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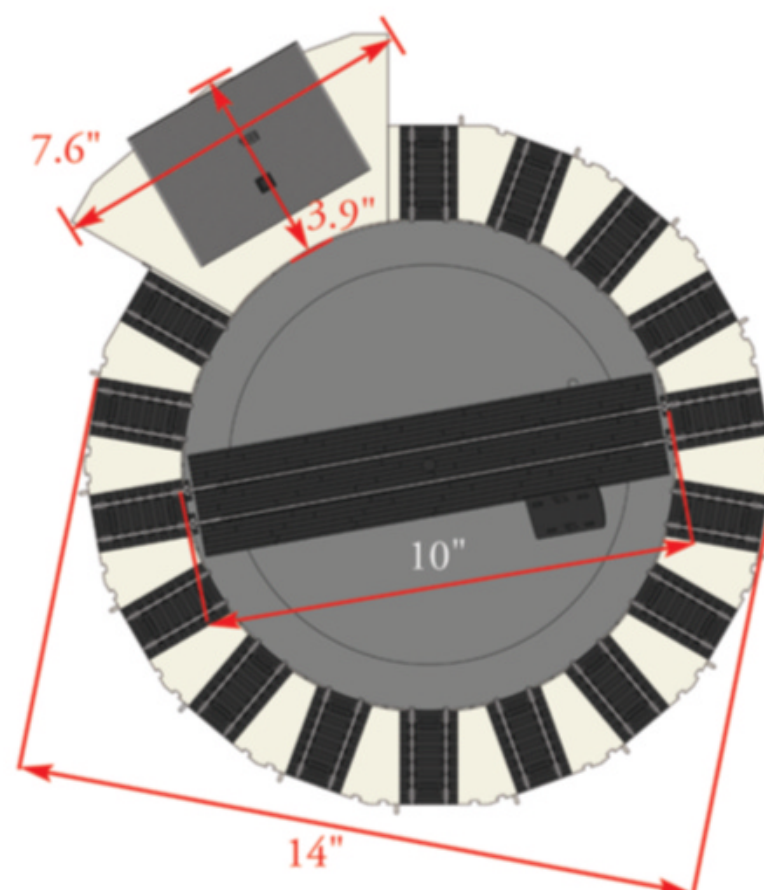
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DCC CORNER: ESU's LokSound 5 is here! p.56

**Rapido RS-18
diesel tested** p.58

June 2020
ModelRailroader.com



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Steam, diesel, and electric
locomotives on a multi-level
Great Northern layout p.28

**Model a
massive timber
trestle in N** p.38

PLUS

Modify an N scale hopper p.24

Scratchbuild a rotary plow p.50

Realistic operation on a two-level railroad p.44

Heritage Fleet: One hobby, many scales p.23

Lee Marsh conquers the
Cascades on his realistic
HO layout. See page 28.

**BONUS
ONLINE
CONTENT
CODE PG. 4**

Today's Lesson – Making something big into something small.

Step #1 – Select a Locomotive

☐ Rohr Turboliner

☐ F-M H16-44

☒ MLW M420

Step #2 –
Do some
Research



Kaluza-Mueller collection photo

A pair of M420s in the Lead. Berlin, New Hampshire, 1979.



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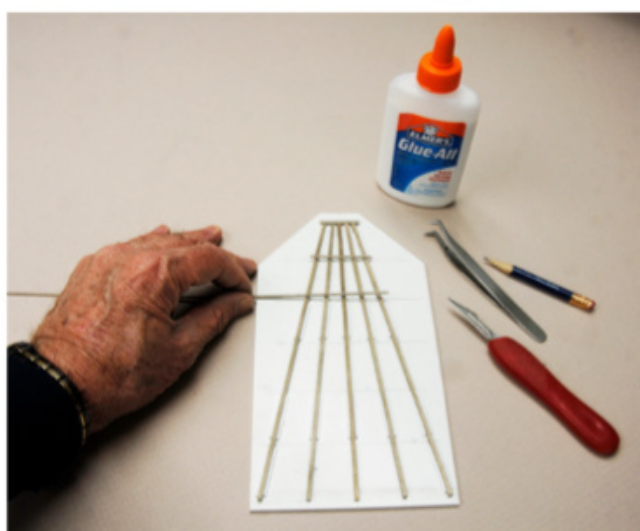
Features



28 Conquering the Cascades

Steam, diesel, and electric power lead trains over the multilevel Great Northern
by *Lee Marsh*

- Online bonus ModelRailroader.com



38 Model Spring Creek Trestle in N scale

This 5-foot span is based on a Milwaukee Road prototype
by *Dan Lewis*

- Online bonus ModelRailroader.com



44 Ride the Frisco to St. Louis

This double-deck HO scale empire is packed with scenes from the prototype's Missouri main line

by *Patrick Hiatte*

50 A winter's project

Take a look at a scratchbuilt turn-of-the-century steam-powered rotary snowplow
by *Andrew Dodge*

In every issue

6 On the Web

The latest videos and extras from our website

8 From the Editor

What inspires your modeling?

