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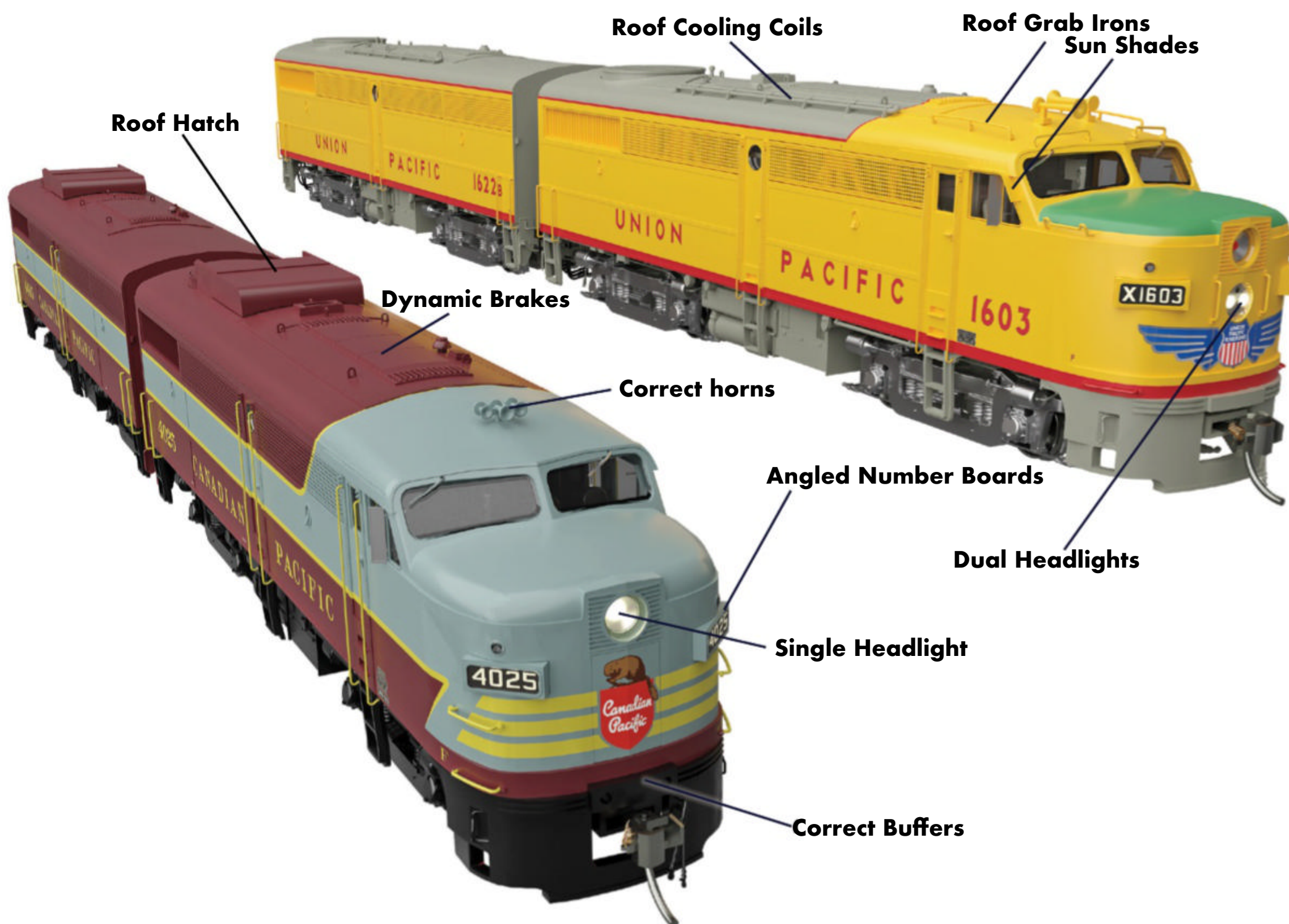


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On the cover: Trains pass on a curve on Chris Moore's HO scale Cascade & Twin Mountain, based in Colorado in the 1960s. Bernard Kempinski photo



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In October, see a track plan for a West Virginia paper mill layout. Plus, visit a double-deck industrial layout, build a drawer for operations paperwork, and more!

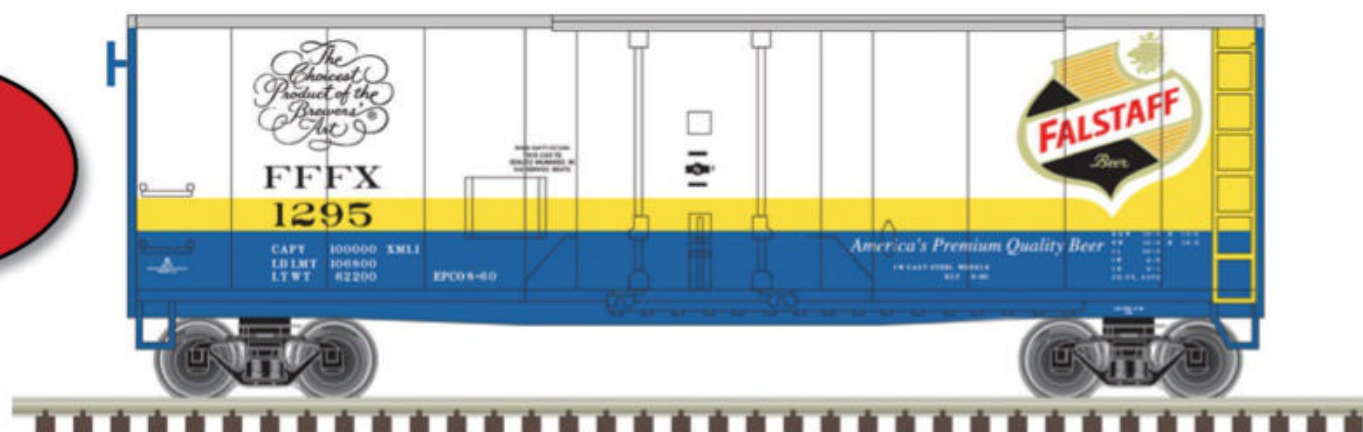
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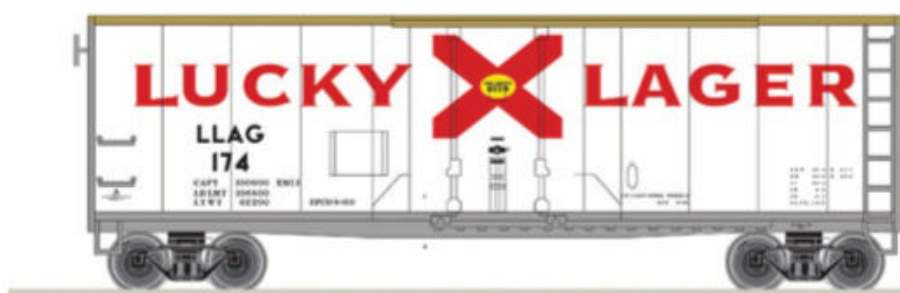


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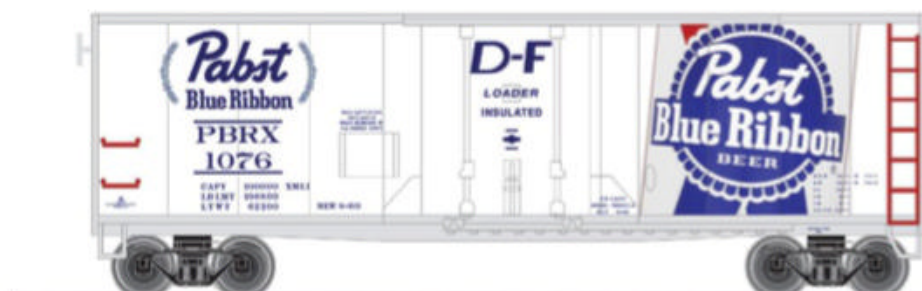
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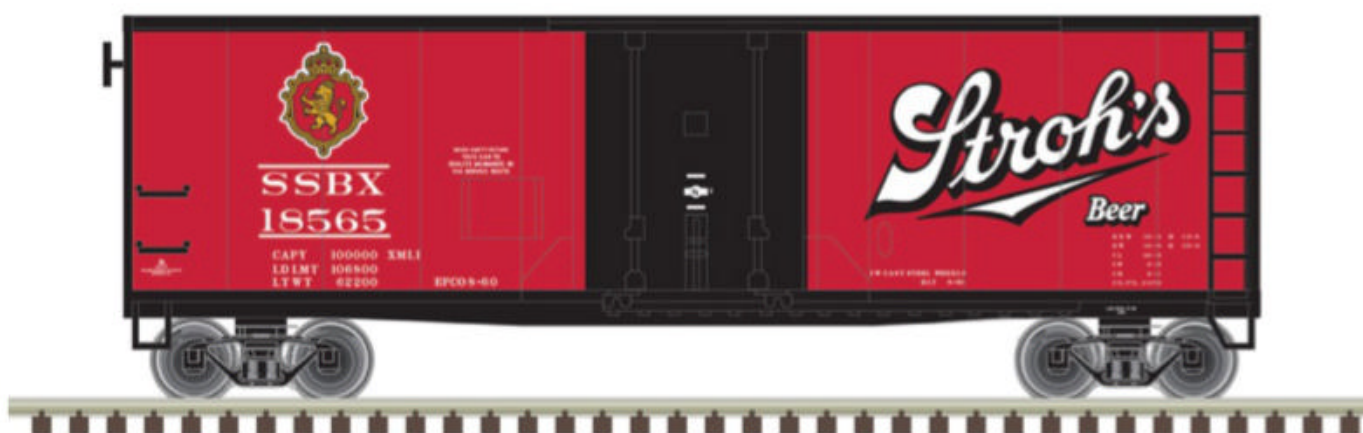
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How to run steam locomotives on your modern model railroad

It's not uncommon for model railroaders who focus their efforts on the modern era to also own some equipment that doesn't fit their modeled time period. Whether your collection includes famed steam locomotives such as the Big Boy or even earlier engines, Bryson Sleppy explains some prototypical ways and reasons to operate this anachronistic equipment on your modern layout.



How to model railroad signals

Model railroad signals are an essential component to convey information to engineers, control traffic, and add detail to a layout. While building and wiring model railroad signals for operation may sound daunting, it doesn't have to be. Steven Otte explains the most common forms of signals used on model railroads, their prototype equivalents, and links to articles on how to build them.



Built by Others: Robert Mountenay's HO scale Merkiomen Valley Branch

In the latest installment of the Built by Others series, Robert Mountenay showcases his HO scale Merkiomen Valley Branch layout, which takes its inspiration from the Alkali Central layout that originally appeared in the pages of *Model Railroader* in December 1995. Have you been inspired to build a layout patterned after a layout or track plan that was once published in *Model Railroader*? We'd love to hear from you! E-mail dpopp@kalmbach.com to have your layout possibly featured in an article on Trains.com.



Rapido Trains HO scale RTL Turboliner

See the new HO scale RTL Turboliner from Rapido Trains in action on the *Model Railroader* staff layout, the Milwaukee, Racine & Troy! Editor Eric White and senior editor Cody Grivno discuss the many features of this ready-to-run five-car train as they get it up to speed on the MR&T in this exclusive for Trains.com Video.



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Play with your trains

It used to be that model railroaders refused to call what they're doing "playing with trains." But now, we talk about the "play value" of many products and activities. While building our models has entertainment value, one of the things model railroads gives us is something to play with once it's finished.

Of course, we don't call it "playing with trains." We call it "operating." We are serious modelers, after all, aren't we?

But that seriousness can put people off of operating. They hear about timetables and train orders, railroad rules, rights of trains, and think "This sounds like work. Why would I want to do that in my free time?"

Many people build model railroads with no plans to operate them, and that's perfectly understandable. On one hand, it isn't the thing, it's the creation of the thing that's

fulfilling. On the other hand, once the thing, or layout, is built, it's rewarding to watch it all work as you planned, to finally see your trains run through the landscapes you've created. As long as you're having fun, you're doing it right.

But sometimes, a modeler will "finish" the layout, and realize there's something more. Maybe someone invited them to an operating session, and it was more fun and less work than anticipated (I've usually found that to be the case). Stories about model railroads that have been rebuilt to accommodate operations aren't uncommon.

For some model railroaders, operation is the whole hobby. They don't own a layout, nor do they plan to build one. Check out the story on page 28, "The life of an itinerant model railroader," for more on this.

On the other side of the coin are guys such as Jack Burgess. He built his Yosemite Valley layout with the idea that others would operate it. Other than to test equipment or new work on the layout, Jack doesn't run his trains.

On page 52, he explains the steps he's taken to ensure visitors to his layout have a reasonable chance at success. Having been there, I can report his methods work well. I can also confess I failed to read the short instructions that went with my train, causing myself a problem I shouldn't have had.

That doesn't mean I didn't have fun, it just meant the guys I was operating with had something to tease me about at dinner!

When I started at *Model Railroader*, I had never been to an operating session. I was



truly concerned I might not like it, then where would I be? I'm happy to say I've never had a bad time. Even in the rare cases the trains didn't run well, there was always the camaraderie of the crew to make up for that.

So what are you waiting for? Go to your layout room and play with your trains!

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Phone 262-796-8776
E-mail editor@modelrailroader.com

Model Railroader Art Team
Design Director
Assistant Design Director
Illustrators
Production Specialist

Thomas G. Danneman
Scott Krall
Kellie Jaeger, Roen Kelly
Jodi Jeranek

Trains.com
Director
Executive Producer
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HO scale



Rohr RTL Turboliner. This HO scale five-car passenger train is available from Rapido Trains. The Rohr RTL Turboliner is painted in Amtrak's phase 3 early, phase 3 late, phase 5, and X2000 demonstrator paint schemes. The Turboliners feature factory- and modeler-installed parts; tinted window glazing; trucks with third rail shoes; full interior details; and working

headlights, strobe lights, and cab marker lights. Both end units in each set are powered. Separate coach and coach/snack bar cars are available for **\$129.95**. The X2000 two-car set sells for **\$449.95** (DC) and **\$649.95** (DCC and sound). Five-car sets are **\$749.95** (DC) and **\$949.95** (DCC and sound). Rapido Trains Inc., 905-474-3314, rapidotrains.com

ScaleTrains acquires ExactRail

ScaleTrains, a manufacturer of N, HO, and S scale model trains based in Cleveland, Tenn., announced it has acquired ExactRail, a producer of freight cars and bridges in N and HO scales.

"We're excited about the future of our favorite hobby," Shane Wilson, president of ScaleTrains, said in a press release. "Our growing product line coupled with the addition of MTH HO and S products, Fox Valley Models, and now ExactRail continues our mission to provide high-quality models trains for every skill level and budget."

John Pestana, co-founder of ExactRail, said, "It's hard to believe that it's been 15 years since I entered the model railroading community with ExactRail. Over the years we brought new products, new online resources, and had a great time doing it with amazing friends. Now, the time has come to pass the baton to our friends at ScaleTrains who share the same passion for the hobby that I do."

To help shepherd the transition and ensure ExactRail models are released

regularly, long-time ExactRail employee Chris Brimley has joined the ScaleTrains team. Chris stated, "I am thrilled to be joining the impressive team at Scale Trains and look forward to bringing ExactRail models and more to this wonderful hobby."

The first ExactRail N scale freight car under the ScaleTrains banner, the Pullman-Standard 4,427-cubic-foot-capacity three-bay low-side covered hopper, was announced at the National N Scale Convention in Reno, Nev. The model is in production now and will be

available later this summer. Several other ExactRail models are in production, with additional deliveries scheduled for early 2024.

ExactRail.com has become an archive site for past releases. Remaining in-stock ExactRail models are now available on the ScaleTrains website and are shipping from the company's warehouse in Tennessee. Future announcements will be available for pre-order. ExactRail models will once again be available at brick-and-mortar dealers through the ScaleTrains Select Retailer network.



ScaleTrains announced its first offering from the recently acquired ExactRail line, the Pullman-Standard 4427 three-bay low-side covered hopper. It will be available in six road names with multiple road numbers per scheme.

HO scale locomotives



- **Alco PA1 diesel locomotive.** Erie Lackawanna; Alco demonstrator (one A-B set); Atchison, Topeka & Santa Fe

(repowered in one A unit and one A-B set); Canadian National demonstrator (one A-A set); Gulf, Mobile & Ohio (two road numbers); Missouri Pacific; Missouri-Kansas-Texas; New York, New Haven & Hartford (orange and McGinnis schemes); and Union Pacific (two A units and one A-B set). Three numbers per scheme unless noted. Santa

Fe units feature unique roof profile and EMD-style exhaust and fans. Unit-specific details such as dynamic brakes and light packages. Direct-current A-unit, \$239.95; direct-current two-pack, \$459.90; A-unit with DCC and sound, \$349.95; two-pack with DCC and sound, \$669.90. Rapido Trains Inc., 905-474-3314, rapidotrains.com



• **Class D 4-truck Shay geared steam locomotive.** Greenbrier, Cheat & Elk; Carolina & Northwestern; Chesapeake & Ohio (three road numbers); Mower Lumber Co.; Norfolk & Western (two numbers); Red River Lumber; Southern Ry. (three numbers); and Western Maryland (two numbers). Also available painted black but unlettered. One number per scheme unless noted. Operating smoke unit and die-cast metal boiler, tender body, and chassis. Direct-current model, \$499.99; with DCC and sound, \$599.99. Broadway Limited Imports, 386-673-8900, broadway-limited.com



• **General Motors Diesel GMD-1 diesel locomotive.** Canadian National ("wet noodle" herald with red cab; green scheme; wet noodle herald with black cab; and zebra stripes in five road numbers), Oregon Pacific (one number), and Waterloo Central (one number). Four numbers per scheme unless noted. Die-cast metal frame with detailed piping and traction cables. Flexicoil trucks and separate grab irons. Direct-current model, \$239.95; with DCC and sound, \$349.95. Rapido Trains Inc., 905-474-3314, rapidotrains.com



• **Baldwin BF/RF-16 diesel locomotive.** U.S. Army Air Force (fantasy scheme in one road number), Baltimore & Ohio, Delaware & Hudson (two

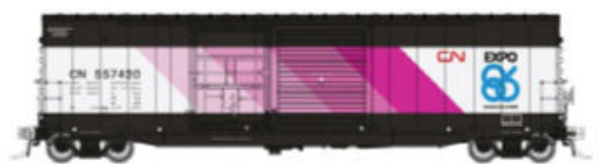
numbers), New York Central, and Pennsylvania RR (single-stripe and five-stripe schemes). Seven other fantasy schemes. One A unit and one A-B set unless noted. All-wheel electrical pickup. Factory-applied grab irons and bell. Direct-current A unit, \$199.99; DC B unit, \$189.99; A unit with dual-mode Paragon 4 sound decoder, \$299.99; two-pack with DCC and sound (powered A unit, unpowered B unit), \$399.99. Broadway Limited Imports, 386-673-8900, broadway-limited.com

HO scale freight cars



• **81-foot eight-axle depressed-center flatcar.** Westinghouse Electric; Burlington Northern; Chicago & North Western; Kasgro Rail; Norfolk Southern; and TTX. Four road numbers per scheme; also available undecorated. Die-cast metal body and four 100-ton trucks with 36" metal wheelsets. \$39.98.

