and relaxation."

Tony Koester
@Kehlsteinhaus, Germany 2012 overlooking the infamous Eagle's Nest with wife, Judy.
"Looked as if it were a set for Band of Brothers rather than a relic of a dark past."

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FROM TABLETO...TO TO

Careful planning makes turning an empty layout space into a small whistle-stop town easy

By Gerry Leone • Photos by the author

BUILDING A TOWN on a layout is easy, but building a realistic town on a model railroad is a lot harder. There are a ton of decisions that need to be made, and every one can affect the outcome. The key is to first decide what kind of town it's going to be.

There are dozens of choices – from sleepy rural backwater to heavy industrial city. Once you define the type of town you want, every decision after that needs to fit the image you've selected.

When I was ready to build the town of Eagle Lake, I decided that it would be an out-of-the-way whistle stop on the outskirts of a wooded area that surrounds a large lake. It's the type of place where city folks have weekend cabins in the summer, and where the majority of locals work at the nearby flour mill. With that in mind, I set about creating a town that would hold true to that vision.

Following are some of the steps I used for changing yet another empty space on the layout into a seemingly real place.

The sleepy town of Eagle Lake is awakened by a massive Mikado hauling today's through-freight to cities down the line. Eagle Lake is a detail-rich small town built inside a curve on the Gerry Leone's HO scale Bona Vista Railroad.

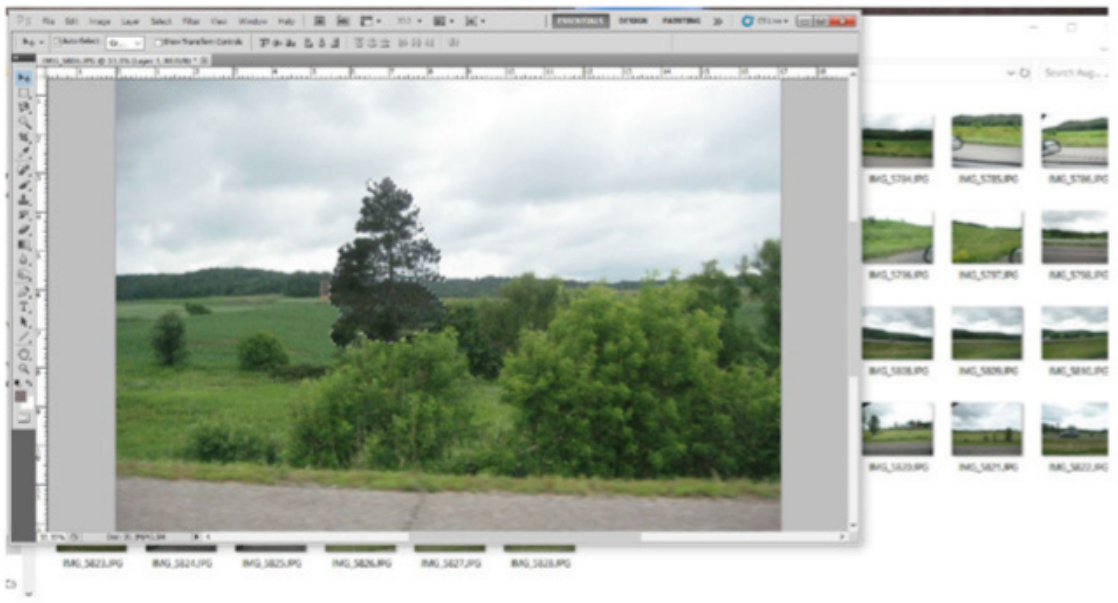
WATCH IT!

Free Video!

Gerry made a series of videos for this project. Watch an episode at MRVideoPlus.com/TUG20

>> Getting started

The job site. To start, the town of Eagle Lake would occupy a 12-inch deep slice of land inside a 180-degree turn in the tracks on the upper deck of my layout. I'd already placed a flour mill at the left edge of the town, just beyond the lake and woods. I planned to add a small river on the right side of the scene to separate Eagle Lake from the area that follows it on the layout.



Build a backdrop. I use photo backdrops extensively on my layout because they help set the scene and add realism. I design them myself from my own photos and have them printed at a local quick copy center. I made the backdrop for Eagle Lake using photo-editing software and images from my collection.

Whenever I take a trip, I take photos for my layout. As shown here, I used the software to add trees to an otherwise empty field. Once you've created a library of photos to choose from, copying and pasting elements can help you make custom backdrops perfect for your scene.

>> Mocking up the space

Test no. 1. To begin planning, I used some structures from my previous layout and randomly set them into the space, just to see if they fit the personality I'd envisioned for the town. If you don't have loose buildings laying around, you can do the same thing with small boxes or blocks. After several tries, my first discovery was that to keep the small-town feel, the majority of the structures needed to be both small and short.

Test no. 2. The smaller buildings made a big difference. The brick buildings on the left looked a little too "big city" to me, but I liked the gas station and repair shop.

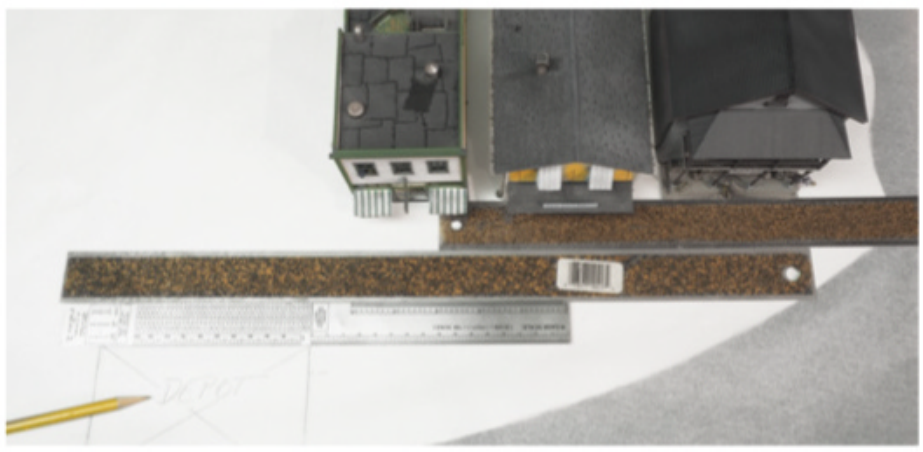
Test no. 3. This time I tried smaller buildings and put Main Street up against the backdrop. The three frame buildings caught my eye – they fit together well.

Test no. 4. Finally we were getting closer, but I didn't like the fact that the retail stores were right next to the big, noisy mill. I also knew I wanted to add a train station.

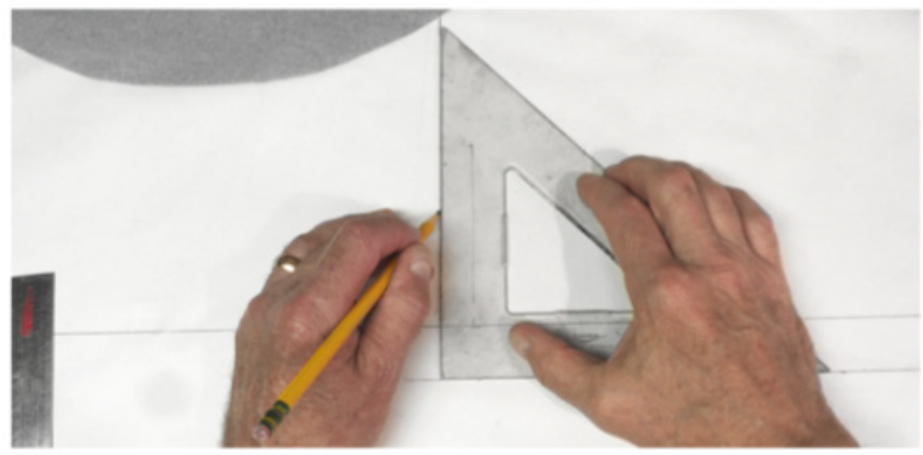
>> Moving construction off site

A case for a base. I knew it would be a lot easier to work on the town at my workbench (the layout is shoulder high here), so I made a template then cut a base for the town out of .080" styrene.

Mark before the move. I arranged the buildings on the styrene base and marked their permanent locations, taking care to leave enough space for a sidewalk and street.



Figuring out the streets. The distance between the depot and the stores was 27 scale feet, enough for a 20-foot-wide street and a 7-foot-wide sidewalk. The street would work but be narrow.



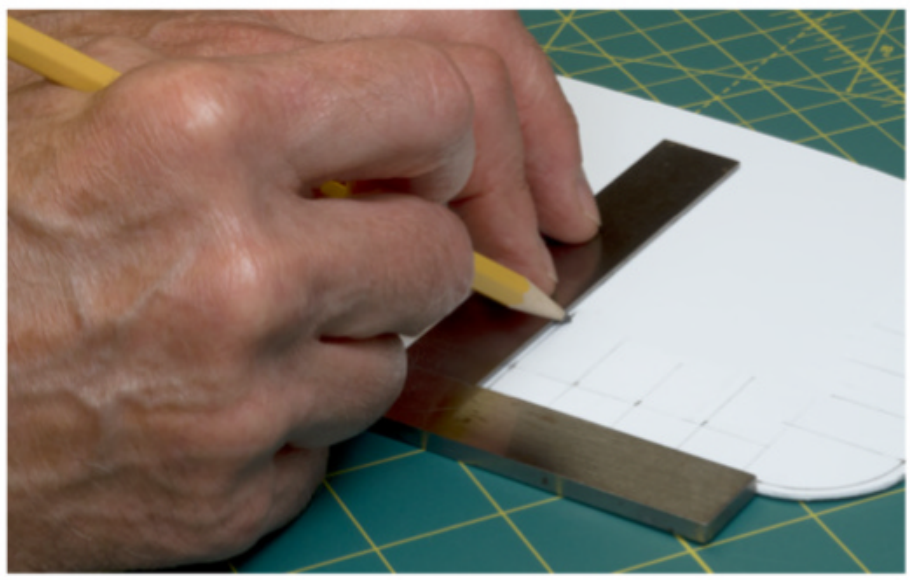
Finished marks. I determined that Main Street would pass the depot, and I would make a gravel road in front of the auto repair shop. I used a drafting triangle to draw the edges of the blocks.

Making sidewalks

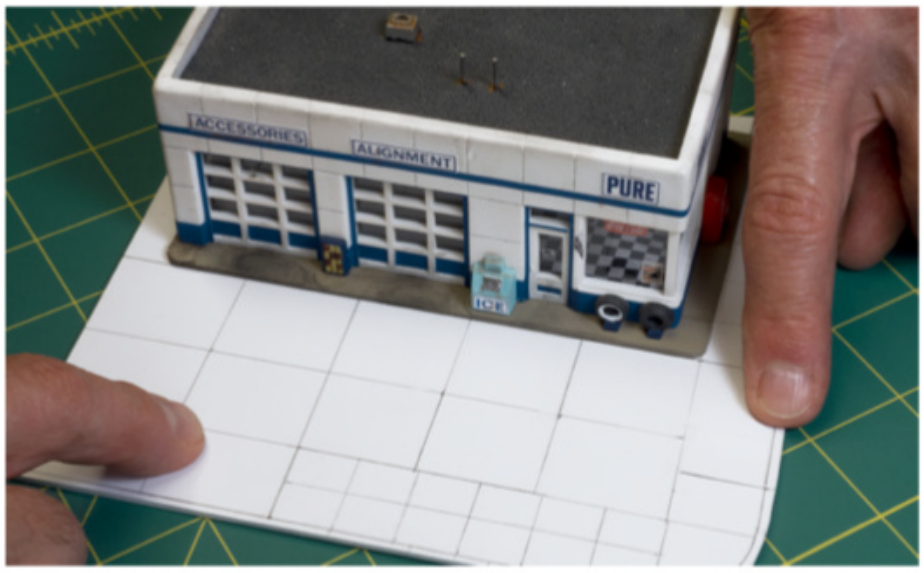
Tracing. Once again, I used the tracing paper as a template to cut the city blocks out of styrene. I used .080" thick styrene because it's roughly eight scale inches thick in HO. Thinner styrene looked a little too short.

Rounding corners. After checking the internet, I found that most cities use anywhere between a 2- and 15-foot radius for sidewalk corners. I found a medicine bottle cap that had a 6-scale-foot radius, traced that on the styrene, and scored along the line with a sharp hobby knife. I then snapped off the excess plastic.

Easy curbs. Typical curbs are about eight inches wide, so I opened my calipers to .08", set one point against the edge of the styrene, and used the other point to make a small mark at various places along the edge. I then connected the marks with a pencil line drawn with a straightedge.



Expansion joints. I decided to space the expansion joints of the sidewalk about 4 scale feet apart and used a thin-beam square to make sure the lines were perpendicular to the curb. I made the curb joints 5 scale feet apart so they wouldn't line up with the sidewalk joints. I then drew a line parallel to the curb about 3 scale feet away to divide the sidewalk panels in half.



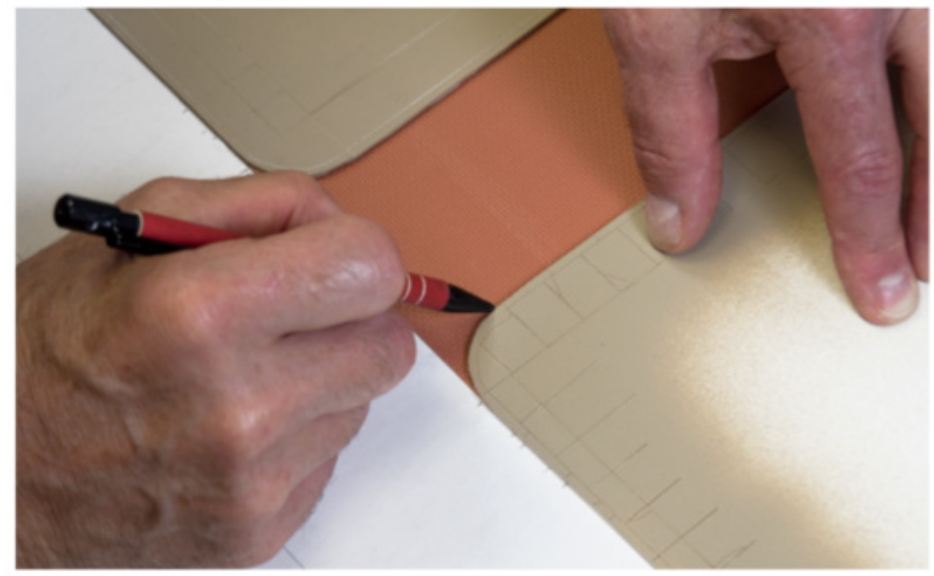
Aprons and cracks. I made the panels in the service area 9 feet long by 7 feet wide. I carved all the joints with a scriber. I air-brushed all the concrete areas with Vallejo Desert Armor (71.122).

Tool Tip!

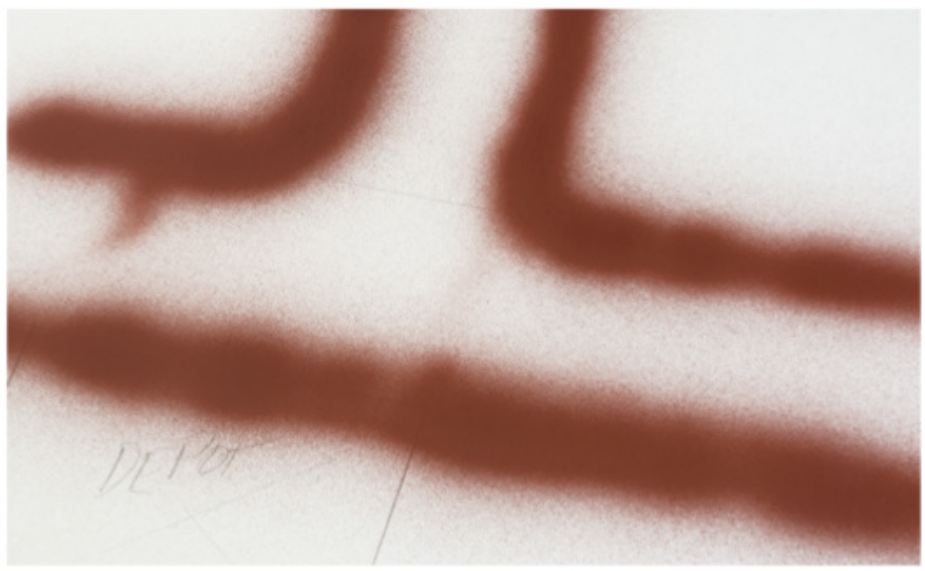
Rather than using the back side of a modeling knife to scribe the joints, I used a panel scriber (available from Micro-Mark). The scriber removes material, rather than just separating it, so it doesn't leave ridges on either side of the scribe. Here you can see the little curly piece of styrene the scriber is removing.

Brick streets from plastic sheets

Cutting sections. To emphasize the age of the town, I decided to make the streets out of brick. For that I used styrene brick sheets from JTT Scenery Products (no. 97422) called HO Scale Plastic Pattern Sheets. To be prototypical, I kept the bricks perpendicular to the flow of traffic. I measured and cut 20-foot wide sections of the brick sheet until I had enough to cover all of Main Street.



Cutting corners. The brick needed to fit tight to the sidewalks, so I put a full brick sheet over the location of the side street and used my city blocks to trace the curves with a sharp pencil. I then cut them out with a hobby knife. When I was happy with the fit I airbrushed the bricks a red brick color to eliminate the plastic shine.



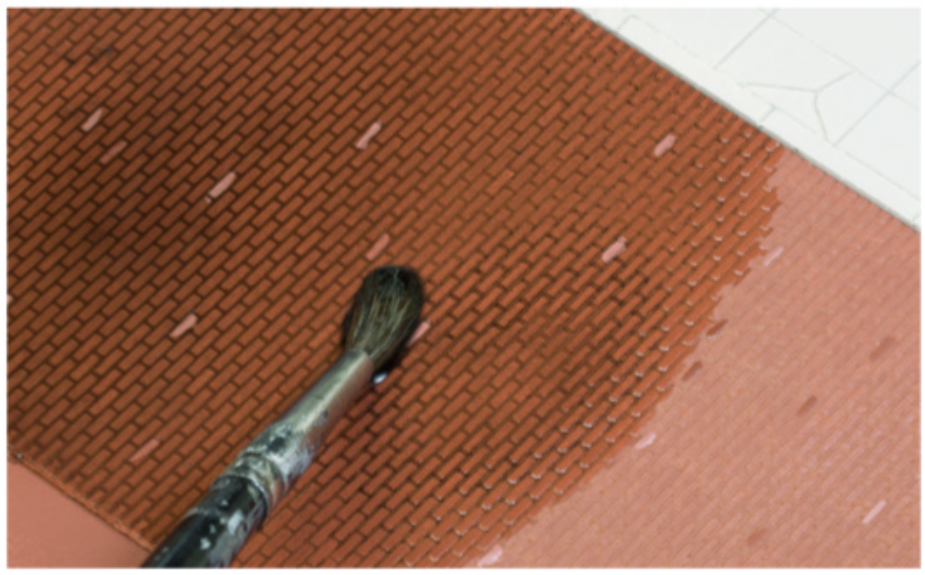
Painting under the seams. While I had the brick paint in the airbrush, I sprayed the edges of where the street would go on the styrene base. This would prevent any white from showing if any cuts in the brick sheets were slightly off.

Painting details. To keep the street from looking mono-chromatic, I painted individual bricks a slightly lighter and darker color by adding either black or white to the original brick color. Although painting individual bricks sounds very tedious, the work goes quickly, and I was done in just a few minutes. It's a subtle detail that really makes a big difference.

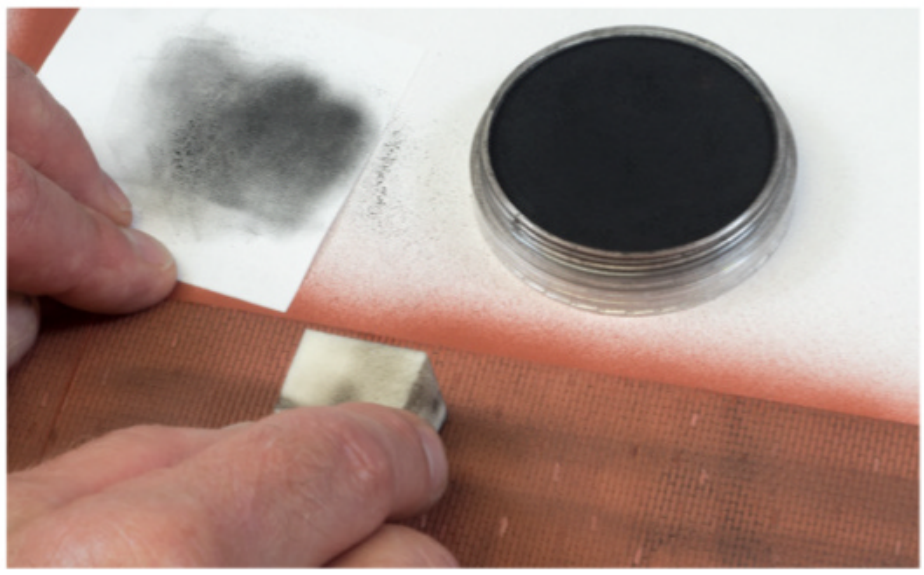
Making bricks stick. To mount the brick sheets to the styrene base I considered using a solvent cement but feared it would warp or dissolve the thin sheets. I could have also used spray adhesive, but instead decided to try 3M High-Tack Transfer Tape. It's available at www.rail-roadkits.com and other online sources, and is a double-sided clear tape with a very strong adhesive.

I cut small pieces and attached one side to the styrene base, being extra careful to add a piece where the brick sheets would butt up against one another. I replaced the city blocks, weighted them down so they didn't move, removed the backing from the tape, and carefully laid the brick sheets in place.

Weathering roads and sidewalks



Ink wash for bricks. To bring out the mortar lines in the bricks, I flooded the sheets with a solution of ¼ teaspoon of India ink in a half-pint of rubbing alcohol. The alcohol can soften the acrylic paint on the brick sheets and remove it, so don't try to scrub the material into the surface. The ink wash dried lighter than I expected, so I gave it a second coat.



Road grime. Tire marks and oil spills on a street add yet another level of detail that makes them look real. To add these details I used black Pan Pastel art powder and applied it extremely lightly with a cosmetic sponge. I then used a clean part of the sponge to wipe most of it away and blend it in with the rest of the street.

Alley details. Before I weathered the sidewalks, I wanted to add some dirt and weeds to the areas between the retail stores. I laid down some full-strength white glue, then used a saltshaker to sprinkle on a thin layer of dirt. This is real dirt from my yard, and you can see how I process it in "Off the Rails: Episode 3" on MR Video Plus. I added some ground foam weeds, too, and let it dry.

Ink wash for sidewalks. I used another solution of India Ink and alcohol (⅛ teaspoon to a half-pint of 70 percent isopropyl alcohol) to weather the sidewalks. The black sinks down into the expansion joints and cracks and really brings them out. Again, be careful not to rub too hard or the alcohol will soften and remove some of the acrylic paint.

The gravel driveway. To finish off the area around the repair shop, I brushed full strength white glue on the styrene base, then sprinkled on some N-scale limestone ballast. I sprayed it with rubbing alcohol, then topped that off with diluted white glue, just to be sure everything stuck together. The ballast seemed too bright, so once the glue had dried, I toned it down with a darker wash than I used on the sidewalks or bricks (½ teaspoon of India ink in a half-pint of rubbing alcohol).

Gerry's wash formulas

Type	India ink	Rubbing alcohol
Light	⅛ tsp.	half pint
Medium	¼ tsp.	half pint
Dark	½ tsp.	half pint

Bringing the space to life

Life at the bakery. A young boy gazes longingly at the donuts in the bakery window, while his mom yanks him along. In the doorway, a man brings home a boxed cake. All the action occurs under the watchful gaze of a cat in the second-floor window box. The figures, as well as the interiors, posters, signs, and window boxes, were all easy-to-add details that give character to what could've been a plain building.

MRVP Tip!

Small stuff matters! The first details I chose were some old-time streetlights. You can find this exact model by searching the internet for "Viessmann 6020 Park Lamp." In addition to the lights, I also used a color printer to make some tiny street name signs that I glued to the streetlights. I put one on each corner of the retail block.

Spare parts as details. Sometimes you have odds and ends that can be combined to make an interesting scene. The antiques store hosts a collection of details I'd had rolling around on my workbench, including a scale, table, chair with rosemaling, and a birdbath. I added several shopping figures and an open sign to complete the scene.

The expected and unexpected. The general store appears to be a beehive of activity. Expected details, such as the crates, bins, barrels, and window signs, lead you to believe that Phyllis & Norm's is the most popular place in Eagle Lake. Even the dogs stop here! Adding something unexpected to a scene, such as the dog and fire hydrant, gives visitors to your layout the opportunity to make fun discoveries, and also invites them to look more closely at your scenes for more.

Another day at work. Gas stations and car shops were common hangouts in the 1950s, the period I model. To give the feel of "business as usual," I tucked a couple of mechanics inside the hood of a car and added a third with his legs poking out from underneath.

The gas station received some decorative bushes, gas pumps, a truck, and figures. I placed a partially built Ford Model T on cinder blocks in the weeds out front – it makes for an eye-catching detail.

Gerry says...
There's a fine line between details and clutter. Details tell stories. Clutter screams "disorganized mess!"

Baseball, anyone? To solve the dilemma of the side street ending at the backdrop, I turned it into a dead-end by placing a guard rail and some trees into the scene. I added a few kids playing baseball to create the homey, small-town feel of Eagle Lake.

>> Another place

Thanks to a lot of planning, Eagle Lake turned out just the way I'd hoped. It looks like a small, out-of-the-way town in a sleepy part of the country. The best part is that it's another space that's been turned from a simple stretch of track into a real place on the layout. It's a place where the daily train is a big deal. It's also the kind of place that visitors to my layout will look at and say, "Hey, I've been through that town!" And really, when you stop to think about it, haven't we all?

Are you paying attention?

10 things in a photo you could model, but might overlook

by Steve Sweeney

PEOPLE WHO MODEL RAILROADS really are distilling their own ideas about railroading into three dimensions. Some people are content with the broad-brush strokes toy trains offer. Others crave scaled perfection down to the last rivet and grab iron.

In May 2019, editors from *Trains* magazine followed the first runs of Union Pacific Big Boy 4-8-8-4 No. 4014 through Colorado, Wyoming, and Utah. And what editor Jim Wrinn captured in one photo at Curvo, Utah, is enough to give even the most detail-oriented modelers something to ponder. I've broken the picture down into 10 things you may have missed. Many of these details and practices could be used to enhance the realism of your layout.

Union Pacific Big Boy 4-8-8-4 No. 4014 leads a UP office car special west at Curvo, Utah, on May 8, 2019. The grade descends here to Echo Canyon.

PHOTO: JIM WRINN

Look at that concrete bridge pier. It's not new. It's probably been holding up heavy trains for decades and shows shoulder wear. You can replicate this by sanding the corners of plaster, plastic, or resin pier castings to give them that crumbled look.

It's raining. The photographer is wet, so is the landscape, and so is the tunnel portal and retaining walls near the right-of-way. Water seepage happens all the time, so even if you don't model a rain scene, you can still add this detail. Paint "washes" can stand in for this if you don't want to bother with resin water.

WATCH THIS ON

Free Video!

Want to see more Big Boy locomotive coverage? Watch Steve and Ben chase the Big Boy free at MRVideoPlus.com/TUG20

Junction box of some kind. It could be for signals, buried fiber optic cables, or any number of different things. And there's also a sign marked "Tunnel 6" on the left portal face, track side. These details could be easily added using bits of painted styrene.

Is that rust, dirt, or dust on this bridge? It's probably some combination of all three. What we do know is that the bridge is anything but clean, glossy black.

All trains are dirty. Big Boy had been out on the road for less than a week, yet you can already see grit on the smokebox and grease and oil on the running gear. Even the most pampered of railroad equipment will need a bit of weathering.

The color of dirt. Rain in Wyoming's high desert darkens the soil, making for a pinkish-brown mud. Pay attention to the region you model to ensure your soil and vegetation match the location.

Things don't always go as planned. U.S. Flag Code aside, there was a problem with the Big Boy's support tender in May. To stay on schedule, the Big Boy crew needed to turn it around. That's why the flag is "flying backward." The world isn't perfect, so model railroads don't need to be either.

Ballast on bridges is a common Class I railroad practice. (For one thing, it's easier to maintain the track.) From a modeling perspective, ballasted deck bridges also offer a nice contrast to non-ballasted bridge construction.

Ground-cover always has variety. The soil is more than one color, it's studded with rocks, and also contains live grass, dead grass, and a whole bunch of other stuff. Adding this kind of variety to the ground cover on your layout adds realism.

Do you see the running board lights? A Union Pacific representative assured us the lights are usually on, to aid inspection of the locomotive.

The underlying theme here is that railroading is dirty, punishing, and always changing. Track, trains, and structures are designed to withstand just about anything nature can dish out, and rarely do railroads do anything because it "looks good." I'm not saying you need to add the things highlighted here to your layout, but consider whether you can broaden your skill set by giving a few of them a try.

PERFECT PEELING PAINT

Making a worn and weathered paint job the easy way with chipping medium

Weathered paint effects like those shown on this stock car are easier than you might think!

By David Popp
Photos by Bill Zuback and the MRVP staff

It's a fact of life that if you paint wood and leave it outside, eventually it will blister and peel.