10 News & Products

Hobby industry news

18 Railway Post Office

Letters from our readers

20 Ask MR

Where can I find scale drawings of the K-27?

- Online bonus ModelRailroader.com

23 Heritage Fleet

The best of all possible worlds?



24 Step by Step

Modifying an N scale hopper

56 DCC Corner

ESU's LokSound 5 is here!



58 Product Reviews

Rapido Trains HO scale MLW RS-18, PRR class K4s 4-6-2 in HO from BLI, and more

65 On Operation

Called for a Barlow Turn

66 Trackside Photos

73 Index of Advertisers and Cartoon

74 Trains of Thought

The all-too-familiar problem of inertia

58
56



28

Great mountain scenery!

Steam, diesel, and electric locomotives on a multi-level Great Northern layout p.28

38

Model a massive timber trestle in N p.38

24

PLUS

Modify an N scale hopper p.24
Scratchbuild a rotary plow p.50
Realistic operation on a two-level railroad p.44
Heritage Fleet: One hobby, many scales p.23

50

44

23

On the cover: A Great Northern passenger train rounds a curve on Lee Marsh's HO scale layout.
Lee Marsh photo



Next issue

In **July**, we show you a huge HO scale club layout in Ohio. Plus, detail figures with decals, use water to texture a stone wall, scratchbuild a yard office, and more!

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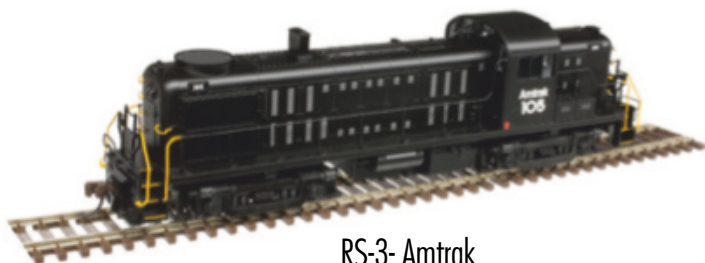
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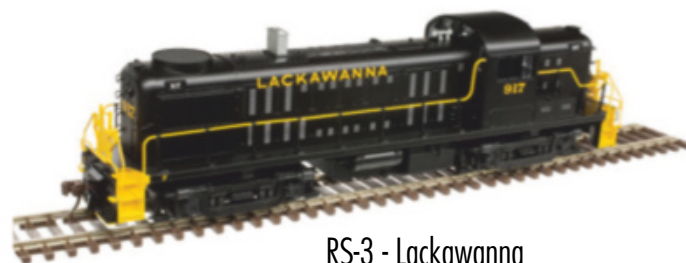


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Free computer desktop wallpaper

Each month visitors to ModelRailroader.com can download a stunning track-side photo to use as a computer desktop wallpaper. This month, the featured wallpaper is this image from Lee Marsh's Cascade Division.

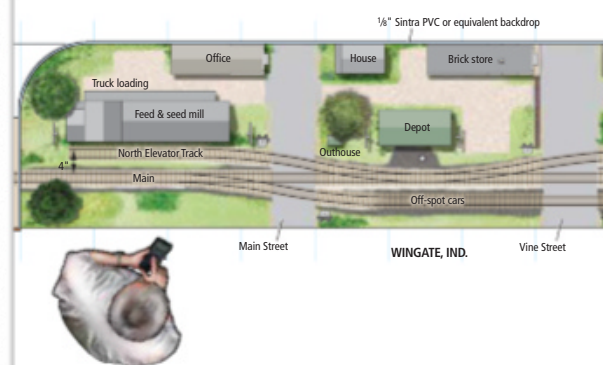
PRODUCT REVIEW



Rapido MLW RS-18

Rapido Trains brings this Canadian road switcher to HO scale rails. The model also features an ESU LokSound decoder. Subscribers can check out an exclusive demo video.