WalthersMainline. Wm. K. Walthers Inc., 414-527-0770, walthers.com



• **National Steel Car 5,304-cubic-foot capacity combination-door boxcar.** Canadian National (Expo 86 two-pack, as-delivered scheme in two single cars and six-packs, late 80s repaint in one single car and six-pack, and North America scheme in one single car). Also available painted but unlettered. Freestanding grab irons, door latches, and uncoupling levers. Single car, \$54.95; two-pack, \$109.90; six-pack, \$329.70. Rapido Trains Inc., 905-474-3314, rapidotrains.com



• **Pacific Car & Foundry 50-foot Plate B double-plug-door boxcar.** Chicago, South Shore & South Bend; St. Louis

HO scale



Gunderson/Greenbrier 6,276-cubic-foot capacity plug-door boxcar. This Aurora Miniatures boxcar is available decorated for TTX (with FBOX reporting marks in 18 road numbers); Arkansas-Oklahoma; Crab Orchard & Egyptian; Canadian Pacific (with Illinois Central marks); Union Pacific (with BKTU marks); and Utah Central Ry. The newly tooled HO scale model is offered in six numbers per scheme unless noted. The boxcar (\$59.99) features version-specific details, rotating bearing caps, and AuroraJanney scale couplers. Aurora Miniatures North America Inc., na.auroraminatures.com

N scale



Siemens SC-44 Charger diesel locomotive. Bachmann's N scale version of the Tier 4 passenger locomotive is decorated for Amtrak (Midwest [two road numbers], Cascades, and Pacific Surfliner paint schemes), Altamont Corridor Express, and North County Transit District Coaster. The contemporary locomotive (\$459) is offered in one number per scheme unless noted. The passenger hauler features a dual-mode TCS WOWSound decoder. Bachmann Industries, 215-533-1600, bachmanntrains.com

Southwestern (Cotton Belt); and Southern Pacific. Two to six road numbers per scheme. New PCF signature riveted car sides with PCF-style ladders. Prototype-specific door stops, door gussets, and sill design. Moloco Trains, molocotrains.com



• **Pennsylvania RR X23 boxcar.** Pennsylvania RR (circle keystone herald in two single cars and six-packs, Lines scheme, Union Lines scheme, and pre-1920 scheme) and Cumberland Valley (single car and three-pack). One single car and one six-pack per scheme unless noted. Warren truss single-sheathed body, flat panel or lap seam roof, Youngstown or Creco panel doors, and archbar or 2D-F8 trucks with metal wheelsets. Single car, \$54.95; three-pack, \$164.85; six-pack, \$329.70. Rapido Trains Inc., 905-474-3314, rapidotrains.com



• **Treadwell single-pot slag car.** Cast-resin kit with one-piece frame and Buckeye trucks. Less wheels and decals. \$59.99. Funaro & Camerlengo, 570-224-4989, fandckits.com

H0 scale scenery



• **Transformer load kit.** Use as a freight car load or scenic detail for industries. Fits on the WalthersMainline 81-foot eight-axle depressed center flatcar (sold separately). Molded in gray plastic. Includes four simulated tie-downs. Measures 2 7/8" x 2 1/8" x 1 7/16". \$14.98. Walthers SceneMaster. Wm. K. Walthers Inc., 414-527-0770, walthers.com

H0 scale structures



• **House under construction.** Laser-cut wood kit featuring microplywood construction. Complete interior framing for a typical postwar two-story Cape Cod house. Interior floor plan includes living room, den, dining room, kitchen, hallway, bathroom, and staircase. Roof features ladder-style gable. Measures 3 13/32" x 4 13/32" x 2 25/32". \$69.98. Walthers Cornerstone. Wm. K. Walthers Inc., 414-527-0770, walthers.com

N scale freight cars



• **American Car & Foundry 50'-6" boxcar.** Burlington Northern; Canadian National, CSX, National Railways of Mexico, Pan Am, Railbox, and Union Pacific. Two road numbers per scheme; also available undecorated. Non-terminating corrugated ends, diagonal-panel roof, and non-operating 10-foot sliding doors. Cross-member attachment rivet detail on side sills. \$22.95. Trainman series. Atlas Model Railroad Co., 908-678-0880, shop.atlasrr.com



• **Angus shops wide-vision caboose.** CSX; Algoma Central; BC Rail; Canadian Pacific (yellow with Multimark herald, Engineering White scheme, and beaver herald with Soo reporting marks); Ontario Northland; and Toronto, Hamilton & Buffalo. One to six numbers per scheme. Ten fantasy schemes also offered, as well as painted white, yellow, and red but unlettered. Detailed underbody including separate air and brake piping. Interior battery-powered lighting and operating end marker lights. \$49.95. Rapido Trains Inc., 905-474-3314, rapidotrains.com



• **Thrall-Trinity 42-foot coil steel car.** Norfolk Southern (six road numbers), Canadian Pacific, Chicago Heights Terminal Transfer (with Union Pacific hood), Conrail, CSX (six numbers), and Indiana Harbor Belt. Four numbers per scheme unless noted. Road-specific hood detail including grab irons, stacking brackets, braces, and lifting bail. Body-mounted Type E couplers and 36" machined metal wheelsets. Five wrapped coil steel weight loads included. Rivet Counter series. \$34.99. ScaleTrains, 844-987-2467, scaletrains.com

Broadway Limited Imports HO EMD SD40



An Electro-Motive Division SD40 is the latest model to join the Broadway Limited Imports HO scale diesel lineup. The six-axle locomotive has railroad-specific details, individually controllable lighting features, and a dual-mode Paragon 4 sound decoder.

Electro-Motive Division produced the SD40 from January 1966 to July 1972. During that time, more than 1,250 units were built for railroads in United States, Canada, and Mexico. The SD40 was rated at 3,000hp and equipped with a 16-cylinder 645E3 diesel engine.

Our sample is decorated as Southern Ry. (SOU) 3178, part of the railroad's 3170 through 3200 series built between April 1971 and January 1972. Following Southern's practice, the road locomotive had a high short hood.

When SOU and Norfolk & Western merged in 1982 to form the Norfolk Southern, the SD40s became part of the newly created railroad's fleet, retaining the same road numbers. The units were off the NS roster by 2009.

The Broadway Limited Imports model has an ABS shell and die-cast metal chassis. The pilots are fitted with plastic uncoupling levers, multiple unit (m.u.) hose clusters, and pilot beams.

Rooftop features include two "fire-cracker" antennas, a pair of three-chime air horns, radiator and dynamic brake fans with see-through grills, and a bell on the point of the long hood.

Freestanding cab details include sunshades, metal windshield wipers and wind deflectors, and clear window glazing. Inside the cab is a painted engineer figure and a control stand.

Our sample is neatly painted in Southern Ry.'s tuxedo paint scheme. The paint is smooth and evenly applied, and the color separation lines are crisp.

Below the road number on the cab are the initials for SOU subsidiary Cincinnati, New Orleans & Texas Pacific Ry. The "F" after the 8 is a check code that Southern Ry. used to confirm the correct diesel number was recorded. Printed Automatic Car Identification labels are both sides of the long hood.

I compared the SD40 to prototype drawings in *Southern: A Motive Power Pictorial, 1968-1982* by Paul K. Withers and Tom L. Sink (P.K. Withers, 1987). Generally speaking the model followed published data. The distance between the truck centers is a scale 39'-2" (it should be 40'-0"). The ride height is about a scale 4" too tall.

The BLI SD40 has a dual-mode Paragon 4 sound decoder with Rolling Thunder and a Go Pack capacitor. In direct current (DC), the model has a higher starting voltage. To control the bell, horn, volume, and other sound effects, you'll need BLI's DCMaster analog control module.

I used an NCE ProCab for Digital Command Control testing. At step 1 the engine moved at 2.6 scale mph. At step 28, the road unit achieved a top speed of 77 scale mph. The Southern units were rated for 71 mph.

Then I took the SD40 over to our Milwaukee, Racine & Troy for further testing. The unit performed well switching cars on Jones Island and pulling a freight over the main line. The SD40 was able to pull a dozen 50-foot boxcars up the curving 3% grade to Skyridge.

The model is equipped with long-shank metal couplers, which helps it operate on 18" radius curves. Medium-shank couplers would look better.

The EMD SD40 is an exciting addition to the BLI HO scale Paragon 4 line. If you'd rather install your own sound decoder in the road unit, BLI also offers the locomotive in its new Stealth (non-sound) series. With or without sound, the BLI SD40 will look good on the point of an HO scale freight train. – *Cody Grivno, senior editor*

Facts & features

Price: With dual-mode Paragon 4 sound decoder, \$399.99; Stealth (non-sound) series, \$299.99

Manufacturer

Broadway Limited Imports
9 East Tower Circle
Ormond Beach, FL 32174
broadway-limited.com

Era: April 1971 to 1980s (as decorated)

Road names: Southern Ry. (high short hood); Atchison, Topeka & Santa Fe; Chesapeake & Ohio; Canadian National; Canadian Pacific; Conrail; CSX; Pennsylvania RR; Southern Pacific; and Union Pacific. Two road numbers per scheme; also available undecorated with C&O details.

Features

- 18" minimum operating radius
- Go Pack capacitor
- Dual-mode Paragon 4 sound decoder with Rolling Thunder
- Kadee-compatible metal couplers
- Weight: 1 pound, 0.8 ounce

Atlas O PS 4427 low-side covered hopper



Atlas O has released a new run of its Pullman-Standard 4,427-cubic-foot capacity low-side three-bay covered hopper. The model, part of the Atlas O Master Line since 2001, features an injection-molded plastic body, positionable hatch covers, and see-through running boards.

Pullman-Standard introduced the low-side 4427 covered hopper in 1964. The 100-ton car proved a success, with more than 23,000 covered hoppers produced for railroads, leasing companies, and private owners. The Atlas O model depicts an early car with a 4-3-4 exterior post pattern. Later cars had 13 evenly spaced posts.

Though the 4427 was popular, the one drawback of the low-side design was difficulty reaching the shaker brackets and outlet gates. In 1966, PS modified the design with higher sides.

Our sample is decorated as Pullman Transport Leasing Division (TLDX) 2674, part of the 2659 to 2683 series built by PS under Lot 8885. Lessee Peavey Co. took delivery of the cars in March 1964. In the 1970s and '80s, cars from this series were repainted into Peavey's solid blue scheme with orange lettering.

The Atlas O 4427 covered hopper has a one-piece injection-molded plastic body. The roof is a separate piece with tabs on the long edges (three per side) that lock into slots on the car's interior.

On top of the roof is a see-through plastic running board with wire corner grab irons. The hatch covers, which have

wire handles, are positionable. A single-sided sheet included with the model shows how to operate the plastic lift latches and locking bars.

The plastic end cages are separate, factory-applied plastic parts with wire grab irons. Features on the B end of the car include a high-mounted brake wheel; a see-through plastic brakewheel platform; and a separate air reservoir, brake cylinder, and control valve.

Underneath, the car has factory-applied center sills, shaker brackets, and outlet gates. An air line runs along the bottom edge of the right side of the car. Use caution when handling the car so you don't damage the delicate part.

Our sample is neatly painted in the Peavey Co. blue, white, and black scheme. The PV diamond logo and PEAVEY COMPANY lettering are on free-standing placards. Stand-offs support the placards where they overhang the exterior posts and span wider body panels. The paint and lettering placement match a prototype photo of another car from the series that I found online.

The covered hopper rides on sprung, die-cast metal roller-bearing trucks with 36" metal wheelsets. Plastic bearing caps on the axle ends rotate when the car is in motion. The die-cast metal couplers are body mounted.

Metal weights are secured to the bottom of the hopper bays from the interior with screws. The model weighs 21.1 ounces, 3.7 ounces too heavy per National Model Railroad Association Recommended Practice 20.1.

I compared the covered hopper to prototype drawings published in the 1966 edition of the *Car and Locomotive Cyclopedia of American Practice* (Simmons-Boardman Publishing Corp.) Most dimensions followed published data. The distance over the running boards is 1 scale foot too long.

The latest run of Atlas O PS 4427 low-side covered hoppers features eight all-new paint schemes. This model only comes around every two to three years, so don't miss out on your chance to get one of these grain haulers for your O scale layout. – *Cody Grivno, senior editor*

Facts & features

Price: \$89.95 (undecorated, \$84.95)

Manufacturer

Atlas O
378 Florence Ave.
Hillside, NJ 07205
shop.atlasrr.com

Era: March 1964 to 1980s (as decorated)

Road names: Peavey Co., Archer Daniels Midland, Cooperative Marketing Association, Gold Kist, Tabor & Co., Indiana Farm Bureau, Scoular, and Valley Mills. Two road numbers per scheme; also available undecorated.

Features

- 36" minimum radius curve
- Die-cast metal couplers
- Weight: 21.1 ounces (3.7 ounces too heavy per National Model Railroad Association Recommended Practice 20.1)

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RailSmith Models N scale 64-seat coaches



A pair of Milwaukee, Racine & Troy

N scale Pullman-Standard 64-seat fluted-side coaches is the latest addition to the Kalmbach Hobby Store. The ready-to-run cars, produced by Rail Smith Models, feature an injection-molded plastic body with a separate roof, sprung diaphragms, and clear window glazing with printed aluminum trim.

The grab irons, stirrup steps, and roof details are molded. Inside, the car has a one-piece interior molded in light brown that has plenty of room for adding passenger figures.

The plastic underbody has metal contacts for interior lighting (not included). The center sills and crossmembers are molded. Additional molded details include the 16" x 8" supply reservoir; battery boxes; control boxes; relay box; pressure water storage tank; motor generator; 3-comp. "T" reservoir; 10" x 30" air reservoir; water tank casing; and air

conditioner starter box, control box, condenser, and compressor.

The RailSmith Models coach is based on cars from New York Central's 3000-3152 built by PS under Lot 6721 (plan 7484). The 153 cars were ordered in May 1944, but World War II delayed the project. The entire lot was delivered between February and October 1946. Cars from this group became part of Amtrak's fleet in 1971. Car 3029 was converted to the passenger carrier's instruction car 16757.

The MR&T-painted cars are designed for commuter service on our State Line Route layout, featured in the January through April 2022 issues of *Model Railroader*. There's precedence for this, as NYC modified 40 cars from the 3000-3152 series for commuter service in 1966. During the rebuild, 15 cars had the fluted siding removed.

The model dimensions closely follow drawings that were published in the September 1998 issue of MR. At 1.4 ounces, the lightweight coaches are at the correct weight per National Model Railroad Association Recommended Practice 20.1.

The screw-mounted trucks have built-in brass wheel wiper pickups. From the box the metal wheel stubs mounted on plastic axles were a bit tight. A gentle twist of the wheels brought them into gauge. The truck-mounted Accumate couplers are at the correct height.

The N scale MR&T 64-seat lightweight coaches are offered in two road numbers. Look for more 1:160 MR&T offerings from the Kalmbach Hobby Store in the coming months. – *Cody Grivno, senior editor*

Facts & features

Price: \$50 each

Manufacturer

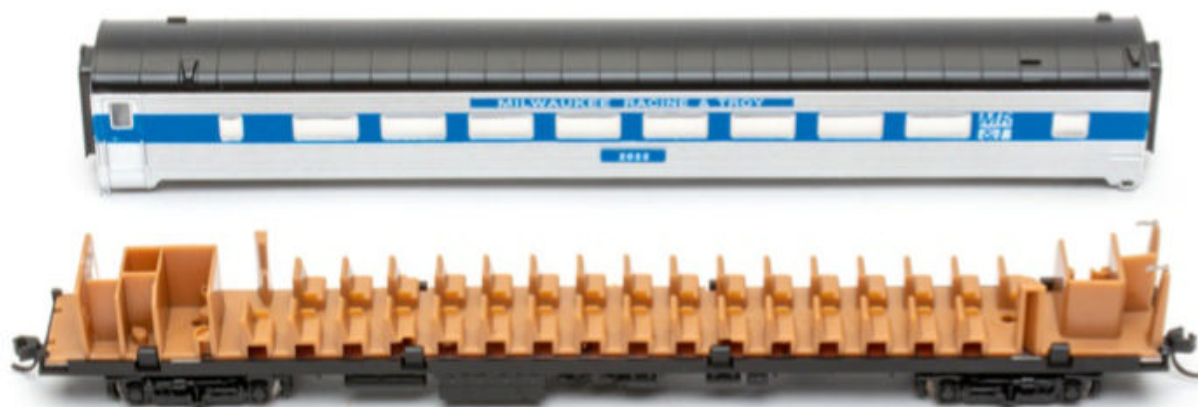
Produced by RailSmith Models, available from the Kalmbach Hobby Store, KalmbachHobbyStore.com

Road name: Milwaukee, Racine & Troy (Nos. 2022 and 2023)

Era: 1980s to 1990s

Features

- Metal wheel stubs mounted on plastic axles
- Truck-mounted Accumate couplers
- Weight: 1.4 ounces



The N scale Milwaukee, Racine & Troy Pullman-Standard lightweight 64-seat coach, produced by RailSmith Models, has a one-piece plastic interior. Some of the underbody detail is also visible in this photo.

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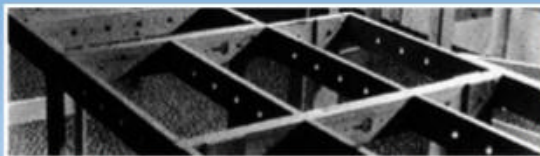
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Extruded-foam insulation board benchwork is a popular choice for model railroad layouts. We here at MR use it on most of our project layouts, like the N scale Red Oak layout. MR staff photo

Does foam benchwork pose any difficulties?

Q What are the drawbacks of extruded-foam insulation board benchwork? I'm re-entering model railroading with an HO scale layout and much has changed since my childhood. I was initially going to just lay cork roadbed and track on top of a plywood tabletop. But now I'm considering adding extruded-foam insulation board on top of the plywood to let me create below-grade terrain features like ditches and small streams. This will probably add some additional difficulty with laying roadbed, track, and switch machines. Do you foresee any other issues or problems?

Barry Kenyon

A Extruded-foam insulation board benchwork is no longer an experimental or innovative model railroad scenery material; it's been around long enough to be considered mainstream. We use it on most of our project layouts. The reason is that it's light, rigid, conveniently sized (in 4 x 8 sheets and 2 x 4 "handy panels"), and easy to cut, shape, and glue.

The biggest drawback to extruded-foam insulation board benchwork is availability. Since it's sold primarily as a construction material to insulate buildings against the cold, it can be hard to find in hotter climates.

Just because you can't use nails to hold down your track on extruded-foam insulation board benchwork doesn't mean track laying is harder on foam. We usually fix cork roadbed to the foam using a foam-safe construction adhesive caulk like Liquid Nails for Projects or Loctite PL 300. Simply run a bead of caulk down the track centerline, spread it thin with a putty knife, press the roadbed into the adhesive, and use pins to hold it in place while the adhesive cures. Once it's cured, use the same technique to glue your turnouts and flextrack to the roadbed. Just make sure to drill holes for your switch machine actuator wires before gluing down the turnouts, and don't get the adhesive under the switch rods.

If you add foam to the top of a plywood table, you can still mount switch machines under the track. I outlined a couple methods to do this in my "Ask MR" columns of October 2016 and June 2019. You might have to replace the actuator wire that came with the machine with a length of stiffer music wire, which is available in 12" lengths from Walthers and other hobby stores. Use a hardened-metal cutting plier and wear eye protection when you snip it to length. Music wire will ruin rail nippers and sprue cutters, and the cut ends can go flying.

But all-extruded-foam insulation board benchwork isn't your only option. You could use the traditional open-grid benchwork with plywood subroadbed on risers. Then, fill in the empty spaces between the subroadbed with foam terrain. This approach gives you the best of both worlds.

Q I'm planning my first layout and I need to learn about train movements and switching a model railroad. Specifically, how are cars spotted on facing-point turnouts versus trailing ones? How do I plan for trains running in both directions?

Jesse Brinson

A There are basically only three maneuvers you need to know: the shove, the pull, and the runaround. Everything else is some variation or combination of those three.

The shove is where a locomotive pushes a car into a siding, either in front of or behind the locomotive, uncouples from it, and leaves it there. The pull is the opposite: the locomotive enters the siding, couples onto a car there, and pulls it out. A runaround is where a locomotive uncouples from a car, uses a double-ended siding to run around the car, then couples onto the other end.

Spotting a car at a trailing-point siding is easy. The operator uncouples behind the car to be spotted, leaving the rest of the train on the main. He then pulls forward past the points of the turnout, lines the switch for the diverging route, and shoves the car into the spur. After uncoupling, he pulls back onto the main, lines the switch for the main, backs up to couple onto the rest of his train, and proceeds on his way.

It's a little more complicated if your car is supposed to go on a facing-point spur. With the turnout ahead of your locomotive and the car behind it, you can't pull into the siding without your locomotive getting stuck behind the car. To work a facing-point spur, you need to find a nearby double-ended siding so you can run around the car and shove it ahead of the locomotive.

But what if you need to spot a car in a facing-point turnout and no runaround track is available? You have a couple options. One is to leave the car in an "off spot" to be switched by a train heading the other way, for which that spur will be trailing. If your train is a turn – one that heads out and back, returning to its point of origin at the end of the job – you might decide to work all trailing-point spurs on the way out and facing-point spurs on the return leg, when those turnouts will be trailing-point.

Send questions to senior associate editor Steven Otte at AskTrains@Trains.com.



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For more on switching a model railroad, read "How to switch model railroad freight cars" on Trains.com.

Q I would like some advice on cleaning an airbrush while weathering. I use an older airbrush to weather my N scale rolling stock. Since N scale models take very little paint, the painting process usually only takes a few seconds to a minute per color. But cleaning the tip, the air point, and the color cup to change colors takes three to four times as long or more. It's very discouraging, so I hesitate to use my airbrush. Do you have any advice on how to change colors without allowing the residue to build up on my brush?

Jim Werling

A There is, unfortunately, no shortcut to cleaning an airbrush. But there are ways you can get the most out of your airbrush weathering sessions and minimize that chore.

First, don't weather single cars, one at a time. Wait until you have at least five



Airbrushing is a popular way to weather freight cars. But cleaning an airbrush while weathering so you can change paint colors can really slow the process down. MR staff photo

or six to weather, then do them all assembly-line style. That way you can spray all the cars with the first color before switching to the second.

Second, if you're weathering, the effect you're going for isn't necessarily pure colors; a little mixing will be fine.

So you don't have to clean your airbrush completely between colors, especially if you have an external-mix airbrush. A quick rinse should be sufficient.

Here's a quick-and-dirty (excuse the phrasing) technique. Assuming you're using water-soluble acrylic paints, get two airbrush jars and fill one with distilled water, and the other with a 50-50 mix of distilled water and blue window cleaner. When you're done spraying one color, remove the paint cup and rinse it out in the shop sink, leaving it to dry upside-down on a paper towel. Attach the jar of cleaner to the airbrush and spray it onto a piece of scrap cardboard or against the inside of your spray booth until it runs clean. Use a damp cotton swab to wipe off the tip if there's any paint still sticking to it. Then switch to the water bottle and spray that for a bit to rinse out any cleaner residue.

That should be all you need to do between colors, especially if you're switching between similar colors. Then you can give your airbrush a thorough cleaning when you're done for the day.

Union Pacific Railroad (UP) class 4000

The Union Pacific Railroad rolled out the biggest restoration of 2019, the complete overhaul of the largest steam locomotive in the world – the **Big Boy**, road number 4014.

TRIX

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Q How high should I place a layout backdrop? I am a long time modeler and have used backdrops on a prior double-deck HO layout. I'm now faced with planning backdrops for a single-deck N scale layout with rolling hills. How do I handle a scene that drops on a 2% gradient into a river bottom, then climbs up again? The scene I am working on covers about 15 linear feet.

Bill Barger

A When you're planning how high to place a layout backdrop, even if the terrain in your foreground may rise and fall, the horizon shouldn't. The placement of the horizon is dependent on the height of the viewer's eyeball, not the terrain in front of it. Distant mountains and valleys may provide some deviation above and below this line, but the imaginary line between earth and sky is fixed. So while you should see trees, rivers, and fields behind your low-altitude scenery, behind your taller hills should be nothing but sky.