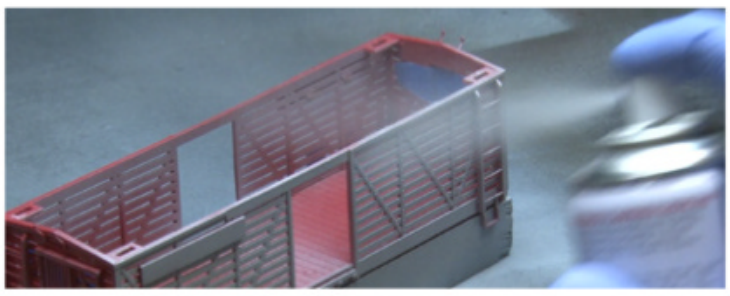
I've spent a lot of time trying to replicate that effect on plastic models so they look like their paint is flaking with weathered wood or rusty metal underneath. But it wasn't until I found chipping medium, a water-based product made by Acrylicos Vallejo, that I felt I finally had an easy way to achieve that effect.

And when I say easy, I really mean it! If you follow the four steps shown here, you can make just about anything look like it has patches of peeling paint. I tried it on an On30 stock car with wood slats, shown here, and the results were amazing.

The Secret Sauce

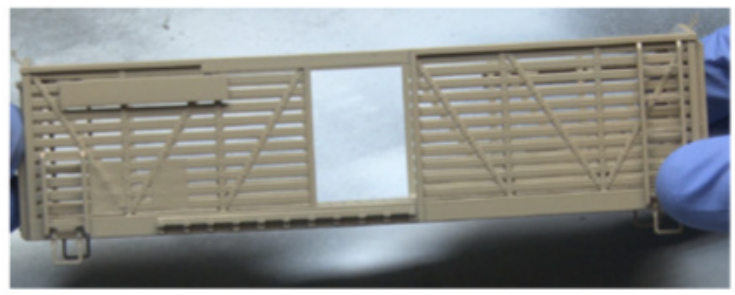
Chipping medium (Acrylicos Vallejo item no. 73.214) is the key to success for this project. It's a water-based material that retards the curing time for acrylic paints. It can be brushed on surfaces in small patches, or to cover larger areas, cut using the firm's no. 71.361 thinner and applied with an airbrush. Chipping medium can be found at many hobby dealers that carry the Vallejo line of paints. I picked up the bottle shown here and some airbrush thinner at my local hobby shop.

Step 1 – Prime and paint



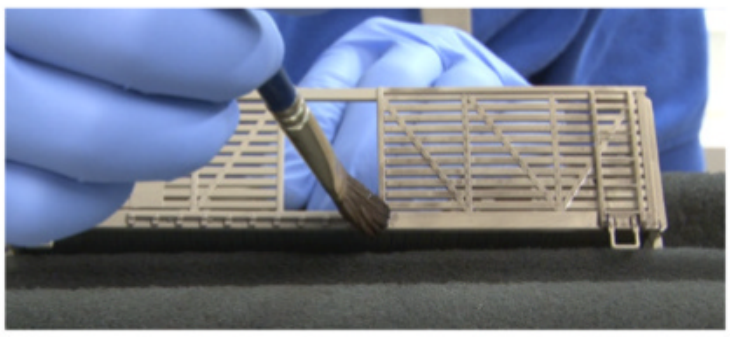
Believe it or not, to get a good peeled paint finish, you need to start with an undercoat of paint that won't come off the model. I sprayed the disassembled car with plastic primer.

My primer of choice lately has been Tamiya gray surface primer no. 87042.



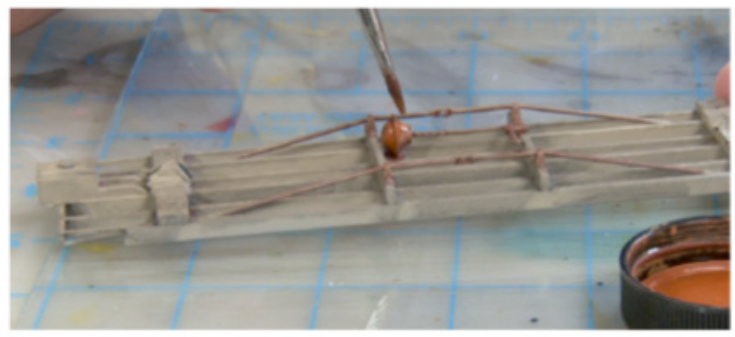
The first coat of paint on the car is actually the undercoat that will simulate bare wood. I airbrushed an even coat of Vallejo Model Air 71.122 US Desert Armour.

Step 2 – Stain, rust, and seal



Although tan paint may look like new bare wood boards, it doesn't look weather-worn. To get that effect, I applied an alcohol and ink stain to the paint with a wide brush.

For the stain, I used Hunterline Cordovan Brown weathering mix. Shake it well.

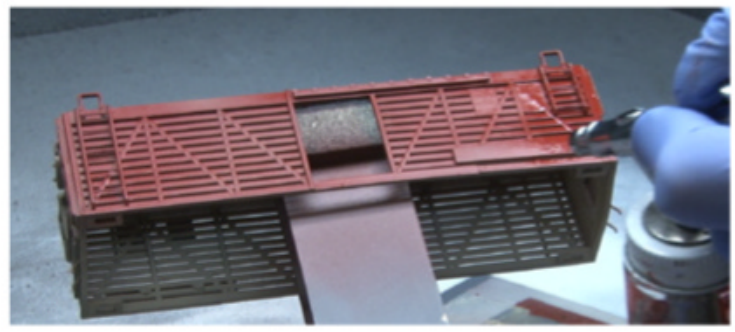


I also wanted patches of rust showing on the brake gear and the truss rods. After spraying the underframe with Testors Dullcote, I applied Monroe Models Scenery Solutions Fresh Rust.

Step 3 – Chipping medium

To airbrush the chipping medium, I had to cut it with Vallejo thinner by about 50 percent. I tried to apply the chipping medium just along the bottom of the car, and in hindsight, I may have been better off just brushing it on.

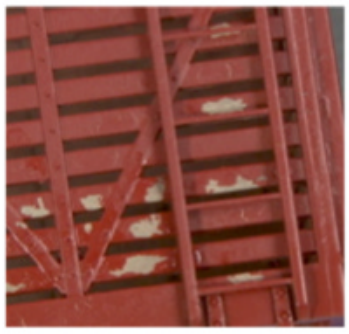
The finish coat of paint is Vallejo Model Air 71.105 Brown. It produces a pleasing boxcar red color.



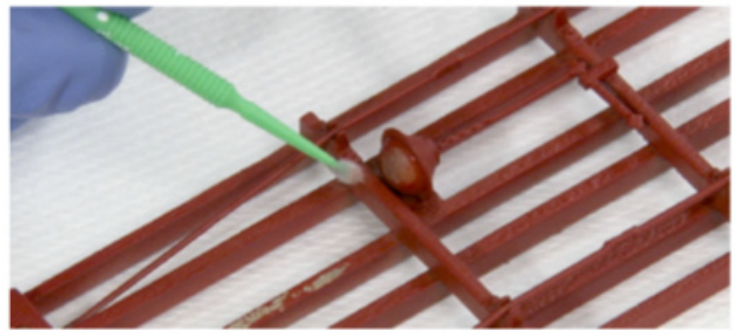
I applied the paint to the exterior of the car 30 minutes after applying the chipping medium. The chipping medium retards the drying time on the finished coat of paint, which allows the modeler to create the flaking effect.

Step 4 – Chip away

You can use a variety of tools to chip the paint, including paint brushes and toothpicks. I found a medium Micro-Brush worked very well. Dip the brush in a little water, then gently rub the paint surface. The flaking will occur easily.



A tip: Weather the side of the car at the top of each ladder rung where the boots would hit the surface.



The chipping medium worked well on the brake details and truss rods, too. Using the same technique as the car sides, I chipped away the paint on the brake cylinder, revealing the rust solution we'd applied before painting the car.

>> Everything else

It takes more than chipped paint to make a weathering job come to life. Here are a few of the other techniques I used to finish the car.

Soot and dust

Soot is common on the tops of freight cars. I applied a thinned coat of Vallejo Model Air 71.056 Black Grey along the center of the roof. I used an even mix of 71.122 US Desert Armor and 71.050 Light Gray thinned 80% as a dust coat along the edges.

Decals

To letter the car, I used MicroScale set 90001 HO scale Railroad Roman white. I made a lettering guide to aid in the decaling process using a small black piece of styrene. The pencil marks show where the breaks between the words should go.

David says...
I've tried for years to get a good peeling paint effect, and chipping medium made it very easy to do.

Car data

I kept the car's original data by masking it during the painting process. When the masks were removed, it looks like the car had been re-stenciled. I cleaned up most of the paint bleed around the edges.

Rust and yuck

The sill of a stock car was typically covered with all manner of nasty stuff. To simulate that, I applied drips and patches of Monroe Models Scenery Solutions. I used no. 110-979 Dark Rust and no. 110-980 Light Rust, brushing it on the sides and sealing it in place with a light application of Testors Dullcote.

Interior details

To add straw to the floor of the car, I applied Micro-Mark Microlux clear flat and sprinkled Woodland Scenics 7mm medium green static grass (no. FS622) into it. I also added a few cow chips from the firm's figure set A2767.

WEATHERING SMALL-SCALE VEHICLES

Even if it's been on a jobsite for just a week, construction equipment will show the effects of hard work quickly. Aaron Skinner shares some of his favorite dirt weathering techniques that can be applied to a variety of heavy equipment.

Products for armor modeling are perfect for construction equipment

By Aaron Skinner

WATCH IT!

Free on MRVP!

Watch Aaron demonstrate these techniques at MRVideoPlus.com/TUG20

Construction equipment is mechanically maintained, but the conditions these machines operate in are rough, dirty, and unforgiving.

There are some great pre-finished dump trucks, tractors, and earthmovers on the market, but out of the box they look perfect for the showroom floor, not a construction site or quarry. It's not hard to add those effects using weathering supplies and products, many of which are sold for armor modeling.

The main thing to consider is the scale. Obviously, an HO scale bulldozer needs less pigments and mud than its 1:35 scale cousin. To demonstrate these ideas, I weathered a plastic cement truck and a die-cast metal power shovel, both in HO scale.

Keep in mind that these techniques can be applied to almost any vehicle. Vary the intensity to fit its role.

1 – Washes

Before anything else, I applied washes to the vehicles. Black deepened engine and radiator grill and door outlines; brown added a little dirt and grime to corners and hinges. Then I masked the clear parts and sealed the washes with clear flat acrylic.

2 - Chips are down

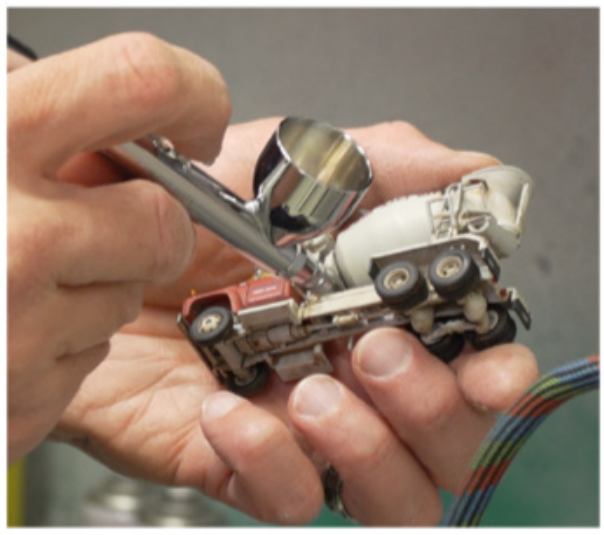
To chip paint around wheel wells, corners, and steps on the truck, I applied dabs and dots of Vallejo German Camouflage Gray with a small brush. Less is more, so keep the chips small with random spacing and shapes. I applied more chips to the shovel, as this kind of equipment tends to be in the middle of the action. In addition to the body, I applied chips along panel edges and the shovel arm.

3 - Scratches

Figuring scratches in the black would reveal underlying paint, I brushed yellow paint along panel lines in those areas. I kept these to a minimum, as most of the black is recessed and too much would look stark.

Aaron Says...
The best way to become better with an airbrush is using it as often as possible.

4 - Truck dust



Next came a layer of road grime and dust. I mixed a little tan-gray into clear flat acrylic and then thinned it slightly more than 50 percent. This mix was air-brushed over the lower areas of the cement truck – wheels, wheel wells, chassis, and mud flaps – at about 15 psi, keeping the pattern narrow. Build up this layer gradually until it looks like a light haze of tan dirt.

5 - Excavator grime

On the power shovel, I added a thin earth-brown and clear flat mix focused on the lower hull, running gear, and shovel. This time, I used slightly more paint in the mix to build up heavier dirt and mud deposits appropriate for a construction vehicle.

7 - Mud effects

I applied Vallejo Terrain Effects European mud to the lower body and running gear. Thinning the material with water keeps it more in scale and helps it flow. Use an old brush that you're happy to part with. I added more to the business end of the shovel, focusing it in corners and edges. A little on the arm adjacent to the bucket gave the machine more of a sense of long-term use.

8 - Powders

Next I turned to powdered pigments, grinding them into the engine deck, steps, cab roof, and arm. Any urban or building debris shades will work; I used Mig Productions Dry Mud.

Materials list

- ☐ Black wash — Tamiya Panel Line Accent Color (No. 87131)
- ☐ Brown wash — Tamiya Panel Line Accent Color (No. 87132)
- ☐ Vallejo Weathering Effects European Thick Mud (No. 73.807)
- ☐ Gunmetal pigments — Mig Productions (P231)
- ☐ Earth Brown — Testors Model Master roof brown acrylic (No. 4884)
- ☐ Clear flat acrylic — Testors Model Master clear flat acrylic (No. 4636)
- ☐ Tan gray — Testors Model Master radome tan acrylic (No. 4722)
- ☐ Vallejo German Gray (No. 70.995)
- ☐ Mig Productions Dry Mud pigment (P232)

9 - No. 2 pencil treatment

Finally, I used the edge of a No. 2 pencil to burnish the raised cleats of the tracks; gentle pressure is all that's needed. Note that I used a little of the mud mix and dry pigments to add dirt caught in between the links. The pencil is also a great way to add a sheen of bare metal to chips worn through the paint on the shovel's bucket and arm. This is another place where less is more.

End results

With that, I called both the shovel and the truck done. As you can see from this finished photo, the weathering makes a big difference. These basic techniques are easy to apply and will quickly place a pre-finished vehicle onto your layout.

10 TERRIFIC TRACK TIPS

Good trackwork techniques for a smooth-rolling railroad

The smoothly flowing track, aided by several curved turnouts, gives this scene on our HO scale Thin Branch layout a realistic railroad look. David Popp laid the track using off-the-shelf components and all 10 of the tips shown here.

BILL ZUBACK PHOTO

By David Popp
Photos by MRVP staff unless noted

Just like on the full-size railroads, good track is all about where the wheel meets the rail. Solid roadbed, tight ballast, and correct rail gauge are just as important for reliable operation on the Union Pacific as they are on a model railroad.

WATCH THIS ON

Watch It!
See many of David's track tips and much more on the MRVideoPlus.com/TUG20 play list.

I've built a lot of railroads over the years, but regardless of scale, there are several track-laying techniques I tend to use over and over again. These are time-tested methods that are easy to learn and produce good results. They don't require any special equipment, either. Chances are good the tools you need are on your workbench.

David's must-have track tools

>> Tip 1 – Rock-solid roadbed

Before laying any track, you need a good base. My favorite option is a subroadbed of ½" plywood topped with a layer of cork roadbed. Cork is dense yet flexible and is very easy to bend, cut, and sand. It's available sized for O, HO, and N scale. Cork also possesses sound-deadening properties, which are good at limiting train noise and allowing you to hear sound-equipped locomotives more clearly.

There are several manufacturers of cork roadbed. I used roadbed from Midwest Products (midwestproducts.com) in the photos shown here, but all cork roadbed pretty much works the same way. The cork comes in strips that are pre-cut with a beveled edge. Glue them to the layout's surface back to back and they form an elevated roadbed with a good right-of-way profile.

It splits! The strips come pre-cut down the middle. Simply pull the two pieces apart and place them back to back to form the roadbed.

Clean it. Cork strips have a lip at the top of the bevel where the cork was joined. To remove it, sand the lip away with a coarse sanding sponge.

Glue it. If the subroadbed is plywood, I prefer yellow carpenter's glue. If it's a foam surface, then I use DAP Dynaflex 230 acrylic latex caulk because carpenter's glue doesn't stick well to foam. I avoid using white glue because it's water soluble.

Tack it. For straight track or gentle curves, the glue usually holds the cork in place well – especially if you press it into the glue using a wallpaper roller. However, for sharper curves, I tack the cork in place with pins for foam and small nails to hold it to plywood.

Turnout tip. The secret to creating smooth roadbed that flows through turnouts is to first lay cork following the outside lines of both routes. Then piece together the angles for the interior, making the narrow cuts using a sharp hobby knife and a straightedge.

Fill it in. Even with the most precision cutting work, there are often gaps where the cork comes together, particularly under turnouts. I fill the gaps with lightweight spackle for a smooth, evenly finished surface that won't gobble up ballast.

Tip 2 – Complex trackwork first

The most complicated sections of track are where turnouts come together. That's always a good place to begin, because you have a lot more freedom to adjust the pieces at the start than you do when sections of track are already fixed in place.

On our HO scale Thin Branch layout, I started at a location where four turnouts, two of which were curved, had to be laid in close proximity to each other. Before cutting anything, as shown in the photo, I pinned the turnouts to the roadbed. I then sighted down the rails and made minor adjustments to the position of the turnouts to make sure things would line up.

Once I have one complex track section complete, I move on to the next one. When that one is ready, I link them with flextrack and glue everything into position.

Pin before you begin. To make sure the track fits its location, pin the key elements to the roadbed, such as the turnouts shown here, before you make any cuts.

Tip 3 – Trimming turnouts

Part of what makes things easy for a full-size railroad is that they build their turnouts to fit particular locations. This is what gives a railroad right-of-way its smooth, flowing appearance.

You can go a long way toward achieving that look by trimming the ends of a manufactured turnout. The critical parts of a turnout are the area from just before the point rails to just after the switch frog, which means everything outside of that is negotiable.

If a turnout fits its location as is, there's no need to trim it. However, where the track needs to curve into or out of the turnout sooner than the manufacturer intended, I'll cut it. For the example shown here, I trimmed parts off of two of the four turnouts used in the complex track section shown in tip 2 to adjust how they connected to the curves required on the layout.

Cut carefully. You can remove quite a bit of the ends of a manufactured turnout without damaging it. Brace the remaining sections so that the rail doesn't pull away from the plastic ties.

Tip 4 – Cutting and filing the rail

There are several ways to cut track. For track that's already attached to a layout, I use a razor saw when I need to remove a section and a cutoff disc in a motor tool for making gaps in rails when creating electrical blocks. However, for new track installation, my cutting tool of choice is a flush-cutting pliers – often also called a rail nipper. It's fast, efficient, and accurate. The following photos show the three easy steps for making good cuts.

One thing to remember with flush-cutting pliers: the flat face of the pliers produces the flush cut. The back side crushes the rail. You can still use the crushed side; reverse the pliers and trim the end.

Step 1: Mark. To measure a piece of track for cutting, I first lay it into position so that it overlaps the connecting piece. I use fine-tipped markers to identify the cut.

Step 2: Cut. Place the smooth face of the flush-cutting pliers facing the piece of the rail you want to save, line it up on the mark, and make the cut.

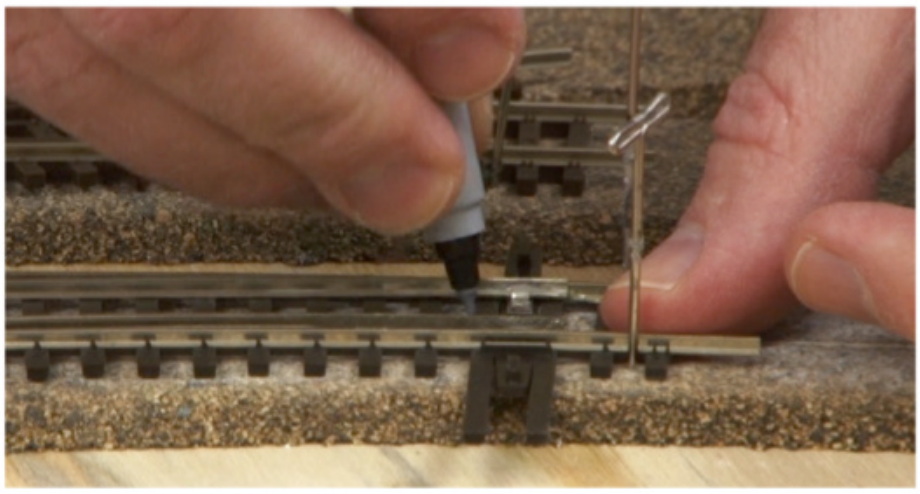
Step 3: File. Even though pliers, saws, and cutoff discs leave a fairly clean cut, you still need a file to remove any burrs left on the rail. Needle files work well for this.

Tip 5 – Cut slots for switch motors

This tip comes straight from experience – cut slots for switch motors even if you think you'll never ever install them! Most modelers refrain from installing switch motors when first building a layout simply because of the added cost. However, just like the world around you, your model railroad changes over time. The longer you have a layout, the greater the chance that you'll want to add switch motors.

As the simple steps show here, the only cost involved in cutting slots in the roadbed for switch motors is time – and not much of it at that. On the other hand, if you don't cut the slots and decide that you want switch motors after the track is installed and ballasted, it usually involves pulling up turnouts. From my experience, it's nearly impossible to remove an installed turnout without damaging it. Trust me, you'll never be sorry you cut the slots before laying your track!

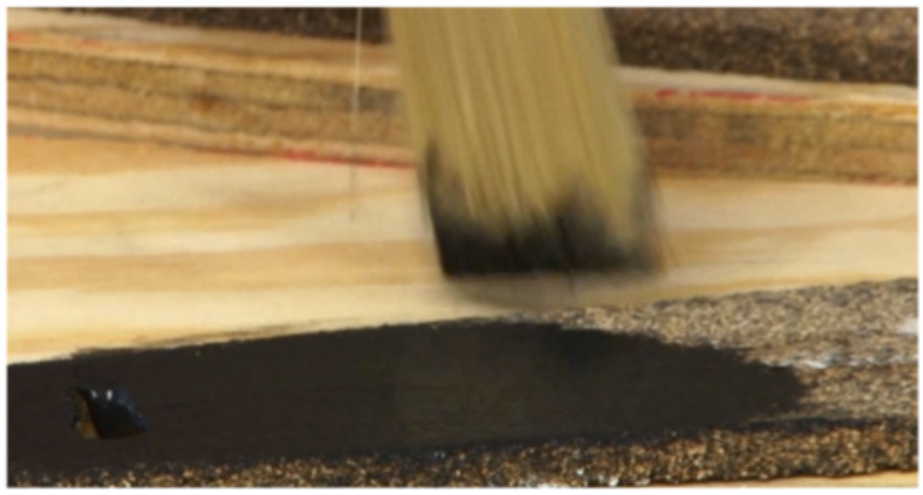
It's much easier to cut the ¼" x ¾" slot needed for a switch motor's actuating rod before the track is installed.



Step 1: Mark it. I use a fine-tip black marker to draw the rough opening on the cork, first with the turnout in place, then with it removed to mark the spot directly under the switch rod.

Step 2: Cut the cork. Using a sharp hobby knife, I cut the cork roadbed down to the plywood top. I then use a knife with a chisel blade or a screwdriver to remove the cork from the slot.

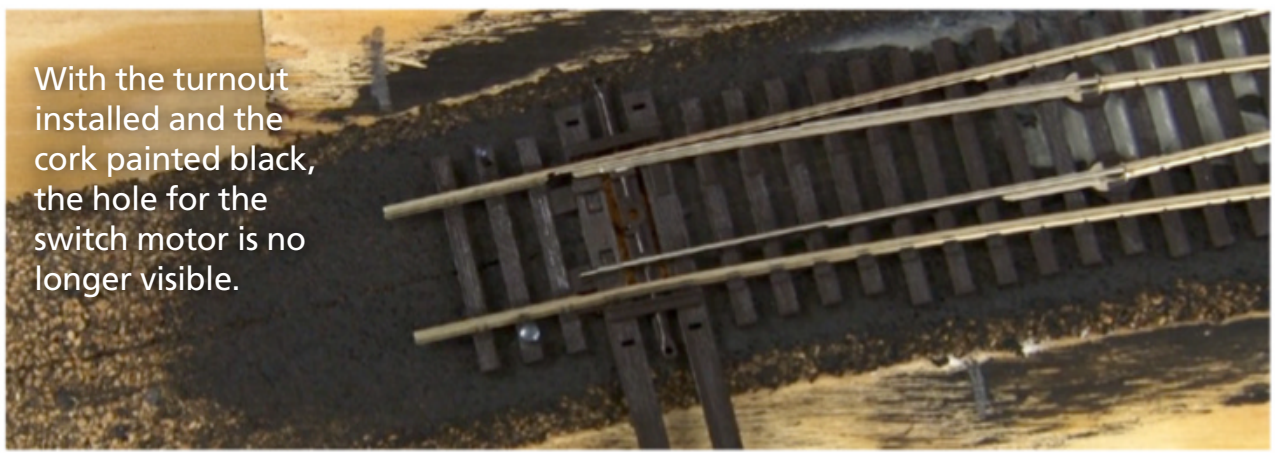
Step 3: Drill. With the cork removed, I bring in a drill with a ¼" bit. I start by drilling both ends of the slot, and then use the side of the drill bit to cut away the center.



Step 4: Paint. Turnouts operate better with minimal ballast around the moving parts, so I paint the cork around the points black and then use just a small amount of ballast in this area.

David says...

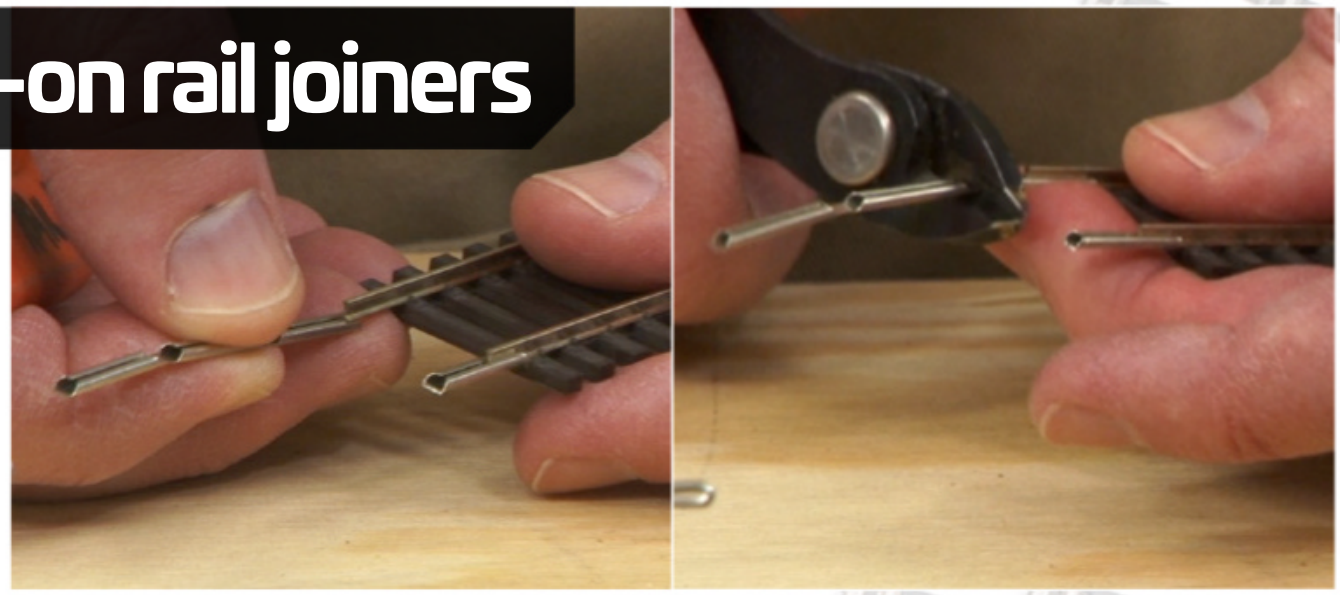
Always wear safety glasses when cutting rail. Small cut-off sections can fly at amazing speeds!



With the turnout installed and the cork painted black, the hole for the switch motor is no longer visible.

Tip 6 – Easy-on rail joiners

The smaller the scale, the harder it is to put on rail joiners. Joiners usually come in a stick of four and need to be cut apart. I figured out when working on my New Haven N scale layout that if I left the joiners together on their stick, I could slip the first joiner on to the end of the rail using the rest as a handle. I then clipped off the stick holding the remaining three and repeated the process. For the last one, I hold it in my spiking pliers to slip it on the rail.



Keeping the joiners together on their four-piece stick (left) makes it easy to slip the first one over the end of the rail. The remaining joiners can be cut free by using a pair of rail nippers (right).

Tip 7 – The ⅔ solder rule

Soldering rail joiners is a great way to improve electrical conductivity of your model railroad's track. However, you don't want to solder every rail joiner. Layouts expand and contract for a variety of reasons, so you need to leave expansion joints every so often or the track will form kinks. On my layouts, I solder every two out of three rail joiners per rail, which I call the "⅔ solder rule." This works great on long stretches of track, as you can solder up to three sections of flextrack together and power it with one set of feeders located in the middle. I leave the next set of rail joiners unsoldered at either end for expansion purposes, but then solder three more sections together, again with its own set of feeders. It makes for very reliable electrical blocks.

A little flux and solder flowed into the outside of each rail joiner is all that's needed for good electrical contact between sections of track.

Tip 8 – Uneven rail joints

Because rail joiners often have some play in them, the rail heads don't always line up well, particularly when you're soldering the joints. If the tops of the rails are just a little off, you can file them a bit to smooth things out. However, sometimes the difference is more noticeable (see the leftmost photo below). Uneven rail joints can cause derailments, so it's important to fix them. Fortunately, as shown here, that's fairly easy to do using a soldering iron and a nail set. After the fix, I test the joints by rolling a car with metal wheels through the trackwork. No bumps means that the rail joints are even and the track is ready for service.