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What inspires your modeling?

John Allen's HO scale Gorre & Daphetid, profiled many times in the pages of *Model Railroader* over the years, was a fantasy world where cliffs climbed from floor to rafters with tracks winding ever upward in tier upon tier, crossing impossibly high bridges and skirting Devil's Post Pile, a cone-shaped mountain that concealed an otherwise inconvenient ceiling support post.

It should have looked like a cartoon of a railroad, but somehow it wasn't. The world of the G-D Line was perfectly reasonable in the same way that dreams seem reasonable to a sleeping man. Pulling off that trick is why model railroads often describe Allen as an artist and his railroad as a masterpiece. It's why he still inspires us today.

When Lee Marsh was a child he came across photographs of Allen's G-D Line

and decided he would someday build a mountain-themed layout of his own.

Lee, whose HO scale layout is our cover story this month, never lost his interest in building a mountain railroad. He chose to follow a prototypical approach based on the Great Northern Railway's crossing of the Cascade Mountains.

His interest was sparked by visits to GN's Stevens Pass line, now operated by BNSF Ry., and by the dramatic story of its construction.

In building his rendition of the GN's line through the Cascade Mountains, Lee followed a style employed by Jack Parker, whose HO scale Northern Pacific layout was featured in *Great Model Railroads 1995*. "Its expansive scenery and uncluttered, realistic look inspired me," Lee writes in his article, which starts on page 28.

It seems likely Lee's own layout will serve as an inspiration to others, continuing a chain that stretches back to 1954, when John Allen began construction of his final version of the G-D Line.

We approach the hobby in different ways. Our work may be grounded in reality or it may be a pure flight of fancy, but it always starts with inspiration. What we do with that inspiration is the art.

The Coronavirus pandemic upended normal routines across the globe and caused widespread suffering and economic hardship. It even had a significant impact on the production of this issue.

Planning for this magazine started, as always, in our offices in the Milwaukee suburb of Waukesha, but its final design and editing took place from our staff's various homes, using group e-mail,



cloud-based document storage, and hastily patched together remote links to our corporate computer servers.

Incredibly, this worked rather smoothly, and we are pleased to deliver this issue to you along with our hopes for a speedy return to normalcy for all of us.

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HO scale



Electro-Motive Division SD40-2 diesel locomotive. New paint schemes on this ScaleTrains.com Rivet Counter model include Dakota, Minnesota & Eastern; BNSF Ry.; Chicago & North Western; and CSX. New road numbers are offered on models decorated for Burlington Northern and Chessie System. The HO scale model has a detailed cab interior,

see-through dynamic brake intakes with resistor grid detail, and directional headlights. Direct-current models with 21-pin connectors are priced at **\$159.99**. Versions with a dual-mode ESU LokSound V5 sound decoders, PowerPack with two super capacitors, and dual cube-type speakers are **\$259.99**. ScaleTrains.com Inc., 844-987-2467, scaletrains.com

Walthers, Micro-Mark host model contests

Looking for places to showcase your modeling skills? Wm. K. Walthers Inc. and Micro-Mark are looking for you, as both companies are hosting model building contests.

Walthers is hosting the inaugural National Model Railroad Build-Off. The contest will feature youth (14 and under) and adult (15 and older) individual and team categories.

The requirements for the contests are to purchase an HO scale entry kit, build a module, and submit photos of the results. Prices for the entry kits and

dimensions of the modules vary based on category.

Prizes for the contest, which closes on May 15, are \$500 for youth individual; \$1,000 each for youth team and adult individual; and \$2,000 for adult team. There will also be a people's choice award. Additionally, winners receive prominent position in the Walthers 2021 Reference book. For contest rules, visit walthers.com/NMRBO.

The Micro-Mark Model Challenge returns for its second year. This year's theme is to build any Scientific model

kit, either on its own or with other Scientific model kits, on a layout or diorama. Entries will be judged on skillful modeling and attention to detail.

The winner will receive a \$1,000 gift certificate redeemable at Micro-Mark and a custom recognition plaque. The contest-winning model will be professionally photographed and featured on a Micro-Mark catalog cover with credit given to the builder.

Entries for the Micro-Mark Model Challenge must be received by June 1. Visit micromark.com for contest rules.