Since the ground level on *Model Railroader's* HO scale Eagle Mountain Mine project layout is fairly low, the horizon line on the backdrop is set rather high. Nonetheless, note how the backdrop mountains on the right disappear behind the high terrain at left. Bill Zuback photo

The only reason your horizon line should rise or fall is if the elevation changes on your layout don't represent altitude changes in the terrain. For example, a "nolix" model railroad – a

multi-deck layout that climbs as it goes around the walls, with no helix – would probably have a horizon that climbs with the track. A layout that's divided into individual scenes could have a different horizon line for each vignette, depending on the altitude modeled.

But if that's not the case with your layout, your horizon should be flat. Note the highest and lowest track elevations on your layout, then choose an area in between, preferably one that will be a center of interest. Place your horizon line where it looks natural in that scene. If you're mainly going to be viewing the layout when operating it, the horizon should probably be a few inches below your standing eye level; if it's more important that your backdrops look right when photographing the layout from track height, put the horizon lower.

Once you've settled on a horizon height, extend a line around your backdrop at this height; a laser level can greatly simplify this task. Then place your backdrops so the horizon is at that level all the way around the layout. **MR**

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Natural materials can make great starting points for trees. Steve Miazga shares how he made trees for his N scale Missabe Junction Ry. using fruitless sprigs from elderberry bushes. Photos by the author

How to make trees from natural materials

My N Scale Missabe Junction Ry., featured in the September 2018 issue of *Model Railroader*, is set in northern Wisconsin. That part of the Badger State has hilly, densely forested terrain. There are plenty of great commercial trees on the market, but variety is the name of the game. Populating a 25 x 25-foot layout with off-the-shelf products would get costly in a hurry. That's why I decided early on to scratchbuild trees from natural materials that I harvest in late summer and fall. My model railroad has close to 1,000 such trees.

The nice thing about using natural materials as a starting point is that not one shape is the same. Goldenrod and

other weeds, plus astilbe and sedum from the flower garden, make great scale trees because they come in a variety of shapes and sizes. However, I never had much success finding the right "to scale" materials to use for smaller ornamental and landscaping trees.

It turned out the solution was right under my nose. The back of our current property is wild and has a variety of berry-bearing bushes. I hadn't looked at them all that closely before. Last fall, as the fruit began to drop from the elderberry bushes, I noticed the bright red sprigs looked like N scale trees. They were the perfect starting point for trees a scale 10 to 20 feet high.

Realizing I had a ready supply of N scale trees, I started harvesting as many of the sprigs as I could from the elderberry bushes. Follow along as I share my techniques for how to prepare them for use on a layout.

Steve Miazga and his wife, Jenny, live in Pewaukee, Wis., a suburb of Milwaukee. The couple has three grown sons. Steve was born and raised in Rhineland, Wis., and graduated with a degree in civil engineering from the University of Wisconsin. His other interests include outdoor cooking, Wisconsin artisan cheese tasting, railroad history, golf, and travel.

STEP 1 GETTING STARTED



After I harvested the fruitless sprigs from the elderberry bushes, I spread them out to dry for a week. The bright red color darkened to brown. In addition, the shapes began to change. Some were symmetrical, others had branches that leaned to one side, and a few were quite misshapen. After sorting the sprigs by shape and size, I inserted them into a sheet of Styrofoam to dry upright **1**.

The dried sprigs can be used as-is or combined to make larger trees. For example, I placed two sprigs that leaned



to the side back-to-back to make a symmetrical tree with a larger trunk. With the sprigs placed in a clothespin, **2**, I used medium-viscosity, gap-filling cyanoacrylate adhesive (CA) to fill in the area between the trunks. A quick spritz of accelerator sped up the curing time.

The dried sprigs are quite fragile, so you may want to stiffen them up before applying the foliage. I used a Microbrush to apply medium-viscosity CA on the delicate sprigs so they could support the foliage.

STEP 2 ADDING FOLIAGE



The basic materials needed for adding foliage are shown in **1**. I used Woodland Scenics bushes for the trees shown in this article. My four go-to colors are Forest Green (148), Light Green (145), Medium Green (146), and Olive Green (144). I've found Light and Olive Green work well together on a single tree.

You can gauge the size of the bushes in the photos above. But don't throw away the smaller pieces. They're great for filling in bare spots.

If you don't have access to Woodland Scenics bushes, you could use the company's Clump-Foliage. However, you'll need to break it into smaller pieces before attaching it to the sprigs.

I built the trees in assembly-line fashion, working on four or five at a time. Wood clothespins, which I often use as paint handles when airbrushing, made convenient handles for holding the trees during this step.



First, I used a toothpick to apply Aleene's Quick Dry Tacky Glue to the branches **2**. The glue comes out of the bottle white, as shown in the photo, but it dries clear. With the glue still wet, I applied the foliage with tweezers. An added benefit of using tacky glue is that it further reinforces the branches.

Once the foliage was in place and the glue had dried (about 20 minutes), I painted the trunks and any exposed branches with Vallejo Model Air Brown Gray (71.248). After the paint had dried, I sprayed the trees with a coat of unscented hair spray. This further secured the foliage and helped the trees maintain their shape.

Some of the finished trees were the perfect shape for flowering ornamentals. Woodland Scenics Flowers in Four Colors (T48) includes fine ground foam in orange, red, white, and yellow. I applied a dusting of white foam to select trees and secured it with hairspray **3**.



STEP 3 INSTALLATION



The scenery base on my layout is foam covered with Sculptamold, so I used a pin vise and drill bits to make holes for the trees. I attached them with Aleene's Quick Dry Tacky Glue.

Since I host regular operating sessions, I placed the delicate trees away from the aisles and frequent reach-in points. In these locations I used Woodland Scenics trees, which have a thicker plastic trunk that will withstand the occasional elbow or bump ①.

Photo ② shows how I used trees made from astilbe and sedum in a shoreline scene. According to my wife, the

most obvious thing missing in forested scenes is dead trees. Instead of discarding the misshapen piece shown, I painted it with several shades of Vallejo gray.

Though modelers often strive to plant model trees upright, they don't always grow that way in nature. I used a lopsided piece of natural material to simulate a crooked tree next to a warehouse ③.

The next time you're walking through your yard or are working in the flower garden, take a closer look at the bushes and plants. You may have a ready source of scale trees closer than you think. **MR**

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The life of an itinerant model railroad operator



Club layouts such as the North American Prototype Modelers' offer operators access to a railroad without having to build their own. In addition to joining the club, some groups host operating sessions for outsiders, usually by invitation. Jim Forbes photo

Despite not having layouts, these modelers happily run trains

By Eric White • Photos by the author, unless noted

Five operators gathered in a Milwaukee basement, the home of John Tindall's N scale Four Corners & Five Lakes. They were there to run a railroad as part of the Wisconsin Southeastern (WISE) Division-sponsored WISEop weekend.

The WISE Division is part of the National Model Railroad Association (NMRA). The NMRA is divided into 18 regions, which are further split into divisions.

Peter Lakatos, Gordy Spiering, Wendy Mollenhauer, and David Wichman were joined by Brian Schmidt, editor of *Classic*

Trains magazine. Peter, Wendy, David, and Brian all have layouts of various sizes and descriptions, but not Gordy.

"Some guys are electronics guys. Some guys are prototype guys. Some guys are layout guys. I'm an operations guy," said Gordy. "That's what I like to do, and I think I do a good job of it, some of the time. Anyway, I know I have fun."

40 years of operations

Gordy has been operating others' model railroads since he saw a call to run trains on *Model Railroader's* Milwaukee, Racine & Troy club layout,



Gordy Spiering holds a switch list while getting ready to take a train out of staging on John Tindall's N scale Four Corners & Five Lakes model railroad, set in the American Southwest.



David Wichman, left, and Jim Hebner build a train in Manitowoc Yard on John Lehnen's C&NW Lake Shore Division. The car cards on the layout correspond to the cars being moved in the yard.

in the former Kalmbach Publishing Co. building at 1027 N. Seventh St. in Milwaukee. There he met then-associate editor Andy Sperandio, whose operating lineage went back to John Allen's famed Gorre & Daphetid.

Gordy heard about the MR&T at a WISE Division meet. Traditionally, there are layout tours after NMRA division meets, and that month it was at the Kalmbach offices. Once there, Gordy found a sign-up sheet for operating on the MR&T, so he added his name.

"I guess there were 30 to 40 guys who signed up. Because of the number of guys who showed up, there were two groups (of operators).

"Andy Sperandio and Bob Hayden (another long-time Kalmbach employee) were the hosts – they were both there for all of our sessions. The other guys (on the MR staff) were behind the scenes. We never saw them at an operating session. Well, Jim (Kelly) or Gordy Odegard might pop in, but that's all. It was Andy and Bob. This was all in the early '80s," Gordy said. "That started me operating. I tended to be the Port Marquette yardmaster."

Before long, Gordy and Andy were traveling around the country to operate on some of the nation's premier layouts, some featured in *Model Railroader*.

Others weren't quite ready for prime time, scenery-wise, but were more than capable of hosting operating sessions.

They traveled to Texas to operate on David Barrow's Cat Mountain & Santa Fe and Lorell Joiner's O scale Great Southern. They operated on Tony Koester's Allegheny Midland. While in New Jersey visiting Tony, they ventured out to some of his friends' layouts, as well. Out West they operated on the San Diego Model Railroad Club's Santa Fe layout.

"I've operated on the famous, the near famous, the soon-to-be famous," Gordy said.

Many of these trips were to weekend-long operating events, drawing from either a regional pool of operators, like WISEop, or casting a net nationally. Gordy recalled an early trip with Andy to the first ProRail Annual event in 1987.

"It's the first time I know of where someone tried to organize an operating weekend. Four or five of us from the MR&T went down there." ProRail is short for Prototype Railroad Operations. It's an informal group of layout owners interested in operating model railroads



Doug Watts

following prototype practices. The group schedules a weekend in different areas of the country each year. Andy and Gordy often traveled together because they both found it easier to get away. "It's not that I was any better, I was just more available," Gordy said.

Since that trip, Gordy figures he's been to 500 operating sessions and

operated on more than 100 layouts. In a typical year, he estimates he'll attend 15 to 20 operating events.

The weekend events generally offer a chance to operate on three to four layouts each. In the early days, it was Andy's reputation as an operator that got Gordy access to all these sessions. "He got the invites, and I tagged along. He was my mentor. He tried to educate me, sometimes with limited success."

Solving puzzles, playing games

Gordy's not the only operator without a home layout. Doug Watts operates on Tony Koester's Nickel Plate Third Sub model railroad. He's a retired professional railroader who had a rewarding 26-year career spanning five railroads.



Bob Lehen, left, John's dad, and Jim Hebner work the Swift plant on Tony DeBates' HO scale LA Junction layout. Jim is the conductor, keeping track of what goes where, as Bob confirms where he needs to break a train to pull a cut of cars.

His responsibilities included daily operations, crew management, locomotive distribution, service design, marketing, sales, and economic development – a little bit of everything, he said.

“Since I’m able to regularly operate on a number of fine layouts, I’ve decided to not build a layout. Also, a good friend has a layout under construction, and I’ll be assisting him,” Doug said.

Gordy started on a layout years ago. “I had my own layout before I started operating on the MR&T, but I enjoyed operating on others’ layouts, so mine went ‘pfft.’ Andy offered more than once to help me build a layout, but...”

So what draws these guys into other people’s basements to run trains?

“One layout I operate on is the PRR Altoona Region. The large yard at Altoona, Pa., is where I like to work. The yard has a yardmaster, two switch crews (east and west), and an enginehouse supervisor. I usually work the west end yard crew. The team at Altoona builds trains, classifies cars, and keeps trains moving through the terminal. It’s all about problem solving and working puzzles. Also, there’s the tremendous camaraderie and fellowship,” Doug said.

Gordy said the same thing. “I enjoy the camaraderie. There have been a lot of guys I’ve known for 20 years, and I’ve met a lot of good people.”

Doug noted, “The common denominator is the goodness of the people. Folks are inviting you into their homes, and they’re great hosts. When I lived in Fort Worth, Tex., one layout owner’s wife baked excellent desserts. We joked with him that we didn’t come to operate trains, we came for the desserts!”

“Whether I can play the game like the owners want me to, that’s the question,” Gordy said. “A willingness to play the game. It’s like a big board game, to me.”

Operating opportunities

While Gordy got into operations through the MR&T, Doug had to do a little more searching.

“I’ve always been interested in the hobby,” Doug said. “In the fall of 1990, I learned about a round-robin operating group covering several layouts in the Philadelphia suburbs that met on Monday nights. I received an invite to join. That led to other invites, and then I was part of a network of operators.” Doug is from the Philadelphia area, and returned after living in Fort Worth.

“While in Fort Worth, I was a member of the former Lockheed-Martin



Peter Lakatos, rear, prepares to make a setout in Sycamore on the North American Prototype Modelers HO scale club layout. Tom Sansone, a NAPM member, checks the switch list.

model railroad club. Thanks to other club members and local hobby shops, I learned about additional operating sessions including ‘road trips’ to operating weekends in locations including Kansas City, Mo.; Tulsa, Okla.; Denver; and Salt Lake City.”

Both Doug and Gordy are members of OPSIG (www.opsig.org), an online special interest group dedicated to model railroad operations. “Once I joined OPSIG and was a member of the board of directors, I received invitations to additional operating sessions,” Doug said. “If you can get involved in a network, people get to know who you are, and if you do well and want to learn, you’ll receive additional invitations.”

Gordy agreed: “You just gotta try and find somebody with a layout and get invited. An OPSIG membership would be a good start. They often have listings on their website for operating sessions.

“Look around locally,” Gordy said, “and if someone asks you to come operate, always respond. Don’t just think, well, I can’t go, so I won’t say anything. Make an effort to show your interest. All you can do is ask, and if they say no, try again or try someone else.”

“It’s all invitation-only stuff,” Gordy said of the operating weekend events. “You can’t just show up, but the (operating weekend) in Kansas City (Prairie Rail), there was like 120 guys. Others have 50 to 60. It all depends on the number of layouts and each layout’s capacity for operators.”

Getting out on the road

At the beginning of a session, the hosts generally introduce their layouts.

“I’m eager to get started once I get the overview and how it’s meant to be operated,” Gordy said. His preferred job is usually in the yard, either as the yardmaster or just one of the yard workers. “I’ll do any job, really.”

Just like the full-sized railroads, there are all sorts of jobs on a model railroad. There are different kinds of trains to run – through trains, locals, yard jobs. There are organizational jobs, such as dispatching the railroad, or acting as a conductor on a train crew. Sometimes there will be a staging job – getting trains ready to go out on the layout.

“When I get to a new layout, I don’t know what the good jobs are. The



Gordy is in his natural habitat, running the yard at Fleming on the NAPM layout. “The advantage of a yard job is if you’re there for an ops session, you’re busy the whole time. I don’t go there to sit on the couch,” Gordy says.

advantage of a yard job is if you’re there for an ops session, you’re busy the whole time. I don’t go there to sit on the couch,” Gordy said.

Each layout has different needs. Often the layout owners will take on the dispatching or staging jobs as they require a bit more knowledge of how the layout is designed to be operated, but on some layouts, the dispatcher’s job is a chance to work a large Centralized Traffic Control panel, an opportunity that doesn’t come up every day.

Sometimes, each operator gets a train to run; other times, trains are assigned to two-man crews. One person acts as the engineer and runs the locomotive, while the other acts as the conductor and plans moves, align turnouts, and keep track of which cars are supposed to go where.

“If you’re the solo engineer taking the local, you have to juggle the paperwork,” Gordy said. “The conductor can carry that stuff and you can just operate the throttle. In the early days, I don’t remember seeing two-man crews that often, but now I see it more and more.”

The operating scheme goes a long way to define the personality of the layout.



The layout hosts posted signs in their yards to help operators find the right place.

“Some layouts, and their owners, are more hardcore than others,” Gordy said. “There are different levels of intensity dictated by the layout owner. Some have a relaxed atmosphere, with a lot of conversation, others you hardly speak at all. It’s not a bad or good thing, just how it is.”

Gordy remembers a session with Andy operating a local Wisconsin layout. “Andy and I ran

Tony DeBate’s layout and we didn’t talk. All we used was hand signals. That was great.” But don’t let this talk of arcane operating practices put you off from joining an operating session.

“As far as an individual’s operating abilities, a fellow modeler once said to me, ‘We’re serious about operating, but we’re serious enough that we don’t take ourselves too seriously,’” Doug said. “Folks have taken the time to answer my questions as I’ve learned operations, and now I take time to explain things to

newer operators in a manner meant to share enjoyment of the hobby.”

“There aren’t really beginner jobs,” Gordy said. “Every layout is different. Sometimes I look like a complete beginner. When I go back to a layout, I like to do the same job because I’m more comfortable with it. And just when I grasp what I’m doing, it’s time to go home.”

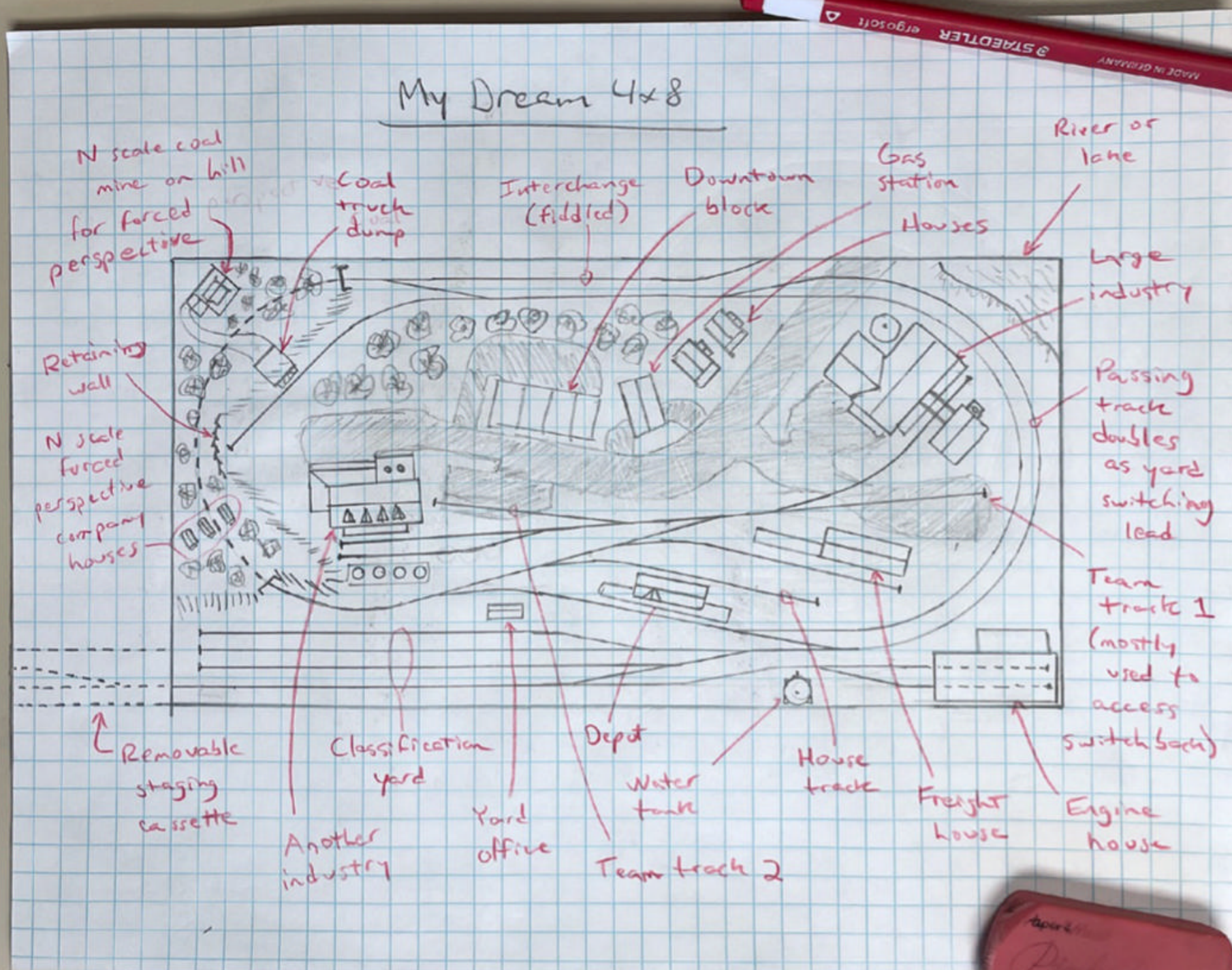
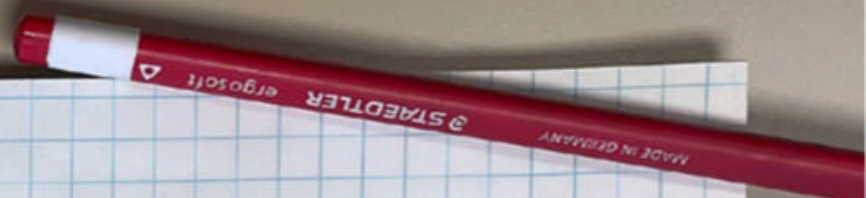
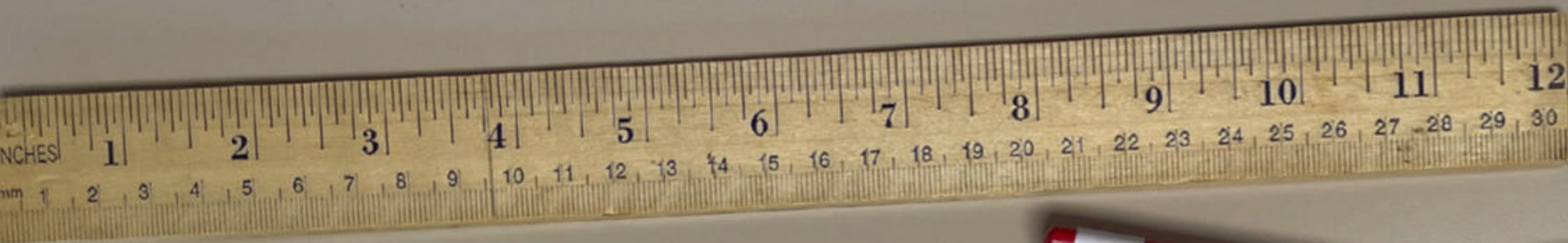
There’s more tomorrow

“I’d rather read Steve King than Stephen King,” Gordy said. Steve King wrote a book on timetable-and-train-order operation and built the N scale Virginia Midland, one of the three Appalachian Lines railroads along with Allen McClelland’s Virginian & Ohio and Tony Koester’s Allegheny Midland.