Uneven rail heads. After soldering the rail joiners in this section, joints didn't line up too well.,The height difference in the tops of the rails can cause derailments.

Heat and pressure. To fix it, heat the joiner with the soldering iron. At the same time, apply gentle downward pressure on the higher of the rails using a nail set.

Smooth finish. Once the solder is warm enough, press the higher of the two rails into place, remove the soldering iron, and hold the rails level until the solder sets.

Tip 9 – Caulk for glue

I've become a big fan of using latex caulk to glue track in place on layouts. I can take no credit for the technique, as I saw it first years ago in *Model Railroader* magazine, but the practice is sound, and it works well. Caulk as an adhesive is easy to apply, holds quickly, and it has some cushion and flex to it. It also doesn't release like white glue when it gets wet while applying other scenery materials. And if you do want to change a section of track, it's easy to pry up with just a putty knife.

Step 1: Apply. DAP Dynaflex 230 is my caulk of choice. Apply a small bead down the center of the roadbed, being careful not to get it near the moving parts of turnouts.

Step 2: Spread. Before laying the track, I spread the bead of caulk smooth using a putty knife. This keeps the caulk from oozing up above the tops of the ties and provides a broad contact point.

Step 3: Tack. In addition to the caulk, I use a few track nails to hold everything firm – particularly turnouts that will be operated with switch motors and on tight curves. You can remove them when the caulk sets.

DAP Dynaflex 230 comes in many colors. If I can't match the color of my ballast, I typically use clear.

Tip 10 – Replacement ties

For years I tried to keep the ties with the track sections while I installed them. I would carefully cut away the spike and plate details to make room for the rail joiners to slip into place. Then I'd have to try not to melt the plastic ties while soldering the joints. In the end, it has proven to be far easier to cut the ties off the ends of track sections, fit and solder the rails together, and then reuse those ties to replace some of the missing ones. The technique is easy to do and adds a lot to the finished appearance of a layout.

Step 1: Trim. Using the cast-off ties from the track-laying process, I start by cutting away the protruding spike details.

Step 2: File. To make room for the rail joiners, I file away some of the tie plate detail. Most rail joiners are made of thin metal, so it doesn't take much filing to work for the plastic ties to slip underneath them.

Step 3: Fit. I carefully slip the new ties under the rail, making sure they do not push up the rails. Most of the time the ties will stay in place by themselves until they're held permanently with ballast and glue. With that, your track is ready for paint and ballast.

Adding a detail kit to a locomotive and building a stripwood fence are just two of the great projects Cody Grivno shares for making your layout more realistic.

THE WONDERFUL WORLD OF DETAILS

Tips for doing the little things that make a big impact on your layout

By Cody Grivno

IF YOU ASKED ME what my favorite aspects of model railroading are, detailing would rank pretty high on that list. Adding a fence to a scene and installing grab irons are little things make an ordinary layout or model look more like what we see in real life.

Though we're blessed with an abundance of detail parts, knowing how to use them may not always be clear. Perhaps you've seen etched-metal parts at your local hobby shop or online. What tools do you need to turn those flat pieces of metal into 3-D shapes?

Sometimes the models we purchase come with details that we don't want, such as running boards. In this article, I'll show you an easy way to plug holes in a caboose roof with styrene rod.

But what if you've searched high and low and can't find the detail part your looking for? No worries! I ran into a similar situation when searching for a fence similar to one used on a prototype railroad. Instead of giving up, I made my own, as shown in the image above.

If you're looking for ideas to enhance the locomotives, freight cars, and scenery on your model railroad, take a look through the following tips and techniques. Hopefully you'll find one or more ideas for your layout.

WATCH IT!

Free Video!

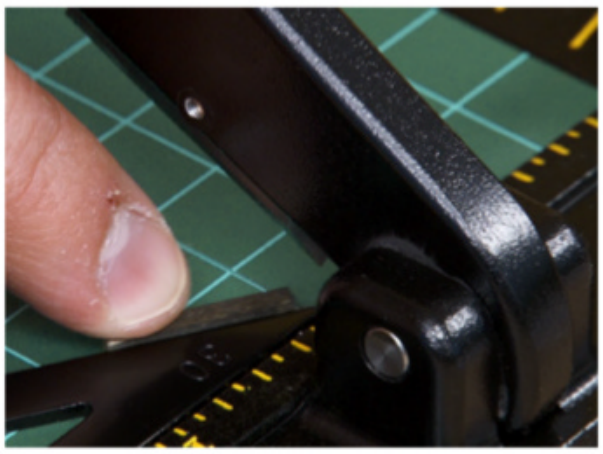
For more tips, watch an episode of Cody's Workshop free at MRVideoPlus.com/TUG20

Stripwood fence

HO scale crossties and stripwood were all Cody needed to build these fences by the rail supply yard on the Milwaukee, Racine & Troy.

Fences are a simple detail that have a lot of visual impact. There are plenty of commercial fences available in most of the popular modeling scales. But what do you do when the style of fence you need isn't available? You make your own.

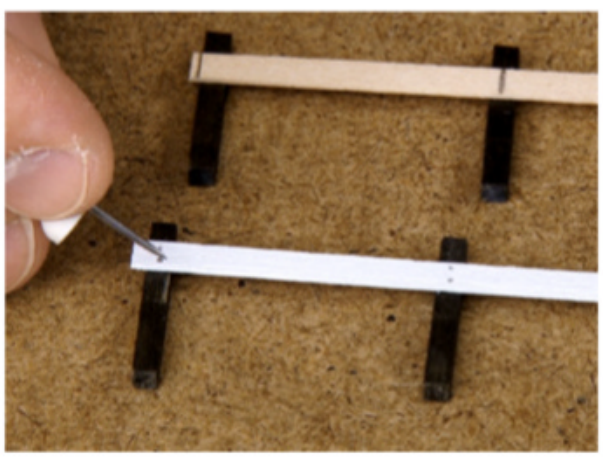
That was the situation I faced when working on a scene for our staff layout, the Milwaukee, Racine & Troy. I wanted to add fences made from old railroad ties and dimensional lumber, similar to those used on the Burlington Northern. Using HO scale cross ties, strip wood, and a NorthWest Short Line Chopper II, I was able to re-create this lineside detail quickly and easily.



I used Northeastern Scale Lumber HO scale ties, stained with Hunterline Creosote Black Weathering Mix, for the posts. I used a North West Short Line Chopper II with a 30-degree miter to cut the top of the 6-scale-foot posts.

The fence rails are Northeastern Scale Lumber HO scale 2 x 12. I used the Chopper to cut the stripwood into 18½ scale foot strips. Since the tip of the stripwood is a bit ragged, cut off approximately 1/16" from the end to start with a clean edge.

I put marks on the rails to help with alignment of the posts. First, I marked a scale 3" in from each end on the rails for the overhang. Then I marked where the center post attached to the rail. The bottom two feet of the posts are in the ground.



I attached the rails to the posts with cyanoacrylate adhesive. I painted the rails white, but any high-visibility color will work. I used a push pin and dots of silver paint to simulate mounting hardware for the fence rails.

I used an awl to poke holes in the foam scenery base. I scenicked the area after making the holes, so I test-fit the fence first. Then I put white glue in the holes, installed the fence, and added matching scenery material to fill in any gaps.

Magnets for miters

The North West Shore Line Chopper II comes with metal miters. To keep better track of them, I attached round magnets to the bottom of the Chopper's base with double-sided foam tape. Now I can stick one or both miters under the tool when I'm not using them.

Enhancing molded details

A semi-gloss finish and painted details make Canadian Pacific SD60 no. 6240 look more like its full-sized rebuilt counterpart.

One of my tasks on our Canadian Canyons project layout was to weather the rolling stock and equipment. But not every locomotive and freight car should have the same level of grime. In fact, it's prototypical to have equipment that looks relatively new, such as Canadian Pacific (CP) SD60 no. 6240.

The full-size 6240 was a Soo Line engine rebuilt and repainted CP. In the era of our layout, the engine would still have a shiny carbody. In addition, I added paint to some of the raised details, such as the grab irons and fan behind the cab; painted the molded plastic trucks; and weathered the wheels. The clean diesel stands out when operating side-by-side its weathered counterparts.

On the full-size 6240 the horn is on the long hood, so I needed to relocate the detail on the model. I was unable to gently pry the horn off the cab. Instead, I used tweezer-style sprue cutters to cut the part off. I plugged the original mounting holes and touched up the cab roof.

The supplied, modeler-installed winterization hatch has three mounting pins. I used a pin vise with a no. 78 bit to open the drill-starter points inside the shell. Then I enlarged the holes from above with a no. 74 bit. I removed the molded nubs that represent lift rings.

I used a 20/0 paintbrush and Model Master Reefer White (no. 4873) to paint the molded grab irons. After getting some paint on the brush, I applied the color to the raised portion of the grab iron. If some paint gets on the model, don't worry. Use a no. 11 blade to scrape it off.

The fan screen behind the cab is unpainted metal. To simulate that look on the model, I painted the fan with Testor's Flat Aluminum enamel paint (no. 1181TT). I did the initial painting with a Microbrush. Then I used a fine paintbrush to do the painting along the edges of the screen.

I let the Flat Aluminum paint dry overnight. Then I used a paintbrush to apply Vallejo Black Model Wash (no. 76.518) to the screen. The wash settled into the low spots, creating a convincing 3-D effect. After a few hours, I carefully wiped wash residue from the raised surfaces.

Fixing loose stanchions

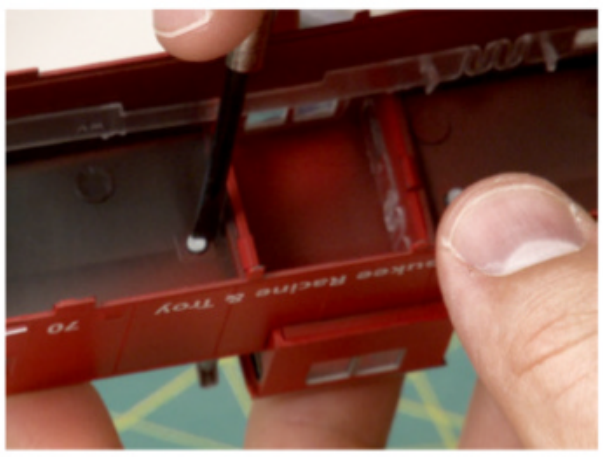
The pins on molded plastic handrail stanchions sometimes pop out of the mounting holes on locomotive sills. To fix this, try using Formula 560 canopy glue. The glue comes out of the bottle white, but dries clear and flexible. Use a piece of brass wire to put the glue in the hole.

Plugging holes

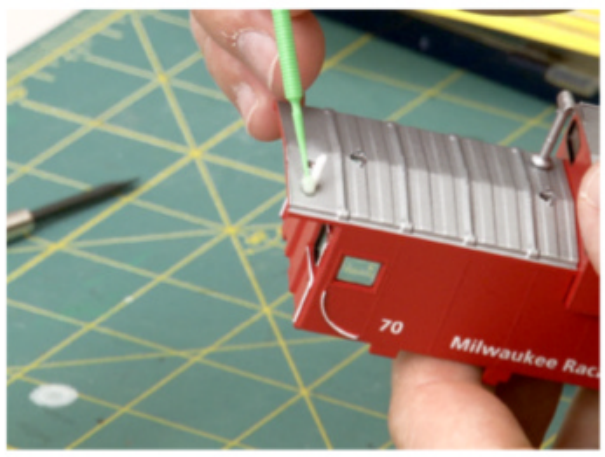
This Athearn caboose used to have running boards. Using the techniques below, you can plug the mounting holes and seamlessly blend the patches.

Several years ago Athearn produced a run of wide-vision cabooses lettered for our HO scale staff layout, the Milwaukee, Racine & Troy. The cabooses looked great, but they had one problem. They were equipped with running boards, which were no longer required on cabooses during the era of our model railroad.

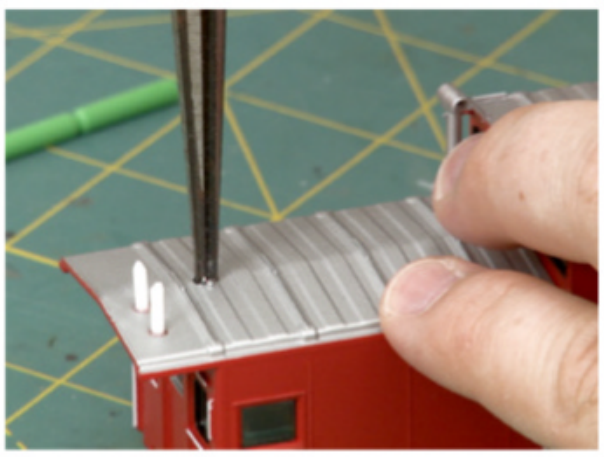
Removing the running boards on the model was easy. The next step was filling the mounting holes. Follow along as I walk you through the steps of using styrene rod to plug the holes.



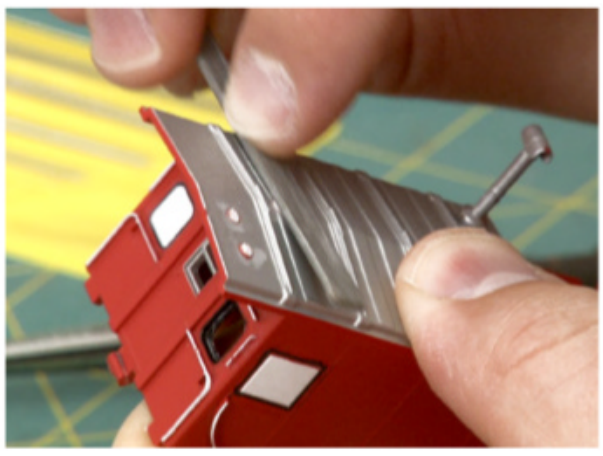
In some cases the separate, factory applied parts on models are glued in place. But we got lucky on our model, as the running boards were press fit. All I had to do was press on the mounting pins on the bottom of the running boards from the inside to release them from the carbody.



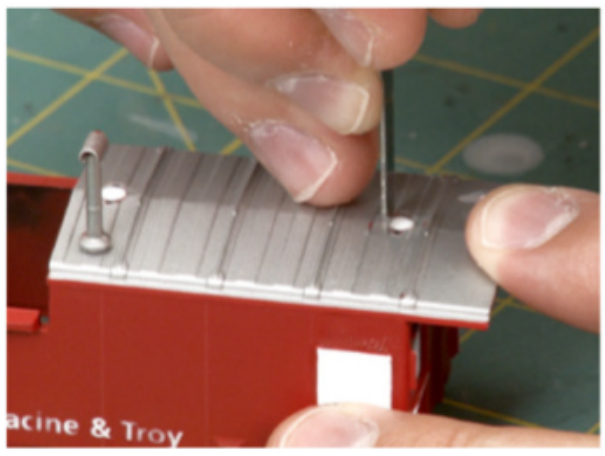
Next, I had to plug the small holes (ladder rails) and large holes (running board mounting pins). After cleaning glue residue from the small holes, I used a Microbrush to apply Plastruct Bondene. With the glue wet, I inserted short lengths of 1/16"-diameter styrene rod into the holes.



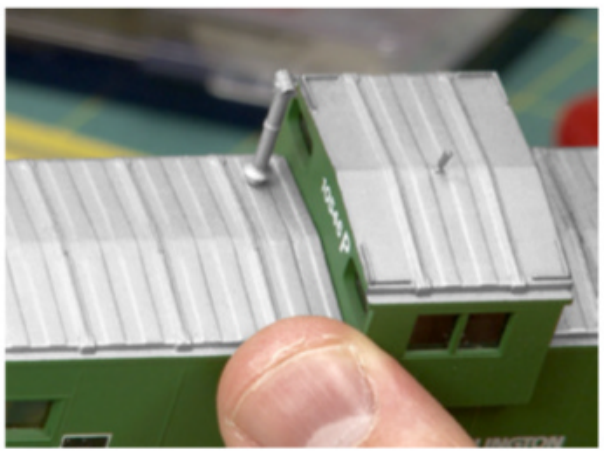
The larger holes for the running board mounting pins aren't perfectly round. To make the holes round, I used a T-handle reamer. Work slowly and check your work often. The goal isn't to enlarge the holes. Instead, you want them to be round for inserting the 1/8"-diameter styrene rod.



Once the glue dried, I used sprue cutters to trim the styrene rod close to the roof. Then I used jeweler's files (sanding sticks will also work) to shape the styrene, as the caboose has a peaked roof. No matter what tool you use, work slowly and don't remove too much material.



The filing or sanding will shape the styrene to the peaked profile of the roof. However, the styrene extends beyond the raised panels on the roof. To make the plugs as seamless as possible, I seated a no. 17 blade against the raised roof panels and rocked it side to side, cutting the styrene.



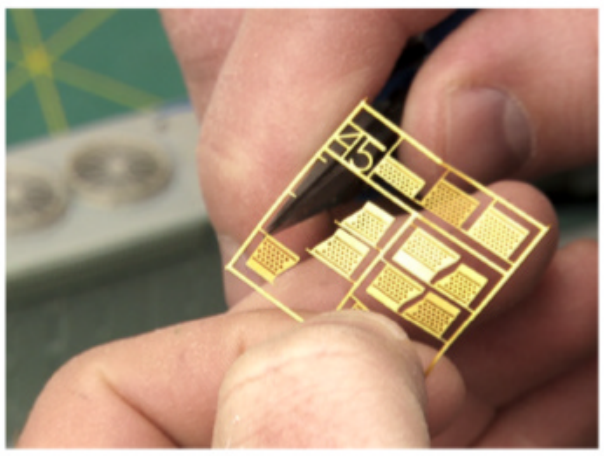
If there are any small gaps, fill them with Deluxe Materials Perfect Plastic Putty or a similar product. After the final sanding and shaping is completed, prime and repaint the roof. Once the final color is applied, you'll be hard pressed to see where the plugs were installed.

Etched metal

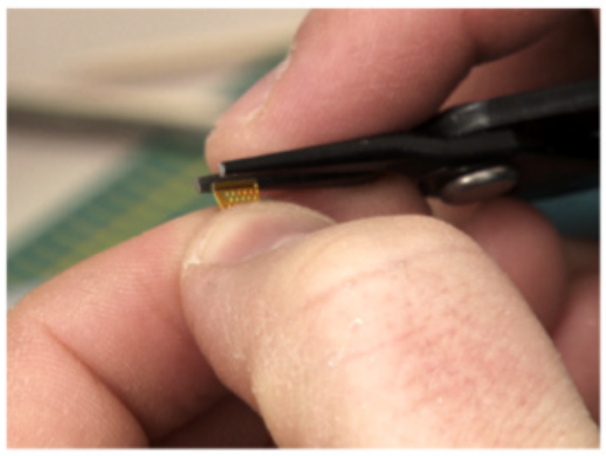
Etched-metal parts typically have a high level of fine detail and are great for adding realism to plastic models.

One of the real game changers in model railroading has been the advent of etched-metal parts. Details for locomotives, freight cars, and vehicles; structure kits; and passenger car sides are some examples of etched-metal items available today.

Though cool, working with etched-metal parts sometimes requires special techniques and tools. In this section, we'll take a look at some practical applications for etched-metal parts and the tools you need to work with them.



One application for etched-metal details is replacing plastic diesel locomotive steps. Here, I'm using shears designed specifically for etched-metal parts to cut Rail Power Products SD45 steps (no. 29230) from a fret. The shears cut through the thin frets without twisting or bending the part.

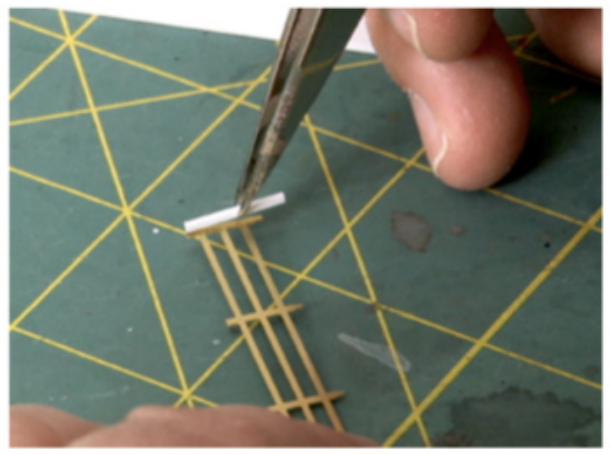


The Rail Power Products steps have fold lines, making it easy to see where each step should be bent. For small parts like this, a pair of smooth-jaw needlenose pliers is all you need to bend the metal. Don't use pliers with serrated jaws, as the teeth will damaged the etched metal.

With the steps bent into shape, I was ready to install them. I used a toothpick to apply a bead of medium viscosity cyanoacrylate adhesive to the top of each styrene mounting strip. Apply the glue sparingly so it doesn't ooze out and plug the see-through holes in the step treads.

Etched-metal is also used for fences. We turned to The N Scale Architect's 3-rail corral fence with gates (no. 61057) for one of our project layouts. The fence had a nice profile, but the posts lack dimension. To remedy that, I cut ½" and ⅜" lengths of .040" x .040" styrene strip.

There is a front and back to the fence. The front has a lip between the post and the rail. The back has no transition between the posts and rails. That's where I attached the styrene strips. I used a Microbrush to apply a bead of medium viscosity cyanoacrylate adhesive to the brass.



I used tweezers to set the styrene in place and aligned it with the edges of the brass. I used the ½" posts on the ends and at regular intervals in between. These posts were set into the extruded-foam insulation foam scenery base. The shorter ⅜" posts sat at ground level.

Etched-metal tools and safety

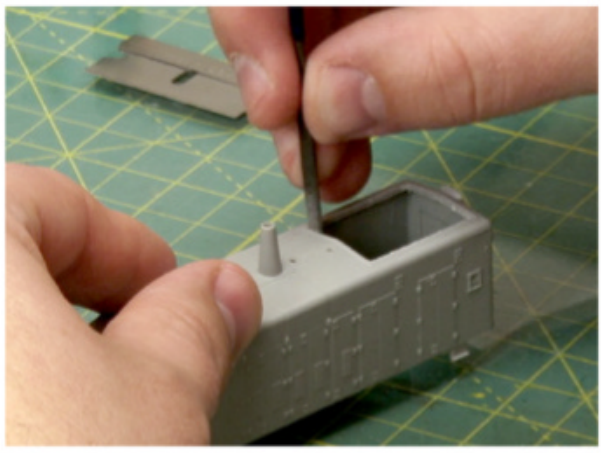
Etched-metal shears and a bending jig are a couple of handy tools for working with etched metal. When working with etched-metal parts, be sure to wear eye protection.

Etched-metal parts can be used to enhance locomotives, freight cars, and scenery, among other things. But to get the best results, you need the right tools. Here are a few of my go-to products.

The first is the Mission Models Etch Mate 3C (Micro-Mark offers a similar product, the Etch Buddy [no. 86143]). Both tools have a double-sided plate for bending and folding etched-metal parts. One side of the plate is for long bends; the other has an assortment of fingers for smaller parts.

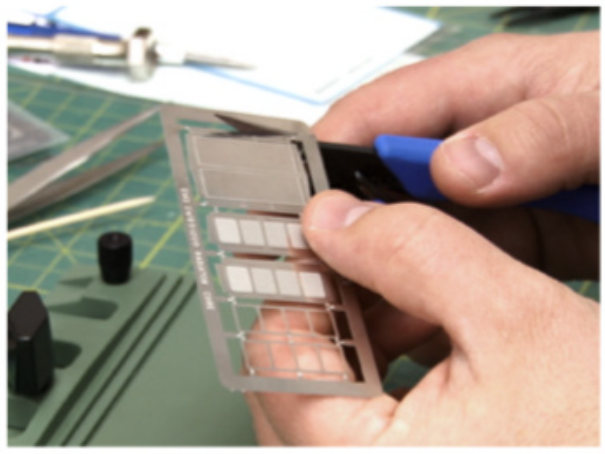
Separating etched-metal parts from the fret without damaging them is critical. For that, I use Xuron professional photo-etch scissors. These are available from the Kalmbach Hobby Store (no. 85013).

When working with etched-metal parts, practice safety first. Handle the parts carefully as the edges are often sharp. When cutting parts from a fret, wear eye protection.



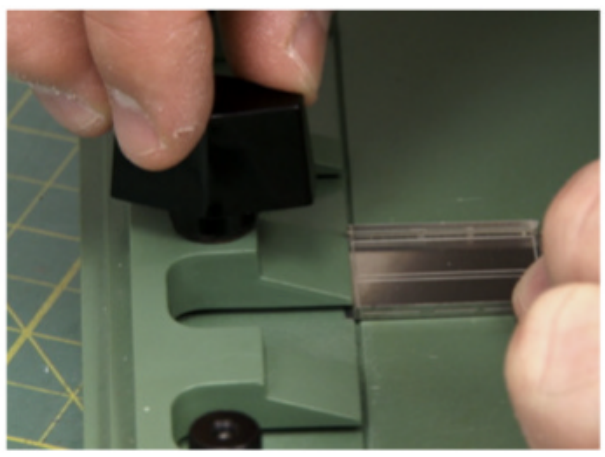
A relatively new face to the world of etched metal parts is Keyser Valley Models (kvmodels.com). I wanted to try the firm's range of detail parts deisgned for an HO scale Electro-Motive Division SW9. First, I removed the molded plastic radiator screens on the front and top of the hood.

Next, I carefully removed molded plastic handrail stanchions. I marked the center of each mounting plate with a pencil. Then I used a punch to create a dimple so the drill bit wouldn't wander off course. To drill through the plastic I used a no. 80 bit in a pin vise.



The radiator core (no. KV-145H) is a multi-piece kit. Before I could turn the flat parts into three-dimensional pieces, I removed them from the sprue with Xuron professional photo-etch scissors.

I used a Mission Models Etch Mate to bend the bottom of the radiator core. I slid the etched-metal part under the plate, aligned it with the fold line, and tightened the thumb screws. Then I used the supplied plastic folding blade to make the 90-degree bend.



To fold the ends I had to flip the plate around so I could use one of the smaller fingers. Then I repeated the folding process as before. You have to be careful when folding etched-metal parts. If you bend them too many times, the metal will fatigue and the part will break.

It's in the bag

There's nothing quite like that sinking feeling of cutting a detail part from a fret and seeing it fly across the room. To prevent that, I hold the fret in a large resealable bag when making cuts. If the part goes flying, it's contained in the bag, making it much easier to find.

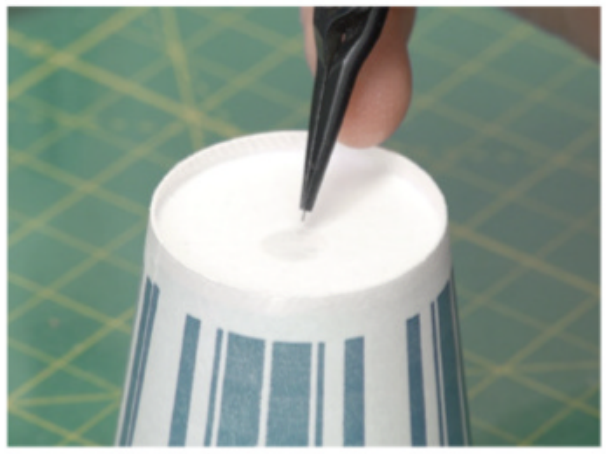
Factory detail kits

This WalthersMainline HO scale Electro-Motive Division GP9 came with drill-starter points for grab irons and lift rings. Cody shares how to upgrade the model using the same firm's detail kit.

Some of today's model railroad manufacturers have multiple product lines that cover various price points. Wm. K. Walthers Inc., for example, has the Trainline, Mainline, and Proto series. WalthersTrainline models feature basic details and printing. WalthersMainline locomotives and freight cars are mid-level models, some of which have drill-starter points for adding detail parts from a separate-sale kit. WalthersProto models are top-of-the-line with prototype-specific details, paint, and lettering.

I'll show you how to install and paint lift rings and grab irons on this WalthersMainline HO scale Electro-Motive Division GP9. Once completed, you'll be rewarded with a good-looking model.

I used Walthers accessory detail kit no. 910-258 for this project. The kit includes a grab iron that goes on the engineer's side of the long hood, lift rings, drop-style grab irons, footboard grab irons (not needed on our model), and instructions. The model has drill-starter points for all of the parts.



With all of the holes drilled, I was ready to start installing the parts. For this project I used medium-viscosity cyanoacrylate adhesive (CA) to secure the metal parts to the plastic model. Installing the lift rings freehand is tricky, so I used a pair of Xuron smooth-jaw tweezernose pliers.

After I'd dipped the leg of the lift ring in the medium-viscosity CA, I guided the part into the hole. Apply gentle pressure when installing the lift rings to avoid damaging the parts. If you feel resistance, stop and check to make sure the hole is free of swarf or other obstructions.

The drilling process for the grab irons is the same as with the lift rings, but the installation is a bit different. After dipping the legs into the CA, I used tweezers to guide the legs into the holes. I like using medium-viscosity CA, as it has a longer working time for making adjustments.

To make sure the grab irons stood off the model at a prototypical distance, I used a piece of .030" x .156" styrene strip. With the CA still wet, I set the styrene between the legs of each grab iron and pushed down with the tweezers. After the glue had cured, I removed the spacer.

I finished the detailing project by adding paint to the bare metal parts. First, I used a fine paintbrush to apply Model Master Gray Primer (no. 4680) to the lift rings and grab irons. Once the primer had dried, I painted the parts Model Master Engine Black (no. 4888).