HO scale locomotives

- **Electro-Motive Division SD60M locomotive.** Burlington Northern (four road numbers), BNSF Ry. (Cascade Green patchouts in two numbers, Heritage II and Heritage III schemes in one number each), Canadian Pacific (without gold beaver herald in two numbers, with herald in one number), Norfolk Southern (Thoroughbred scheme, three numbers), and Union Pacific (as-delivered scheme, four

numbers). Three-piece front windshield and prototype-specific details. Direct-current model with 21-pin NEM connector, \$249.98; equipped with dual-mode SoundTraxx Tsunami2 sound decoder, \$339.98. February 2021. Genesis 2.0 series. Athearn Trains, 800-338-4639, athearn.com

HO scale freight cars

- **Two-bay 70-ton covered hopper.** Ann Arbor (gray), Central Silica Co.



(yellow, 8-70 repack), Chesapeake & Ohio (black, 2-49 repack), Dewey Portland Cement Co. (gray, 7-64 repack), Grand Trunk Western (blue, 2-80 repack), Halliburton (gray and red, 6-76 repack), McMillen Feed Mills (black, 2-57 repack), National Lead Co. (white,

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Conducted by Cody Grivno



3-70 repack), Reading Co. (sand service, 12-66 repack), Southern Pacific (dark gray with yellow lettering, 9-77 repack), Union Carbide Linde (gray, 1-63 repack), U.S. Phosphoric Products (gray, 6-40 build date), and Western Maryland (gray with speed lettering, 2-72 repack). Three road numbers per scheme. Metal wheels and knuckle couplers. \$28.95. Executive Line. Bowser Manufacturing Co. Inc., 530-368-2379, bowser-trains.com

HO scale structures



• **Babcock Boiler Co.** Intermediate level structure kit with laser-cut aged clap-board siding, laser-cut shake shingles, corrugated metal roofing, resin and white metal detail castings, color signage, and a length of Bar Mills Insta-Fence. Figures (shown above) not included. Measures 4½" x 4½". \$57.95. Bar Mills Scale Model Works, 207-929-3400, barmillmodels.com

Rensselaer Model Railroad Society has moved

The Rensselaer Model Railroad Society at Rensselaer Polytechnic Institute spent the spring semester moving to its new home at 258 Hoosick St. in Troy, N.Y. The club's well-known HO scale New England, Berkshire & Western layout was last featured in the November 2015 issue of *Model Railroader*.

"We are thrilled to have the opportunity to grow and share this important work in ways that would not previously have been possible," said Dalton Slegel, student president of the club, in a press release. "With the ongoing support of the Rensselaer Student Union, as well as the alumni and staff who have contributed to the layout over the years, we look forward to getting to work on the next chapter of this historic club."

"There is a lot of excitement about the future of the Model Railroad Society," Slegel continued. "We expect that to grow even more as students come see this important piece of Rensselaer and Troy history."

HO scale



General Electric B36-7. This HO scale diesel from Rapido Trains is decorated for Southern Pacific; Atchison, Topeka & Santa Fe; British Columbia Ry.; Conrail; CSX; Minnesota Commercial; Seaboard System; Southern Ry.; and Trans-Kentucky Transportation. It is also available undecorated. Direct-current models sell for **\$229.95**. Versions with a dual-mode ESU LokSound sound decoder sell for **\$339.95**. Rapido Trains, 905-474-3314, rapidotrains.com

N scale



Electro-Motive Division SD9. Bachmann offers this locomotive painted for Norfolk & Western; Denver & Rio Grande Western; Duluth, Missabe & Iron Range; Pennsylvania RR; and Southern Pacific. The N scale model (\$249) features new and existing tooling; directional, dimmable headlights; and dual-mode SoundTraxx Sound Value diesel locomotive sound package. Bachmann Trains, 215-533-1600, bachmanntrains.com



- **1970s and 1980s Taco Bell restaurants.** Laser-milled styrene and acrylic kits with clear acrylic window glazing, Plastruct ridged clay tile roofing, street and wall signage, 3-D printed bell (1970s version only), self-adhesive logo signage and posters, and instructions. Parking lot base not included. The model measures 7½" x 5¾" x 3". \$75 each. Summit USA, summit-customcuts.com

N scale locomotives



- **Electro-Motive Division GP38-2 diesel locomotive.** New paint schemes: National Railways of Mexico, BNSF Ry. (Heritage I), CSX (dark blue and yellow with boxcar herald), Indiana Harbor Belt (two road numbers), Norfolk Portsmouth Belt Line (one number), Norfolk Southern (horsehead silhouette), and Wisconsin & Southern. New numbers: Boston & Maine (blue and white) and Rock Island (blue and white). Three

numbers per scheme unless noted; also available undecorated (with and without dynamic brakes). Golden-white light-emitting-diode headlights, blackened metal wheels, and separately applied uncoupling levers. Direct-current model with 8-pin plug for Digital Command Control decoder, \$124.95; with dual-mode ESU LokSound Select Digital Command Control and sound decoder, \$234.95. Master Line. Atlas Model Railroad Co., 908-687-0880, atlasrr.com