“This is my avenue of model railroad-ing,” Gordy said. “I’ve enjoyed it since I operated on the MR&T, and it’s continued since then.

“I enjoy operating on all of them, except when there’s shorts or dead track,” Gordy said. “But there’s less than five I wouldn’t go back to, and even if you don’t have a good time on one layout, you’re going to go to another one tomorrow.” **MR**





While most model railroaders I know dream of more space for their layout, sometimes circumstances force you to dream smaller. I decided to see how much model railroading I could pack into my 4 x 8 dream layout.

My dream 4 x 8 layout

A yard, continuous operation, and lots of places to switch

By Steven Otte • Photo by the author

Just because you don't have a lot of room for your model railroad doesn't necessarily mean you need to give up on your dream layout. You might just need to scale your dreams back a bit. While that could mean modeling in a smaller scale, it doesn't have to. You can still get a whole lot of model railroading fun in a small space with careful planning (and a pinch of pie-in-the-sky). So, let's see what I can wedge into my dream 4 x 8 layout.

Let's start with a list of John Armstrong's givens and druthers. Armstrong, whom many regard as the founder of the school of realistic track planning, coined those terms for the criteria that govern a track plan. Givens are unalterable factors and must-haves, like layout space, scale, and minimum radius. Druthers are things we'd rather ("we druther," get it?) include, but can be more flexible on. My list includes:

Givens: 4 x 8 size, HO scale, staging (removable if necessary), passing track.

Druthers: Continuous operation option, short power and rolling stock, a town scene, a classification yard, numerous industries (including several universal ones).

Right off the bat, these requirements and desirable factors determine the basic shape of the plan. In a 4 x 8 footprint, continuous operation means an oval. To maximize the length of the yard, it should go outside the oval, along one long side. Even the shortest wheelbase four-axle diesels require a minimum radius of 18", which leaves room for a four-track yard.

To allow the yard to be switched without fouling the main, I position a passing track around the outside of the right side of the oval and attach the yard to it. That way, the passing track can serve as a switching lead. Only when a road train needs to run around a train to position it for switching does the yard switcher need to stay out of its way. I push the passing track as far into the top-right corner as I can to make room for an engine shed at bottom right, then build a compound yard ladder to maximize the length of the yard tracks.

No matter how small a layout is, if you want to operate it realistically, it needs staging. Staging represents the unmodeled rest of the world beyond the edge of the layout. Unless you're modeling a railroad on an isolated island, you need somewhere for trains to come from and go off to. Since I'm limited to 4 x 8 here, I'll cheat a bit by adding a removable two-track storage cassette, like the

"Universal industries" can ship and receive any conceivable car, making them indispensable for operating variety.

one we built for our Winston-Salem Southbound project layout (see our January and February 2018 issues).

Now that both ends of the oval are fixed, I can connect the two curves. I draw a straight line across the top of the 4 x 8, connecting to the left-side curve with a pair of offset turnouts. It's a no-no on the prototype to route the main line through the diverging route of a turnout, but this space-saving tactic gives me a spur in both directions. I can place my first two industries.

Since there's no room for a structure or even an unloading ramp between the top spur and the edge of the table, I curve the track off the edge to represent a connection to an unmodeled track, turning this into an interchange. During an operating session, cars can be fiddled on and off this track to represent cars picked up and dropped off by a connecting railroad. "Universal industries" like this can ship and receive any conceivable car, making them indispensable for boosting operating variety.

Although ovals are good for continuous operation, they're undesirable for realism. Therefore, I hide the left end of the oval in a tunnel. While my trains build up mileage running laps on the oval, I can tell myself they're going to and returning from unmodeled locations. This gives me a hilltop on the left side of the 4 x 8, which gives me an idea. I curve the other spur about 45 degrees to maximize its length and draw in a coal mine truck dump on the hill over the spur. Truck dumps are great

space-saving industries, since the size of the truck dump is no indication how big or busy the mines it serves are. To maximize the visual size of the layout, I forest the hill with trees that diminish in size the farther they get from the truck dump, then place an N scale mine at the far corner. This forced perspective trick will make that corner of the layout look bigger in photos than it really is. On the other side of the hill, I draw in N scale company houses for the same effect.

To break up the oval racetrack effect, I decide to add a cosmetic curve to the bottom side. This has the beneficial side effect of giving me room for a small yard office. Once I add a passenger depot – in the early diesel era, passenger service is still a must – there's room for only one turnout leading inside the oval.

Not a problem. I can still maximize the number of workable spurs by a switchback arrangement. First, I place two turnouts leading to a house track behind the depot and a spur to a freight house. These tracks receive and ship boxcars of less-than-carload-lot cargos, another versatile operating option.

Next comes a turnout facing the other direction to form the switchback. Since I have a natural aversion to tracks that look like they don't have a function, I pave the area around the switchback tail, making it look like a team track.

A couple more turnouts split the other end of the switchback into three spurs. Two remain parallel to serve a large industry. I want it to receive and ship multiple kinds of cargos, so I draw a row of tanks or silos along the outer spur. Depending on what kind of industry it ends up becoming, these tanks or silos might receive petroleum products, cooking oil, liquid sweetener, grain, or plastic pellets. Maybe it's a paper mill, receiving tanks of chemicals and kaolin slurry. Who knows? I'll figure it out later.

The other spur becomes another team track. Since the first "team track" will have to stay vacant most of the time to serve as the switchback tail, I need another to actually fulfill the function of a team track. If Team Track 2 fills up, Team Track 1 may be pressed into service, increasing the switching challenge.

Finally, one last branch serves another large industry. I imagine this one as a food processor, like a cannery or large creamery, with a separate boiler house across the track from the main building.

Finally, a main street down the middle of the layout with some non-rail-served city buildings and houses complete the layout. 

Helpful resource

To help you fulfill your modeling dream, get your hands on the book *How to Design a Model Railroad* by Lance Mindheim, available from the Kalmbach Hobby Store at KalmbachHobbyStore.com.



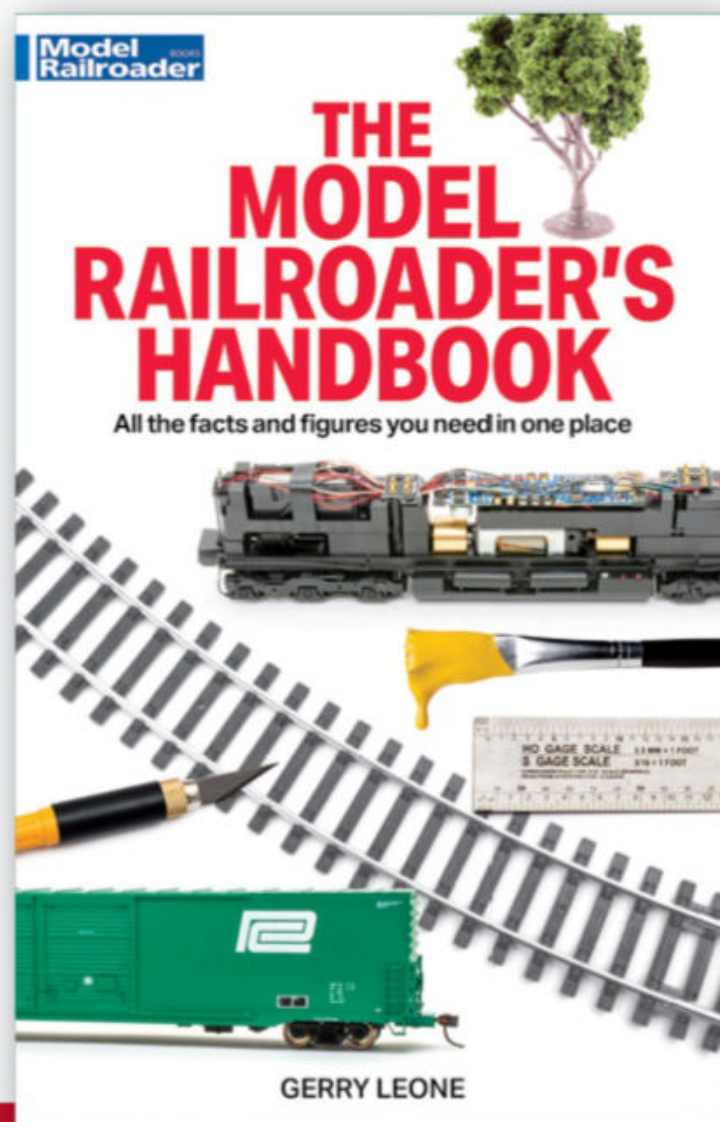
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Oct 1 Wheaton, IL - DuPage County Fair
Oct 14-15 Kansas City, KS - Wyandotte County Fair
Oct 28-29 Shakopee, MN - Canterbury Park
Nov 4-5 Monroeville, PA - Convention Center
Nov 5 Wheaton, IL - DuPage County Fair
Nov 11-12 Springfield, IL - Illinois State Fair
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Photo: A scene on Antony Quinlan's Kamiak Falls.

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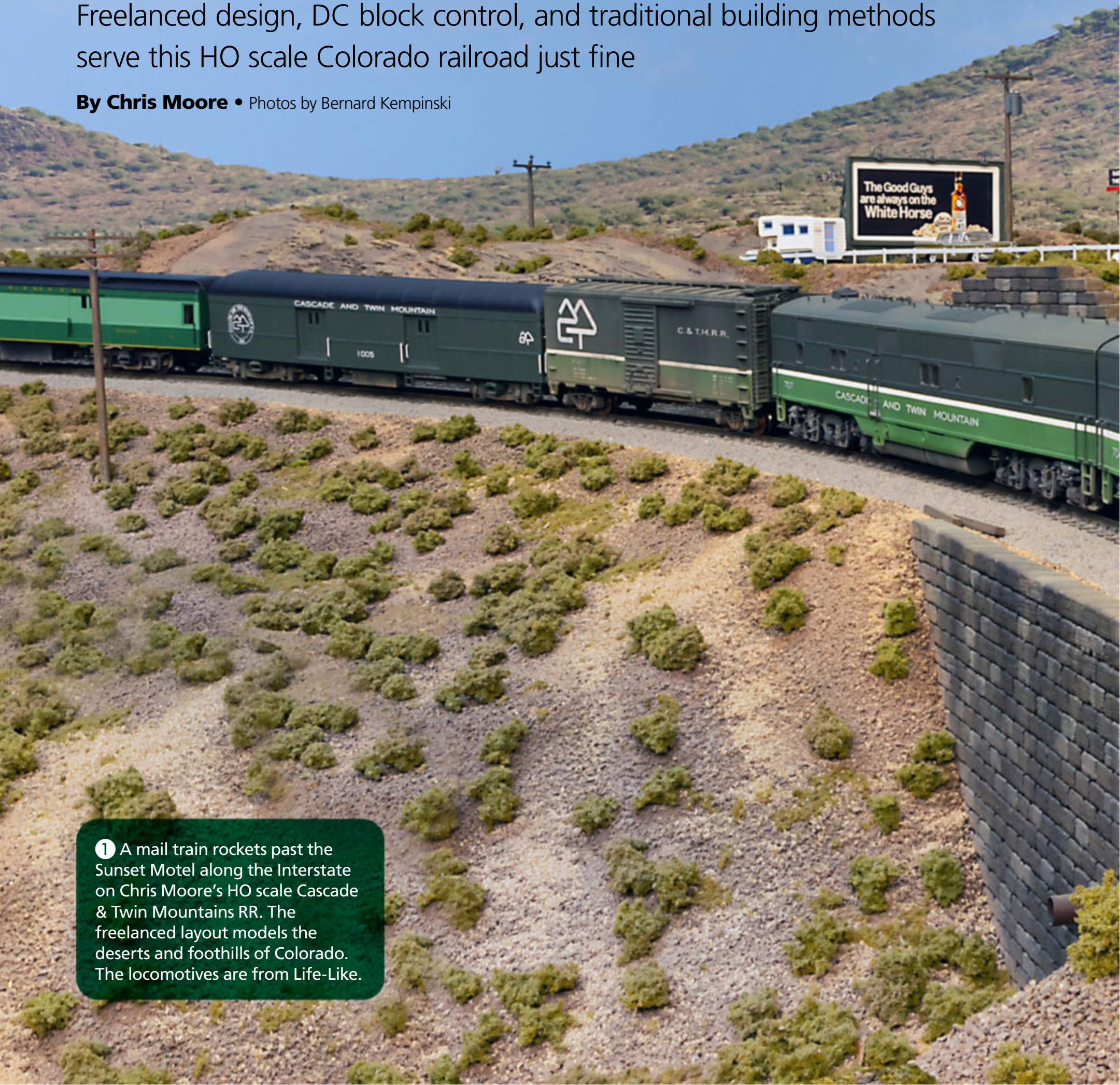
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Keeping it “old school”

Freelanced design, DC block control, and traditional building methods serve this HO scale Colorado railroad just fine

By **Chris Moore** • Photos by Bernard Kempinski



① A mail train rockets past the Sunset Motel along the Interstate on Chris Moore's HO scale Cascade & Twin Mountains RR. The freelanced layout models the deserts and foothills of Colorado. The locomotives are from Life-Like.





② This aisleway photo shows Jarrett on the left and Eagle Pass on the right.

My HO scale Cascade & Twin Mountain is a Colorado short line set in the early 1960s. Though the C&TM is freelanced, three real railroads use its main line tracks as well: the Atchison, Topeka & Santa Fe; Union Pacific; and Southern Pacific. This is in spite of the fact that the prototype Southern Pacific didn't operate in Colorado until it merged with the Denver & Rio Grande Western.

My first goal was to have continuous operation and be able to run two trains on the main line at the same time. Another goal was to have smooth operation with the trains traveling through good looking scenery, and I think that's been achieved.

I also wanted some industries along the main line to switch. But as it turns out, the sidings don't get a lot of use, because I just like to run trains. Over the past 35 years or so, I've enjoyed reading in this magazine all the articles about switching cars in yards and sidings and running a railroad as if it were real. It's just not my thing.

The time period I'm modeling is the early 1960s. There may be a few locomotives and rolling stock on the layout that push the envelope a bit, especially when



③ People are still bustling about after dark between the train station and the bus depot in Hillside. Many of Chris' structures have been outfitted with lights and interior detail.

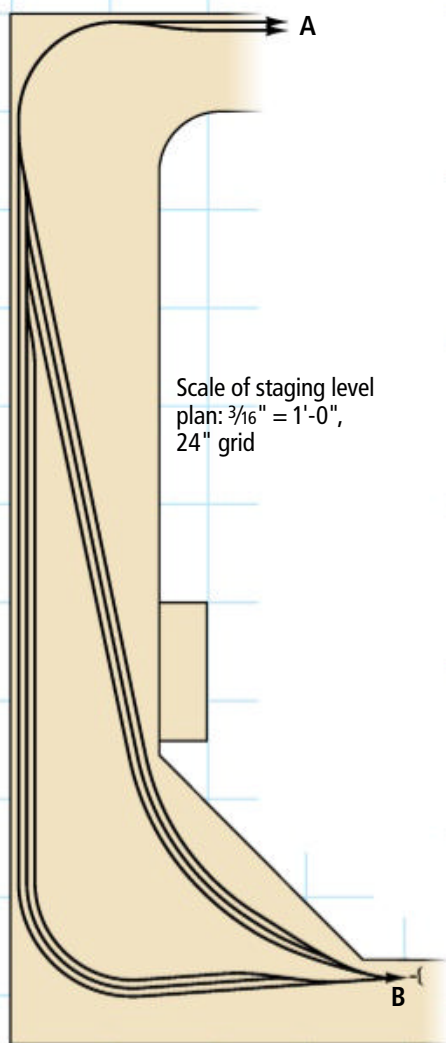
it comes to later production phases, but I've tried to stay true to the time period in other details. You won't see any automobiles built after 1961 on the layout, that's for sure.

Benchwork and track

When my wife and I bought a new house, the basement was a clean slate.

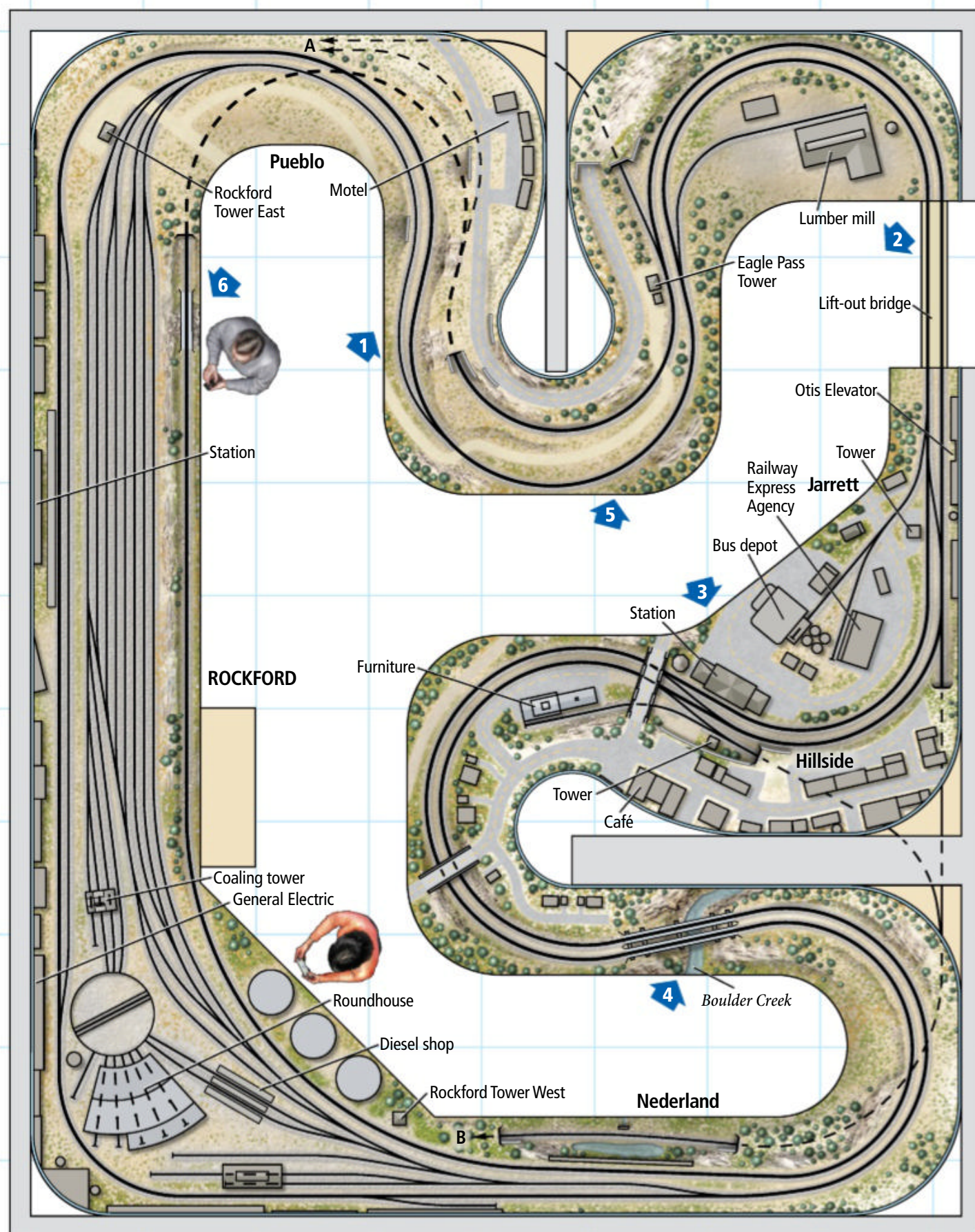
First priority was to build a workshop, then the layout room. Once the rooms were finished, the benchwork construction could begin.

The top of the benchwork is about 54" above the floor. I believe scenery looks better if looked out at, rather than looked down upon. The height also gives me more room underneath for wiring and maintenance.



Cascade & Twin Mountain RR

HO scale (1:87.1)
Room size: 16'-5" x 20'-11"
Scale of plan: 5/16" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Kellie Jaeger
Find more plans online in the Trains.com Track Plan Database.



The framing is 1 x 4 pine in an open-grid style, screwed to the wall in back and supported by 2 x 3 or 2 x 4 legs in front. The 3/4" plywood subroadbed is supported by 1 x 4 risers – a pretty standard arrangement.

Most of the flextrack was salvaged from the model railroad I had built in my previous house. It never progressed to the scenery stage, so the flextrack and turnouts weren't ballasted and could be easily removed. It's code 100 flextrack, and the turnouts are mostly No. 6 with a few No. 8. All the curves are super-elevated using cardboard strips under cork roadbed. The C&TM yard is laid on top of Homasote, and the track is nailed right to it.

The layout at a glance

Name: Cascade & Twin Mountain RR
Scale: HO (1:87.1)
Size: 16'-6" x 21'-0"
Prototype: freelanced
Locale: Colorado
Era: early 1960s
Style: walkaround
Mainline run: 247 feet
Minimum radius: 24"
Minimum turnout: No. 6

Maximum grade: 2.75%
Benchwork: open grid
Height: 54"
Roadbed: cork, Homasote in yard
Track: code 100 flextrack
Scenery: hardshell over cardboard web
Backdrop: 1/8" tempered hardboard, mostly hand-painted with some commercial photos
Control: DC cab control



4 An all-tank train led by a mix of EMD power rolls downhill over the Boulder Creek bridge. Chris cast the bridge abutments and piers in plaster of Paris, then hand-carved the stone detail.