Cody's quick hitters

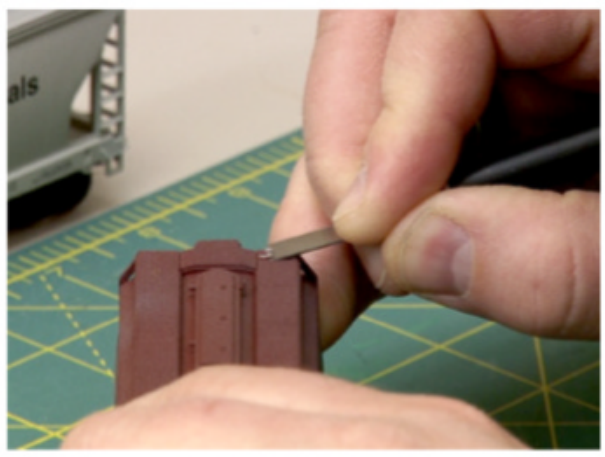
Don't have much time for modeling? Give these quick techniques a try!

The following page features tips that I've presented on "Cody's Office" and "Cody's Workshop" over the years. These are simple things you can do to enhance the details on your locomotives, freight cars, track, and right-of-way. I call them "quick hitters" because they can all be accomplished in a fairly short amount of time.

When you look at a model railroad, it's often the details that separate the good layouts from the great ones. Hopefully this article has inspired you to push your modeling to a higher level.

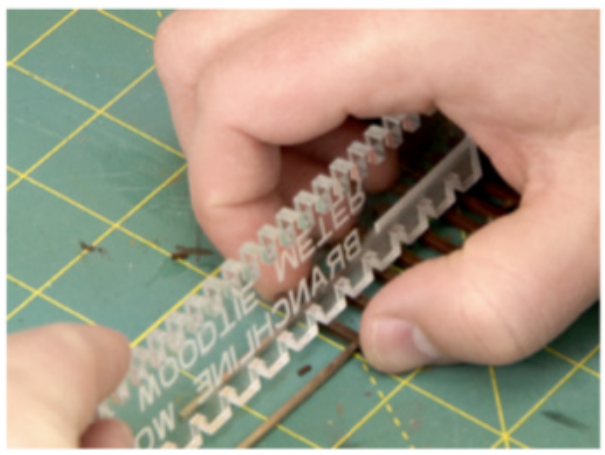
Some Accurail HO scale freight cars have a vertical brake staff (unpainted brass wire and a black plastic brake wheel). To make the parts look more prototypical, I prime the parts to ensure the final color will cover evenly. Then I paint the staff and brake wheel to match the car's body color.

Keeping figures upright isn't easy. First gently sand the bottom of the feet on figures to remove flash or any other rough spots. Then use a toothpick to apply the Woodland Scenics Scenic Accents Glue to the sanded areas. When the glue turns clear it's tacky and the figures are ready to place.

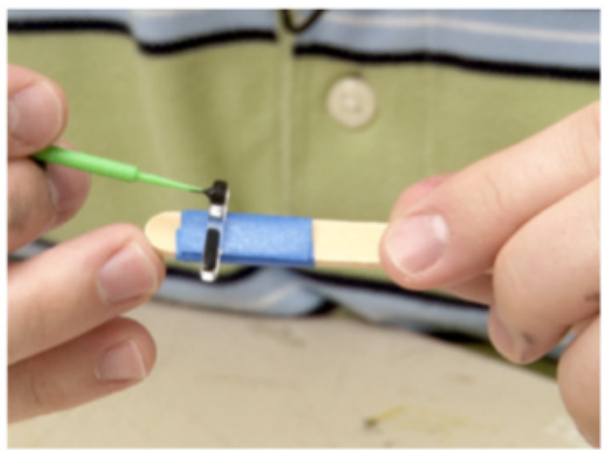


The no. 17 chisel blade is handy for removing molded-on details, such as grab irons. Just put the tapered edge of the blade on the model and shave off the molded parts. Once removed, touch-up the bare plastic with paint and add the wire replacement parts.

A frequent question I receive is how to paint the stripes of contrasting color to step faces on locomotives and cabooses. I use a 4/0 paintbrush to paint step faces. Once the paint has dried, I use a no. 11 blade to clean up the top and bottom edges of the steps.



ANE Model's HO scale Sleeper Spacing Caliper (no. LA002) is a handy way to space ties for branch lines, sidings, and yards. On flextrack, cut the connectors between the ties, slide them apart, and use the caliper to space the ties. The caliper also works great for handlaid track.



Painting locomotive number boards is easy, and you don't have to fire up the airbrush. Instead, loop a piece of masking tape around a wood craft stick. Then attach the headlight and number board assembly to the tape. Once secured, use a Microbrush to apply the paint.

ONBOARD KENT'S

The thrill of riding the rails

by Kent Johnson

While many modelers, railfans, and magazine publishers lament the undignified loss of North America's heralded passenger trains from the Golden Years of Railroading, you won't see me shed any tears. Why no sorrow for the fallen flags? Simple.

In the onset of a brand-new decade, there are still plenty of splendid mainline passenger trains you can hop aboard and ride through some of the continent's most remarkable landscapes. Albeit in redacted form, modern passenger trains like Amtrak's *Empire Builder* and VIA Rail's *Canadian* do their best (with government subsidies) to keep from tarnishing the drumheads of classic name trains.

So rather than throwing shade on a largely unphotogenic Silver Fleet of uniformly branded coaches, sleepers, and diners, I made a decisive choice to explore and enjoy some of the best adventures today's passenger service still has to offer. After traveling in accommodations ranging from a 1950s-era, Budd-built streamliner to the fastest train set flying along American rails, I can relay that the reports of the passenger's trains demise have been grossly exaggerated!

Vancouver

Seattle

Portland

3 Cascades

Winnipeg

7 Grand Canyon Railway

Grand Canyon

Williams

1 VIA Rail *Canadian* Train No. 1

Miles: 942
Duration: 38 hours
Stops: Toronto-Winnipeg

A North American rail odyssey isn't complete without a journey on this renowned train. Although the western Canadian scenery of this 2,769 mile transcontinental journey garners much of the fanfare (Drew's Trackside Adventures: Eps. 36-38), buying a discounted Sleeper Plus Class ticket for just the eastern segment proved to be a more affordable option. One that includes every bit of the nostalgic appointments, retro charms, and exceptional customer service expected at an archetypal downtown terminal (Toronto Union Station) and aboard a streamlined train set.

2 Amtrak *Acela* Train No. 2166

Miles: 270
Duration: 5 hours
Stops: Philadelphia-New York-Boston

Exploring true high-speed rail travel in Europe and the Orient is a bit out of reach for me. However, the Acela's best effort to replicate upscale, lightning-speed passenger service offered a good glimpse at what the future could bring stateside. Along with the speed of travel (tops out at 150 mph), the First Class appointments (appetizing cuisine, complimentary adult beverages, assigned seating) were also worth expending every last one

WATCH IT!

You can catch a glimpse of KJ's Onboard Adventures and Drew's Trackside Adventures by visiting MRVideoPlus.com/TUG20

of my Amtrak Guest Rewards rail miles to enjoy. But the opportunity to join my father for his first foray into express rail travel…now that was priceless!

3 Amtrak *Cascades* Train No. 518

Miles: 312
Duration: 8 hours
Stops: Portland-Seattle-Vancouver, B.C.

Crossing the U.S. or Canada entirely by train is a feat I need to undertake – while it's still an option! But after riding aboard Amtrak's Pacific Northwest service, I can at least say I've crossed the U.S./Canada border by train. A Business Class ticket allowed me to be seated alongside MRVP's Charlie Conway between Seattle and Vancouver, B.C., plus enjoy a respectable bistro car menu that included freshly prepared clam chowder. But the biggest perk of this shoreline route had to be quick clearance through Canadian customs at Pacific Central Station!

4 Amtrak *Capitol Limited* Train No. 30

Miles: 593
Duration: 18 hours
Stops: Chicago-Pittsburgh-Washington, D.C.

5 *Silver Star* Train No. 91

Miles: 233
Duration: 6 hours
Stops: Washington, D.C.-Richmond-Raleigh

A few days before Christmas, one of the busiest travel periods of the year, I found myself boarding a venerable Superliner sleeper…and actually looking forward to a family journey to North Carolina! Travel during the winter holidays can devolve into headaches and hassles, but making it a family affair aboard a distance train rarely fails to be fun for us. The pulse rates for all in the Johnson Five plummeted from the moment we settled into Chicago's Metropolitan Lounge to await departure for D.C. Conversation (complimentary beverages too) flows and laughter grows, as my octogenarian parents work the room until our train is called. Even then, there was no need to rush, as Amtrak Red Cap service was set to ferry my folks and their luggage straight to the platform. Once on board, we indulged the "contemporary dining menu" experience before settling into adjoining bedroom compartments. While the dawning of Christmas Eve from aboard a train brought us all joy, the sentiment was heighten upon realizing we'd get to continue the fun *together*…on No. 91!

6 VIA Rail *Ocean* Train No. 15

Miles: 836
Duration: 22 hours
Stops: Halifax, N.S.-Montreal, Q.C.

Securing a chance to ride aboard the maligned Renaissance passenger fleet (See Drew's Trackside Adventures: Ep. 35) was worth going the extra distance to reach eastern Canada's bustling port city. Unfortunately, the compact European car set would be sidetracked for the 22-hour trek. Alas, my up-sized accommodations aboard Budd-built streamliners gave me no room to grouse. While en route to Montréal, I'd be treated to wondrous winter scenery and a sensational, seaboard sunrise. A prepared dining car meal enjoyed in the company of a decorated Canadian Army veteran and the eclectic musical stylings of the Israeli songstress in the dome car confirmed that the same charms of *The Canadian* can be had at a fraction of the No. 1 fare!

7 Grand Canyon Railway Train 10:30 a.m. departure

Miles: 65
Duration: 2 hours
Stops: Williams-Grand Canyon National Park

More than a century ago, a great trip to the South Rim of the Grand Canyon began and ended along the rails. Today, The Grand Canyon Railway continues operating both steam and diesel-powered excursions to and from U.S. National Park Service's Grand Canyon National Park. Even in the midst of a hot Independence Day visit, it was easy to keep the Johnson Band in comfort aboard *Coconino*, a former Northern Pacific Ry. dome coach built by Budd. But even beyond the ride, the accommodations (including pool and dining options) at the Grand Canyon Hotel, situated just steps away from the former Santa Fe depot at Williams, Ala., offers railfans plenty of sites to explore, plus prime trackside views of BNSF main line action.

Developing a long-range (track) plan

Pencil sketches, key scenic elements, and new rolling stock all inspired David to consider developing another expansion plan for his On30 Olympia model railroad. – Bill Zuback photo

Planning a layout that can be built in stages keeps the hobby interesting

By David Popp
Photos by Bill Zuback and the MRVP staff

WATCH IT!

Learn more about model railroad design as David shows you how from start to finish in "Designing a Layout," a 9-part series on MRVideoPlus.com and on DVD at Kalmbachhobbystore.com

In my book, the sooner you are able to run a train, the better. After all, that's usually the point of building a model railroad – running trains. If you approach building your layout in manageable sections, no one task becomes too monotonous, you see results quickly, and you enjoy working on your railroad even more.

When building a layout, unless you're trying to replicate a specific location, you don't always need to know everything you want to build up front to get started. And it's good to approach any layout construction project with an eye for eventual growth. Giving yourself the potential to expand the railroad often produces creative opportunities to do so later.

As such, I'm in the process of planning the third section of my home On30 layout, Olympia. Although I didn't have a master plan for this railroad when I set out to build the first piece, or even the second, I've since created a roadmap for possible projects that would keep the little logging line going for several years to come.

And even if I don't follow the plans shown here, just knowing the layout has the potential to grow is part of why I enjoy building a model railroad. Much like the rail barons of old, I love the thrill of expanding the empire! It keeps the hobby fresh and fun.

Olympia 1 and 2

The original Olympia was big on charm, even if it was short on space. This view shows more than half of the visible layout, where unfortunately the log pond, saw mill, and log camp were all on top of each other at one end of the railroad.

No two ways around it, the original Olympia logging layout was small. The top photo shows most of it. The premise for the project was to see how much modeling I could get into a small living space (See *Model Railroading: The Ultimate Guide Vol. 1*).

I used the 10 x 11-foot dining area of the condo we rent for vacation as an example and developed a plan with a 22" x 78" footprint built into a self-contained furniture-quality cabinet. The layout had to share the space with the table and chairs, so it had to look like it belonged.

The first Olympia had just 10 square feet of visible modeling space and only two turnouts. I used a space-saving sector plate to get between the mill, log camp, and staging tracks.

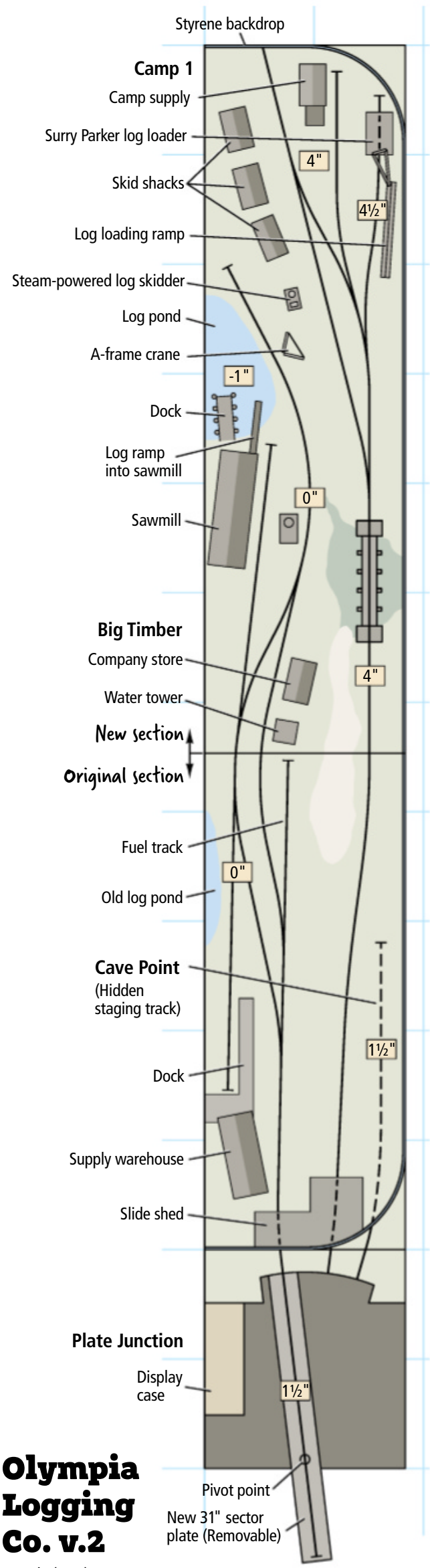
For the modeling scale, I selected On30 (O scale narrow gauge) trains. Though the trains are compact, O scale allows for a lot of detail, and detail it had. Despite its small size, the layout provided plenty of model-building and scenic detailing opportunities. And it was fun to run… to a point. It needed more space to really make it enjoyable to switch.

As shown in the photo below and the track plan on this page, the Olympia 2 addition doubled the size of the railroad. The addition required reworking about half of the original layout, but it added some much-needed track and structures. The layout became a lot more fun to run, too, as the addition enabled the model railroad to simulate the activity of hauling logs from the camp to the mill and cut boards from the mill to market.

Track plan at a glance

Name: Olympia Logging Co. v 2.0
Scale: On30 (1:48 narrow gauge)
Size: 1'-10" x 13'-0"
Minimum radius: NA
Minimum turnout: Peco On30 code 100
Maximum grade: 6.9 percent

Adding Olympia 2 to the original layout required some significant modification to the railroad, requiring the removal of all the foreground track. This view shows how the two sections now blend smoothly together as one 13-foot layout.



Olympia Logging Co. v.2

O scale (1:48)
Layout size: 1'-10" x 13'-0"
Scale of plan: ⅝" = 1'-0", 12" grid
Illustration by Rick Johnson

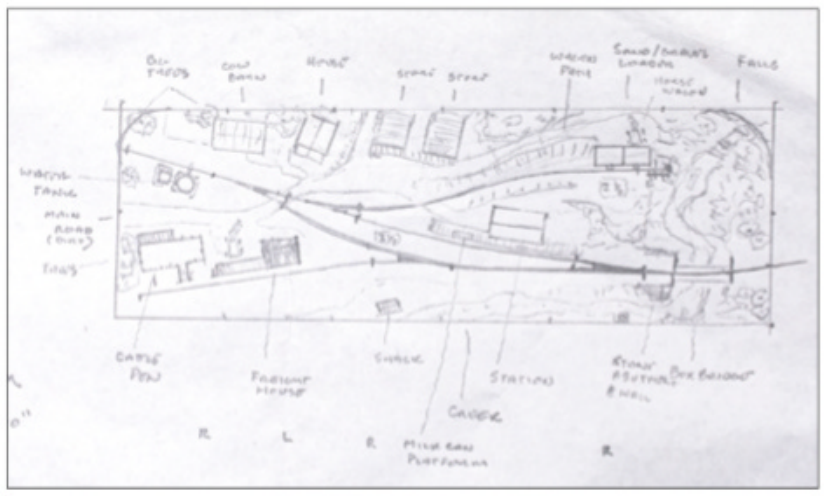
Find more plans online in the ModelRailroader.com Track Plan Database.

>> Olympia 3 - Sand Creek

Gerry Leone came for a few days last summer to help me build the benchwork box for section 3 in 90-plus degree heat. You can watch us build the benchwork at MRVideoPlus.com/TUG20 for free.

I wasn't even finished with Olympia 2 when the wheels were already turning for another expansion. I'd left an opening in the end of the benchwork to accommodate a track that could pass to a new section and just couldn't let that go to waste!

Since I'd already modeled a sawmill and small logging camp, I wanted something different for the new section. I liked the idea of the logging railroad breaking through the forest to get something else it needed, such as gravel for ballast, and in doing so, providing a small town a connection to the outside world.



Sometimes I get lucky on the first try. One sketch was all it took to come up with a plan I liked for Sand Creek. However, it then took me five tries to get a scale version that would actually fit the space.

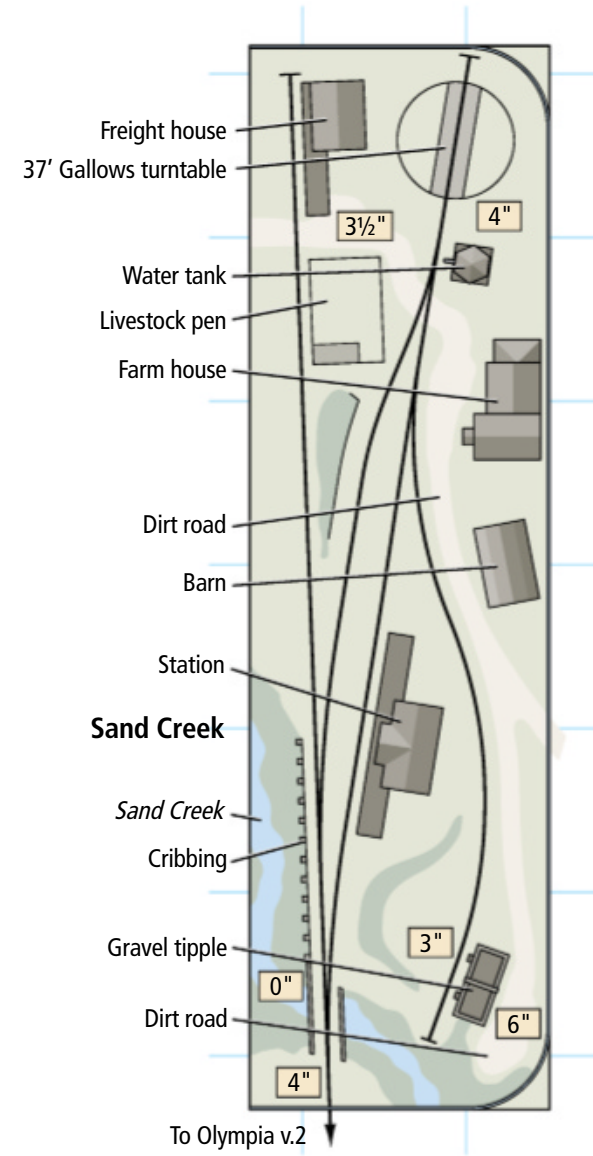
One afternoon while at my workbench, I picked up a scrap piece of paper and in about 15 minutes doodled the Sand Creek addition. The results are shown in the photo below. Later, I turned my sketch into the track plan shown here, although I needed to add an extra 6" to make it all work.

Sand Creek fills another 6 ½-foot box and is designed to plug into the end of the railroad. It features a small depot, a freight house, a stock pen, and a track that doubles back down a hill to a hint of a quarry with a two-pocket gravel loader. There's a path to the top of the loader for ore wagons to fill it.

Later, I came across a fun little gallows turntable kit from Kitwood Hill Models. I'd never built a turntable, so I added the smallest one the company offers (9" in diameter) to the end of the layout. Since I'd acquired an 0-6-0 tender locomotive to serve Sand Creek, I plan to use the turntable to turn the locomotive for its trip back through the woods.

Olympia v.3 – Sand Creek

O scale (1:48)
Layout section size: 1'-10" x 6'-6"
Scale of plan: ⅝" = 1'-0", 12" grid



Track plan at a glance

Name: Olympia & Sand Creek
Size: 1'–10" x 6'–6" (overall layout 1'–10" x 19'–6")
Minimum radius: NA
Minimum turnout: Peco On30 code 100
Maximum grade: 3 percent (down to quarry)

A Farm House's Story

While I was planning the town of Sand Creek, I found an Arttista figure at a local hobby shop of a woman milking a cow. My wife grew up on a dairy farm, so I decided I wanted to include a small farm scene on the new section. At the same time, I was also in the process of working with Renee Grosser to do a series of videos for MRVP on scratchbuilding structures. Since Renee was going to need a modeling subject, I sent her a few photos of my wife's family farm house. (The original two-story part was built before the American Civil War!) As shown in the photo here, Renee did a great job on the model, which will hold a place of honor behind the depot. You can watch the first part of Renee's scratchbuilding series of videos for free at MRVideoPlus.com/TUG20 today.

Olympia 4 - Quarry Falls

While I liked the idea for Sand Creek well enough, I wanted the quarry to have more room. I also wanted a better stretch of creek scenery. And admittedly, 20 feet of linear model railroad doesn't fit easily into many spaces. An L shape needing around 16 feet of straight wall on any one side would work much better. So, I started drafting plans for a corner section.

I tried various sketches, but all of them had a common problem – they were too large to get up or down the basement stairs. Eventually, I wizened up and worked on first designing a corner benchwork section that could be carried out of the basement before coming up with a track plan to put in it.

I nicknamed the new section "the football" because of its shape. From point to point, the football measures just under 5 feet in length, and its 30" width allows it to fit through most any normal stairway or doorway.

Quarry Falls is designed to plug in between Olympia 2 and 3, stretching the run between the logging camp and town. The focal point is the quarry, complete with two tracks, the gravel loader taken from the Sand Creek section, a supply shed, and a much-expanded ore wagon path. To move the quarry to its new home required reworking a small 18" patch of scenery and track on the Sand Creek section.

The second major point of interest on the Quarry Falls section is its scenery. It includes a lot more creek, as well as a pair of small waterfalls and a couple of new trestles – all of which will provide some breathing space between the more densely packed sections of the layout. They will also make for some fun scenery modeling projects.

I've spent many enjoyable hours building Olympia and Olympia 2, largely thanks to taking on the construction projects in manageable-sized chunks. I am just as excited to continue with Sand Creek, Quarry Falls, and beyond using this technique.

As of now, the Sand Creek benchwork is already built, and it's just a matter of time before the new series of videos will begin.

Try this!

Building a layout in sections also has the benefit of spreading the cost of materials over time!

Olympia by the numbers

We've thoroughly covered the construction of our On30 Olympia project railroad on MRVideoPlus.com. Here are just a few of the key numbers:

41 The number of videos from the original Olympia 1 series.

27 The number of episodes of our Olympia 2 Log Blog series.

6 The episodes of the Summer Camp logging scene series.

1 Lumberyard shopping tips video for building benchwork.

1 A related video where we install DCC sound and a capacitor pack in a Bachmann Heisler.

30+ The number of hours of Olympia project coverage available on MR Video Plus.

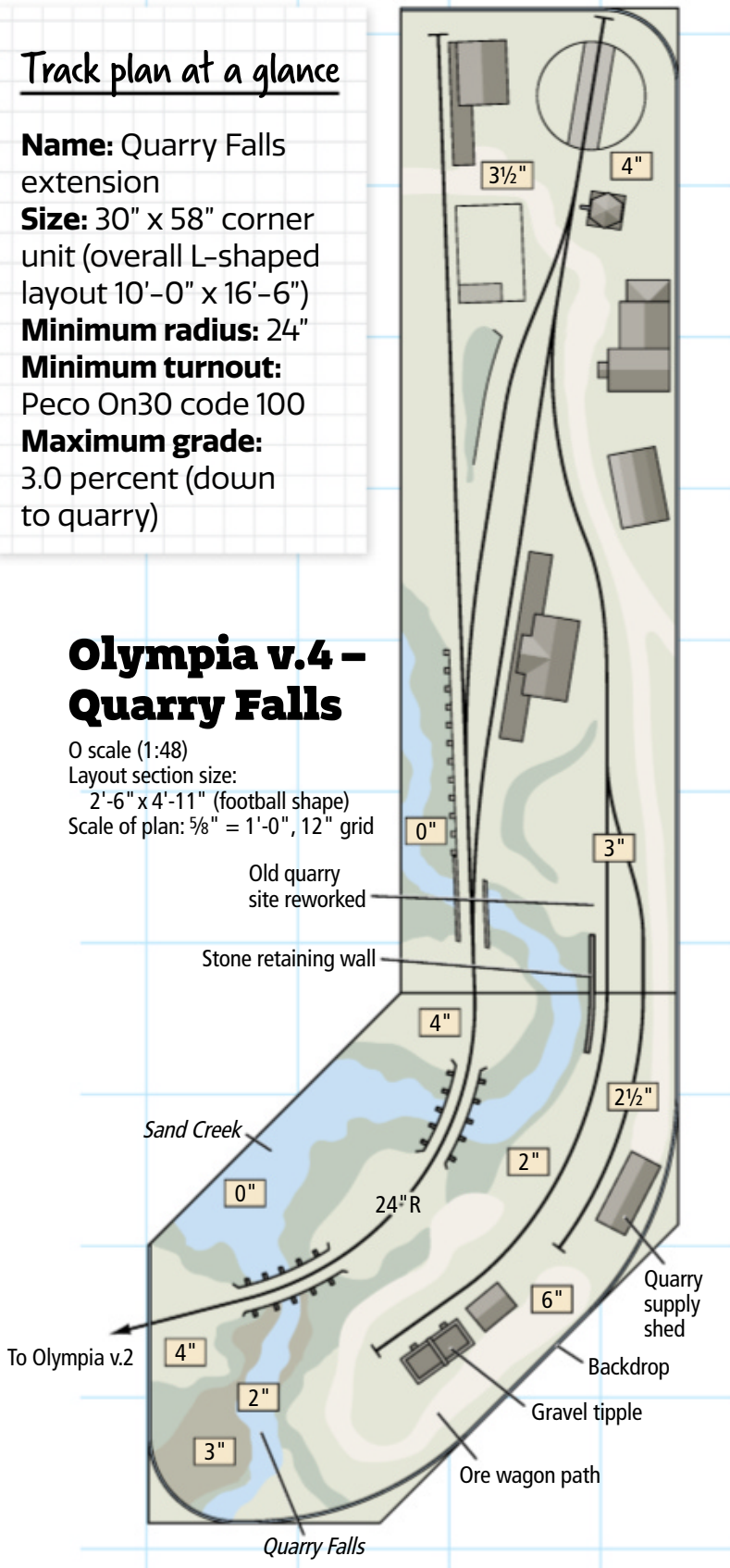
To watch it, simply subscribe to MRVideoPlus.com and get started on an amazing adventure today!