- **Electro-Motive Diesel SD70ACe.** Norfolk Southern (Thoroughbred scheme in two numbers; New York Central, Reading Co., Erie, and Penn Central heritage schemes in one number each) and Union Pacific (George H.W. Bush Presidential Library scheme in one number; "Building America" scheme in two numbers; and Chicago & North Western, Denver & Rio Grande Western, Missouri Pacific, Missouri-Kansas-Texas, Southern Pacific, and Western Pacific heritage schemes in one number each). Also available undecorated. Die-cast metal locomotive chassis, golden-white light-emitting diode headlights, and dual-mode Paragon3 sound decoder featuring Rolling Thunder. \$249.99. Broadway Limited Imports, 386-673-8900, broadway-limited.com

Club offerings



- **Kankakee Foundry Association of American Railroads 41-foot steel gondola.** Accurail HO scale model custom-decorated for the Kankakee Model Railroad Club. Kit, \$25; assembled with Kadee couplers, \$30. Shipping \$5 per car. Checks payable to KMRC, 197 S. East Ave., Kankakee, IL 60901



- **Nickel Plate Road Painesville, Ohio, tower.** Laser-cut craftsman kit produced for Nickel Plate Road Historical & Technical Society by Right on Track Models. Includes mailbox, roofing, window glazing and other details shown except for base plate. N scale, \$37.95; HO scale, \$49.95; and O scale, \$64.95. Nickel Plate Road Historical & Technical Society, nkphs-shop.myshopify.com



- **Hanley's Beer & Ale 40-foot double-sheathed refrigerator car.** Accurail HO scale kit produced for the Providence Northern Model Railroad Club Inc. Two road numbers are offered. \$25 per car plus \$7.90 shipping (covers two cars). Rhode Island residents must add 7 percent sales tax. Make checks payable to PNMRR Club, c/o 26 Glendale Dr., West Warwick, RI 02893; credit card sales available online at providencenorthern.com

Showcase



1 Freight cars. New Accurail HO scale kits include an American Refrigerator Transit Co. 40-foot refrigerator car (\$19.98); a Chicago, Burlington & Quincy USRA 40-foot boxcar (\$18.98); a Pittsburgh & Lake Erie 50-foot boxcar (\$18.98); and a Family Lines System covered hopper (\$20.98). Accurail, accurail.com



2 National Power & Light. Factory-assembled structure from Menards. This HO scale power plant (\$69.99) has exterior lighting, animated sign and measures 5 1/8" x 8". menards.com/trains
3 Razor saws. Three-piece set produced by Excel Hobby Blades Corp. The razor saw set (\$12.99) includes 42- and 46-tooth-per inch saws.



KalmbachHobbyStore.com
4 Electro-Motive Division SD50. Wm. K. Walthers released this HO model decorated for Chessie System and five other lines. Main-line-series (direct current, \$139.98; dual-mode sound decoder, \$199.98). Wm. K. Walthers Inc., walthers.com
5 Coalveyor gondola. Joseph Transportation is one



of six new paint schemes on this Atlas N scale Master Line car (\$32.95). Atlas Model Railroad Co., atlasrr.com
6 New York, New Haven & Hartford dining car. Rapido Trains HO scale model (New Haven Railroad Historical & Technical Association exclusive version offered; visit nhrhta.org). The car retails for \$139.95. rapidotrains.com

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HO scale



General American G85 class 85-foot flatcars. These flatcars are the latest addition to the Walther'sMainline. The HO scale flatcars (\$29.98 each) are painted for Railway Express Agency (20- and 40-foot container loading); Trailer Train (GTTX reporting marks with trailer hitches in brown and yellow schemes; VTTX reporting marks for 20- and 40-foot container loading); Atchison, Topeka & Santa Fe; Penn Central; and Southern Pacific in four numbers each. The models have 33" turned-metal wheelsets and Proto-Max metal couplers. Wm. K. Walther's Inc., 414-527-0770, walther's.com

N scale structures



• **Union Freight House.** Laser-cut basswood kit with scribed interior floor, peel-and-stick shingles, and loading dock details. Measures 2¼" x 6". \$35. Ipswich Hobbies, ipswichhobbies.com



• **Cazin Garage.** Laser-cut cardboard kit with railings and signs. Measures

N scale passenger cars

• **70-foot heavyweight mail baggage car.** Denver & Rio Grande Western (\$29.95) and Pennsylvania RR (\$32.90).