Scenery

I cut cardboard beer cases into strips and wove them into a latticework to support my layout's terrain. (I figure that I paid for the cardboard, so I might as well use it.) On top of this grid I layered paper towels soaked in plaster of Paris. After it dried, I applied big globs of plaster to model rock formations. When it dried, I carved it with a hobby knife to form the rocks, then painted the surface. Ground foam and Clump-Foliage bushes were then glued down.

The trees were made from wooden dowels sanded to a point, then holes were drilled into them for branches made of copper wire. The tree was spray-painted a dark brown, then two coats of highlights were hand-painted on.

Now the fun begins. I shaped and glued conifer green foliage to each branch. When that was done, I sprayed them with a mix of white glue and water to secure everything together.

The first batch was about 40 trees. When I placed them on the layout, they hardly made a dent. I remember thinking I was going to need at least 1,000 trees to make it look right. Well, the years went by, and at last count there are 1,083 trees on the layout.

They're not the best looking trees. I've seen many people make better ones, and I've seen great looking trees at train shows for around \$20 to \$25, but I'm not Rod Stewart. These trees cost around \$2 to \$2.50 each.

The structures are all built from kits with lights and interiors placed in about a quarter of them. The roads are cut

from plastic sheets, then painted. The figures are mostly hand-painted to keep the cost down.

Controls

I don't use Digital Command Control. I hope nobody just fainted. I like to keep things simple. Since I sit in front of a computer all day at work, the last thing I want to do at home is deal with another computer. I don't even have a cell phone and still function as if this were the 1980s. But for me, it works.

The layout has three throttles, one for the engine servicing area and two that can operate the entire layout. I removed the plastic enclosures they came in, voiding the warranty I'm sure, and installed the workings in a control panel. This panel is made from plywood with a track schematic on top made out of car pin-striping. The 208 toggle switches control 62 blocks and 54 turnouts. Every turnout and every piece of rail are wired to a bus underneath the benchwork.

Rolling stock

There are around 60 locomotives, 45 passenger cars, and 150 freight cars on the layout. Most of the long trains – about 20 to 25 cars – are kept in a storage yard underneath the visible yard on top. Three or four locomotives are needed to pull these trains up the 2.75% grades and winding curves.

The C&TM equipment is all painted in a scheme I came up with about 30 years ago, but I didn't have decals for them until recently. I found a guy in



New Hampshire and sent him my artwork. He converted it to work with his software, and they came out beautifully.

The future

I think the layout needs a signal system of some sort installed. Since I'm not keen on high tech, I would consider non-working signals as long as they were kits and correctly fit the situation needed. I once reached out to a manufacturer and asked if they would consider making the signals I needed, but got no feedback, so the search continues.

I have many other hobbies to keep me busy while I wait, so I will continue with them while also continuing to run trains and add this and that to the layout. I do things the old-school way, but that's how I like it. **MR**



5 A freight lumbers through the canyon at Eagle Pass, heading up the 2.75% grade into Rockford. The Electro-Motive Division F3 locomotives are redecorated Stewart models.



6 As the heart of operations on the C&TM, Rockford Yard is a busy place, with trains coming and going in both directions. In the background is the Rockford passenger station.



Meet Chris Moore

Chris lives in Phoenixville, Pa., with his wife, Lucy. He retires this month after a 46-year career as a draftsman. In addition to model trains, he enjoys building model ships, cars, and airplanes. Chris would like to thank Lucy for her patience and his nephew, Mike Ciaccio, for making this article possible.



REJUVENATING a scene

A new tower adds new life to this busy HO scale interlocking

By **Dave Abeles** • Photos by the author

As we near completion on our layouts, we often joke about what we'll do next. For those who enjoy operations like I do, running trains with others brings satisfaction for years to come. Yet no model railroad or scene is ever truly completed. Even in the midst of well-developed operating schemes, there's room for improvement. Such was the case at Controlled Point (CP) 282 on my HO scale Conrail Onondaga Cutoff.

Located at west end of Onondaga Yard, CP 282 is the location of the interchange with the Minoa & Euclid.

Though my layout is set in 1994 and includes Centralized Traffic Control (CTC) and working signals, I still needed a tower at CP 282. My goal for the scene was to capture some of the visual cues and excitement of Conrail's CP 293 at the western edge of Syracuse, N.Y., complete with Syracuse Junction (SJ) Tower [See "Syracuse Junction history" on page 46 to learn more about the prototype. — *Ed.*]

Al Tillotson, a regular operator on my layout and a modeler himself, contributed a foam core mock-up of an old New York Central (NYC) tower created with

photographs of a full-size structure on the Hudson Division. Though a different design from towers across central New York, the model was better than a generic placeholder or leaving the spot empty. Al's tower served the layout well for nearly a decade.

While researching available options similar to SJ Tower, it was obvious that heavy kitbashing or scratchbuilding would be necessary. With a full-time job on the railroad and a wife and young children at home, I didn't have time for a project like this. Collaboration was clearly the answer.



Conrail train SENF (Selkirk, N.Y., to Niagara Falls, N.Y.) passes a New York Central-era tower at Controlled Point 282 on Dave Abeles' HO scale Onondaga Cutoff. The tower, built by Perry Squier, was the focal point of a scenic makeover at this busy interlocking.

A little help from my friends

I was discussing layout plans with Perry Squier, a friend and an accomplished modeler who lives a short drive from my home. His HO scale Pittsburgh,



1 The big find. An internet discussion group put Dave in contact with Charles Newton, a former Conrail employee who saved the original New York Central blueprints for Syracuse Junction Tower. Dave's friend Perry Squier used the plans to build an HO scale version of the structure.

Shawmut & Northern features a number of beautiful scratchbuilt structures [Perry's layout was featured in *Great Model Railroads 2009*. – Ed.] He offered to assist with the tower project. I found a few photos of SJ Tower online. Perry also asked if I could find some plans or basic dimensions to give us a start.

I first reached out to a few contacts at the New York Central Technical & Historical Society. I also searched the group's website (nycshs.org) to see what I could find. The society had previously offered a tower kit that had some of the parts we were after, but not enough for Perry to use it as a starting point.

Several additional photographs were found, but no plans. One of my contacts mentioned the website groups.io/g/NYC-Railroad, an online discussion group centered around the NYC. I joined

the group and posted a few questions. Quickly I received an email from a list member who worked for Conrail in Syracuse when the full-size tower was being removed. Incredibly, he saved the NYC blueprint drawings for the 1934 construction of the brick-and-masonry SJ Tower and let me scan them **1**.

Thrilled at the success of finding the plans and amazed at the power of the internet, I reported the progress back to Perry. I also provided him with a copy of the blueprints.

Thinking it through

Perry pointed out a number of things to consider when reviewing the plans. First, could the area on the layout where the tower would be installed support the full footprint of the prototype? Second,



2 Out with the old. After marking the tower's footprint, Dave used a utility knife to cut through the existing scenery. He then peeled away the materials inside the lines.



3 Easy does it. Dave then used a jigsaw to cut through the subroadbed. Scrap pieces of lumber protected the layout when he made the cuts.



4 A perfect fit. After Dave cut through the subroadbed, he test fit the new tower and basement boiler room. The old tower, built by Al Tillotson, is visible in the background.

with the structure on hand. Once the walls and floors were placed, I picked up the tower and brought it home to prepare the site on the layout.

Making the cuts

First, I marked out the footprint of the tower and removed the existing scenery. I used a utility knife to score the surface of the layout, cutting through the fabric I'd installed over the plywood subroadbed throughout Onondaga Yard to help deaden sound and support the scenery **2**, previous page.

Next, I had to cut a hole in the subroadbed to accommodate the tower's basement boiler room using a jigsaw. This required a delicate touch, as I was working next to a remote-controlled interlocking and directly above a five-track staging yard.

Before making the cuts, I placed a drop cloth on the staging tracks to catch any debris from above. Then I marked out the corners of the basement, including where the staircase would be installed for the entry. I drilled $\frac{1}{8}$ " pilot holes at each corner, offset by $\frac{1}{4}$ " towards the center. This allowed subsequent $\frac{1}{2}$ " holes to follow, from which I could start the jigsaw cuts to remove the plywood.

In addition, I used small clamps to hold the power bus, command bus, and



5 That retro look. Perry delivered the partially built tower so Dave could install the interior details and lighting. Dave used photo-editing software to make an HO scale tile floor for the tower.

did I want to model the structure with the basement boiler room? In both cases the answer was yes.

With those basics established, Perry agreed to build the structure per the plans. However, many of the details required further discussion based on the few prototype photos we found. Over the years, parts of the tower had been removed or altered, and I wanted to model some of those changes so the structure would look more like it did in the 1990s.

Perry began to research what parts were commercially available to model the doors, windows, and brickwork. We eventually selected doors from San Juan Details (formerly Grandt Line) and windows from Tichy Train Group.

After extensive research Perry noted the exterior staircase, the only access to the second floor in these towers, would have to be scratchbuilt unless we could find some other way to approach it.

Another consideration was the interior. The tower would be placed on benchwork 56" off the floor, so the interior would be visible from most viewing angles. We replicate the 24-hour nature of railroading on the Onondaga Cutoff, including nighttime running [See "Running on the dark side" in the September 2019 issue of MR. – Ed.]

Operations in the dark would not only make exterior lighting important, but would make the interior quite visible. Therefore, I wanted to fully detail the inside of the tower. Adding to the challenge, Perry advised that the rolled-membrane roof would need to be fixed in place for proper appearance and to prevent light leaks, so the interior detailing had to be finished before the structure was completed.

Since the model would include the basement boiler room, I needed to do some work at the existing scene. This process would be much easier to work on

signal wiring out of the blade's path. I placed scraps of plywood on the layout to protect the track and signals ③. Then I installed a fine blade in the jigsaw and started cutting. I stopped periodically to check the dimensions before proceeding.

Once the hole was cut, I used a small shop vacuum to remove the debris. A final test confirmed the basement boiler room, staircase, and building would fit ④, opposite. It was time to head back to the workbench and turn my attention to the interior details.

Back to the tower

Based on suggestions from employees and my own visits to modernized towers, I added a simulated linoleum vinyl floor. New York Central overlaid the floors around 1960 upon the removal of the interlocking machinery, so selecting appropriate colors was important. I chose an olive green and gray pattern, which I scaled to 12" and printed on a color printer. I cut the printout to shape ⑤, installed the paper with canopy glue, and weathered it with powdered pastels.

A search on shapeways.com turned up an assortment of HO scale 3-D printed office furniture appropriate for the project. I painted and weathered the furniture and installed it on the floor, then added figures ⑥. After I'd installed the interior and lighting, I took the tower back to Perry so that he could add the roof, flashing, and final details.

Ready for wiring

A few weeks later, Perry notified me that the tower was assembled and ready for pick up. Since the interior and exterior light-emitting diodes (LEDs) were installed before Perry added the roof, all that remained was to select resistors for each of them before connecting them to the accessory power bus.

I used 680Ω resistors in line with each LED for the interior and 220Ω resistors for the exterior lighting. Each was connected separately to the bus I'd set up for accessory lighting. While the exterior lights are always on, the interior lights are controlled by the yardmaster via a single-pole single-throw switch ⑦. I installed the wires with extra slack so the building can be moved without straining or breaking the connections.

A quick touch-up

I added a cinder and soil mix around the base of the tower to blend it in with



⑥ **A lived-in look.** Commercial figures, 3-D printed furniture and fixtures, and parts from the scrap box brought the tower's interior to life. The light-emitting diodes used to illuminate the interior are also visible.



⑦ **The tower at night.** Light-emitting diodes were used to add interior and exterior lighting to the tower. The exterior lights are on constantly, while the interior lights can be turned on and off by the yardmaster.

the existing scenery. I used Arizona Rock & Mineral N scale Black Cinders (1031) as the base. I added highlights with the company's HO scale Union Pacific/Silverton/Western Pacific Bold Gray Blend (1352), which closely matches the mix used on the Chicago Line across central New York ⑧, next page. I wet the scenery materials with a few drops of isopropyl alcohol to break the surface tension. Then I applied a 50:50 mix of white glue and water to secure the products to the layout. I let the glue dry for 48 hours before proceeding.

Finally, I added static grass and small vegetation around the less traveled areas near the tower base. Even though Conrail, like most railroads, sprayed its property, weeds still popped up. A few

tufts of grass and small bits of brush were enough to suggest a maintained, but natural, appearance.

Worth the effort

I'm amazed at the difference the new tower made to this scene ⑨. The classic lines, but modern use, help convey the vision of the Onondaga Cutoff, a Conrail artery that uses infrastructure built by the NYC. Though the modern physical plant has fewer tracks and stations, buildings like this former tower connect the route to its history.

When the lights go down and the office lights come on, the tower takes center stage. Bridge and building and track crews inside the office can be seen

Syracuse Junction history

The scene at **Controlled Point (CP) 282** on my HO scale Onondaga Cutoff layout was inspired by a prototype location in Syracuse, N.Y. Here's a brief history of Syracuse Junction (SJ).

Syracuse Junction is next to the Solvay Process Corp. industrial complex, which came under ownership of Allied Chemical in 1920, producing salts and other products. New York Central's original main line established Switching Station No. 2 (SS No. 2), the original name of SJ, west of where it traversed Washington Street in Syracuse en route to Auburn, Rochester, and points west.

When NYC embarked on a mainline reconstruction and grade-separation project through downtown Syracuse in the late 1920s and early 1930s, a new freight bypass around Syracuse to the north and the new four-track mainline to the west still left the original alignment at the same spot, renamed Syracuse Junction (SJ). As part of the upgrade project, the two-story brick-and-masonry SJ Tower was built in 1934 using standardized NYC architectural details.

SJ Tower controlled the interlocking until approximately 1956 when NYC, a forerunner in the race to modernize its physical plant, embarked on one of the first trunk-line CTC installations. Interlocking machines in NYC towers were removed and control was consolidated in a handful of offices across the state. In addition, the number of main tracks was largely cut from four to two. The towers remained in use as field offices for maintenance crews.

Even with the changes following the 1968 Penn Central merger, subsequent PC bankruptcy, and the creation of Conrail in 1976, SJ Tower remained. Conrail rebuilt the entire ex-NYC main line across New York in the late 1980s for use as its premier intermodal route between New York and Chicago.

As part of the rebuild, Conrail renamed all of its interlockings based on their distance from Grand Central Terminal. Syracuse Junction, 293 miles west of Grand Central via Albany, N.Y., became Controlled Point (CP) 293.

Conrail's sale of the former Delaware, Lackawanna & Western route south to Binghamton to the New York, Susquehanna & Western (1982) and the original NYC "Auburn main" line west of Syracuse to Auburn to the Finger Lakes Ry. (1995) brought renewed interchange agreements that relied on CP 293 as an interchange location. – *Dave Abeles*



8 Blending in. Dave used N and HO scale Arizona Rock & Mineral ballast to blend the area around the tower with the existing scenery. He used diluted white glue to secure the scenery materials to the layout.

handling a few last tasks for the day. As the darkness deepens, the detailed interior becomes even more apparent. Trains move 24 hours a day, seven days a week, 365 days a year, an urgency we capture during op sessions on the Onondaga Cutoff. Now the crews that help keep the railroad moving have a proper home base for their operations. [MR](#)

Dave Abeles is a frequent contributor to MR and author of the Model Railroader's Guide to Signals and Interlockings. He models a fictional Conrail bypass of Syracuse, N.Y., in HO scale.



9 Telling a story. Though the diesel and crew trucks are lettered for Conrail, the lines on the tower follow those of predecessor New York Central. This view also shows the scratchbuilt staircase.



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A first generation layout by **THE NEXT GENERATION**

A millennial's layout depicting a fictional New York railroad in 1838

By **Frank DeStefano** • Photos by the author

You're young with limited income and even more limited space. You move around from apartment to apartment in the New York City area and devote most of your time to employment and a social life. Despite having a lifelong interest in model railroading, you have no hands-on experience. How can you make a layout interesting, or for that matter, good?

These were all questions I asked myself when I first started thinking of modeling ideas in my early 20s. I was lucky that the time period I had in mind, the first-generation railroads of the 1830s, would be very accommodating to these limitations. Little trains on barely graded track and bare-bones operations would allow me to create something

simple in a small space but with ample room for my imagination to run wild. I was ready to build my first layout.

The backstory

The year is 1838, and the Flushing & Brooklyn RR has just opened for service between its namesake towns. It was intended to connect Flushing with New York City by way of Brooklyn ferry connections. The railroad is well financed and built to a high standard for the time, with all 11 miles of track constructed within a single year. This is using "heavy" rail and wooden ties, but with the contemporary practice of filling the track gauge with soil to provide a walkable path for horses should backup motive power be needed.

The railroad has three locomotives: two Norris-built "six wheelers" (4-2-0), and a Stephenson "four wheeler" (0-4-0) leased from a neighboring road. The passenger fleet consists of two-axle passenger coaches with stagecoach-style seating compartments and a single eight-wheel coach with traditional bench seating and center aisle. A boxcar, a flatcar, and a hopper handle freight such as coal imports, lumber, and locally grown produce for New York City markets. I had a great deal of fun creating the backstory for my fictional railroad.

To keep my first layout manageable, the Flushing & Brooklyn was planned as an exercise in creativity and technique rather than operating possibilities. The track plan, an oval with a few turnouts, is about as basic as it gets, but it allowed



1 The Flushing enginehouse is a beehive of activity on Frank DeStefano's HO scale Flushing & Brooklyn RR. The layout is set in 1838.

me to focus more on creative elements and honing my skills.

Early railroads featured simple timetables with a single train running from point A to point B and back. Complex practices like switching, train meets, and interchange wouldn't develop until railroads expanded later in the century. To generate some extra operational interest, I created a dock siding at Flushing Bay and a team track in the rail yard, a combination which allows a freight pick up/drop off scenario. Such simple operations let me focus more on improving my detailing and scenery skills.

A small, portable layout

Being a young man living the renter's life, I knew the layout had to be easily portable. The 3 x 6-foot table is made of 1" plywood on top of a 4" high L-girder frame. Rather than build legs, I simply laid the layout on a folding table. With this simple arrangement and lightweight design, two people can pick up the layout and carry it away with relative ease.



2 The *Pegasus*, a Bachmann Classic Collector Series 4-2-0 steam locomotive hauls a train of two-axle stagecoach type passenger cars past the Flushing enginehouse.



3 Though the layout is just a loop of track and early railroad operations were quite simple, Frank chose to model a wharf and dock for the railroad to serve to increase operating interest.

For the terrain I glued a 1"-thick piece of extruded-foam insulation board to the top of the table, then carved out a section to create the bay scene. That section of exposed wood was painted a deep marine blue and topped with Liquitex gloss medium to create Flushing Bay.

The backdrop is a 1/8" sheet of plywood painted sky blue with large white clouds. For maximum portability, the



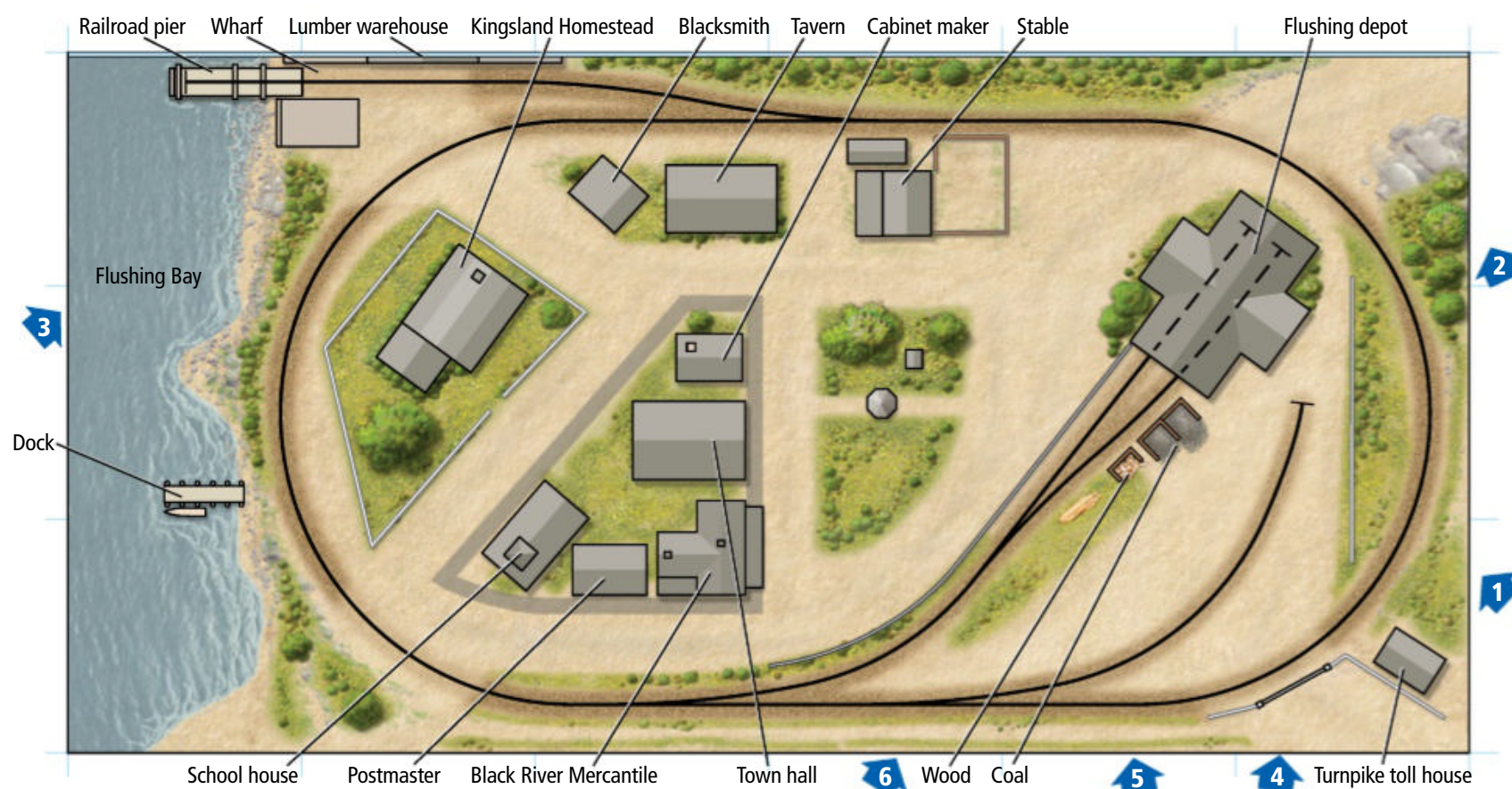
4 As with early versions of every machine, reliability is questionable. Fortunately the Flushing & Brooklyn RR has access to horses who can haul its stagecoaches down the track via a horse path in the gauge of the rails.

backdrop isn't screwed to the table, but clamped to the girder frame.