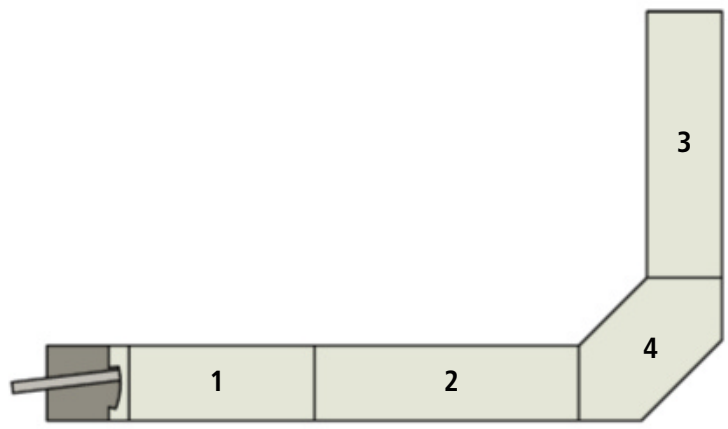
Track plan at a glance

Name: Quarry Falls extension
Size: 30" x 58" corner unit (overall L-shaped layout 10'-0" x 16'-6")
Minimum radius: 24"
Minimum turnout: Peco On30 code 100
Maximum grade: 3.0 percent (down to quarry)

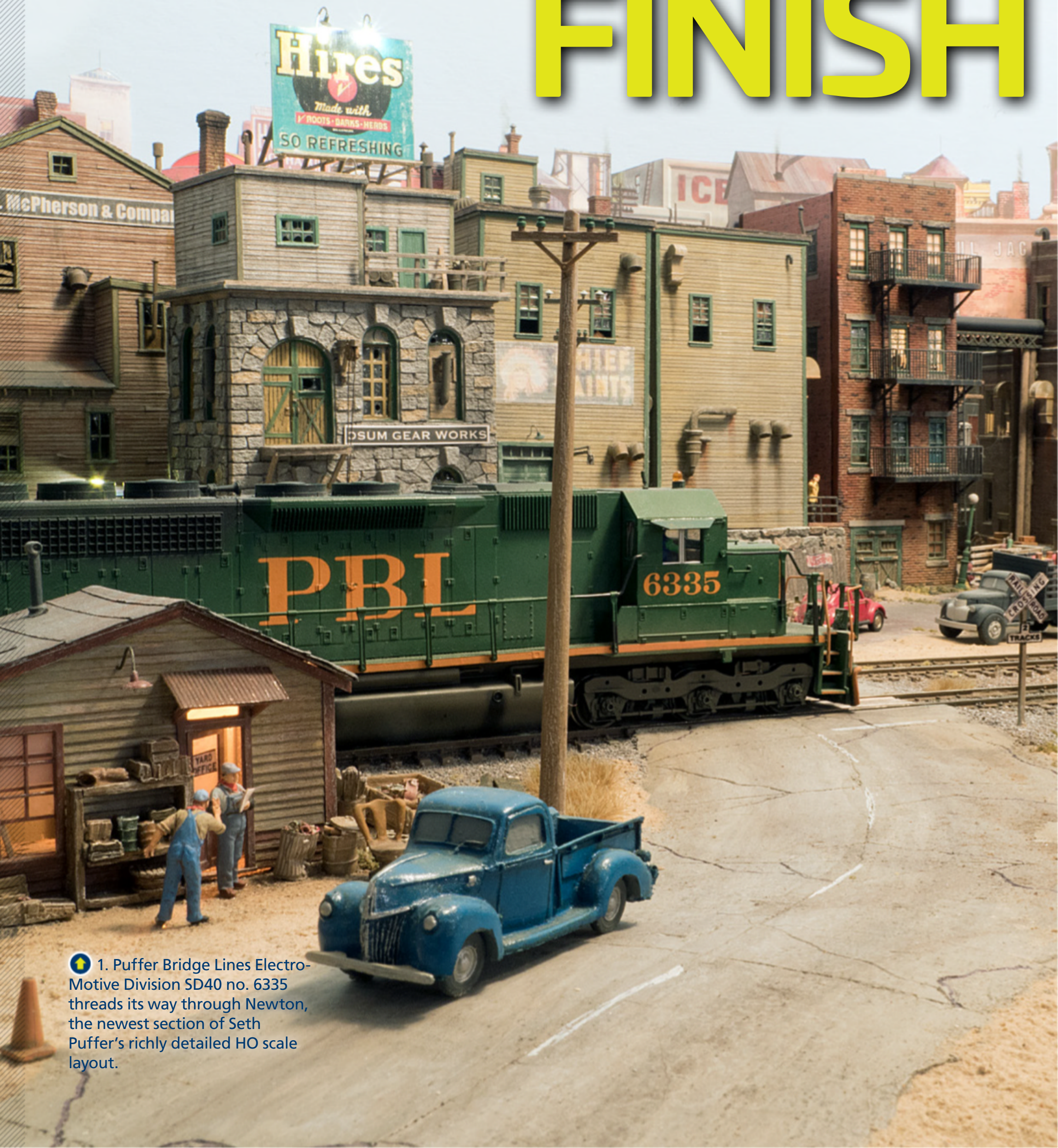
Olympia v.4 – Quarry Falls

O scale (1:48)
Layout section size:
2'-6" x 4'-11" (football shape)
Scale of plan: ⅝" = 1'-0", 12" grid





Approaching the FINISH



1. Puffer Bridge Lines Electro-Motive Division SD40 no. 6335 threads its way through Newton, the newest section of Seth Puffer's richly detailed HO scale layout.

LINE

After two decades, this freelance 14 x 25-foot HO scale layout nears completion

By Seth Puffer
Photos by Gerry Leone

Rarely is a model railroad truly complete. But after nearly two decades of work, the finish line is in sight for my freelanced HO scale Puffer Bridge Lines (PBL). The 14 x 25-foot model railroad, which I describe as a figment of my imagination, is set in the United States and features urban, mountain, and hillside communities. One theme that ties the towns together is detailed scenes with kitbuilt, kitbashed, and scratchbuilt structures.

Work started on the Puffer Bridge Lines in early 2001, shortly after my wife and I moved into our new house. With the help of family and friends, I went from having an unfinished basement to having the mainline installed and operating in less than six months.

Over the next seven years, my friends and I continued making steady progress on the new Puffer Bridge Lines, completing the towns of Aurora, Kirscht, and Grosser's Gulch. You can read about the early years of the PBL in my article "Restarting from scratch" published in the February 2009 issue of *Model Railroader*.

In the track plan that accompanied the story, there was a section between the river and Grosser's Gulch depicted with bare plywood and labeled "under construction." That's where my efforts have been focused since. I made a few minor tweaks to the track plan, as shown on page 45. The plywood is now covered with scenery and structures. And the empty space between the river and Grosser's Gulch is now home to Newton and McRae, two new stations for the PBL and sister railroad, the Turtle Creek Central (TCC).

WATCH THIS ON

Free Video!
Take a video tour of Seth Puffer's HO scale Puffer Bridge Lines at MRVideoPlus.com/TUG20

2. Puffer Bridge Lines Electro-Motive Division MP15 no. 95 waits on the lead at the north end of Aurora Yard for a passing grain train. The MP15 is a Con-Cor model that Seth upgraded with a Kato drive, new handrails, and extra details.

3. Though the focal point of Aurora is the large classification yard, the town is home to some rail-served customers. Here, Puffer Bridge Lines Electro-Motive Division NW2 no. 82, a second-hand unit acquired from Burlington Northern, spots a boxcar at Moore & Co. The siding for Moore & Co. is also the entrance to the staging track that runs behind the backdrop buildings.

With the major work complete on the layout, I now have time to add more details, try new modeling techniques on existing scenes, and run trains. As you'll see on the following pages, I really enjoy the freelance aspect of the hobby.

Aurora

The heart of operations for the Puffer Bridge Lines is Aurora, home to the railroad's large classification yard. To give Aurora a big-city feel, I lined the backdrop with a variety of multi-story structures. Some of the buildings are from my previous PBL layout, featured in *Great Model Railroads 2002*. Others I've built from kits, kitbashed, or scratchbuilt since starting work on the layout shown here. I wanted the Aurora skyline to feature wood and brick buildings of varying heights with unique roof lines to let visitors know they were on the edge of a big city.

An overpass, which spans the yard at a slight angle, provides access to the elevated portion of Aurora. But the Rix bridge kit is more than just a way to bring vehicles to and from the city. It also provides a visual break for the town, which occupies about a third of the layout.

To the right of the overpass is the yard office, North Aurora Tower, and smaller businesses that serve as a transition between the city and the wooded, mountain terrain leading toward Kirscht and Grosser's Gulch. To the left is the engine terminal, complete

with a sand column, fuel stand, turntable, and roundhouse (see page 51 for more on this area). South Aurora Tower is located at the edge of town, where the city starts to give way to wooded, rocky terrain.

Newton

Completed in February 2019, Newton is the most recent addition to the model railroad. I consider Newton to be on the edge of a larger town that's mostly off the layout.

I initially considered building a two-level town here, but when I started working on the area, I quickly realized that I'd run out of room if I added another spur. Then I considered what you see most often from the track side of any town, the backs of buildings. Approximately two-thirds of the structures in Newton are less than 2" deep.

Newton is home to a few rail-served industries. Jeffries Point Stave & Heading, a Fine Scale Miniatures kit, receives wood and metal products in boxcars to make barrels, containers for construction materials, and other miscellaneous wood products. The finished products are also shipped by rail in boxcars.

VanDeWater Freight & Storage primarily receives less-than-carload lot shipments. The industry, which I scratchbuilt and named after my good friend Art VanDeWater, also receives quite a bit of material for Mitchell & Godfrey Distillers as it doesn't have its own siding.

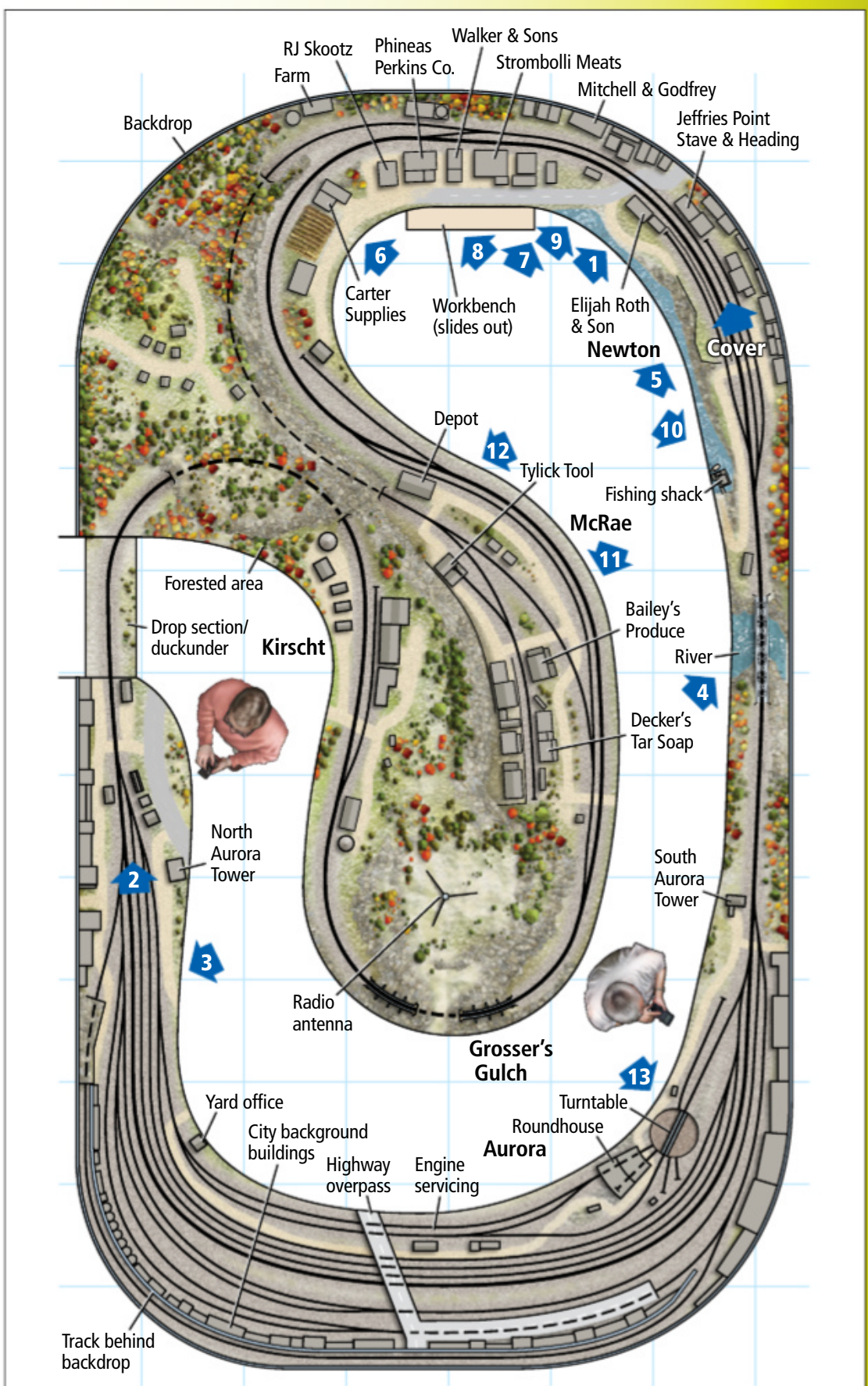
The final rail-served customer in Newton is Elijah Roth & Son, built from a Fine Scale Miniatures kit. The business originally catered to the local machining industry, producing tools and supplies. After some time, Elijah became interested in collecting scrap metal and turning a buck on it, so a scrapyard was born. He convinced the railroad to put a spur in. Now the industry ships out scrap metal of all kinds in gondolas.

Most of the other structures in Newton are scratchbuilt to fit the space they had to occupy. I'm fortunate that Dave Proell, owner of JL Innovative Design, lives just up the road from me. Dave has supplied me with most of my scratchbuilding supplies over the years.

In the February 2009 MR article, I noted that the layout wasn't signaled. I've since added a manual signal system to the model railroad. I use the local turnout control panels with toggle switches to change the signal aspects. A few years back I added a Logic Rail Technologies Searchlight Master circuit so the signals at mainline turnouts would display an amber aspect for the diverging route.

Adding working signals was a long and sometimes frustrating process because of the wiring runs. It took approximately two months to complete. I started to realize that I'm getting too old to crawl under the layout that much.

The scenery in Newton follows methods I used elsewhere on the layout. I started by building a cardboard lattice. I covered the



Puffer Bridge Lines

HO scale (1:87.1)
Room size: 14 x 25 feet
Scale of plan: ¼" = 1'-0", 24" grid
Numbered arrows indicate photo locations

The layout at a glance

Name: Puffer Bridge Lines
Scale: HO (1:87)
Size: 14 x 25 feet
Maximum grade: none
Benchwork: modified L-girder
Height: 53"
Roadbed: N scale cork
Scenery: plaster cloth over cardboard lattice
Backdrop: tempered hardboard

Newton

4. Engineer Art VanDeWater looks down from the cab of CF7 no. 2496, dreaming about a lazy day on the river with a fishing rod and bucket full of fresh fish. But today he's in charge of getting freight back to Aurora Yard. Seth used Enviro-Tex Lite, a two-part resin, to model the river. The figures, boats, and canoes are from Preiser and Woodland Scenics.

5. An employee from Jeffries Point Stave & Heading Co. enjoys some impromptu railfanning while finishing a cold soda during his break. The structure is from George Sellios' Fine Scale Miniatures line. The photo illustrates the high level of detail Seth adds to each scene, including open factory windows, discarded materials, and a barricade, among other items.

Seth's structure showcase

The variety of kitbuilt, kitbashed, and scratchbuilt structures is what I feel makes my Puffer Bridge Lines unique. When I was building my previous layout, I discovered that I enjoyed building craftsman kits. Dave Proell, owner of JL Innovation Design (jlinnovative.com), had just introduced his line of craftsman kits at the time, and I built many of his early offerings.

As my skills matured, I found I had an even greater interest in building my own structures. Many of my buildings started as drawings I made in a sketchbook. After seeing something I liked in a magazine or on someone else's layout, I would sketch my own version of it.

I've been lucky to meet many great modelers and friends who have added inspiration to my work. Since my current layout is essentially complete, I plan to go back and redo some of my early buildings using the techniques I've developed over the years.

6. Carter Supplies is a FOS Scale Models kit. "I liked it the minute I saw it because it has cool roof angles," Seth notes. "It was the perfect size for this spot, and I added extra details to complement the ones that came with the kit."

lattice with Woodland Scenics plaster-impregnated gauze strips. I made the rock outcroppings using Bragdon Enterprises latex rock molds. Since I have less than a half dozen molds, I rotated the castings so they wouldn't look repetitive.

I used Woodland Scenics stains and a brush to color the early castings. A couple of years ago, I switched my stain application technique. I noticed that the stains have a water-like consistency, so I tried applying them with an airbrush. It was a stroke of genius and greatly sped up the process. I finished up the rock castings with an alcohol and India ink wash and some drybrushing.

The trees are largely Scenic Express SuperTrees. After cleaning up the trees per the instructions, I sprayed them with unscented hair spray and flocked them. I knew I wanted to set the layout in the fall, and I'm pleased with how the autumnal foliage looks. There are also some pine trees from various manufacturers mixed in.

There's plenty of rail traffic in Newton as it's one of two junctions with Turtle Creek Central (TCC), a sister road of the PBL. The TCC and PBL work in concert with one another. The TCC is often tasked with spotting cars in Newton for the PBL, especially during the grain rush. The PBL has become increasingly busy running grain shuttles. The railroad also has new business moving liquefied-petroleum gas in unit trains.

McRae

The other new scene is McRae, a small hillside town that I completed in late 2012. The town has some light, rail-served manufacturing. Of course, the idea of "up in the hills" is kind of funny, since the layout has no grade whatsoever.

Like Newton, McRae is also home to a junction with the Turtle Creek Central. I view the TCC as a "pressure relief valve" for the PBL, and it provides another routing option for traffic. Except for a few short sections, the TCC is largely hidden from view. The tunnel behind the McRae depot leads to the hidden trackage. In reality, I use this track to stage TCC trains. The other end of the tunnel comes out near Newton. Most of the business the TCC handles isn't visible.

7. With its local switching completed, Puffer Bridge Lines Electro-Motive Division SD40-2 no. 1652 backs down the mainline with an empty bulkhead flatcar to couple onto its train. In the background is Mitchell & Godfrey Co., a FOS Scale Models kit that Seth expanded. The three structures to the left are all scratchbuilt. Seth designed and built the structures to fit into the hillside.

8. On the outskirts of Newton is this cluster of buildings that Seth built from structures included with two different Fine Scale Miniatures kits. “What I love about these kits is the incredible wealth of detail that George Sellios includes with them,” Seth notes. He added figures and vehicles to the scene. In the background is a Puffer Bridge Lines grain extra approaching Newton.

Weathering figures

9. A wash of oil paint adds to the realism of these stock Preiser figures. Notice how the wash gives the facial features better definition and helps tone down the vibrant clothing colors.
SETH PUFFER PHOTO

I remember watching an Allen Keller *Great Model Railroads* video many years ago that featured George Sellios' HO scale Franklin & South Manchester layout. I noticed that the figures looked just as weathered as everything else on the layout. I found out later that he used an India ink and alcohol wash on them. The wash not only toned down the paint on the figures, but it gave their features definition.

At the time my layout had lots of figures that stuck out because of their brightly painted clothing. That convinced me to try the India ink and alcohol wash weathering method. About seven or eight years ago I began using artists' oils for weathering structures. Not long after that, I began using a thinned version of the same colors on figures. I was impressed with the results and continue to use this method today.

10. Using the last bits of available light, the photographer was able to capture this image of Puffer Bridge Lines CF7 no. 2496 easing into Newton to do some switching. The fishing shack, a modified Builders in Scale kit, is located near the edge of the layout. "I get all kinds of great comments about it," Seth said. "Of course, it's loaded with details."

The railroad just moves cars from one place to another.

There are three key structures in McRae. Bailey's Produce was the first Fine Scale Miniatures kit that I built. The industry receives occasional carloads of produce.

Decker's Tar Soap was the first FOS Scale Models kit that I completed. I purchased the kit because of the varied roof angles, something I appreciate about structures in the FOS Scale Models line. This industry receives boxcars and tank cars with materials for soap manufacturing.

Tylick Tool is a Bar Mills Scale Models kit I purchased because its namesake, Mike Tylick, is a friend. We got to know each other 20 years ago when I visited his layout on a trip to the East Coast, and we've managed to keep in touch since.

The industry has a short spur that can't handle any car larger than 40 feet. Tylick Tool, like many of the other businesses along the tracks in McRae, primarily receives less-than-

12. A heavyweight passenger car tacked on the end of a freight train can only mean one thing – the railroad president has come to town. He's paying a nighttime visit to the McRae depot to check in on the third trick crew. The McRae depot is scratchbuilt, based loosely on a Soo Line prototype. As with other structures near the layout's edge, the depot is detailed inside and out.

11. As old man Wilson takes his dog for a walk, PBL GP35 no. 714 eases back toward the main line after dropping a car at the interchange. Bailey's Produce Co. is a Fine Scale Miniatures kit. The buildings to the right are all scratchbuilt. Preiser and Woodland Scenics figures fill out the well-detailed scene.

carload lot shipments that are unloaded at the dock. The other buildings in McRae are scratchbuilt to fit the space.

As you can see in the top left photo, the roads in McRae aren't paved. The gravel for

13. The day is winding down and the shadows are getting long, but the work continues on at the Aurora Yard roundhouse. Though it may not be the biggest or newest facility, the skilled crew at Aurora Yard deftly maintains the Puffer Bridge Lines eclectic mix of diesel locomotives. Here, General Electric U30B no. 894 takes a ride on the turntable while a couple of Electro-Motive Division units are tended to inside the roundhouse.

the roads was supplied by my friend Art VanDeWater. He was living in Winona, Minn., at the time and sourced the scenery material from a local baseball diamond. I used turf, weeds, and details in the off-road areas to further reinforce the town's industrial theme.

Aurora roundhouse

The south end of Aurora is where my scratchbuilt two-stall roundhouse, turntable, and light engine servicing terminal is located. I took a piece of lined, legal-sized paper, laid it over the tracks, and said, "This is where I'm going to build a roundhouse." As I was building it, I thought, "Wouldn't it be cool if I was able to take the roof off and detail the interior?"

The wood-frame roundhouse has numerous interior and exterior details, and it's illuminated. I spent way more time on it than I needed to, but I get a lot of complements on the roundhouse. Visitors often want to know what kit it's from. And I say, "Well, it's just out of my mind."

The motorized 90-foot turntable is a Walthers Cornerstone product. I weathered the turntable from top to bottom, and added grass and weeds to the pit. As shown in the photo above, I installed a fence made from scrap rail and chain on two sides to prevent inattentive drivers (and pedestrians) from winding up in the bottom of the pit.

What makes the roundhouse unique is that one track goes through the back of the structure to a turnout. Diesels can then go down one of two tracks served by the fuel stand and sand column behind the roundhouse near the overpass.

More time coming soon

I'll be semi-retiring in a few months after nearly four decades in broadcast television, so I hope to have more time to make the Puffer Bridge Lines even better.

I'm currently working on a Digital Command Control decoder installation for one of my Turtle Creek Central diesel locomotives. Future projects include upgrading foreground trees, weathering freight cars, and replacing structures I built in a hurry to fill spaces. As you can see, I really enjoy scratchbuilding, so that should be easy.

For now, though, I'm going to enjoy running HO scale trains across this 14 x 25-foot figment of my imagination.

By David Popp
Photos by Bill Zuback

Kitbashing is the key to variety

10 different ways to change up a common plastic structure kit, and tips for more

All of the structures on this page were built starting with parts from the same kit, using a technique called kitbashing. It's a great way to turn a stock model into something that's completely your own.

While there are many great structure kits available for model railroaders, when they're built following the instructions, they're easy to spot on other people's layouts. If you're looking for something a bit different for your own model railroad, then kitbashing is a great solution. Kitbashing uses parts from one or more stock kits, but combines the pieces in new ways to produce unique models. It's a fun, creative way to populate your layout with structures that don't look like anyone else's.

Recently, MR Video Plus held a kitbashing challenge, giving staff members and several of our contributors the same plastic structure kit to see what each person could make of it. For the challenge, we used State Line Farm Supply, a Walthers kit available in HO and N scale. Our kitbash challenge had three simple rules: At least some part of the original kit needed to appear in the finished model; challengers could add up to $50 of additional materials; and finished models needed to be self-contained and ready to place on a layout.

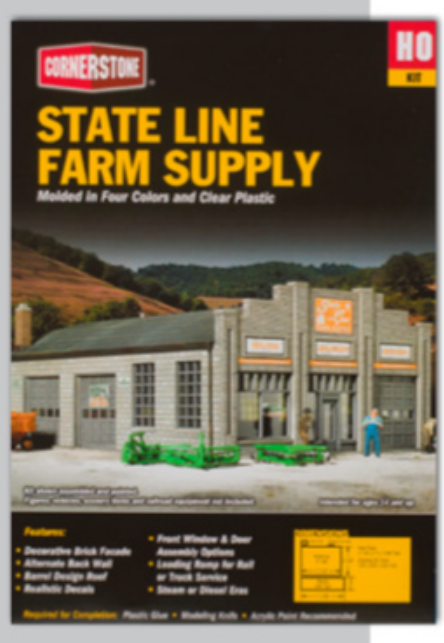
We made a multi-part series of videos for MRVideoPlus.com sharing the progress and final results with viewers, and you can watch it for free on the website.

As shown here, each finished model was different from the others. Everyone had their own ideas as to how they could use some or all of the kit parts, and several modelers used more than one kit to complete their projects. A short profile on each project appears on the following pages, along with a few of the modelers' best kitbashing tips.

Hopefully our State Line Challenge will inspire you to give kitbashing a try. It's a fun way to model!

The Original

Our kitbash challenge used the Walthers State Line Farm Supply kit as the starting point. The model's brick front, cinderblock side walls, and curved roof are all common to mid 20th-century architectural features. The kit is available in HO and N scales and includes a number of additional parts.



Steven Otte – Vibora Bay Citrus

Steve's Tip:
When printing your own decals, be sure to seal the ink on the decal film with Testors' Dullcote before soaking the decals in water.

Steve built perhaps the most colorful model in the challenge. He used the parts from his kit to make a set of building flats that could fit along a backdrop. For his subject he elected to build a small citrus packing plant, like those found in Florida where he grew up.

Steve augmented the kit walls with various sections of styrene strip and sheet, and he also scratchbuilt a roof-top refrigeration unit. He made the Vibora Bay Citrus signs and logo using Adobe Photoshop software, printing them on decal paper using a color laser printer. Model Railroader Video Plus subscribers can see a video showing his decal-making technique on MR VideoPlus.com.

The smaller building is the retail shop, and Steve added figures and built small boxes of oranges and grapefruits from scrap-box cargo crates and Woodland Scenics scale fruit.

Ben Lake – Dairy Larson

Ben's Tip:
When modeling metal buildings, try using styrene L channel to trim the edges. It adds a clean, finished look to the model.

A common feature of Ben's home state of Wisconsin is the small cheese manufacturer, so he decided to model one. His finished structure, Dairy Larson, is both a creamery as well as a retail shop. Ben changed the base kit into an L shape, then added corrugated metal walls from a Pikestuff kit to the back of the model, where the cheese is made. He also removed most of the mulleins from the kit windows to give his finished model a modern look.

He made signs for the exterior of the structure using custom-printed decals and a craft-cutting machine to make backs and frames from sheet styrene. He completed the model with a few simple interior details and lights.

Fun with craft cutters!

While most craft cutters will cut lightweight materials like foam, paper, and vinyl, a few can handle heavier stock, such as cardboard and plastic. Ben uses a Brother ScanNCut DX model, which can cut thin styrene sheets. Brother provides free design software for your computer, making it easy to draw and cut things like doors, windows, and more. You can learn more about the ScanNCut DX at brother-usa.com, and you can watch Ben's video on MR Video Plus.

Jenny Freeland – Freeland Brewery and Tap Room

Jenny's Tip:
Don't overlook everyday details, such as door mats and flowerpots. These go a long way to making a finished model look realistic.

Jenny based her Freeland Brewery and Tap Room on a craft beer brewery located in Milwaukee. She used the alternate back wall from the Walthers kit to divide the interior of the building into two separate rooms, a bar/dining area and a brewing room. To detail the brewing room, Jenny used Busch brewery and Faller distillery detail kits. These two kits include plastic and 3D printed parts for all of the brewing and distilling tools.

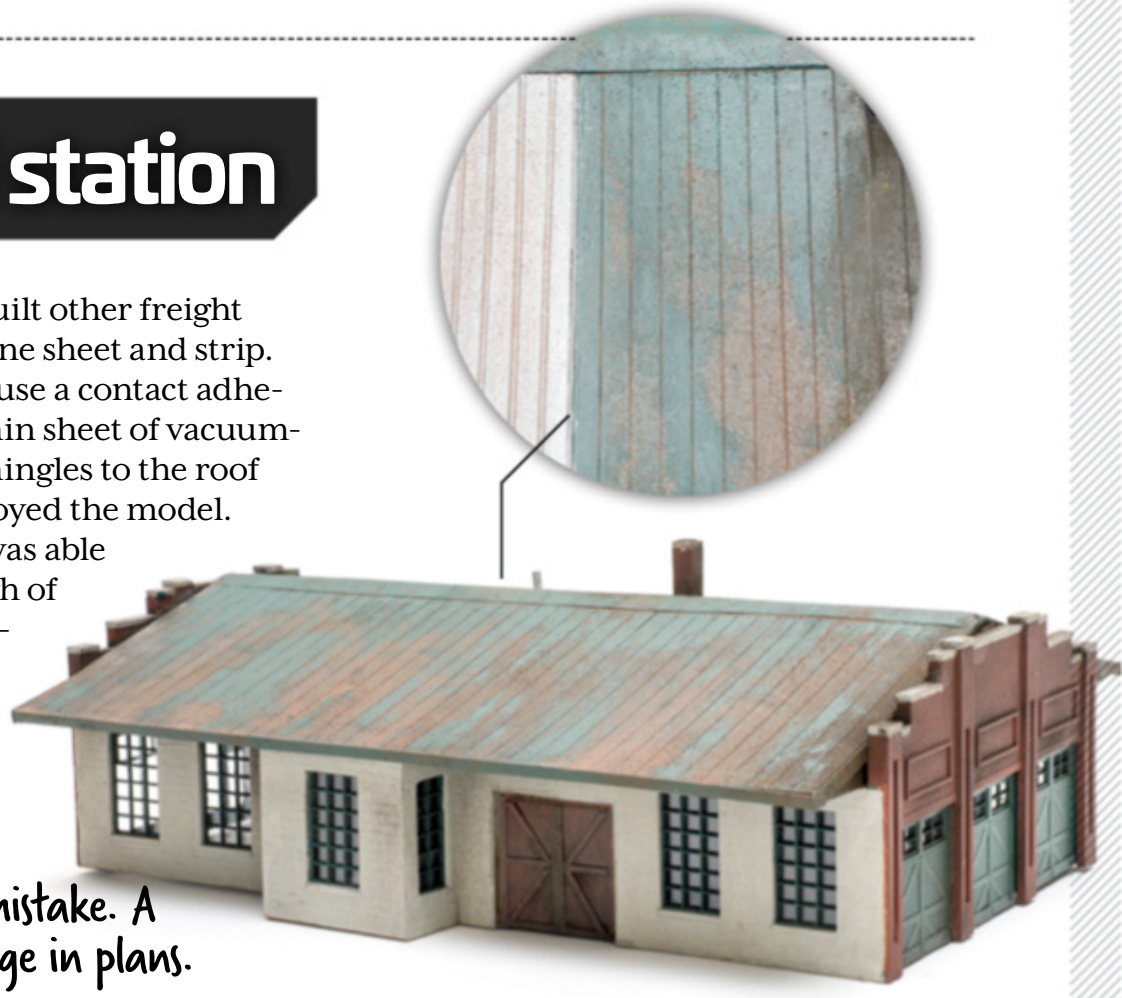
Making the bar proved to be much simpler. Jenny found an image of a bar she liked on the internet, scaled the image to roughly HO scale in Photoshop, and printed two copies. She glued a full copy of the bar to a piece of styrene and cemented that to one of the interior walls. To create the bar's 3D effect, Jenny cut out the countertop and stools from the second photo and glued it to a piece of .060" black styrene. She then glued this section of the bar over the one already attached to the model, causing it to stick out from the wall. When viewed from the windows, this simple trick gives the bar depth, making it appear to be fully modeled instead of just two flat photos.

Jenny needed more modern overhead doors for her model than came in the kit. Ben Lake made the modern doors for her from black and clear sheet styrene using the Brother ScanNCut DX craft cutter, as shown on the previous page. You can watch the video at MRVideoPlus.com/TUG20.

Circles made easy

Jewelers often use a tool called a disc cutter to make perfectly round circles from a variety of materials, including metal and plastic. We use ours in our workshop to cut styrene discs up to .040" thick. A quick search on Amazon.com will net a large selection of available cutters, ranging in price from $30 to $300, depending upon quality, number of disc sizes, and the material it can cut. Jenny used the disc cutter to make the round tabletops for her brewery.

Dana Kawala – Rural station



After experimenting with the kit parts for a bit, Dana decided to combine parts from two State Line kits to build a railroad station with a large freight room. He started by cutting up the wall sections and reworking them to build an operator's bay window on the track side of the depot. He then scratchbuilt a new roof to cover the larger model.

To give the depot a more vintage feel, Dana replaced the kit's overhead doors with Tichy hinged freight doors. He also scratchbuilt other freight doors from styrene sheet and strip.

Dana tried to use a contact adhesive to attach a thin sheet of vacuum-formed plastic shingles to the roof and nearly destroyed the model. Fortunately, he was able to remove enough of the damaged material to cover over it with standing-seam roofing.

Dana's Tip:
Don't give up, even when it looks like you made a mistake. A project can often be salvaged with a just little change in plans.

Gerry Leone – Freddie's Furniture Barn

While several challengers added a second kit to make a longer structure, Gerry used a second kit to make his building taller. For a modeling subject, he turned to the rural icon of the furniture barn – dealers of sofas and dining rooms often found in repurposed buildings on the outskirts of small towns. After grafting two kits together to form a two-story building, Gerry gave the model a flat roof and added an assortment of vents and pipes from his scrap box. A particularly neat detail on his model is its downspouts. He made them from a styrene rod with small pieces of wire insulation spaced evenly along it to represent the joints in the pipe sections.

He also modeled peeling paint on the façade using the hairspray technique. This involves painting the model a base color (in this case brick red), coating it with hairspray, then applying another color (white) over the top. The hairspray makes it easy to remove some of the topcoat of paint before it fully cures. Once the white paint dried to the touch, Gerry picked away at it with a toothpick to expose some of the brick red underneath.

Gerry's Tip:
Look for uses for ordinary things. The Furniture Barn's sign uses a battery-powered flashing LED set taken from a greeting card.

David Popp – MINI dealer

David's Tip:
Scrounging for scraps is part of the fun of kitbashing! Keep a "save box" and fill it with leftover kit parts and details from other projects.

WATCH THIS ON

More kitbashing fun!
Follow the entire State Line Kitbash Series at MRVideoPlus.com/TUG20

Originally I had thought of using my State Line kit to model a bowling alley. Before I started, however, I happened upon a box of containing a few HO scale MINI Coopers I'd collected. Since my wife and I both drive MINIs, I quickly changed the plan to build a small dealership. I knew I would need more cars to make it work, so I spent most of my $50 on more MINI models. That meant I had to beg and borrow the remaining materials from others to finish the building and stay within the rules. Fortunately, with five of the other challengers working in the shop, there were a lot of spare parts laying around!

I cut up the kit's side walls and repositioned the doors and windows to make a showroom up front and a small service area in the back, borrowing leftover kit bits from both Cody and Eric.

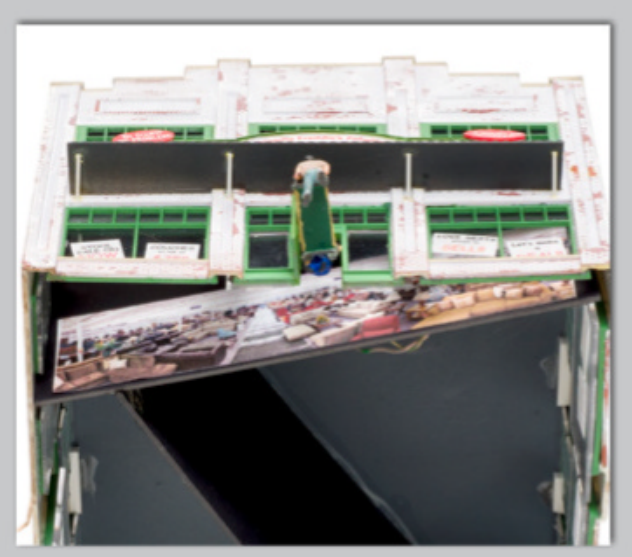
Easy structure details

Many of our kitbashers added a lot of details to their models using simple tricks. Here are a few examples from the Furniture Barn and the MINI Dealer.

Furniture Barn

Roll up those doors

Overhead doors are far more interesting if they can be modeled in open or partly open positions. Gerry cut the top off of one of the kit's overhead doors and glued a piece of it back at an angle. After installing it in the model, he added a figure pushing up the bottom to make it look like the door is being "rolled up."



Instant interior

To make the store look like it was full of furniture, Gerry found a photo of a store interior on the internet. He resized it using Photoshop, then printed it and glued it to a piece of cardboard. He placed it on an angle inside the building, and also added a second black card to act as a view block through the rest of the building. A couple of figures moving a sofa through the front door completes the illusion of a well stocked store.

Sign me up

Stores like the Furniture Barn have a lot of signs. Gerry made simple window posters and a somewhat more complex store sign using Microsoft Word. He scaled them to fit the model, then printed them out and glued them to the windows and walls. This may be a simple set of details, but they add a lot of realism to the finished model.

MINI Dealer

Easy offices

While the show room needed cars, it also needed offices. The showroom floor is made from Evergreen styrene tile sheets painted tan. I built all of the office walls, desks, and even computers for the dealership using more styrene strips and sheets. Just add a chair and a few figures (both from Preiser), and all that's missing is the contract to sign on the dotted line.

Grab the graphics

Car showrooms often have larger color graphics on the walls, showing off the exciting products for sale. I picked up a few sales brochures from my local MINI dealer and cut out appropriately sized pictures and logos, including the photos on the wall, the sign on the front of the service counter, and the logo on the exterior of the dealership.

Light it up

Because the building is a stand-alone model, I added battery-powered LEDs to the interior. After all, you want to see all those MINIs! I built a simple box for the battery from styrene, added contacts made from thin brass stock, and wired up a simple on-off toggle switch to operate it. The 9-volt battery is held firmly against the brass contacts with a small foam block cut from a model box.

Kathy Millatt – Dockside warehouse

Kathy took one look at the State Line kit and realized she could make it into a dockside warehouse for her layout. The difficulty was that the space for the warehouse wasn't big enough for a full building. Her solution was to cut the kit in half on an angle, then use the discarded part of the roof and side wall to make the building into a long wedge. The building is open to the aisle as a cutaway structure, so Kathy plans to put a detailed interior in it once it is installed on the layout. As shown in the detail photo, it has already acquired some crates on pallets.

Because the interior of the structure would be easily visible, Kathy replaced the thick Walthers window glazing sheets with a product called Glue 'N' Glaze from Deluxe Materials. This is a liquid film that you spread over the windows to fill in the panes of glass. It dries clear, producing windows with a realistic appearance with the glazing inside the panes where it should be.

Kathy's Tip:
Buildings on a model railroad don't need to have all four walls or even be rectangular in shape to complete a scene. Sometimes half of a building will do.

Cody Grivno – Richfield Municipal Building

Chasing trains around southeastern Wisconsin, Cody found a building that would fit the kitbash project well. The municipal building in Richfield, Wis., had a similar profile to the State Line kit, complete with round roof. However, Cody wanted a more faithful representation of the front and back of the building, so he chose to scratchbuild those parts using .020" sheet styrene and N Scale Architect brick sheets.

While he was at it, he replaced the garage doors from the kit with more modern versions from Pikestuff. To make the doors fit the model, he had to rework the overhead door openings on the kit walls.

An interesting detail on Cody's model is the rooftop snow fence. On the real building, the fence is made from lengths of pipe mounted to the roof. Cody used some Cal Scale brass pipe brackets to support .022" brass wire. This produced a convincing snow fence for his model.

Cody's Tip:
Solid, square corners make all the difference in a finished model. City Classics makes inside and outside 90-degree corner braces that work great for squaring up walls.

The shadowbox

Often a building doesn't need a full interior, as just a hint of one will do. Enter the shadowbox technique. Cody created a shadowbox on his model in front of the open overhead door by adding just two simple interior walls, a couple of figures, and a few details, such as pallets and boxes.

Steve Brown – Engine house

MRVP contributor Steve Brown models in N scale, so he used the 1:160 version of the State Line kit for his project. Steve decided to use the kit to build a locomotive servicing building for his layout. Straight out of the box, the building isn't tall enough for housing locomotives, so he used the cinderblock side walls, but then built a new front and back to the model from styrene sheet to represent metal siding.

Steve also added an interior to the model, complete with tracks for the engines and an elevated service platform. He used parts from a Walthers icing platform to build the platform. He completed the scene with assorted figures and details to make it look like a busy engine shop. In a quest for thinner glazing, Steve used the plastic from a Peco turnout package.

Steve's Tip:

As times change, often older buildings have existing doors and windows bricked up or resized. This is an easy detail to add to most any structure and gives your model a sense of history.

Eric White – William Cohen & Co.

Eric found a photo of the William Cohen & Co. scrap dealer in Pennsylvania, housed in a round-roofed building, and thought it would be a good kitbashing project. To build it, he used parts from two State Line kits. He sliced the walls up and put them back together to get the doors and windows in logical places. To clean up the seams where the cut wall sections were joined, Eric used plastic putty for a smooth, tight fit.

The signature element of the structure is the large block lettering on the roof. Eric tried several times to get the lettering to work correctly, and finally enlisted the aid of Ben Lake and his craft cutter. Ben cut the letters in yellow self-adhesive vinyl, and Eric applied them to the building. After a bit of weathering, the letters blended into the model perfectly, giving it a realistic industrial feel.

One other neat feature on Eric's model is the simulated glass block windows on the office side. Eric made window panels from Evergreen Styrene tile sheet, painted it black, added painted mortar lines, and glued them into the window openings. From most any distance, the black tile looks like a glass block window.

Eric's Tip:

Use primer before applying a paint coat to your models. The primer helps the finished paint coat stay in place, particularly when you're masking parts of the building for other colors or trying to apply self-adhesive lettering.

Re-creating signature scenes

Maps and photos augment even the best of memories when modeling specific locations

By Tony Koester
Photos by the author

1 Building the structures for Cayuga, Ind., on Tony Koester's HO scale layout was an important step in re-creating a familiar scene, but they also had to be positioned correctly.

Watch It!

See this finished scene and many others on Tony's HO scale Nickel Plate layout for free on MR Video Plus. Visit MRVideoPlus.com/TUG20

When you model your hometown, unless your model depicts it as it is today, you can't possibly remember exactly how it looked. I have clear memories of how Cayuga, Ind., appeared when I lived there during the 1950s. But when it came time to build an HO scale model representing this junction of the Nickel Plate Road's St. Louis Division with the Chicago & Eastern Illinois (see photo **1**), memories, measurements, and photos came up short. Now what?

Plotting the track locations

The NKP main line ran straight through along the south edge of downtown Cayuga, then curved to the southwest as it began the climb out of the Wabash River valley. At the foot of the hill, the NKP crossed the C&EI at a slight angle. But what angle?

I didn't have railroad survey maps that would have provided precise data, so I checked my copy of a U.S. Geological Survey (USGS) quadrangle map **2**. Most of the U.S. has been surveyed and mapped in well-detailed 7.5-minute topographic maps, although some remote areas are covered by less-detailed 15-minute maps.

What do the minutes mean? Sixty minutes comprise one degree of latitude or longitude, so the 7.5-minute maps cover an area ⅛ degree wide and high. To give a sense of scale, on a 7.5-minute map, 1 inch equals 2,000 feet.

These maps are now available online: https://store.usgs.gov/map-locator. Expand the map until you find the desired location, then double-click, and a listing of available maps will appear. Sometimes this will take a while. I deemed the Newport, Ind., quadrangle map that showed Cayuga to be sufficiently accurate to measure the NKP-C&EI crossing angle for modeling purposes. I then had my friend Jim Lincoln build the twin diamonds.

Locating structures

With the NKP and C&EI main lines and connecting interchange and elevator tracks located, the remaining task was to place the structures in their proper positions. I was intimately familiar with this area, having passed by countless times as a youngster on my way to and from town, so any discordant note would be readily apparent to me.

Sanborn fire insurance maps are a major resource for building locations. Copies of them are available from most historical societies, state university libraries, and even some local libraries. They are less trustworthy as far as track locations and railroad structures are concerned, but every scrap of information can be helpful. Comparing them with USGS topographic maps can also yield otherwise unobtainable information.

Aerial and satellite photos, even from much more recent eras, can be very helpful, too. Even a low-resolution copy of a recent aerial photo provided structure location information.

Selective compression is often needed on model scenes and structures, but it needs to be applied uniformly across the board so that everything in a scene is moved closer together or reduced in size at the same proportion. In this case, I was able to maintain scale distances and sizes to a considerable degree.

Modeling the station

With its curved bay windows, central waiting room, and conical towers, the Cayuga depot would need to be built from scratch. In my research, I had measured the depot in 1971, and drawings based on my measurements appeared in the July 1982 issue of *Railroad Model Craftsman*.

I scratchbuilt the model using a core of .080" Evergreen styrene overlaid with N Scale Architect brick sheet material **3**. Five Tichy 8028 windows butted together

2 U.S. Geological Survey "quadrangle" topographic maps provide helpful landform information. Tony used this 1955 map of Cayuga, Ind.

3 The L-shaped brick depot has walls of .080" styrene. Tony used N Scale Architect brick sheets over the styrene core.

4 The station roof is a cranked or compound hip, which means the corner is two overlapping quarter cones.

5 The finished model of the Fable House hotel has walls printed on an ink-jet printer bonded to .080" styrene walls. Tony added a styrene roof, porch, and flower boxes to complete the historic structure.

formed the two curved bay windows. A Tichy 8119 door was close enough for the waiting room entrance, but no commercial doors matched the freight doors, so I cut the transoms off Tichy 8125 doors. The four windows adjacent to the main entrance are Tichy 8043; the others are Tichy 8024.

I used pre-painted strips of .010" x .020" styrene attached with canopy glue to make the diamond-shaped windows above the trackside window frames.

Canopy glue is a versatile bonding agent used by airplane modelers to attach clear parts, such as canopies, but it can be used to glue just about anything to anything else without hazing the plastic. Pacer's Formula 560 Canopy Glue is an easy to find brand.

The cranked or compound hip roof **4** presented two problems: At the corner, it's actually two overlapping

Digital restoration

Photo-editing software such as Photoshop Elements is almost an essential tool for the prototype modeler or freelancer who wants to model specific scenes. It can be used to make photo backdrops, which often require removing and/or replacing vehicles and signs, as well as to create walls for individual structures.

In this case, I had photographed all four sides of the still-standing Fable House hotel in Cayuga, Ind. But many windows had been boarded up, and a shed covered about a quarter of the west wall. The east wall was covered by a porch that needed to be replaced by a 3-D modeled one.

Let's start with my best tip: Always work on a copy of your image file! This way you can go back to your original and start over if necessary.

Photoshop has numerous tools that allow various flaws to be corrected. Along the top of the screen is a list of menu options including Image, under which is Resize, then Canvas Size. I added 10" to the height and width to give me some elbow room to correct any distortion in my original photos. The extra height and width can be cropped off after the building is squared up.

This is the hotel years later. The shed, boarded up windows, and the door would have to go.

Also under the Image tab is Transform and Skew. Skew allows you to "pull" the corners of the image out to correct for perspective, thus letting you create perfectly horizontal and vertical walls. When you use the tool, it will ask you if you want to create a background layer – yes, you do! You can always turn off or delete a layer if you don't like what you've done and try again.

Perhaps my favorite feature is the Clone Tool, which allows you to copy parts of the image and clone them elsewhere. As shown in the original photo, I had some boarded-up windows to replace. I selected a window that looked good. I then selected the clone tool, which looks like a rubber stamp, set the size of the cursor circle (25 pixels), then set the cursor bull's eye at the lower-left corner of the "good" window by holding Option while clicking with the mouse. (On a Windows PC, ALT-click.) I moved the cursor to the same spot on a lower-floor window and click-dragged the mouse to "paint" in the new window over the old.

Perhaps the best part of building a model in Photoshop is that it's forgiving. Command-Z (CTRL-Z in Windows) will undo your last change – something you can't do with ordinary modeling tools.

Tony Says...

Always work on a copy of your original image file. If you make a mistake, you can delete that copy and make a new one from the original.

quarter cones. It wasn't as hard to make as it appeared, but it required some study and cardboard templates to be sure I understood it.

The two cones over the bay windows, rolled first from card stock and then .020" styrene, required some careful retrofitting after the main roof was in place. I cut the openings undersized and gradually opened them to fit the cones.

Other key structures

Some structures proved to be easier to build. I had photographed all four sides of the still-standing Fable House Hotel behind the depot.

Since I had the photos, I built a box from .080" styrene and used Photoshop Elements software to replace boarded-up windows (see "Digital restoration" on page 62). I glued prints of the walls to the box sides and added a styrene roof and front porch **5**.

Since this is a background model, the photo-print sides and a styrene roof were all that was needed to make the building look the part.

Sometimes you can get a model you need by starting with a stock kit and altering it using simple kitbashing techniques.

As shown in photo **6**, the tower for Cayuga is a kitbashed Walthers interlocking tower kit with its long sides narrowed and a new chimney and roof added. When comparing the modeled scene with the actual photo, the finished tower fits the layout well.

Across from the depot is the Thompson grain elevator. After making sketches of the real elevator **7**, I kitbashed parts from several Walthers grain elevator kits to make the finished model. My version has been narrowed to fit the space, particularly the side along the backdrop.

6 The interlocking tower at Cayuga guarded the NKP crossing of the C&EI's double-track Chicago–Evansville main line. Tony kitbashed the tower from a Walthers 933-3071 kit by narrowing the long walls by one window width, then adding a new roof and chimney.

7 Tony made a sketch to see how the various walls from several Walthers kits could be rearranged to approximate the appearance of the prototype. Tony's finished elevator is thinned a bit along the side facing away from the tracks to fit along the sky backdrop.

The post office, visible at the right of photo **1** on page 60, was a simple kitbashing project, starting with a City Classics 195-109 Carnegie St. Manufacturing kit.

The proof of the pudding

Although none of the structures are what I would consider contest quality, I was happy with all of them, especially when they were placed together in the proper context. The depot stands alongside a brick platform; lawns surround the hotel and post office.

As I added some flower boxes to the hotel porch walls and proclaimed the scene sufficiently well done, I started to walk away. But when I turned back for one last look, I felt a shock like I had touched a live wire! I was suddenly transported back in time to the mid-1950s. Everything was just as it was when I was maybe 12 years old. If I waited a while, one of the Nickel Plate's big 700-series Berkshires would surely come blasting through town.

Thanks to photos, measurements, and USGS maps, I'd apparently gotten Cayuga right!

One last look before Tony called it a night proved to be a trip back to the 1950s as all the pieces came together. Scale model railroading can indeed be a form of time travel!

Running a railroad with Raspberry Pi

Use a low-cost computer and free software to add the power of JMRI to your layout

Ben Lake used a small computer called a Raspberry Pi to set up our N scale Canadian Canyons layout for smartphone operation. It's an easy and cost-effective way to add computer control to your DCC-equipped layout.

By Ben Lake

There's no doubt that the freeware program JMRI (jmri.org) is a useful tool for reading and programming Digital Command Control decoders. We use it around the workshop to read and program DCC decoders, and every so often we'll use it to run trains with our phones, tablets, or throttle that supports WiThrottle server.

Up to this point, I've always needed a network router and a laptop to make it work, but when we started building our N scale Canadian Canyons project railroad, I fancied something a little different. I didn't want to have to lug the computer around to do it.

The obvious choice? A Raspberry Pi, of course! When combined with JMRI, it's a powerful tool for model railroaders.

What you'll need

Hardware

- ☐ Raspberry Pi v.3 or later kit with power supply and microSD card reader
- ☐ 8GB or greater, speed class 10 U1 microSD card
- ☐ RR-CirKits Loco Buffer DCC system interface • rr-cirkits.com

Free software

- ☐ Disk image of Raspberry Pi running JMRI • mstevetodd.com/rpi
- ☐ SD Card Formatter sdcard.org/downloads/formatter
- ☐ Balena Etcher balena.io/etcher

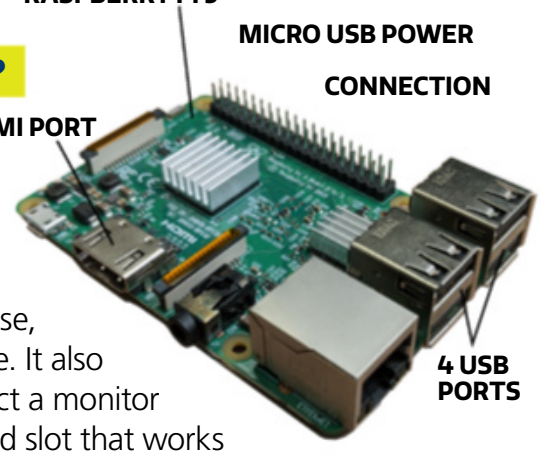
Smartphone apps

- ☐ Engine Driver app for Android-type phones
- ☐ WiThrottle app for Apple iOS devices

Watch it!

See Ben explain how to install the Raspberry Pi computer on our Canadian Canyons layout for free at MRVideoPlus.com/TUG20

What is Raspberry Pi?



Raspberry Pi is a low-cost, credit-card-sized computer. It operates similar to a desktop computer and features USB ports for accessories, such as a keyboard, mouse, and most DCC systems' USB interface. It also has an HDMI port, so you can connect a monitor or television, as well as a microSD card slot that works something like a hard drive. It can be configured so that you don't need a separate router to use your smart devices over Wi-Fi. And it doesn't require an internet connection to operate.

Typically, Raspberry Pi uses a Linux operating system. This isn't a big deal, since running JMRI on Linux is just like running it on Windows or MacOS. You'll need a Raspberry Pi version 3 or better.

I bought a Raspberry Pi kit, and it included the computer, a plastic enclosure, a microSD card (8GB, speed class U1), a microSD card reader, and a power supply (5.1v, 3A).

The other bits

A layout cannot quite run on a Raspberry Pi alone. To complete the project, you'll need some additional hardware, starting with a DCC system that is supported by JMRI. For the complete list, see the JMRI website. I used a Digitrax system for our Canadian Canyons layout.

One important item you'll need is a USB interface device to connect your DCC system to the Raspberry Pi. I selected the RR-CirKitsUSB Loco Buffer shown here (rr-cirkits.com). JMRI will also work with the Digitrax PR4. Just make sure the interface is compatible with the DCC system. You also will need a desktop or laptop computer with an internet connection, so you can download and set up the microSD card image.

Download the program

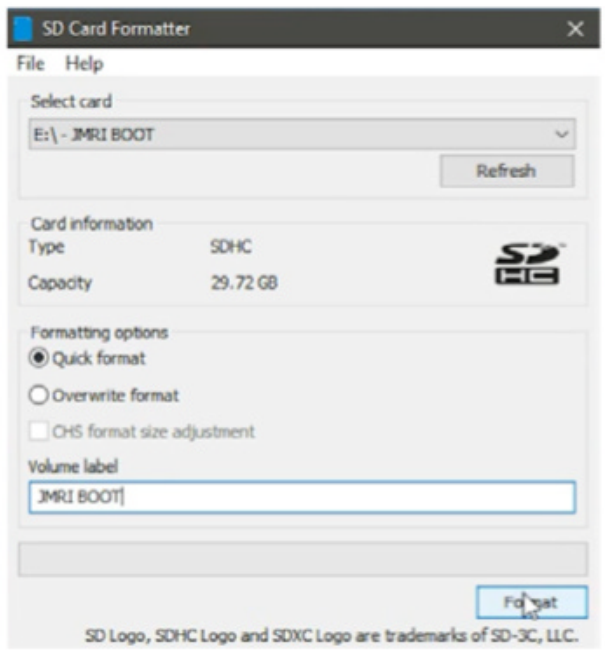
Although you will be running your layout from the Raspberry Pi, you briefly need another computer to set up its SD card. First, you need to download a file called a disk image to your computer. A disk image is like a snapshot of a computer's hard drive, including its settings and software. In this case it's a snapshot of a Raspberry Pi running JMRI. This free disk image can be found at mstevetodd.com/rpi.

Under the "Software Image" header click on "Download the latest image [HERE]." The folks who maintain this site do a good job of making sure that it uses the most recent version of JMRI.

The file is downloaded as a .zip file. Open it and extract the .img file.

Ben says...
"It's never been easier to add low-cost computer-controlled devices to your model railroad."

Format the card



In order to load the disk image onto the microSD card, you'll need to format the card. Start by downloading SD Card Formatter from sdcard.org/downloads/formatter. Once you have the software installed on your computer, plug the microSD card into the reader. Open SD Card Formatter, check "Quick Format," then click the "Format" button.

"Flash" the card

Next you will need to "flash" (load) the JMRI image onto the SD card. This is a little more involved than just copying files to the SD card, so it requires a specific tool. I use Balena Etcher, which you can get from balena.io/etcher. It's available for both Macs and PCs. Once you have Etcher installed, open it. Loading the SD card is a two-step process. First, select the JMRI disk image. After you have done that select the formatted SD card and click "Flash!" Once Etcher is finished with the card, insert it into the bottom of the Raspberry Pi.

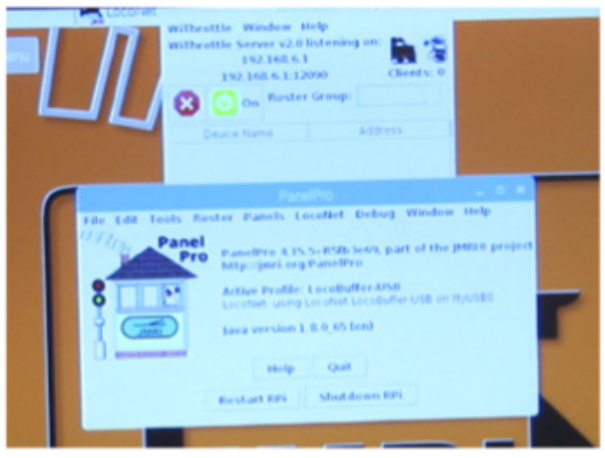
Make sure the card makes it into the actual SD card slot - it's easy to miss if you are using an enclosure like this one.

Power it up

Next, power up your DCC system and connect the Raspberry Pi using the proper interface for your system. Also, since this is the first time you've started up this configuration I suggest connecting a keyboard, a mouse and an HDMI compatible TV or monitor as well, so you can see what's going on. Once everything else is connected you can connect the power cable. This will boot up your Pi.

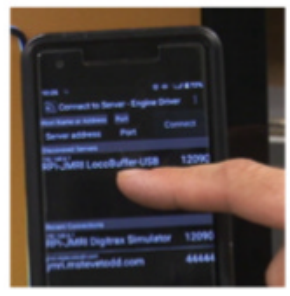
If you have a monitor connected to your Raspberry Pi, you should see something like the photo shown below, with JMRI Panel Pro up and running. It should have also auto-detected your DCC system, and it should be running WiThrottle Server.

The interfaces JMRI can auto-detect include Locobuffer-USB, Digitrax PR4, SPROG, LENZ USB, NCE Serial, NCE USB, and MRC Prodigy.



Try it with a phone

At this point you are ready to set up your smart device to run trains. If you haven't already, download the throttle app to your device. Use Engine Driver if you use an Android device or WiThrottle if you use Apple iOS.



Next search for Wi-Fi networks on your phone. As shown here, look for one called "RPi-JMRI." Enter the password "rpI-jmri" then click connect. You'll get an alert saying that the network isn't connected to the internet. Don't worry about it.

Next, open Engine Driver and find the layout. If JMRI auto-recognized your DCC system, its interface will show up under discovered servers. In my case it says "RPi-JMRI LocoBuffer-USB." Click on it.

The throttle interface should now pop up. Enter a DCC locomotive address and use the throttle controls to operate it.

Running trains on your smart devices just scratches the surface of what you can do with JMRI on your DCC layout.

Consisting locomotives with DCC

Distributed power, in this case a pair of General Electric Dash 8-40Bs on point and a single unit at the rear, eases a freight train down the 3 percent grade at Skyridge on the *Model Railroader* staff's HO scale Milwaukee, Racine & Troy. Digital Command Control makes it easy to simulate this and other multiple unit operations. Bill Zuback photo

Run multiple-unit lashups easily and realistically with Digital Command Control

By Dana Kawala

One of the reasons diesel-electric locomotives killed steam power was their versatility. Individual locomotives could be connected and controlled by a single crew, a process called multiple-unit (m.u.) operation. As the diesel era progressed into the 1950s it was common to see two, three, or more diesels on the head end of a train.