Where the backdrop meets the layout, I created a distant treeline using a technique described by Lance Mindheim. I cut out an undulating line on cardboard, painted it black to mute any visual detail, then glued clump foliage to the surface. This sits at the back edge of the layout to gracefully transition from level topography to backdrop.

The track plan uses sectional Atlas code 83 flextrack with Peco Electrofrog turnouts. Powered frogs were an absolute must on my layout, as the light, short-wheelbase engines would stall on insulated frogs. The tracks were glued directly to the insulation foam without any roadbed, as I wanted to recreate the crude trackwork of the 1830s.

To make a horse path in the track gauge, I simply poured fine brown ballast between the rails, covering the ties completely, then left it alone! Rather than tamp the ballast between the ties, all I did was run a train car over the tracks to be sure the flanges would clear the



The layout at a glance

Name: The Flushing & Brooklyn RR

Scale: HO (1:87.1)

Size: 3 x 6 feet

Prototype: freelance

Locale: Flushing Village, N.Y.

Era: 1838

Style: portable tabletop

Mainline run: 12 feet

Minimum radius: 15"

Minimum turnout: No. 5

Maximum grade: none

Benchwork: open grid

Height: 34"

Roadbed: none

Track: Atlas sectional, Peco turnouts

Scenery: Woodland Scenics ground foam

Backdrop: painted plywood

Control: direct current

Flushing & Brooklyn RR

HO scale (1:87.1)

Plan size: 6 by 3 feet

Scale of plan: 1" = 1'-0", 12" grid

Numbered arrows indicate photo locations

Illustration by Kellie Jaeger

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

so I was glad to be done with it fairly early on in the construction process.

Practical scenery

A few of the techniques I used to either create or apply general scenery on the layout are modeling tricks described in early issues of *Model Railroader*. Because the town scene is dominated by country roads, I knew I wanted these roads to have a high degree of realism.

ballast, then I left it to soak in scenic cement. Once settled, the brown ballast covering the track gauge creates the impression of packed soil.

The layout is direct-current powered with a main bus running from a

standard power pack supplying the layout's power. Atlas switch controls help adjust polarity for sidings, as the rails beyond each turnout are isolated to accommodate the points. Wiring is by far my least favorite aspect of the hobby,



5 An assortment of early first-generation locomotives and rolling stock can be seen outside the Flushing, N.Y., enginehouse. Most rolling stock at the time only had two axles, as seen at right. The passenger car on the left is an early example of bench and aisle seating arrangements.



6 The horse path continues throughout the entire railroad, even through turnouts. Frank utilized a technique called zip texturing to create the desired look. The brown is a stark contrast from the colorful locomotives and rolling stock.

I researched many products and techniques, but nothing looked quite right to me. Despite its popularity, I personally had zero interest in using real dirt on my layout. So a friend sent me an article outlining the old yet highly practical art of zip texturing. [This technique was introduced in the April 1965 issue of *Model Railroader*. – Ed.] This involves mixing dry plaster of Paris with dry paint pigments to create an earth tone.

When ready to apply, the layout surface is sprayed with wet water, the mixture is sifted onto the damp surface, then a few more mists of water are sprayed on top of that.

While it was still damp, I'd take an old car and roll it lightly over the surface to create wagon-wheel ruts. Eventually this would harden enough to keep the visible appearance of soil, but would not blow away in transit. Zip texturing was an extremely simple yet highly effective technique that made my village pop.

Another trick I discovered was a zero dollar resource. I knew I wanted to add a few small rock formations around the layout, but nothing large enough to justify purchasing rock molds. So I created my own using sheets of tin foil glued together, folded up, and crinkled to make the right surface texture.

The trains

I was incredibly lucky that Bachmann created the Classic Collectors Series, which gave me just enough variety to model the era. The collection includes a few variations of the Norris 4-2-0 locomotive (*Lafayette*, *Prussia*, and *Pegasus*),

the *John Bull*, and the *DeWitt Clinton*, all of which I purchased for different reasons. The two Norris engines were upgraded with custom paint, while the third engine on my roster, Bachmann's *John Bull*, is modified greatly in physical design. The famous engine that resides in the Smithsonian Institution was a widely produced British design exported to America in large numbers. Bachmann re-created the locomotive as it appeared in service on the Camden & Amboy RR, featuring upgrades unique to that company only.

To make my engine look generic, I removed the pilot truck, headlight, bell, and other features that are associated

with the *John Bull*. Then I swapped the enclosed tender that came with the model for the that of the *DeWitt Clinton*, but traded the canopy car body for the tender frame of an old OO scale *Rocket*.

For rolling stock, I chose the two-axle compartment coaches that accompanied the *Prussia*. I thought these were unique and reflect a transition in American railroads from early stagecoach designs to the modern aisle coach passenger car.

For horses, carriages, and figures, I leaned heavily on Preiser models, but also hand painted a few metal Victorian figures I picked up from eBay.

The Flushing & Brooklyn has been a wonderful learning experience for me, and hopefully a stepping stone to larger and more challenging projects in our hobby. I'm already dreaming up a new layout, one set in the modern day. I know exactly what I'll do differently next time around, a characteristic I believe all first-time modelers share.

This has also been a great way to indulge in a time frame I find very fascinating, when railroads were brand new and comparable to space travel today. With my little Flushing & Brooklyn, I sincerely hope to inspire other modelers to give the 1800s a try! It's a challenging time period to model, but I think the results are well worth the effort.

I also hope fellow young modelers will be encouraged to leap into the hobby despite the challenges. Our time, space, and funds may be limited, but that doesn't mean we can't produce something as creative and highly detailed as the largest basement empire of a seasoned modeler. **MR**



Meet Frank DeStefano

Frank DeStefano is a 31-year-old video producer living in Queens, N.Y. While not at work, he enjoys full-size railroading, history, exploring old taverns, and time spent with friends and family. He is a volunteer at the Black River & Western in Flemington, N.J., and serves as the railroad's social media manager.



Engine 29 moves through El Portal Yard on Jack Burgess' HO scale Yosemite Valley RR, which is set in August 1939. Jack holds operating sessions using procedures and paperwork inspired by the prototype. The derails in the foreground work and must be operated by engineers working the yard.

Prototypical operations on the Yosemite Valley

Realistic paperwork makes operation easier and more fun

By Jack Burgess • Photos by the author unless noted

Some 50 years ago I decided to model the prototype Yosemite Valley RR. After 10 years building a test layout and researching my prototype, I began construction of my multi-deck layout in 1980. It was completed in June 2011. Except for test runs or checking new trackwork, I've

never run a train on my HO scale layout by myself.

I don't participate in operating sessions, either, which visitors find difficult to understand. I don't have a dedicated crew of engineers who come over on a regular schedule to operate my layout. I have organized operating sessions at the

request of friends, and I also make my layout available as part of an invitational operating event (BayRails) every two years in the San Francisco Bay area.

I designed my layout so that visiting engineers could experience much of what a real YVRR engineer would have experienced in August 1939, the era I



EASTBOUND TRAINS HAVE RIGHT OVER WESTBOUND TRAINS OF THE SAME CLASS

YOSEMITE VALLEY RAILWAY COMPANY

EASTWARD

Second Class No. 8 Freight Leave Daily Except Sunday	First Class No. 2 Passenger Leave Daily
---	--

Miles from
MERCED

TIME TABLE

No. 103
May 27, 1939

STATIONS

MERCED-S. F. Depot	5	77.7
MERCED-Y. V. Depot	0	77.2
MERCED-S. F. Depot	0	
A. T. & S. F. Crossing	15	76.7
Bellevue	35	73.3
Edendale	37	66.8
Hopeton	0	62.5
Snelling	0	59.6
MERCED FALLS	0	53.5
Moran	0	51.1
Starr	0	48.1
Exchange	0	47.0
Ellis	26	44.0
Barrett	21	42.0
Jasper	10	38.6
Dutwiler	0	36.8
Kittredge	0	33.5
BAGBY	0	30.0
Lehmer	0	24.2
Kocher	0	22.2
Harle	0	21.6
Briceburg	0	16.9
Drum	0	14.5
Emory	0	10.7
Bloss	0	7.3
Clearinghouse	0	6.1
Incline	0	4.7
Moss Canyon	0	2.7
EL PORTAL	0	0.0

Miles from
EL PORTAL

Capacity
of Sidings
Feet

Peak Water,
Tide Tables,
Wires and
Phones

W.F.T.P.

WESTWARD

First Class No. 3 Passenger Arrive Daily	Second Class No. 9 Freight Arrive Daily Except Sunday
---	--

10:45 PM	

One of the prototype YVRR's timetables shows the name "Yosemite Valley Railway Co." at the top. Though the prototype changed names officially in 1934, most paperwork and signs kept the original name, so Jack did, too.



The westbound Log Train, running under timetable authority, follows the Merced River with a pair of empty tank cars, a bad-ordered empty log car, and 40 or so loaded log cars on the prototype in July 1940. Wilbur C. Whittaker photo

model. The three yards have the same track arrangements as the prototype, and modeled towns have the same structures and scenery as the prototype. Thus, engineers build trains the same way YVRR engineers did and operate those trains through the same scenery a YVRR engineer would have seen 80 years ago.

The prototype

The prototype YVRR ran 77 miles east from Merced, Calif., to El Portal at the western edge of Yosemite National Park. It was built primarily to transport passengers to the park but soon also developed a profitable freight business.

The YV had interchanges with the Southern Pacific and the Atchison, Topeka & Santa Fe in Merced. Nearly all of the interchange was with the SP. With no connection to another railroad on the east end, there is no "through traffic" on the layout from staging to staging, as there is on many layouts.

One change from the prototype timetable format to help visiting engineers is that meets on my timetables are highlighted in bold. In addition, small type next to these meet times list the train numbers of the other trains that will be involved in that meet. This is helpful to engineers to make sure that they wait for meets when and where required.

My model timetables also include the statement “Eastbound trains have right over westbound trains of the same class,” as on the prototype. This might be difficult for visiting engineers to remember if they typically operate on other layouts with a dispatcher and train orders. Some visiting engineers assume that the first train to arrive for a meet can hold the main line. But I remind them of this statement on the timetable.

Assignment cards

Assignment cards provide the visiting engineers with their train name and number, where the engineer is to report to work, the locomotive and caboose assigned to that train, and the departure time per the timetable. It also informs an engineer of how long they have before departure in real time. Prior to the start of an operating session, I hand out the assignment cards, give the engineers a few minutes to see what they need to do, and then start the 8:1 fast clock time, which is displayed on the wireless SystemOne (now NCE) throttles.

Switch lists

I designed my switch lists based on some I collected that were used during the last weeks of operation on the prototype YVRR. Switch lists, like other operating paperwork, were usually disposed of after a shift. But a railfan named Leon Bartholomew was there in early August 1945, just weeks before the last run of the railroad on Aug. 24, 1945, and the crews gave him a number of switch lists at the end of the day.

Decades ago, I got hold of Leon’s mailing address and wrote to him seeking some new-to-me YVRR photos. His wife wrote back that he had passed away a few weeks earlier. She said that he didn’t have any photos, but she would mail me some YVRR paperwork he had collected.

The prototype switch lists show where the cars were to be picked up from



Jack’s model railroad is operated using an 8:1 fast clock; a minute on the layout takes just 8 real seconds. The fast clock time is shown at upper right of the SystemOne throttle display.

Merced Yard spots with names like “Team track,” “House,” and “SP Transfer.” Also note that on the prototype switch list, the “To” column entries are listed by MP (milepost). So Erie

51766 is to be delivered to MP 24, which is Merced Falls. The type of car Erie 51766 was is not listed.

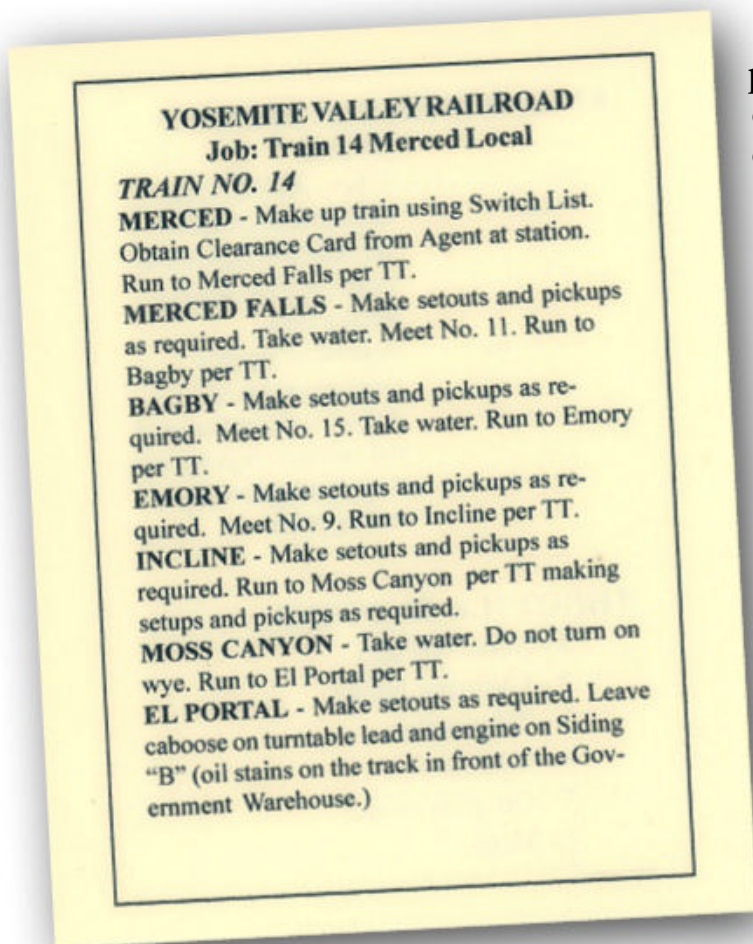
Like the prototype’s switch lists, my switch lists are 11" high by 4 1/4" wide – half a sheet of paper. I designed my switch lists based on these prototype YVRR switch lists with the information that an engineer would need to know, such as the yard where the car is currently located, the car owner and number, and the final station and track where the car is to be set out.

The type of car is listed using standard Association of American Railroads abbreviations, such as “X” for boxcars and “R” for refrigerator cars. These designations are listed in *The Official Railway Equipment Register*. Including that information makes it much easier for an engineer to find the cars needing to be picked up.

The back of my switch lists have graphics of every yard on the layout with the track names. The names of the spurs and other tracks were taken from actual YVRR yard plans. The engineers of the Merced Local and El Portal Local, especially if they are experienced, will typically have several cars to pick up at their originating station and at least one of them will be “buried” behind other cars at the start of the session.

Station	Car No.	Type	To	Track
Merced	51766	X	24	X
Merced	40560	X	76	-
Merced	97072	B	-	-
Merced	96875	-	-	-
Merced	31646	-	-	-
Merced	6012	-	-	-
Merced	6012	-	-	-
Merced	93848	B	one	clean
Merced	26548	R	78	meat
Merced	12704	B	78	meat
Merced	58230	T	78	air

In comparison to the prototypical switch list on the left (from Aug. 10, 1945), Jack’s switch list on the right includes more information, such as the name of the stations and tracks where cars are to be spotted.



This is the Engineer Summary Card for Train No. 14, the Merced Local. It lists all the work the engineer of that train will do during the session – not just setouts and pickups, but also when and where the locomotive is to take on water.

Although one could manually prepare the switch lists needed for an operating session, I developed a pair of switch lists on my computer using Microsoft Excel. These two lists are linked to a master page that has the reporting mark, number, and type of every freight car on the layout, and in which yard or siding it is located.

It's easy to move a freight car from one yard or location to another by "moving" the car initials, number, and car type from the current location to a new location on that worksheet. That is automatically copied to the pair of switch lists, which are then printed and cut apart.

You might notice that my switch lists include a date. I model the YVRR in August 1939. If the session takes place on March 16, the switch forms give the date as Aug. 16, 1939. This level of detail might seem a little overboard, but most of my forms follow the design of the prototype, and those included a date. So it was an easy step toward more realism.

Operation cards

Experienced engineers need only a timetable and the switch list if they are in charge of a local. But operations of the Rock Train and Log Train may not be obvious. All engineers are also given a laminated Engineer Summary Card. The card shown in the photo at left explains each step for the operation of Train No. 14, the Merced Local. There are similar cards for each train on the timetable. These cards also list what is required by the timetable, such as meets and setouts, as well as when and where to take water.

Doing it right

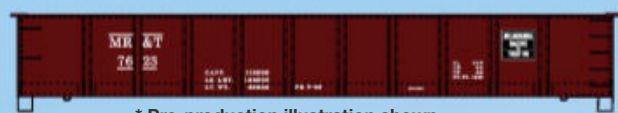
An operating session typically takes 2½ to 3 hours. When it is over, I hope every engineer feels that they have actually operated a real Yosemite Valley RR train in a real place on a warm day in August 1939. **MR**

Jack Burgess is a frequent MR contributor from Newark, Calif. His layout appeared in Great Model Railroads 2013.



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INSTALLING DITCH LIGHTS in an NW2



The ditch lights shine brightly as Georgia Northeastern locomotive No. 81, an EMD NW2, works the yard in Tate.

Surface-mounted diodes provide bright light in a small package

By Thomas Klimoski • Photos by the author

You know if you model the modern era that ditch lights are a prominent feature on all locomotives today. In order to increase safety and visibility for locomotives, the Federal Railroad Administration (FRA) released a new requirement in 1996 that locomotives traveling more than 20 mph and over public highway grade crossings must have auxiliary lights. All railroads were required to have them installed by December 31, 1997.

Many new model locomotives come from the manufacturers with working ditch lights already installed. But just as the prototype railroads had to retrofit their older equipment to meet this rule,

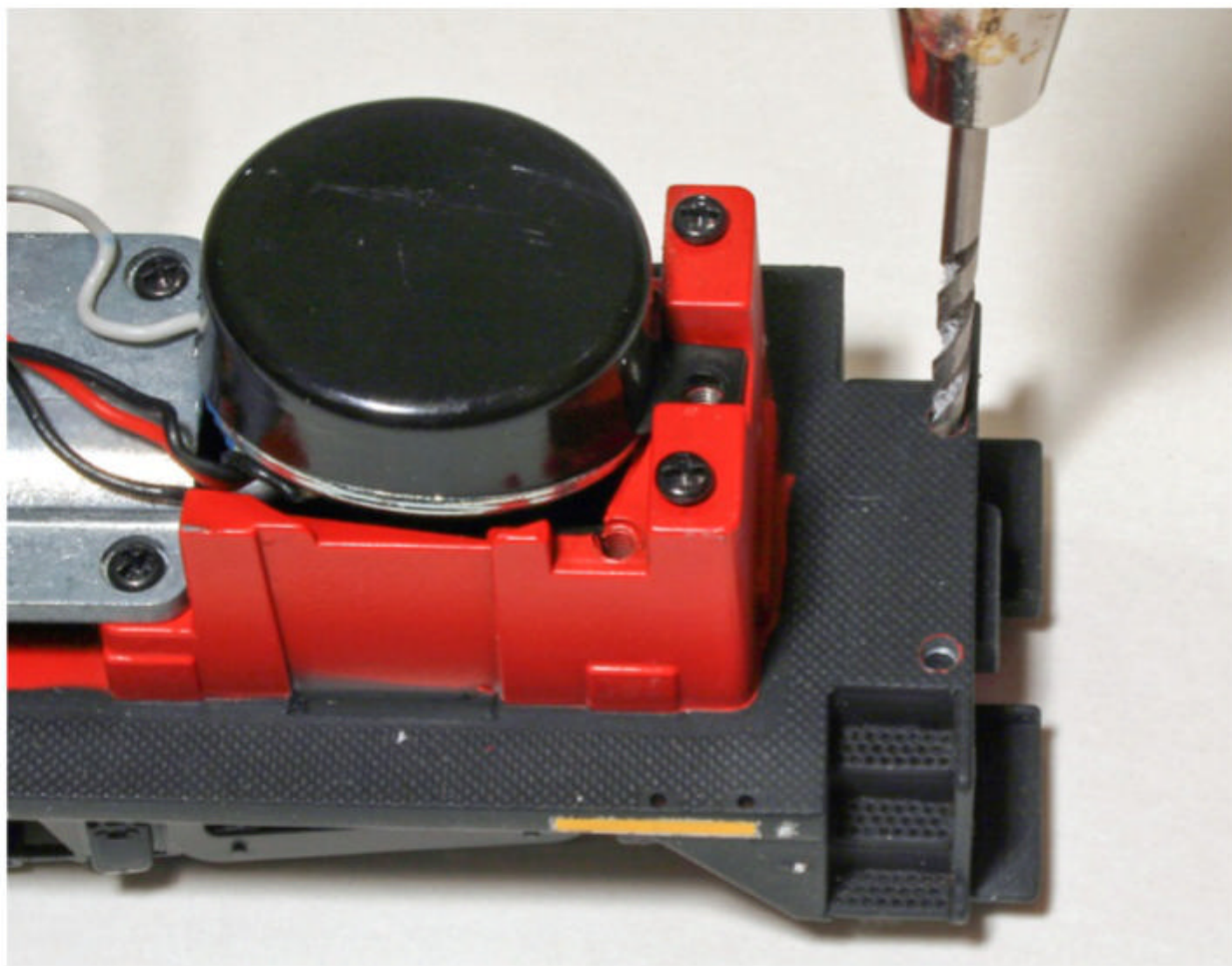
modelers may have to install their own ditch lights on their locomotives if they want to follow current-day practices. With the advent of surface-mounted light-emitting diodes (LEDs), the installation of ditch lights is much easier today than it has been in the past.