These days technology has progressed to a point where multiple unit operation can mean distributed power throughout the train. In addition to running multiple units on the head end, the lead engine crew can control unmanned locomotives in the middle or at the end of a train.

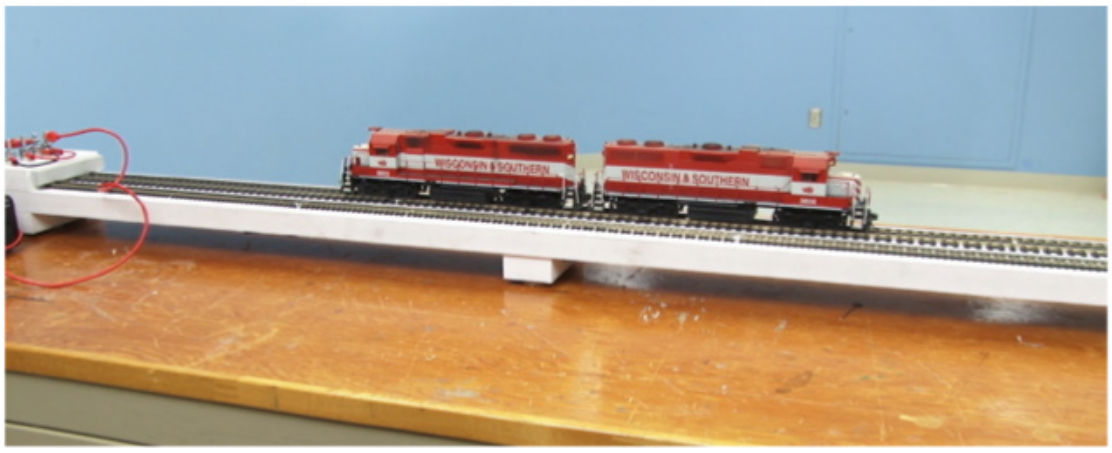
Digital Command Control (DCC) and a technique called "consisting" makes it easy to realistically simulate m.u. or distributed-power operation.

DC and DCC

On a direct-current (DC) layout, locomotives move according to the voltage applied to the rails, which in turn is directly connected to a locomotive motor. More power equals more speed. Any locomotive on the rails responds. There is no individual control within an electrical block.

On a DCC layout, power to the rails is constant. This current also carries signals from a computer, called a command station, to a small computer in each locomotive, called a decoder. Each command is preceded by an address that's unique to a specific decoder. This means a locomotive won't respond to a command unless it "sees" its address.

To run together on a DC layout, locomotives have to be geared the same. If they're to run tail-to-tail, one



Basic consisting involves simply giving two locomotives the same DCC address. To run tail-to-tail, as with these Wisconsin & Southern GP38-3s, one of the locomotive decoders must have bit 0 of CV29 tuned on. While basic consisting works, modern decoders offer more versatile options.

of them would have to be wired backward. With DCC, decoder-equipped locomotives can be speed matched electronically. Their direction of travel – and, in today's decoders, most other performance features – can be adjusted using programmable configuration variables (CVs). (For an extensive guide on speed matching and other DCC-related topics, be sure to check out the series *DCC Programming* on Model Railroader Video Plus.)

Some DCC systems like the Fleischmann/Roco Z21 Digital Command Center will automatically speed-match locomotives.

Basic consisting

The easiest way to consist locomotives is to program them with the same DCC address. If two locomotives have the same DCC address, both will respond to all commands. If you want the locomotives to run tail-to-tail, you can turn on bit 0 of CV29 on one of the units. While this method is simple, there are some drawbacks.

If the locomotives have headlights, they won't behave prototypically. The rear headlight of the trailing unit will turn on when the train is running forward. If the units have sound decoders, things will also sound unrealistic, as both horns will play, as will the bells and any other sound effects.

Universal consisting

Universal consisting, sometimes called "old-style," is another method for m.u.-ing locomotives. With this method, the DCC command station stores the individual locomotive information for each consist. When the lead locomotive, or "top address," is used, the command station sends signals to all the locomotives in the consist, and each responds accordingly.

For sound locomotives, the functions of the lead locomotive, such as the bell and horn, can be triggered under the top address, providing more realistic control than under basic consisting.

However, if you want to trigger functions for the trailing unit – such as turning on dynamic brakes during a downhill run – you would have to enter the trailing locomotive's address, trigger the function, then re-enter the top address to regain control of the consist. That back-and-forth can be a bit cumbersome.

Universal consisting also takes up significant memory in the command station. Therefore, the number of universal consists that can be supported by a DCC system is limited. A typical system can usually handle from one to five universal consists at a time, depending upon how many locomotives are in each consist.

Because the consist information is stored in the command station, the consists aren't portable. If you take a consist to run on another layout or switch DCC systems, it will need to be set up again.

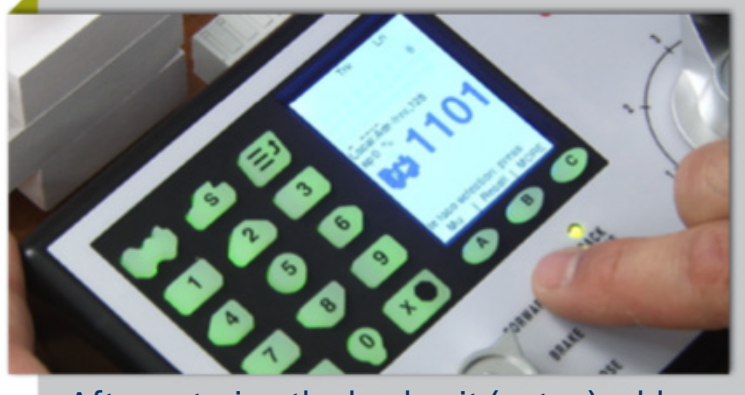
Digitrax's instruction manuals state that universal consisting is the preferred method for its DCC systems, although their products support both universal and advance consisting. It's easy to set up a universal consist with the Digitrax Zephyr Express system, as I demonstrate in the playlist at MRVideoPlus.com/TUG20.

Universal consisting

I reviewed the Digitrax DCS 52 Zephyr Express in the September 2019 *Model Railroader*.

While it's easy to set up advance consists with the Zephyr Express by programming CV19, universal consisting is the preferred method according to the Digitrax instructions. On-screen menus make the process quick and easy.

For all the DCC demos, I used a pair of Atlas HO scale General Electric Dash 8-40Bs with ESU LokSound decoders. Our test track is made by GoodDeals DCC and is available at the Kalmbach Hobby Store, kalmbachhobbystore.com.



After entering the lead unit (or top) address of 1101, Dana pressed the locomotive-shaped key on the keypad to activate the soft keys A, B, and C. To set up a consist, Dana pressed the A key under MU on the command station's screen.

Next, Dana entered the address of the trailing unit, no. 1175, making sure the direction lever was set to reverse. He pressed the A key again, which now had "MU+" above it.

With the consist now set up, Dana entered the top address 1101 and ran both units together. Since 1101 is also the lead unit's address, the function keys will trigger the lights and sounds of that engine.

Advanced consisting

The Model Rectifier Corp. Prodigy Express^2 shares many of the same features as MRC's flagship Prodigy Advance^2 system. It also supports both advanced and universal (referred to as "old" by MRC) consisting.

In addition to using on-screen prompts to guide users, the instructions for setting up consists are printed on the back of the throttle's case. I reviewed the Prodigy Express^2 in the August 2019 MR.

Dana set up an advance consist using no. 1101 as the lead and no. 1175 as the trailing unit. He began by pressing the PROG button until "Cons SET" appeared on the screen.

He then chose a consist address between 1 and 127, in this case 11. Both locomotives are on the track at this point. This setup can be done either on the main or on a programming track.

After entering the consist address, ADD appears on the screen. Dana then entered the lead unit's individual address (1101) and made sure the direction was set to forward. He repeated the process for the trailing unit (1175), but set its direction to reverse. That's it; the consist is set up and ready to run.

Advanced consisting

Advanced consisting is most DCC manufacturers' preferred method. It requires decoders that support CV19, which stores the advanced consist address. If CV19 holds a value other than 0, the decoder will respond to that address instead of the short address in CV1 or long address in CVs 17 and 18.

All decoders in an advanced consist would have the same address entered into CV19 – with one exception. Any trailing units that are to run in reverse, in a tail-to-tail configuration, would have the consist address plus 128 entered into CV19. Therefore, if you were setting up consist address 1 for an A-A set running tail-to-tail, the value of CV19 for the lead unit would be 1 and, for the trailing unit, 129.

This means that advanced consist addresses can't equal 0 or 128. The address values are usually limited to values of 1 to 127 for forward-running units, or 129 to 255 for backward-running ones. It's important to make sure these addresses don't conflict with the individual addresses of any other locomotives in your fleet.

I show how to program an advanced consist in *DCC Programming* episode 2 on MR Video Plus. As with universal consisting, most DCC systems have intuitive on-screen menus that walk you through the process of setting up an advanced consist, including setting up the locomotive direction. I demonstrate some examples of advanced consisting at MRVideoPlus.com/TUG20.

Advanced advantages

Because the command station doesn't have to store any information, DCC systems can support a greater number of advanced consists compared to universal consists. With an advanced consist, the number of locomotives in each consist is virtually unlimited.

Since all the information for a universal consist is stored in the command station, a particular consist will need to be set up again if it's taken to another layout or if the DCC system is replaced. In contrast, an advanced consist is portable. All the consist information is stored in each locomotive's decoder, so the entire consist can be taken to another layout without having to reprogram.

MORE on MRVP!
Watch video demos of universal and advance consisting with DCC!

More control options

When using an NCE system, an advanced consist can be run with either the consist or the lead locomotive address. Using the latter allows the user to trigger the functions of the lead locomotive.

However, advanced consisting allows even more control options with today's latest sound decoders. Using CVs 21 and 22, it's possible to program functions 0 to 12 to be triggered under the consist address instead of the individual locomotive address. Some decoders also now support additional CVs that allow control of functions 13 to 28 under the consist address.

For example, I may want only the horn, bell, and headlight to come on for the lead unit, but I want to be able to manually notch the engines or trigger the dynamic brakes for both lead and trailing units. By programming CVs 21 and 22, I can control those specific functions without having to toggle back and forth between the individual locomotive addresses.

Another advanced consist control option is consist momentum, programmed using CVs 23 (acceleration) and 24 (deceleration). These CV values provide an offset for the individual locomotive momentum programmed into CVs 3 and 4. This can be useful for simulating the added mass of more locomotives on a train, or helping to better speed-match a locomotive to the rest of the units in a consist. [For more on momentum and speed matching, watch *DCC Programming* on MRVP.]

So, put an A-B-B-A lashup on point of your crack streamliner or load up your modern-era freight with several of Electro-Motive Diesel and General Electric's finest. With programmable features and reliable operation, Digital Command Control makes it easier than ever to run your diesel fleet like the real thing.

Advanced consisting with NCE

The NCE PowerCab. We use this system on our own Milwaukee, Racine & Troy. I reviewed the PowerCab system in the December 2008 issue of *Model Railroader*.

The NCE system supports universal consisting, but advanced consisting is preferred, especially with more than two units. On-screen prompts make the process intuitive. You can also use the lead locomotive address to trigger functions without additional programming

The NCE PowerCab throttle has a cluster of CONSIST buttons near the bottom. Pressing SETUP prompted Dana to choose between advanced (ADV) or universal (OLD) consists.

The NCE system supports advanced consist addresses between 110 and 127. Dana entered a consist address of 112.

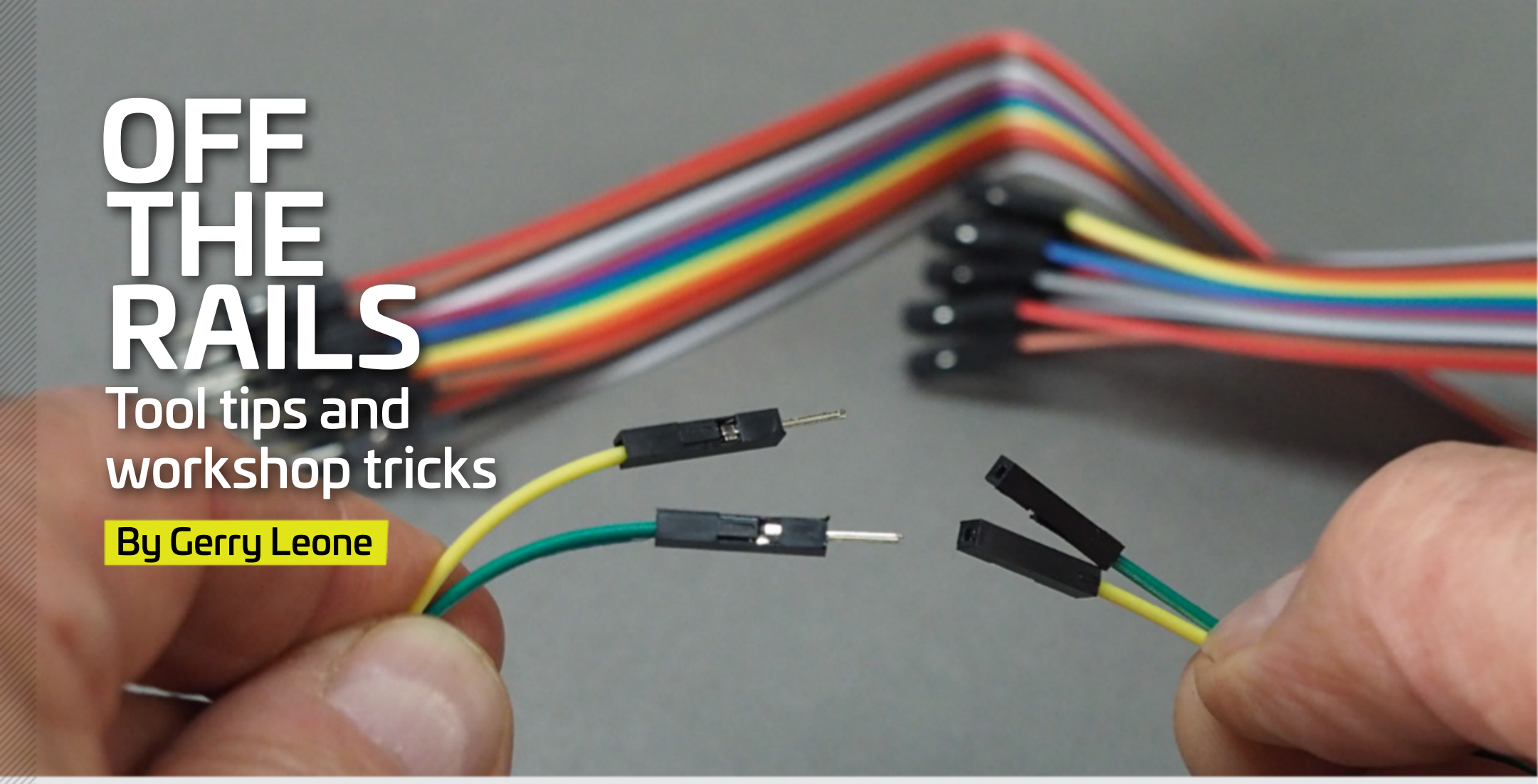
Dana then entered the lead locomotive address followed by its direction (forward). This address can also be used instead of the consist address to allow some function control.

With the lead/consist address set to 1101, Dana enters the trailing unit address (1175). He also set its direction to reverse for tail-to-tail operation.

OFF THE RAILS

Tool tips and workshop tricks

By Gerry Leone



Every model railroader loves new tools, tips and tricks to use on a layout. And that's just what I talk about on my MRVP show, *Off the Rails*. Here are some fun, useful ideas for you.

Pull the plug

Make structures and other lighted objects easy to remove from your layout by using inexpensive Dupont connectors. You can get ribbon cables with up to 40 sets of male and female connectors for only a few dollars on Amazon.com. Peel off a pair, cut 'em in half, then attach one end to your lights and the other end to your power source. You can then remove that structure in a jiffy when necessary by simply pulling the plugs to disconnect it. (Episode 39)

Write where you need it

Here's an easy way to keep pencils or pens handy on your layout. Get a pack of ¼" coax staples at your hardware store, reverse the direction of the nail, and attach them to your fascia. They'll keep writing instruments handy, and your operators won't lay them on your scenery. (Episode 40)

Get the hang of it

Here's another way of keeping a pencil handy for your operators. Look for tiny eye hooks at your neighborhood hardware store, then screw one into the pencil's eraser. Add a brad or cup hook to the layout fascia and hang it up. To use a smaller golf pencil, drill a hole in the end and screw in the eye hook. (Episode 40)

Give it the brush-off

Have an old electric toothbrush? Give it a second life cleaning off models – it'll really get into those nooks and crannies. Use it dry to easily brush off dust and dirt, or dip it in a soapy solution to get rid of factory oils before you paint. Some modelers even attach paint bottles to their electric toothbrushes and use them as shakers! (Episode 47)

The difference is clear

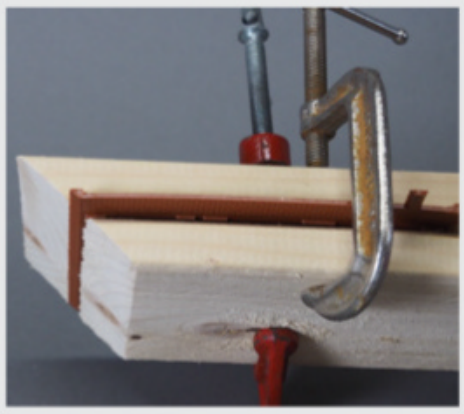
To make green glass insulators, paint the plastic insulators with Testor's Model Master Ghost Gray, then top that with Createx transparent green paint, available at craft stores. (Episode 39)

Rockin' rollers

Here's something you can use on your layout or all over the house: soft rollers. They're foam-covered wires that are perfect for keeping anything wrapped up, from extension cords to wire bundles under the layout. (Episode 46)

What's your angle?

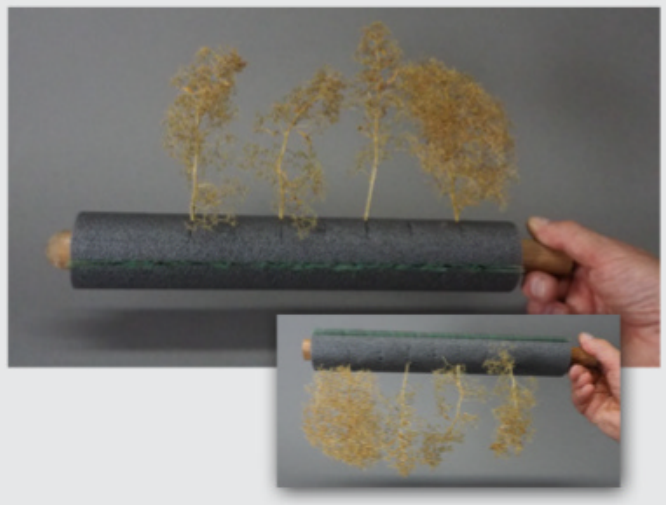
Need to sand a perfect 45-degree angle on the sides of a structure wall? Cut two boards at a 45-degree angle. In the photo I'm using pieces made from a 1 x 4. Next, clamp your wall section between them. From there you can use a file, sandpaper, or even a hobby knife to get that angle precise. (Episode 47)



Up to scratch

Many modelers believe that flux cleans the materials before soldering, but it actually only removes oxidation. To properly clean metals, use a scratch brush. It removes tarnish, dirt, rust, oils, and other impurities. (Episode 45)

Quick turnover



When you're making trees for your layout, cut slots in a piece of pipe insulation and mount that on a broomstick. Then poke the trees into the slots. Stand them upright to spray-paint the trunks, then turn them over for dunking in diluted matte medium and adding ground foam. (Episode 38)

Twice as nuts

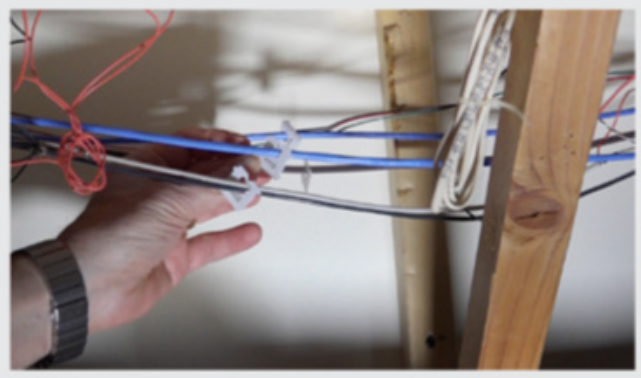
Here's an improvement on a tip from *Model Railroading: The Ultimate Guide 2019.* Like last time, add a nut to a bolt before you cut it to re-straighten the threads. But this time, add a second nut to make it easier to hold in the vise for sawing. (Episode 39)

Look ma, one hand

Trying to hold the screw on the screwdriver while using the other hand to hold something can be tough. An inexpensive wax toilet ring gives you a lifetime supply of tacky wax. Just put a small blob on the end of your screwdriver and pop on the screw! You can use it to hold down figures and vehicles, too. (Episode 39)

Keeping tabs

Under any layout there are dozens of wires. Who remembers what they're for? An easy way to mark them is with the tabs from packages of bread, carrots, and other foods that come in bags. I used a label maker to add ID markers to the tags, and they're easy to slide out of the way when you need to work. (Episode 40)



7 TIPS FOR WINTER SCENERY

Want something different? Try modeling a winter scene! MRVP contributing editor Kathy Millatt built this diorama to test many of the wealth of winter weather modeling products available.

Our *Make a Scene* series host shares her best ideas for this not commonly modeled season

by Kathy Millatt

I LOVE TRYING NEW TECHNIQUES, and when I decided to attempt a winter scene, it brought up a lot of things I'd not considered before, such as how to model snow, ice, and frosty branches on a layout.

Not many people choose to model winter; perhaps for most it hits too close to home. However, there are a lot of great products available for snow and ice. For my series *Let's Make a Scene* on MRVP, I built a winter diorama and used many of them, almost all of which were new to me.

Dioramas are an easy, cost effective way to test ideas and learn how to use new products before committing them to your model railroad. Building my winter diorama proved to be a lot of fun, and it was refreshingly different from other modeling.

Probably the biggest lesson I learned was that because ice and snow tend to cover over everything, the scenery on the base model became less important to the process. While you can watch my winter series to see everything I tried, here are some of my best winter scenery tips. And even if you don't want to build a layout with snow and ice, modeling a winter scene can make a fun Christmas diorama project. Have a go at winter!

TIP 1 - WORK FROM PHOTOS

Snow comes in many forms, from fresh powder to muddy half-melted snow. Before trying any of the winter products available, get some photos or go look at the real thing if you can. Consider adding more than just snow, too. Frozen rivers and lakes, waterfalls, or icicles add a lot to your finished scene. And be sure to observe how snow falls on railroad tracks and roads and how moving vehicles push it aside.

TIP 2 - A SIMPLE BASE IS BETTER

Basic terrain shapes are all that is needed for a snow scene. I cut rough shapes in the foam with a hot-wire tool. I filled the transitions with Sculptamold.

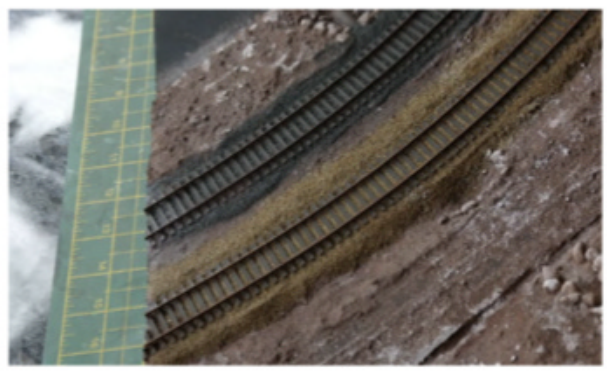
The surface just needs to be complete enough for the bigger details that will poke through the snow layer, such as large rocks, tracks, and matted-down grass.

MORE on MRVP!

Kathy Millatt is a master at scenery, and this article just scratches the surface of all the great tips and techniques she shares in "Let's Make a Scene," her regular series on MRVideoPlus.com. To watch all of Kathy's collection of scenery videos, subscribe to MR Video Plus today!

TIP 3 - SEAL IT UP

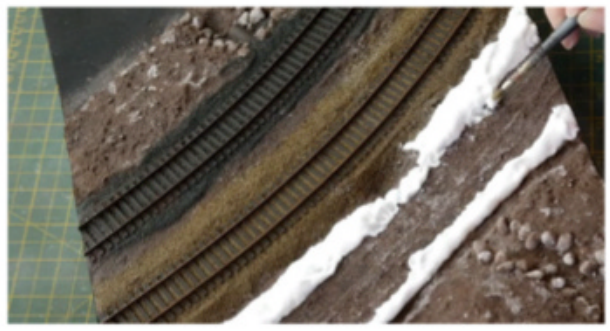
Seal any base modeling so the colors don't bleed into your snow. Snow is white, but any scenery glue can pick up paint pigments and dyes used in scenic materials, causing them to bleed through and stain your fresh snow. I used an acrylic matte varnish from Plastikote before adding any snow effect, but Tamiya TS-80 will also work. Both are safe for scenery, but be sure your space is well-ventilated.



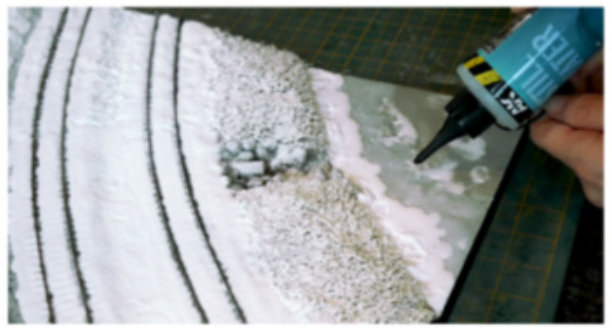
The varnish reacted with the tile grout I'd used for dirt, leaving white patches, but that didn't matter once I applied the snow.

TIP 4 - BE CHOOSY

Choose the right type of product for the scene. For example, fresh snow on vegetation is best done using snow powder.



Heaped snow is made using a snow paste. These come premixed and are easy to spread. Many can be thinned with water.



For frosty frozen water, I used several things, including Still Water by AK Interactive (AK8008) over PVA (white glue).

Try This!

There is an amazing variety of snow scenery products on the market. I tried a lot of them while working on this project, and these are the few favorites:

- *Micro balloons snow powder – AK Interactive AK8010 – for most fluffy snow*

- *Terrains Snow paste – AK Interactive AK8011 – use for making piles of snow*

- *Icicles – Noch 08756 – can be added to just about anything!*

- *Resin Ice – AK Interactive AK8012 – great for modeling broken ice*

TIP 5 - BREATHE EASY

Wear a face mask with any scenery products that cause fine dust! I learned the hard way that the snow powders I used caused me to cough.

Cheap disposable masks are ok, but you're better off using a respirator (shown above). These are good for harmful particles and noxious fumes.

TIP 6 - NOT JUST THE SCENERY

Don't forget to add snow and ice to your rolling stock, too. It will help tie your scene together. I applied a quick coat of snow to the sides, top, and ends of this wood reefer. I also used some of the Noch icicles underneath the car to great effect.

Kathy says...

Modeling winter is something out of the ordinary, and it can be a real talking point with others.

TIP 7 - SNOW SHOWS SIGNS OF LIFE

Snow looks pristine only just after it's fallen. It doesn't take too long for the snow to reveal where people, animals, and vehicles have been.

And you don't even need people or vehicles to add interest. Footprints and tire tracks are easy to make when applying the snow to the scene.

WATCH IT!

Free Video!

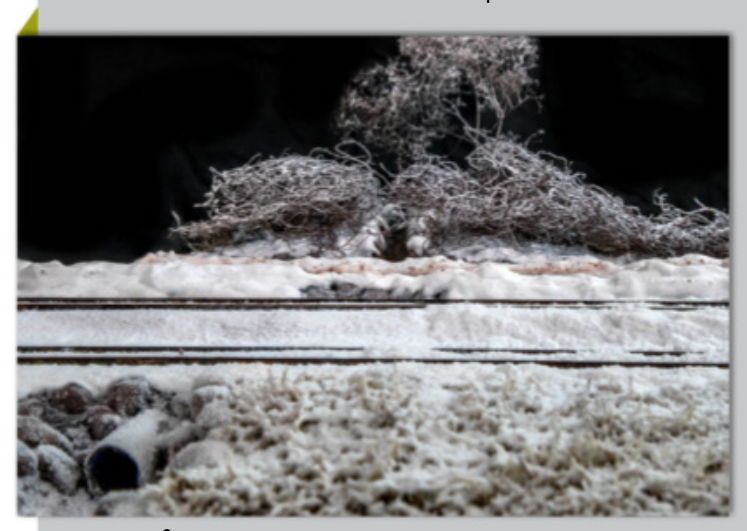
See Kathy's work by watching The Ultimate Guide playlist at MRVideoPlus.com/TUG20

Bonus Tip

To make spattered mud effects, I used more AK Interactive Still Water, mixing it with a muddy brown acrylic paint.

Gluing stuff

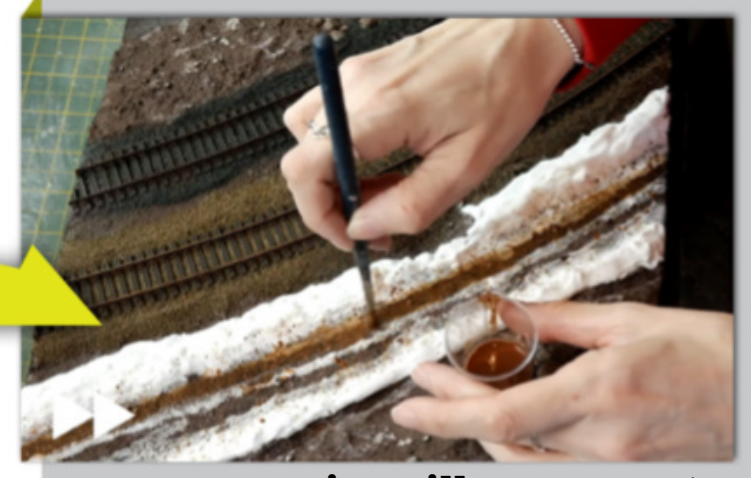
After trying many different products, I found that I came back to the micro balloons time and again to build up convincing layers of powdered snow. To get the micro balloons to stick to the scenery, I found that different glues produced different effects. Here are some of the options I've tried:



Hair spray – Good for grass, fences, and lacy construction, but it may yellow slightly. Hair spray is good for dense coats of heavier snow fall. I used this on the grass, and it will work well if you plan to add footprints in deeper snow.

Clear spray varnish – This is also good for structures and grass, but it results in a lighter coat of snow than the hair spray. You can add more layers for heavier snow, but I like it for thin frost effects too. I used this on the bushes shown above.

Matte liquid varnish – You can paint this material on the scenery with a brush, so it offers good control. However, it does not result in particularly fluffy snow. I used this on the reefer, track, and ice edges where I needed a strong hold. You can add a fluffier coat on top using spray varnish or hair spray.



AK Interactive Still Water – I used this material to make a lot of the ice, but I also dusted it while wet with micro balloons to create frosty effects. I dribble it on the scenery and then use a brush to spread it around before adding the powdered snow.

Snow paste – This works well to tie together various snow-covered areas. If you stir micro balloons into it, you get a fluffier final finish. I used this around the tracks extensively.

Easy signals for HIDDEN TRACK

Hidden behind the tunnel is a junction with the main line and a crossover that the crew of this branch line local will need to negotiate. Fortunately, Steve Brown installed signals to show turnout indication on his N scale layout.

Simple techniques to add on-layout turnout indication for places you can't easily see

by Steve Brown • Photos by the author

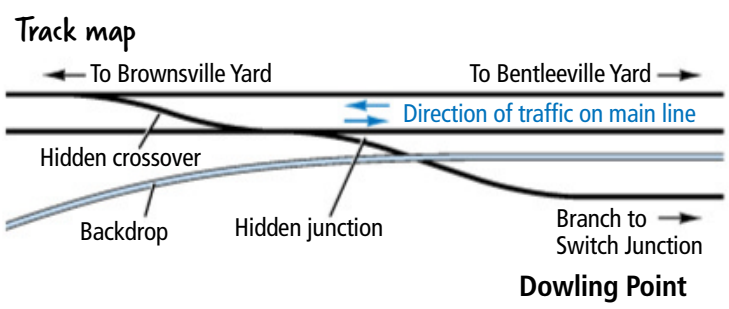
I'VE JUST STARTED installing signals on my N scale Brown Smith RR, and I love the razzle dazzle and realism their lights give my layout. Just like a real railroad, model signals can be used to help operators know the track conditions that lay ahead of their trains – particularly when that includes the position of turnouts they can't see. If your layout uses switch motors, you can easily add working signals just like those shown here.

WATCH IT!

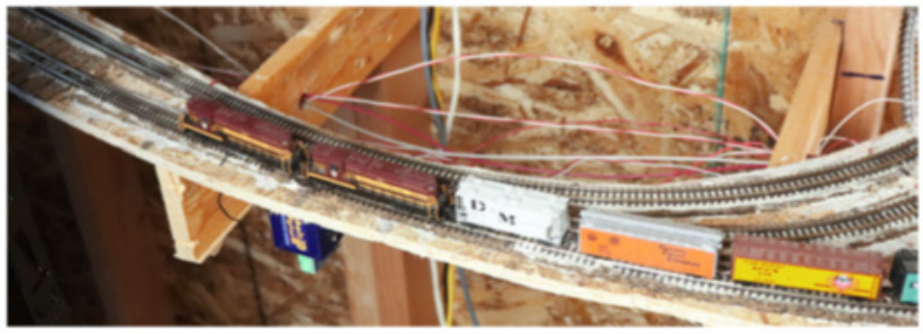
Free Video!

See Steve's signals in action for free by checking out MRVideoPlus.com/TUG20 today!

The problem



As shown in the diagram, my town of Switch Junction sits at the end of a branch line. Trains work their way from Switch Junction, through Fertile Valley, to Dowling Point, and then join the main line to get to their final destination, Brownsville Yard. That doesn't seem too complicated, right?



However, at Dowling Point the branch passes trough the backdrop, then joins a double-track main line in a hidden space. It's imperative that an operator knows the position of the turnout to the branch line, as well as the position of the crossover, to get the train onto the correct main line and back to Brownsville Yard.

Sourcing signals

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Free Returns
91 Sold
Watch

$13.99
Buy It Now
Free Shipping
72 Sold
Watch

To fix the problem, I decided I needed two signals – one to tell the position of the crossover, and one to tell the position of the branch line turnout. I also decided that I needed only two elements, red and green, as this would be a go-or-no-go scenario. I also decided the crossover position would equate to giving the train out of Switch Junction permission to join the main line (green) or to hold in place (red). I used a mast-mounted signal for the main line crossover and a dwarf for the junction turnout. The dwarf signal would be the indicator that the turnout used to join the main line was aligned (green), or not aligned (red).

I managed to find signals I liked on eBay by typing "N Scale Signals" into the search bar. When I did, I found the Everest JTD1503GR mast signal and the Everest JTD1501GRCN dwarf signal would work well. The mast signal came in a three pack, and the dwarf signal came in a five pack. When you consider the price, these were a real bargain and ultimately look great on the layout.

The Everest signals came prewired with a resistor in-line on the common (negative) wire. They are rated for 12 volts DC. I powered the signals from a direct current (DC) bus I installed under the layout that connects to a 12-volt transformer. The transformer is plugged into a wall outlet controlled by a regular light switch. I can turn the entire DC power bus on and off with the light switch, which is very handy.

Drilling holes

To install the signals, I needed to drill two holes in the layout, one for each signal. Because of the tight clearances with the upper deck directly above the work area, I used my motor tool for this task. I worked slowly so that the drill bit wouldn't cast debris all over the nearly finished scenery surrounding the signal. I vacuumed up the drill shavings before continuing with the project.

Steve says...

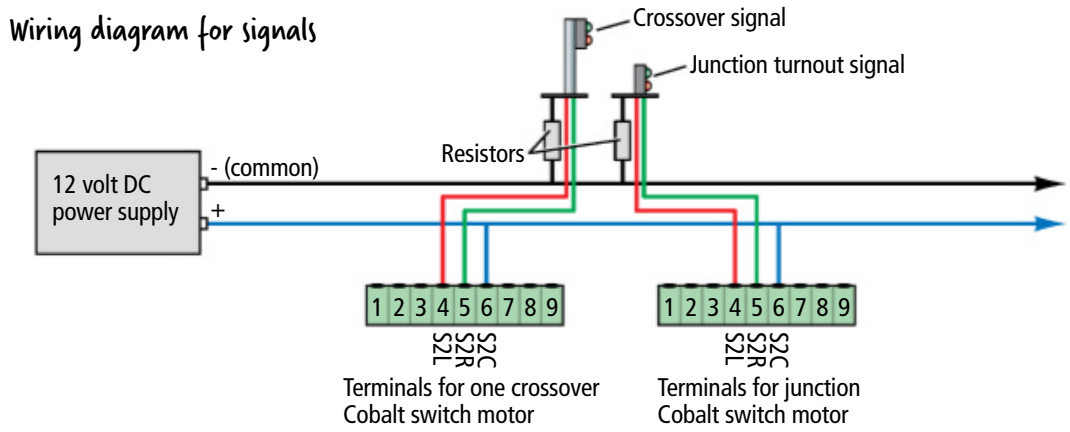
When working in tight spaces, a compact motor tool can be a better choice than a larger cordless drill.

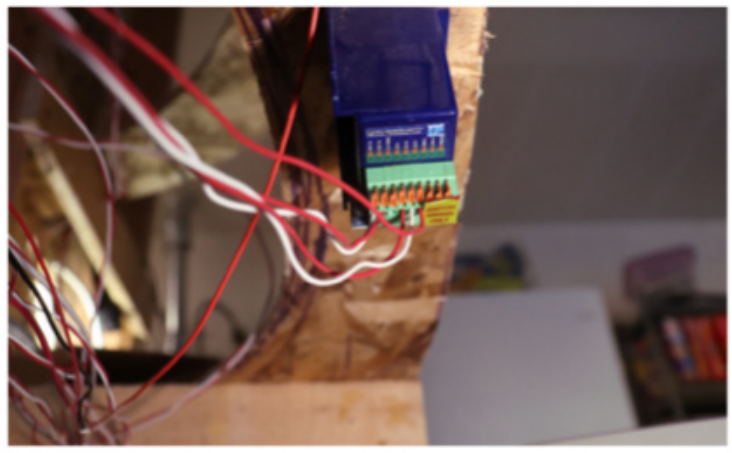
Installing signals

Once I'd drilled the holes, I inserted the wires for the signals and placed them in their final positions. The tower signal sat pretty straight as it was, but I put a drop of CA on its base to ensure it stayed in place until the final scenery was done. The dwarf signal was less cooperative, and I needed to drive a wedge into the hole next to it to hold it in place. At this point I also installed a small instrument shack, like those commonly found near signals on real railroads.

Later I ballasted the location with a mixture of gray fine ballast. The diluted white glue that holds the ballast to the layout also holds the signals securely in their holes.

Wiring it up





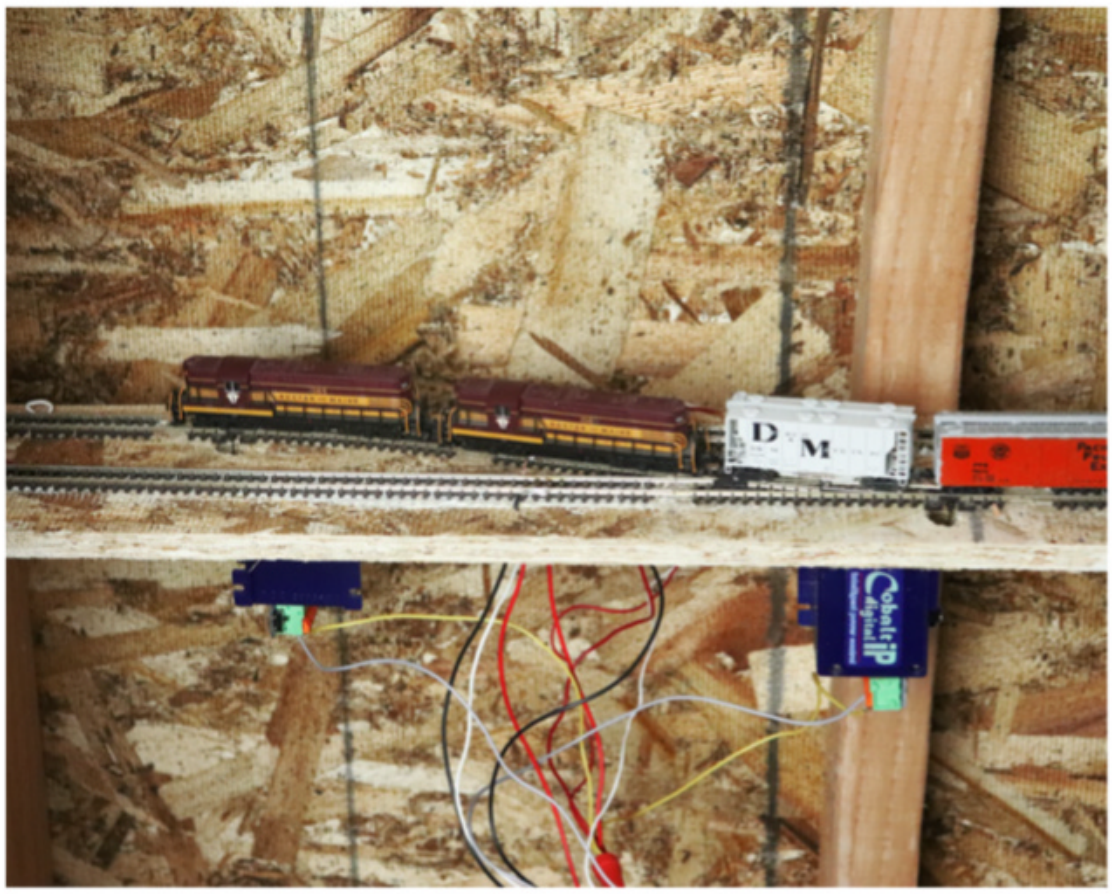
To control the signals, I used the switch terminals on the Cobalt switch motors I installed on the layout. Cobalt switch motors are made by DCC Concepts (dccconcepts.com), and the wiring portion is pretty simple. As shown in the diagram above, I took the signal wires with the resistors on them (black wires) and connected them to the common (negative) terminal of my 12-volt DC power supply. Next I took the green and red leads and connected them into the S2-L and S2-R terminals. For the final connection, I ran a wire from the S2C terminal to the positive line on the DC power bus.

As a test, I aligned the turnouts in the desired direction and watched with excitement as the LEDs changed from red to green. Then, I reversed the turnout, setting the signal back to red. Boom! Working signals – it was totally awesome.

One of the reasons I prefer Cobalt switch motors is that they have a simple set/run switch for easy programming. Simply put the switch in "set" mode, punch in a DCC address, and then issue a DCC command (on or off in my case, but it could also be N for normal and R for reversed). Move the programming switch back to the "run" position and you're set. An additional advantage to this is that in the case of my crossover, I programmed both switch motors to the same DCC address. So one address switches the position of both at the same time.

Signals in action

With everything installed, I was pumped to run a train using the new signals. I ran the train out of Switch Junction and stopped it at Dowling Point. I could see from the signals that I had two reds indicated. This meant that the junction turnout wasn't aligned, and we weren't cleared for the main. I punched up the switch motors I use for the crossover and set them into the diverging position. As anticipated, the tower signal changed from red to green. Now, I had clearance onto the main.



Next I lined the turnout that joins the main, and the dwarf signal turned from red to green. I now had complete confidence I could pull the train onto the mainline, send it through the hidden crossover, and run it all the way to Brownsville Yard.

I also use these signals for trains returning from Brownsville Yard. In that case, the crossover signal needs to be in the red position, indicating that the crossover is aligned for the straight route, and the dwarf signal needs to be green, indicating that the junction turnout is set for the branch line.

MORE on MRVP!

Steve Brown has a series on MR Video Plus called "It's My Railroad." In it, Steve walks you through his "regular-guy way" of doing things as he builds his N scale layout. Subscribe today and you won't miss a single episode!

Q&A with Steve Brown

Get to know MRVP's crazy host of the *It's My Railroad* series

By Jenny Freeland

Steve Brown is the newest addition to the MR Video Plus lineup. In his series *It's My Railroad,* Steve shares the latest projects on his N scale Brown-Smith Railroad and hopes to inspire other "regular guy" model railroaders, too. Read on to learn more about Steve!

Jenny: How did you get started in the hobby?

Steve: I have been a model railroader off and on for nearly all my life. My first layout was a 4 x 8-foot oval that my parents surprised me with when I was in my pre-teens. It was a Tyco jobber with an auto dumping log car, a siding and a spur with Atlas snap switches – it even had a lighted station and street light. I spent a great deal of time running trains in a circle without really knowing what running trains was, or how model railroad operation was done. At that age, I didn't even know it was a thing.

After a couple of years, I tore up that layout because I was going to build a better one (which sounds an awful lot like me today). Unfortunately, I never had the money to do it, and by high school, I no longer had a railroad.

However, I still had a dream for what I wanted to build. I wanted a railroad that started in the mountains, came down to a small yard, and went from there to a port. I also knew I wanted a shelf layout. It was that vision of a model railroad that I carried with me for the next 40 or so years. Always dreaming of the day when I could actually build my layout.

Steve Brown has his own series on MR Video Plus called *It's My Railroad.* In each episode, Steve shares his tips and techniques for building a model railroad "the regular guy way."

J: So when did you get back into the hobby?

S: Roughly three years ago (at the time of this writing), I decided I needed a hobby, and of course, model railroading was top of the list. I immediately started watching all of the model railroad videos I could find. When I discovered Model Railroader Video Plus, I was off and running! I would say that the bulk of what I learned in those early days – and even now – came from watching David and the gang building model railroads. To this day, you can see the MRVP DNA in everything I model.

So, in one way I have been a model railroader for about three years. But I also feel like I've been a model railroader for my entire life.

J: How many layouts have you built?

S: That's a complicated question. My very first model railroad was a 12" deep shelf layout that was 7 feet down one wall and 11 feet down another. It was the first version of the Brown Smith Railroad (BSR). It incorporated all of the things I always wanted in a

model railroad, but it was DC only.

For the second layout, I took the first one and added two reversing loops to it so that I could have continuous running. I had to figure out how to use DCC to switch the turnouts so the train could run on a single-track main without any help from me. I never finished it, however, because we moved to a new house with a new hobby room.

What you see on Model Railroader Video Plus is basically the fourth version of the BSR. Many folks may remember seeing my logging camp, coal mine, and the town of Switch Junction in some of my videos. These are all parts of the BSR 2 that I just had to integrate into the whole enchilada.

J: Why did you choose N scale?

S: When I decided to get into model railroading, I really looked at three scales – HO, N, and Z. My wife (Cyndi) and I visited a local train exhibit at the Fullerton Train Station in Fullerton, Calif., where a number of clubs had set up layouts. As we walked the exhibits, I really liked the detail of HO, but I also really liked the amount of track you can get from Z scale. N scale seemed to have a happy medium that worked for us.

J: What does your wife think of the railroad? Does she work on the layout?

S: Cyndi, "The First Lady of Model Railroading," as I refer to her publicly, loves the hobby and the layout. Though she doesn't actually "work" on the layout with me, her interest is such that she has been instrumental in helping me. Whether it be how to detail a scene or the color to paint the rocks, her creative eye can be found in the DNA of the Brown Smith Railroad.

We have talked about her being more involved in working on it, but she also has crafts and hobbies that keep her pretty well occupied. Still, my dream would be to be working side by side in the hobby room with her as we come up with something awesome together!

J: How did you come up with the idea for It's My Railroad?

S: When I first got full-time into model railroading about three years ago, I ran into two snags. The first was folks who were snobby about the hobby and whose responses to newbie inquiries were nothing short of brutal.

The second were master model builders. When I saw what some of these folks can do, I just figured I could never do that. In both cases, I was nearly ready to give up the hobby. I felt as though no one would ever respect my work or ideas, and I would never be able to build anything anyone would enjoy.

Then I had a "light bulb moment!" It's my railroad! I am the one putting the time, money, and emotion into what I'm doing. So what if my modeling is subpar? So what if I mix various eras, architectures, and landscapes? It's my railroad! It was shortly after this realization that I decided there must be more folks like me.

I set out to make a vlog of my model railroading adventures in a way that encouraged anyone who had a hankering to model trains to go for it! Who cares what other people think? Enjoy the adventure!

J: Besides MRVP and YouTube, have you done any other model railroading videos?

S: After starting my YouTube channel, "It's My Railroad," I experimented with a couple of additional video features. One that still survives is my Saturday morning live talk show, *Track Smack*. Here I get the chance to interact with the viewers to share tips, tricks, and techniques. Most importantly, though, an awesome community of modelers has grown from that.

It was actually *Track Smack* where I first got connected to David Popp. We had a great time on the livestream, and through that I became part of the MRVP family. Since then I've also had Kathy Millatt on the show, as well as a number of just "regular guy" subscribers.

J: Since you make all those videos, I'll ask you this question, do you have a favorite train movie?

S: LOL! Currently my favorite train movie is *Unstoppable* with Denzel Washington and Chris Pine. I realize it has a lot of Hollywood in it, but hey, it's got trains and Chris Pine, too – it's cool!

J: What's your best piece of advice for anyone interested in starting model railroading?

S: The best piece of advice? It's your railroad! There is so much that model railroading has to offer. It's creative, technical, challenging, and comes with an awesome community.

Don't be afraid to show off what you've been able to get done on your layout. There are tons of folks that will appreciate it and encourage you. But first, you got to just jump in! Don't worry about your skill level, or your knowledge of prototypes. Just watch a few videos, buy some materials – even if it's just a train set and let her rip!

Whatever you do, whatever your budget, whatever you have space for, don't let anyone get in the way of you jumping into the best hobby in the world!

MORE on MRVP!

Steve's monthly series on MRVideoPlus.com, *It's My Railroad,* follows his progress as he builds his N scale layout. Subscribe and never miss an episode!

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Free Video!

Steve made a special installment of *It's My Railroad* just for *Ultimate Guide 2020!* Visit MRVideoPlus.com/TUG20 to watch it for free!

ASK MRVP

Your questions answered

by Jenny Freeland

Q: How can I prevent light leaking from the inside of my structures?

- David Spring

A: The best practice is to paint the inside of the structure black. In the inset picture, you can see the interior of Wolski's Bar on our HO scale Beer Line layout. We've painted the interior of the structure with flat black paint and left some of the windows open. We've also painted over some of the windows to make it look like the lights are turned off in certain rooms or the curtains are drawn. The flat black paint keeps the walls from glowing when the building is on its base. Note, too, that we've used masking tape to represent window shades in some rooms.

TOP: Wolski's Bar is just one of the may structures on our HO scale Beer Line layout that has interior lighting. INSET: To keep the light from making the walls glow like a pumpkin, David Popp painted the interior black. He also sealed the seams between wall sections.

Q: What gauge wire should I use as buses and feeders?

– Brian Patterson

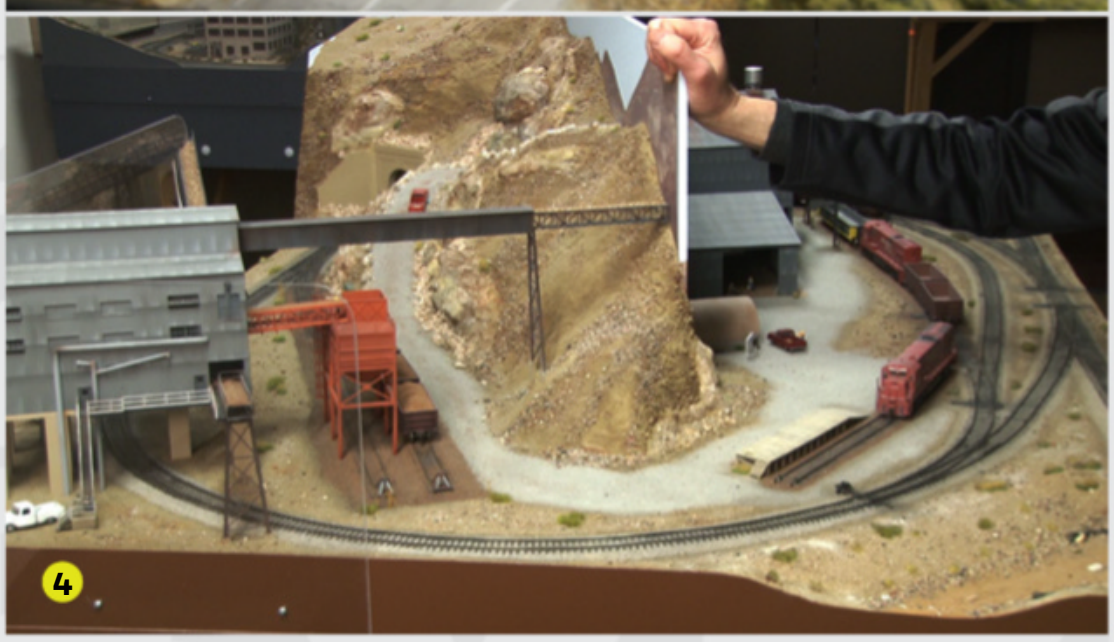
A: Wire comes in different sizes, and the smaller the number, the thicker the wire gauge. You can run thicker wire farther than you can run thinner wire. David Popp's general rule of thumb when building a model railroad and running bus lines is 20/40/60. Basically, if you are going from 0 to 20 feet, you can use 16 AWG wire. For 20 to 40 foot wire runs, you'll want to use a heavier gauge wire such as 14 AWG wire. Anything that goes beyond the 40-foot mark, say, 40 to 60 feet, 12 AWG wire will be best.

When working with feeder wire, you can use anything that's small and unobtrusive. For N scale track, the smaller the feeder wire the better, because it will be less noticeable when you solder it to the rails. The trick is that finer gauge wire can't be run for very long distances without significant current loss. Typically, 6 inches is the longest fine gauge feeder wire from your rails to your track bus should be. If you need a longer feeder than that, you should graft a transition wire (16 or 18 gauge) in between the feeder and the bus to make up the rest of the distance.

Q: What are some options for passing track through a backdrop?

– Ted Ziegler

A: There are several different techniques we've used on our project layouts. 1 One of the most obvious options is to put in a tunnel to extend the tracks to the other side of the layout. 2 On the Salt Lake Route, we used a highway overpass to disguise where the tracks go through the backdrop. The tracks disappear underneath the overpass. On the backdrop itself, we extended the paper background so it looks like it goes on forever. 3 On the Red Oak layout, the track also disappears under a road bridge, but it's set in front of the backdrop by a couple of inches. On the backdrop itself, we've extended the tree line to go over the top of the opening to make it look like tracks pass through a tree tunnel. 4 One of our favorite techniques is to stop the backdrop short of the end of the layout and wrap the scenery around it, as well as the printed material on the backdrop. As shown here, we used this technique on our Eagle Mountain layout to complete the scene as we transition from one layout zone to the next.



Q: What is the liquid plastic solvent for painted parts?

– Patrick Geringer

A: You'll want to use Plastruct Bondene (item no. BOND-2), available at www.plastruct.com. The solvent will go through the paint layer to the plastic layer and bond the parts together. Apply the material sparingly on finished surfaces, as it will dissolve any paint it touches.

Q: How do you install switch motors on foam-based layouts?

– Greg Zylgaldo

A: You'll need to create a hard surface for the mounting screws. We suggest cutting 4" or 5" squares of ⅛" tempered hardboard, underlayment, or plywood. Glue the squares to the bottom of the foam surface under the location of the switch point. Be sure to use a foam-safe construction adhesive, such as PL300. You'll need to hold the square to the layout with pins or clamps until the glue cures. Let the construction adhesive set for at least 24 hours.

After that, remove the pins or clamps and follow the normal installation instructions that come with your switch motor or switch machine. The ⅛" board is enough for the screws to have something to bite into in order hold the switch motor to the model railroad.

Note that if you require the actuating rod to run through more than 1½" of material, you'll need to replace the supplied wire with a longer, slightly heavier gauge wire.

MORE on MRVP!

For even more answers to your modeling questions, check out Ask MRVP on our website. Subscribe and join in the fun!

Q: Is it okay to use a train power pack to power lights on structures?

– Fred Musselwhite

A: Yes, but it's important to know how much power it puts out so as not to exceed the voltage rating of the bulbs. In order to check this, connect a DC voltage meter to the track terminals on the power pack. Test meters are available at most hardware or home improvement stores.

Next, set the throttle knob until the meter reads just a bit below the power rating for the light bulbs you intend to use. If you run them at full power, they won't last as long. Place a piece of tape next to the knob on the power pack so you know where it needs to stay, or if you're worried about the knob getting bumped, tape it into position.

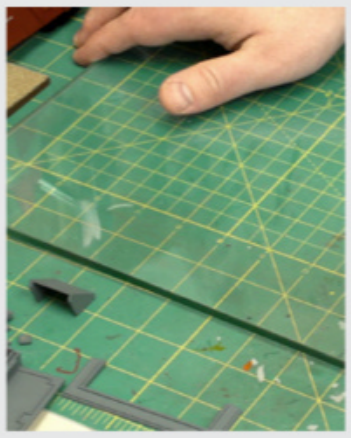
One other thing to note is that you don't want to exceed the current rating of the power pack. Most train set power packs are rated at .5 amp or 1 amp. If you have a large layout with a lot of lighted accessories, you'll likely need a bigger power source.

Q: What type of lumber have you used on project layouts?

– Joe Altnether

A: We've built a number of layouts from all sorts of different materials, everything from 2 x 4s down to sheets of plywood ripped into dimensional lumber lengths. But we keep coming back to good, old clear pine. It's a little more expensive than no. 2 pine, but the benefits outweigh the costs. First of all, it's better kiln dried than no. 2 lumber, so it doesn't warp as easily. Second, with no. 2 pine, it never fails that you end up with knots in places where you don't want them; with clear pine, you won't have that. Finally, you can finish the clear lumber on the lower part of the benchwork with stains and paints to make them look nice. With no. 2 pine you may not get the same look, as it tends to have a rougher surface to it.

Clear lumber is always the best bet. At the lumberyard, go through the stack to find straight boards. When you store them, lay them as flat as possible in a dry area.



Q: What kind of glass does Cody use on his work surface?

– Art Britten

A: It's a ¼-inch thick, 12 x 12-inch piece of tempered glass. If you get yours at a glass store, have them polish off the edges so they are smooth. Cody added 3M self-adhesive dots on to the corners of the glass because his piece isn't perfectly flat. The dots act as feet and help correct that. Another benefit of adding the glue dots is that the pane of glass doesn't slide around as much on your work surface. Cody places his on a self-healing cutting mat for better grip.

Q: What method do you recommend for adhering track?

– Mike Hauri

A: My default is clear adhesive caulk, such as DAP Alex Plus (item no. 18071). If you decide later that you want to remove the track for some reason, it's very easy to slip a putty knife underneath and pop the whole thing right out of the caulk.

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