I recently purchased an Electro-Motive Division NW2 from Broadway Limited Imports to add to my fleet. I model the Georgia Northeastern RR (GNRR), a short line that operates in North Georgia. No manufacturer offers a locomotive in the GNRR paint scheme, so I had to disassemble the locomotive to paint it. While it was disassembled was the perfect time to upgrade the decoder and install ditch lights.

Locating the ditch lights

I began by determining the best location to mount the ditch lights following FRA requirements. The prototype GNRR NW2 had its ditch lights mounted on the upper portion of the front pilot, but the model didn't have enough room to mount the lights there. The second option was to mount the lights on the deck, which was an acceptable alternative and made the installation slightly easier. I purchased Details West pilot-top mount EMD ditch light castings (DL-228) for this project.

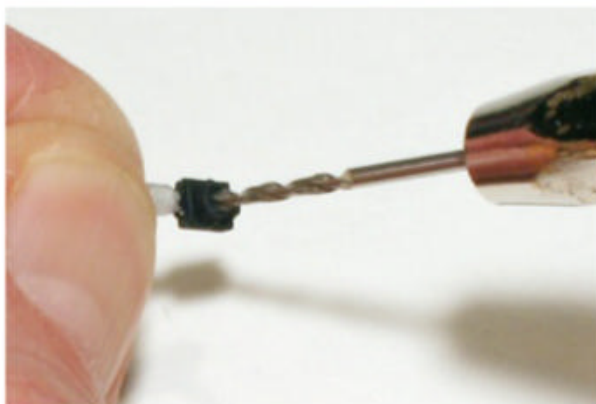
The BLI NW2 has a metal frame that includes the front and rear deck in the frame casting. After removing the front



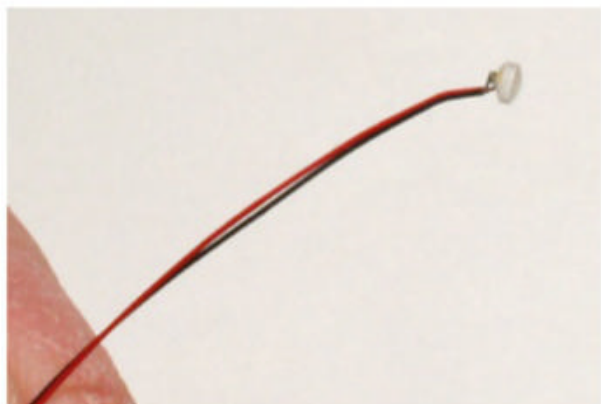
1 Tom used a $\frac{5}{64}$ " drill bit to enlarge the hole in the frame to accommodate the mounting post of the ditch light.



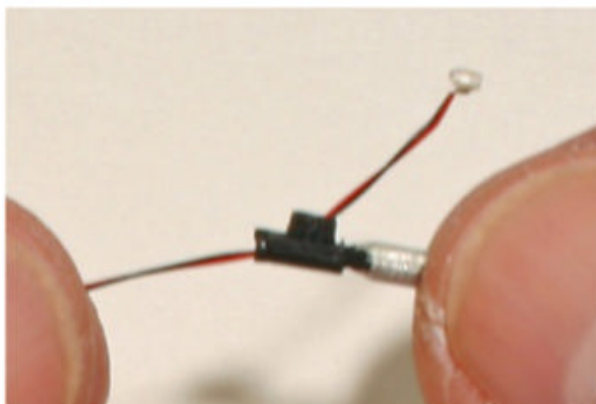
2 Using a $\frac{3}{64}$ " drill bit, Tom drilled a hole in the mounting post of the casting which will accommodate the wires for the LED light.



3 Tom drilled through the front of the white metal ditch light casting to connect the front hole to the previously drilled vertical hole.



4 Placing a slight bend in the wires on the back of the LED helps it to sit flush in the housing and directs the wires down the shaft of the casting.



5 Tom threaded the wires for the LED through the front lens opening of the ditch light casting and down the mounting post.

deck handrails to protect them from damage, I drilled a pilot hole with a $\frac{1}{32}$ " drill bit in a pin vise in the front deck at the outermost portion of the deck, $\frac{1}{8}$ " back from the front pilot and inboard to the top side step on each side. I was careful to keep the drill bit vertical and

worked slowly to drill completely through the frame.

Once I completed both pilot holes, I followed up with a $\frac{5}{64}$ " drill bit to enlarge the holes to accommodate the mounting posts cast into the white metal ditch light castings **1**.

Ditch light casting

I began by painting the ditch light castings Polly Scale Engine Black, which matched the color of the frame and deck of the locomotive. I kept the small "handle" on the ditch light casting to make it easier to hold and work with until I had the LEDs installed and was ready to mount the assembly.

After the paint dried, using a $\frac{1}{32}$ " bit in a pin vise I drilled a pilot hole through the mounting post. Next, I followed that up with a $\frac{3}{64}$ " drill bit to enlarge the hole which will accommodate the wires for the light. I was careful to keep the drill bit centered in the casting and not drill too far into the top; I only needed to go to the center of the casting, where the light mounts **2**.

With the hole drilled for the wires, I drilled the front of the casting where the light mounts with a $\frac{3}{64}$ " drill bit. I only drilled deep enough to connect the front hole to the vertical hole I had just drilled for the wires **3**. Once the two holes were connected, I enlarged the hole in the front of the casting where the lens mounts, using a $\frac{5}{64}$ " drill bit. I drilled just deep enough to allow the lens to sit flush with the front of the casting.

With both castings prepared, I turned my attention to the lights.

Surface mount LEDs

I purchased the warm white no. 0402 surface-mount light-emitting diodes (LEDs) from a vendor on eBay. The LEDs come pre-wired with very fine 0.28 mm wires already soldered to the LEDs, which makes installation much easier.

To install the LEDs inside the ditch light housing, I first used extra thick cyanoacrylate (CA) to glue the LED to the clear lens that came with the ditch light castings. It's important to get the LED as close to the center of the lens as possible to allow the light to shine through correctly and allow clearance for the wires. I placed the lens curved side down on a piece of painter's tape, placed a drop of CA on the lens, and then placed the LED into the glue. Once I was satisfied with the placement, I used a drop of Insta-Set CA Accelerator to instantly harden the glue.

Next, I placed the LED and lens assembly in a small clamp and bent the wires so they came off the back of the LED at a 45 degree angle **4**. I stripped approximately $\frac{1}{4}$ " of the insulation from the ends of the LED wires and tinned them with solder.

To install the LEDs, I threaded the wire through the front lens opening of the ditch light casting and down the mounting shaft. As I approached the end where the lens and LED light were, I rotated the wires so that the 45 degree angle pointed down the housing **5**.

I placed a thin film of Aleene's Clear Gel Tacky Glue on the inside edges of the lens housing, then pressed the lens into position while guiding the wires through the casting. Once everything was situated in the housing, I placed another drop of glue in the bottom of the mounting post to secure the wires in place. I tested the LED with a 9V battery to make sure it operated.

With the LED working properly, I cut the "handle" off the ditch light casting, smoothed it out with a small file, and touched up the paint. With the ditch light assembly completed, I set it aside to dry and began installing the ESU LokSound Select Micro sound decoder.

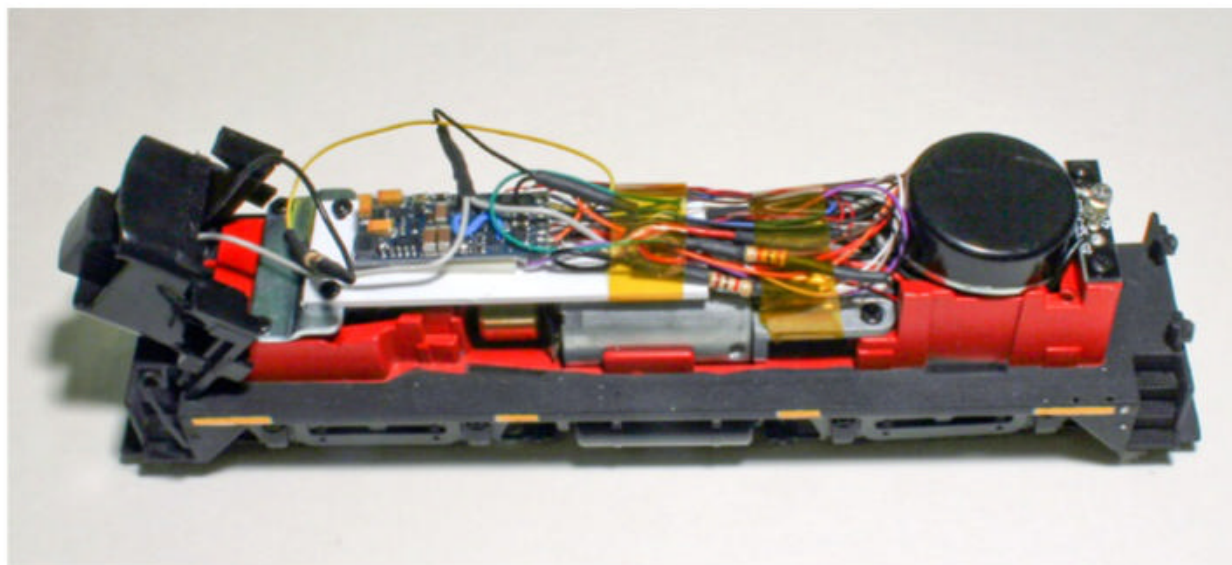
Wiring the lights

My original plan involved reusing the factory-installed LEDs for the front and rear headlights. The LEDs require a resistor. I soldered a 1K Ω resistor on the negative wire for each light before soldering it to the appropriate wire from the decoder. The two positive LED wires, one from each light, were soldered together and then to the blue common positive wire. I used heat-shrink tubing to cover the solder joints.

Next, I threaded the wires for the ditch lights into the mounting holes on the chassis after twisting each pair of wires together. I added a small amount of Aleene's Clear Gel Tacky Glue around the hole and then inserted the ditch light casting into the hole. I routed the wires up through the opening for the front truck, making sure they had plenty of slack and wouldn't interfere with the gears or truck movement. I used a small piece of Kapton tape to secure the wires to the bottom of the chassis where they exited the mounting hole.

On the Georgia Northeastern RR's locomotives, the ditch lights don't flash, so I soldered both negative ditch light wires together. Next, I added a 1K Ω resistor to the black negative wires from the ditch lights, then soldered it to the green Aux 1 wire on the decoder.

If I wanted the ditch lights to flash alternately, I could have soldered each ditch light black negative wire independently to the auxiliary function wires (green and violet) on the decoder. This



6 The wires are all bundled up, and Kapton tape is used to secure them to the locomotive chassis. The speaker is located above the front truck.



7 Tom reassembled and lightly weathered the locomotive. The ditch lights fit perfectly just above the footboard handrail.

would have allowed each light to flash when the horn function is activated.

I then soldered the red positive wires from the ditch lights together and soldered them to the blue common positive wire on the decoder.

Once I had all the lights hooked up, I tested the end-cab switcher. Everything worked perfectly. However, the factory-installed LED headlights looked too white and didn't match the warm white look of the ditch lights. To remedy this, I went back to the workbench, removed the factory LEDs, and installed a 3mm Bright Warm White 12V LED in the rear headlight housing.

For the front headlight, I used a piece of .060" styrene to replace the original light bracket, then installed the warm white LED in its place on the bracket.

I bundled up the decoder wires and used Kapton tape to secure them to the locomotive chassis **6**. I reassembled the locomotive and tested the lights again. The new LEDs better match the warm white light of the ditch lights and more closely approximate the look of an

incandescent lamp used on the prototype locomotive. The ditch lights fit perfectly just above the lower handrail **7**.

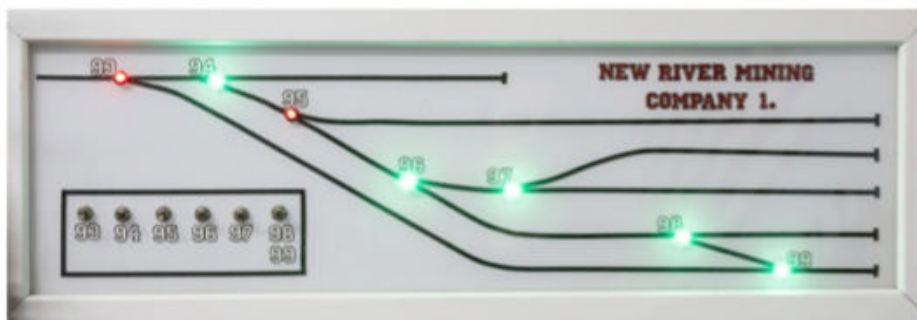
Programming the lights

The factory default setting for the two auxiliary functions on the decoder is to have them alternately flash when the horn function is activated. With both ditch lights hooked to function 1 on the decoder, both lights flashed together when the horn was activated.

To convert them to non-flashing, I needed to change a few CVs. First CV 31 needed to be programmed to 16, then CV 32 needed to be programmed to 0. Once this was done, I programmed CV 275 to 2. With those CVs changed, the ditch lights shone without flashing when the air horn was activated. Success! 

Thomas Klimoski and his wife, Diane, live in the North Georgia Mountains. Tom's HO scale Georgia Northeastern RR layout was featured in Model Railroad Planning 2016.

Introduction to switches



This month, Allan Gartner discusses various types of switches and their applications for your model railroad.

This month we'll discuss switches. No, not turnouts, but the switches that you would use in a control panel to control turnouts. All Electronics (allelectronics.com) and Jameco (jameco.com) are a great source of these switches.

First, some good news. I've seen posts on the internet of people that lose sleep over getting something called a "make-before-break" switch. These people warn that you need a center-off switch to avoid getting a make-before-break switch. Relax. A make-before-break switch is a specialized switch and is very uncommon. They're typically used in amp meters. I've never come across one otherwise. I'm sure if you were to buy one, the catalog would say that it was this type of switch. What you might find on eBay is another matter, but you still probably will not end up with a make-before-break switch. Ask the seller if in doubt. You can always test for it. Just put your meter across the end terminals of the switch with it set to read ohms. If you get a reading while you flip the switch, you will have found a make-before-break switch.

Below you'll see the terms "pole" and "throw." The pole is the movable internal electrical switching device to the switch. The throw is how many different electrical contact positions the pole can

have. Applicability is highlighted below.

The most common switches are single- and double-pole configurations. You can also buy triple-pole and four-pole switches from hobby suppliers. In the April 2023 DCC Currents, I provided an example use for a four-pole switch for programming tracks.

You can also find multiple-position and multiple-pole rotary switches on eBay. In this modern digital age, they're hard to come by with any predictability. New ones are nearly impossible to find and are very expensive. Those available on eBay aren't too expensive but are probably tarnished. So plan on also buying a can of contact or tuner spray to spruce them up if they are dull or black and have a not very low contact resistance. Note: If you're buying a surplus rotary switch on eBay that came out of a multimeter, this might be the one time you would get a make-before-break switch.

Be careful with small toggle and pushbutton bodies that are mostly plastic. They can be a real challenge to solder without becoming deformed and damaged.

I use a 25-watt soldering iron. Pre-tin your wires. Bend the wire and pass it through or bend it around the terminal. Squeeze the wire with small pliers to make sure you have a good mechanical connection, then solder. Be quick!

How do you tell what type of switch you're buying? I'll start with push buttons **1**. These are almost always momentary contact. You'll find NO (normally open) or NC (normally closed) push buttons. When you press a NO type, it will make contact and close the circuit. This is the type you typically want for control of twin-coil switch machines or most Digital Command Control (DCC) accessory (turnout) controllers, like an NCE Button Board (used with their SwitchIt controllers) or a Digitrax DS74. If you use the DCC Specialties PSXX electronic circuit breaker, you'll want the NC type for the optional manual reset of the circuit breaker.

If you have a push button that isn't momentary, it will



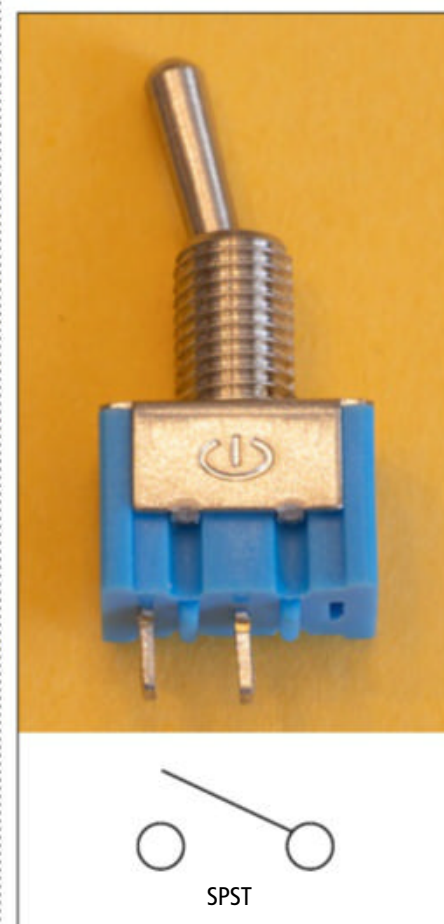
1 A normally open (NO) momentary push button, the symbol for a NO switch, and the symbol for a normally closed switch.

often click-on and click-off like a ball point pen. You can easily test for this type of switch with the resistance or continuity settings of a digital meter. If you find one that stays on after you release the button and then opens after you press it again, you'll know that you have one that isn't of the momentary type.

There are a couple of things that you'll see describing a switch. You will see switches described as SPST, SPDT, and DPDT. There are others, but these are the most common switches available.

A SPST (single-pole single-throw) is a basic switch with two terminals **2**. You would use this type of switch if you want to kill the power to an engine stall track or any track on a layout.

A SPDT (single-pole double-throw) switch **3** is used by people who are controlling their slow-motion switch machines with two power supplies. More commonly, you could use it like a



2 A single-pole single-throw (SPST) switch and symbol. This is a basic switch with two terminals.



3 A single-pole double-throw (SPDT) switch. Some switches will have information stamped on the sides indicating what kind of switch it is and what the maximum operating current and voltage is.

SPST switch to kill power to a track. Just use the center and one of the end terminals. This might sound like a waste, but due to how it's constructed internally, you may find this switch is more common and may not cost significantly different than a SPST.

A DPDT (double-pole double-throw) switch 4 is commonly used to control a slow-motion switch machine. You can also use it to switch power between the programming track output and track bus output of your DCC command station.

For toggle switches, you might see ON-ON. This means that the switch is a two-position switch that is on in either position. The DPDT version of this switch you would use to operate a Tortoise by Circuitron slow-motion switch machine. If catalogs just say that a switch is, say, a DPDT but doesn't

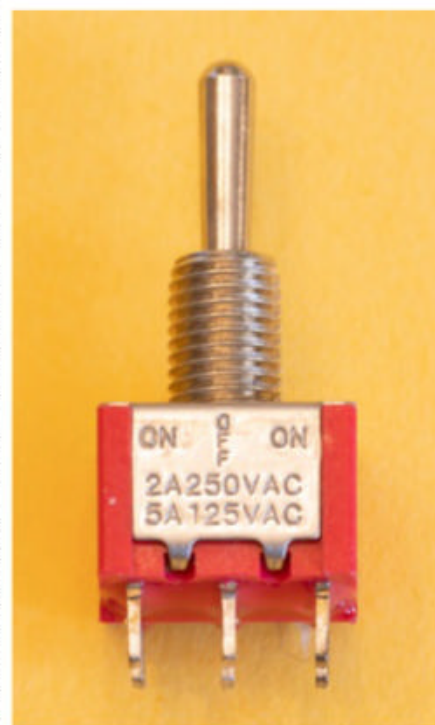


4 A double-pole double-throw (DPDT) switch. Though hard to see, there are actually two rows of three terminals on the bottom of this switch.

say anything else, it is probably an ON-ON.

ON-OFF-ON means that the switch is a center-off, three-position switch 5. I use one of these for my programming track. One position goes to the programming output terminals of my command station and the other position goes to the track outputs of the command station. The center is off.

(ON)-OFF-(ON) means that it's a center-off switch and is momentary contact when thrown to either position. This is useful to control turnouts instead of two push buttons. Since the handle is centered when released, you may want some LEDs to indicate which way the turnout is lined. How you wire this will depend on what kind of switch machine and circuit you are using to control your turnouts. This type of switch or push button control would

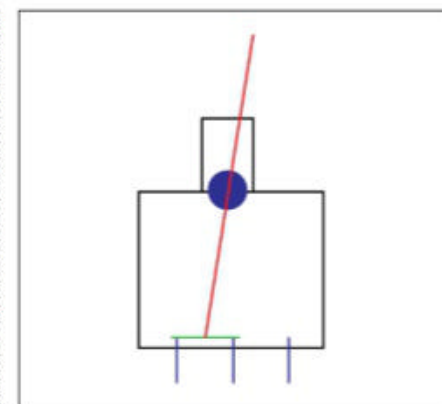


5 A double-pole double-throw (DPDT), center-off switch. Alan uses this switch for his programming track.

be used with twin-coil switch machines or DCC accessory decoders that use momentary contact inputs. You wouldn't use this type of switch to directly control a slow-motion switch machine.

When wiring any type of toggle switch, note that when the handle or bat is to the right, the switch is making contact with the center and left contact(s) 6. When the handle is flipped to the left, it is making contact with the center and contact(s) on the right. While this may seem a little different, when you look at the diagram, it's mechanically compact, simpler, and less expensive to make. Now that you're aware of this, you will not have any trouble wiring them.

How much current (amperage) a switch can handle has two different specifications. There's the continuous rating and a switching rating. Rarely will you see the switching rating.

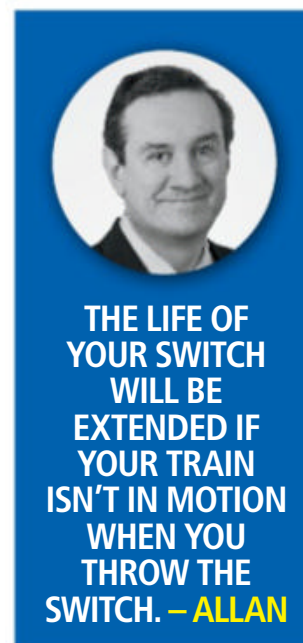


6 An example of the internal workings of a toggle switch. When the handle is to the right, the internal mechanism makes contact with the terminal on the left.

It's usually lower, and if you are frequently switching trains while in motion, this will likely lead to the early demise of your switch. The lesson here is that the life of your switch will be extended if your train isn't in motion when you throw the switch. A Tortoise has a built-in DPDT switch, and it's common to use one of the poles to power-route your turnout's frog. It's fortunate that you'll rarely have a locomotive on top of the frog when you switch your turnout.

If you're using a switch to control cutting the power to a track, such as an enginehouse stall or a siding, you don't need a switch with the same rating as your booster output. For HO scale and smaller, a switch good for 2 or 3 amps is fine. Even for large scale locomotives with modern can

motors, a switch rated for 3 amps will usually be enough. Sure, during a short and before the booster or electronic circuit breakers trips out, a switch will briefly handle more than it's rated. But it will be so brief, it won't hurt it as long as it wasn't being switched at the time. **MR**



Rain, Ruth, and a rule

Feel-good stories are hard to resist. The best ones have staying power, such as Kate Shelley's on the Chicago & North Western, which made her a heroine. A similar flooding incident on the Erie so touched Babe Ruth that he repeated it in a memoir.

Kate's childhood home overlooked the railroad where it bridged Honey Creek, a tributary that joins the Des Moines River near Moingona, Iowa, about 45 miles northwest of Des Moines. Heavy rain from storms on July 6, 1881, made water rise so fast that 15-year-old Kate and her mother worried if the bridge could hold. Near midnight, a loud crash confirmed their fears: it collapsed under a helper engine running light. Kate saw survivors when she rushed to the scene and knew that a passenger train was soon due. She decided to go to Moingona, the nearest station about a mile away, to stop the train and find help. Doing so required crossing the railroad's long bridge over the Des Moines River, equally threatened by flooding.

Various accounts differ in detail but agree that crossing the river was a terrifying ordeal. "The True Story of Kate Shelley" by Edward Meyers appeared in the October 1957 issue of *Trains Magazine* with the endorsement of Mayme Shelley, Kate's younger sister. Meyers described how the teen made her way across by "grasping the rail" to keep from falling into the river, inching along through lashing wind and rain, a daring feat that made her famous. She reached Moingona and led rescuers to the wreck, where they saved two victims. Chicago & North Western honored her with a lifetime pass and years



Six boys prevented the wreck of an Erie express train. This Associated Press photo shows them with their raincoats at the freshly repaired washout they discovered. Mark Auerbach collection

later named its train between Chicago and Boone, Iowa, the "Kate Shelley 400." A 1901 line relocation moved the crossing upriver west of Boone, and in 2009, Union Pacific officially named its new double-track span there the Kate Shelley Bridge.

Half a century later, heavy rain in Passaic, N.J. on May 3, 1933, made heroes of six boys who lived at an orphanage there. Checking on the condition of a baseball field between the building and Erie's main line, the boys were startled to find the road-bed washed out. One, Johnny Murdock, recalled "there was a ditch about 10 feet deep underneath the tracks" in a 2005 article in *The Record*, a regional paper. They ran and flagged down a rush hour express crowded with 500 commuters by waving their raincoats wildly, saving the train. When railroad officials asked about a reward, they said "just let Babe Ruth know what we did."

This reached Ruth overnight, and he wired them congratulations the next morning. Ruth followed up, giving the boys batting tips in Passaic and hosting them at a game at Yankee Stadium.

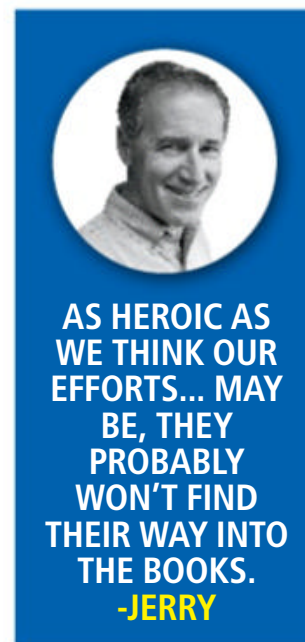
These events touched Ruth so deeply that he made the story one of three career highlights in his article "How it feels to be a has-been," published by *Liberty Magazine* in 1936, the year after he retired. The others were his two World Series accomplishments, pitching 29 consecutive scoreless innings for the Red Sox and his "called shot" homer after he pointed to the Wrigley Field centerfield bleachers.

The record books aren't the only place Kate and the boys found their way into. The rule book has a place

for them, too: "Any object waved violently by anyone on or near the track is a signal to stop." This appeared in similar form in the first Standard Code of 1887 and remains in today's General Code of Operating Rules and NORAC Operating Rules. The waving motion seems instinctive; it's how a motorist indicates danger when stopped on the side of the road. It's also how I flagged the engineer whose train was derailing at a recent operating session. However,

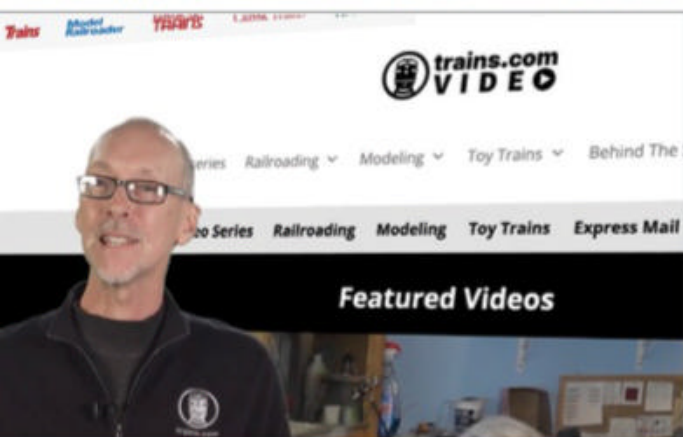
as heroic as we think our efforts on our model railroads may be, they probably won't find their way into the books.

Special thanks to Mark Auerbach, the Passaic historian who generously shared his research about Babe Ruth and the orphans with me. 



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It was worth getting up early to catch the sunrise glinting off the cab window of Otter Creek & Ripton No. 1 as it steamed over the Texas Falls trestle. Dave McLeod of Burlington, Vt., photographed the scene on his On30 OC&R layout, which appeared in *Great Model Railroads 2018*. The Forney was shortened to convert it to an 0-4-4, then backdated. Dave used a halogen spotlight to mimic the sunrise and used Helicon Focus to improve depth of field.



Send us your photos

Trackside Photos is a showcase for the work of *Model Railroader* readers. Send your photos (digital images 5 megapixels or larger) to: *Model Railroader*, Trackside Photos, P.O. Box 1612, Waukesha, WI 53187-1612; or upload them to fileupload.kalmbach.com/contribute. For our photo submission guidelines, contact senior associate editor Steven Otte at sotte@kalmbach.com.



Alistair Road's No. 32 pulls up to the Marlowe water tank as the line's owner enjoys one of the fringe benefits of owning a scenic railroad from the rear of his private caboose. Peter Vassallo took the photo on his freelanced HO_n3 railroad, which is set in California during the early 1950s. The sky in the background is painted cardboard; the hills on the horizon and the steam exhaust were added digitally.

Three current and former Railbox boxcars wait on a siding to be picked up for delivery to businesses along the Visalia Electric RR, an agricultural short line owned by the San Joaquin Valley RR. Rick Sutton of Atascadero, Calif., decorated and weathered the ExactRail, Walthers, and Athearn freight cars and photographed them on his HO scale layout. The structures are scratchbuilt using photos of prototype buildings laminated onto styrene cores.



Norfolk Southern No. 9692, a General Electric C40-9W, waits on the passing siding with its manifest freight for a meet. Braden Gryskiewicz of Wadsworth, Ohio, photographed the scene on his HO scale module depicting a Southern Alberta grain elevator in the modern era. The C40-9W is a ScaleTrains model and the cylindrical hopper is from Bachmann Trains.



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Schedule of Events

AL, HELENA: Smokey City Rails Show & Sale. October 27-28, 2023. Helena Sports Complex, 110 Sports Complex Dr., Helena, AL 35080. Friday 4pm-8pm, Saturday 9am-3pm. Admission: Adults \$6, Children 8-12 \$2, Under 8 Free. \$10 Two-Day available. For additional information, contact: 205-864-7769 or email: scrmmc029@gmail.com

AR, CONWAY: Central Arkansas Train & Hobby Show. Conway Expo Center, 2505 E. Oak Street, Conway, AR 72032. August 26-27, 9:00am - 4:00pm. Vendors, Layouts, Contests. Admission \$5.00, 12 and under free. Contact RAIL & SPRUE Hobbies, 1200 John Harden Drive, Jacksonville, AR 72076. 501-982-6836, or railandsprue@aol.com

CA, TULARE: TRAIN, TOY, & MODEL KIT SHOW. November 18-19, 2023, 10am-4pm. International Agri-Center, 4500 S. Laspina St., Tulare, CA 93274 (off Route 99). Admission: \$10/person; \$15/family. FREE parking. Up to 400 vendor tables plus operating train layouts, live steam displays, a parts dealer. Vendor information: send SASE to TTOS-Tulare Show, PO Box 6710, Fullerton, CA 92834

FL, MELBOURNE: The Melbourne Train and Toy Show. Azan Shrine Center, 1591 West Eau Gallie Blvd, Melbourne, FL 32935. Saturday, September 2, 2023, 9am-2pm. Admission: \$5, kids under 10 FREE. Vendor tables \$25 each or 3 or more \$20 each. Join us for trains, toys, and fun! Lunch/snacks available. For more information: SchultzSpaceCoastTrains@aol.com or 321-805-1963

IA, DAVENPORT: Model Train Show. October 27-28, 2023. Friday 10am-6pm and Saturday 10am-4pm. N, HO, O27, O & American Flyer...NEW & USED. Buying trains, pay in cash. FREE admission & parking! Cash and credit cards only. American Legion, 702 West 35th Street, Davenport, IA 52806. Questions, call John at 563-349-0134 or email: JohnTrainsHobby@aol.com

IA, DELMAR: Delmar Train Show & Swap Meet. October 7-8, 2023. Saturday 10am-4pm and Sunday 10am-2pm. Delwood School Gym, 311 Delmar Avenue, Delmar, IA 52037. Admission: Free Will Donation. Free tours of Delmar Railroad Museum. Vendor tables: \$15 each (limit 10 tables per vendor). Food & drink available. Free parking/handicap accessible. Information: sjebsen@fbcom.net

IA, ELKADER: 11th Annual Elkader Model Train Show-Swap Meet. Sunday, August 20, 2023, 10:00am-3:30pm. Johnson's Reception Hall, 910 High Street. Adults \$5, children 6-12 \$2, under 5 FREE. Free parking, lunch stand available. Information: Larry Lerch, 563-880-2066 or 563-245-3345

IA, IOWA CITY: 3rd Annual Iowa City Train Show. Sunday, October 22, 2023. 9am-3pm. 4261 Oakcrest Rd. SE, Iowa City, IA 52246. Admission: \$5, children 10 and under free w/adult. New club building open house! All different scales! Displays and layouts to see! Sponsored by the Hawkeye Model Railroad Club. iowacitytrainshow@gmail.com or visit: www.hawkeyemodelrrclub.com

IL, ORLAND PARK: Fall S-Fest 2023. November 3-5, 2023. CASG, Inc. Be part of the greatest S, 1/64 event! Registration \$35. Georgios Quality Inn & Suites, 8800 W. 159th St., Orland Park, IL, 60462. 110 tables! Clinics! S-Fest cars! www.trainweb.org/CASG or call Joel at 847-212-3541

KS, TOPEKA: TMRR Club 2nd Annual Show. Great Overland Historic Station, 701 N. Kansas Ave., Topeka, KS 66608. September 30-October 1, 2023. Saturday 10am-5pm, Sunday 10am-3pm. Over 10,000 sq.ft. of operational layouts, displays, dioramas, railroad history and vendors. Admission: Adults \$7, Children \$5, under 6 free. Food on site, free parking. Contact info: philskow@yahoo.com or 785-221-2174

MI, BATTLE CREEK: Battle Creek Train Show & Swap Meet. Calhoun County Fairgrounds, 720 Fair St., Marshall, MI 49068. Saturday, September 16, 2023, 10am-3pm. Admission: \$5 adults, under 12 free. Operating layouts, hands-on displays, door prizes. Refreshments available. Dealers welcome, \$25.00 per table. For information: contact Andy Buck 269-268-0910, Shawn Rhoades 269-224-1142.

MO, SPRINGFIELD: Ozarks Model Railroad Association Annual Train and Scale Vehicle Show. September 23, 2023, 9:00am-3:00pm. Ozarks Empire Fairgrounds, Central Events Building, 3001 N. Grant Ave., Springfield, MO 65807. Adults \$10.00, Children 11 or under free with paid adult. 45,000 square feet of operating layouts and vendors. For more info www.omraspringfield.org

NC, FLETCHER: Autumn Rails 2023 Model Railroad Show. September 29-30, 2023. Friday noon-6pm, Saturday 10am-4pm. WNC Agricultural Center, Expo Building, 785 Boylston Hwy., Gate 5. Admission: \$8 (covers both days), under 12/scouts in uniform FREE. Boy Scout Merit Badge clinic. Dozens of vendors, plus operating layouts. Dealer tables \$35 (covers both days.) Free parking. Door prizes. www.fbemodellrr.org

NC, RALEIGH: Neuse River Valley Model Railroad Club Annual Show; Jim Graham Building, NC Fairgrounds, 4825 Trinity Road; November 4th-5th, 9am-5pm; admission: \$10, children 12 and under free w/adult, \$1 off coupon on club website. The largest, oldest train show in NC, 95,000 SF with 300+ tables, multiple layouts. Contact George Lasley, email: gwlasley52@gmail.com, visit www.nrvclub.net

NH, CONCORD: 37th annual Concord Model Railroad Show. Sunday, August 20, 2023. 10am-3:30pm. Everett Arena, Concord, NH. Tickets: \$8.00 adults, 15 and under free with an adult. Over 50 dealers, door prizes, free raffles, food stand open, operating layouts in multiple gauges. Free parking, handicap accessible. For more info contact Concord Model RR Club. rhfsaf@aol.com www.trainweb.org/cmrc

NJ, TOMS RIVER: ECTP and Collectibles LLC presents the Toms River Toy & Train Show. Elks Lodge, 600 Washington St., Toms River, NJ 08753. Sunday, August 20, 2023, 9:00am-2:00pm. Admission: \$7.00; under 12 free with adult. John LaLima 732-845-5966. Go to www.eastcoasttrainparts.com and click on Toms River Show.

TX, HOUSTON: Houston Area Model Train Show, November 18-19, 2023. Saturday 10am-5pm, Sunday 10am-4pm. Adults \$7, 17 and under free. All scales, operating layouts, club/museum displays, table sales and more. Pearland Knights of Columbus Hall, 2320 Hatfield Rd., Pearland TX 77581. More information at http://houstontrak.org or by email info@houstontrak.org. Sponsored by Houston Area T-TRAK Association, Inc.

TX, TEMPLE: 41st Annual Temple Model Train & RPM Show by CentraMod Inc. Central Texas Area Model Railroaders. Frank W. Mayborn Convention Center, 3303 North 3rd St., Temple, TX 76501. September 16-17, 2023, Saturday 10am-5pm and Sunday 10am-4pm. Admission: \$10, Seniors & Military w/ID \$9, 12 and under free w/adult. FREE Parking! Additional information: 254-760-3761 or www.centramodrr.com

WA, BATTLE GROUND: Southwest Washington Model Railroaders, Great Train Swap Meet. Battle Ground High School Gymnasium, 300 W. Main St., Battle Ground, WA 98604. Saturday, September 30th, 9:30am-2:30pm. \$10.00 Beat-the-Crowd (9:00am), Adults \$5.00, Students \$3.00, under 6 FREE with adult. Take N. Parkway Avenue to Free Parking. Vendor tables \$25.00. Contact Larry: 360-619-8899, Larry.sprenkel@gmail.com

WA, KELSO: LK&R MRR Club Train Show and Swap Meet. Saturday, September 9, 2023, 10am-3pm. Admission: \$5.00. Three Rivers Mall, Kelso, WA. Interstate 5, Exit 39, southwest corner. Over 150 tables. Information for vendors and guests, see our web site at: http://lkrtrains.yolasite.com or contact Kerry King 360-431-3992, email: lkrtrains@gmail.com

WI, MONROE: Green County Model Railroaders 45th Annual Model Train Show & Swap Meet. The Stateline Ice and Community Expo, 1632 4th Avenue West, Monroe, WI 53566. September 23-24, 2023. Saturday & Sunday, 10am-4pm. For information contact Kevin Johnson, 608-558-9332, or visit www.gcmrrinc.org

CANADA-ON, KITCHENER-WATERLOO: Sunday, September 24, 2023. BRESLAU TRAIN SHOW sponsored by WOD-NMRA. Manufacturers, vendors, four "free" clinics, operating layouts. \$300+ in Door Prizes. Preview: https://www.youtube.com/watch?v=f2ZiifyDpQA . Ample free parking. Breslau Community Centre, 100 Andover Drive, Breslau, ON. 10am-3pm. Admission: Children under 12 free; General - \$6.00; NMRA members - \$4.00. TrainShow@wod-nmra.ca

All listed events were confirmed as active at the time of press. Please contact event sponsor for current status of the event.

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Appalachian geology made easy



An overlook at Grandview State Park in Beaver, W.Va., allowed Jim Hertzog to get a good view of the Appalachian ridges near Quinnimont, W.Va. Note the meandering river and the similar elevation of all of the ridges. Jim Hertzog photo

I've been an amateur student of geology for decades. And to be honest, there's nothing "easy" about understanding it. Just about the time I think I have a good grasp of how this mountain range was formed or why that river is where it is, a geologist friend explains myriad nuances I never considered. It makes me feel like my oversimplified views of how the landscape took the shape we see today seem a bit lacking in detail, or just plain wrong.

The good news is that I'm not a geologist or even a student aspiring to be one. So if I can form a general overview of how things came to be that is within shouting distance of the truth as the professionals understand it, that is more than good enough.

Why should I even care about geology and the forces that shaped our planet? For starters, we modelers call it "scenery," and it's good to have some sense of what we're trying to model before we cover vast portions of our layout with it. We wouldn't

dream of scratchbuilding a locomotive without reams of prototype information. Even a lineside shanty is a lot easier to build when we have prototype photos and drawings to refer to.

Similarly, if our model railroads are to represent a specific region of the continent, it pays to have geological reference information to use as a guide. But we're unlikely to find enough photos and drawings that depict every foot or mile of the modeled region. So we need some knowledge of the basic geology of that area to help us fill in the gaps.

The accompanying photo was taken by Reading modeler Jim Hertzog in central Appalachia. It illustrates a primary tenet of modeling this eastern mountain range that needs to be kept foremost in mind when shaping the ridges that embrace our model railroads. Take a good look at it and see if anything catches your eye.

Those of you who live near or model the western peaks

will immediately note the lush forestation. The central Appalachian ridges aren't high enough to break the tree line, so those of you who aspire to model Appalachian railroading will wind up investing heavily in deciduous trees and some kind of leaf material.

But that's not what I'm referring to. Did you notice that all of the summits of the ridges are at roughly the same elevation? That's because these are not the original Appalachians; those rose up and were eroded down over countless millions of years to a near plain ("peneplain") before being rudely awakened from their slumber and shoved back up several thousand feet to form today's mountain range. As I recall, that may also have happened at least once before.

The New River that cuts through them is perhaps the most inaccurately named waterway in the U.S., as it's an extremely old river. Its meandering path gives its age away; the meanders would have happened on the ancient peneplain. As the new Appalachians rose up, the river was able to maintain its original course by cutting down through the rock. Some of the meanders are sufficiently gentle for a railroad to curve around the mountains with the river; others require tunneling through them.

This is an overly simplified version of how things along the central part of the eastern United States came to be, but it's sufficient to be useful from a modeling standpoint. We know that the Appalachian ridges should be modeled at similar elevations – individual peaks are unusual – and we know that the major waterways should meander. And we know why.

There are other aspects to modeling the Appalachians worthy of discussion at another time. The rock formations range from flat beds of sedimentary rock, includ-

ing seams of coal (mostly bituminous except for anthracite in northeastern Pennsylvania), or steeply folded beds, some of which now lie vertically. The major industry was coal, which led to distinctive structures and lifestyles.

The more we know, the better our models can be, regardless of our modeling skills. **MR**



WE MODELERS CALL IT "SCENERY," AND IT'S GOOD TO HAVE SOME SENSE OF WHAT WE'RE TRYING TO MODEL BEFORE WE COVER OUR LAYOUTS WITH IT. – TONY

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