Injection-molded plastic with window glazing, six-wheel trucks with plastic wheelsets, and Magne-Matic couplers. Micro-Trains Line Co., 541-535-1755, micro-trains.com

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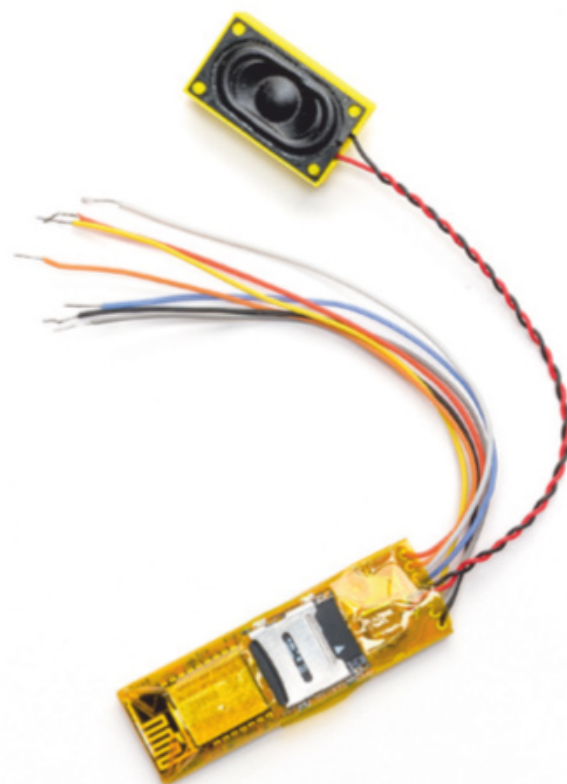
N scale details and accessories



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- **Grumman delivery truck.** Kit has resin body, pewter frame, etched doors, decals, laser-cut glazing, and instructions. \$14.75. Showcase Miniatures, 334-750-3276, showcaseminiatures.net



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Model Railroader June 2020

News & Products

HO scale



General American 4,180-cubic-foot-capacity Airslide covered hopper.

Tangent Scale Models released a new run of paint schemes on this car, including Great Northern (March 1968 Big Sky Blue, four road numbers); Boston & Maine (1984 Prince Spaghetti scheme, one number); Chicago, Burlington & Quincy (January 1966 scheme, four numbers); Chicago & North Western (1983 Zito repaint, two numbers); General American (1974 Multifoods scheme, two numbers); Louisville & Nashville (November 1966 scheme, six numbers); North American Car Co. (1980+ Rock Island blue patchout, one number); and Rock Island (1975 blue scheme, three numbers). The HO scale model (\$44.98) has see-through etched-metal running boards and Kadee scale couplers. Tangent Scale Models, 828-279-6106, tangentscalemodels.com

S scale details and accessories



• SceniKing photo backdrops.

Nineteen scenes. Digitally printed on glare-free heavyweight paper with long-life inks. All scenes have identical top coloration to support extension upward using color-matched wall paint. Using ¼" overlap, individual scenes can be linked seamlessly for infinite length. Backdrops are 72" long and 16½" tall. \$39.95 each. BPH Enterprises, 705-739-4878, sceniking.com

Z scale passenger cars



• **Canadian National lightweight passenger cars.** 4-bedroom, 4-compartment, 2-drawing room sleeper (*Auld Cove, Beaver Cove, Chinook Cove*). 6-open-section, 6-roomette, 4-double-bedroom sleeper (*Green Brook, Green Cabin, and Green Mount*). Baggage car (unnumbered). Coach (unnumbered). Diner (nos. 1342 and 1347). Etched-metal stirrup steps, flush window glazing, Auto-Latch couplers, and add-on

details. American Z Line, 614-764-1703, americanzline.com

Electronics/controls

• **LokSound upgrade kits.** For Electro-Motive Division GP35, GP38-2, GP40X, GP40-2, SD38, SD39, SD40, SD40-2, SD40T-2, SD45, SD50, and SD60; General Electric AC4400CW and C44-9W; and Santa Fe rebuilt CF7 diesel locomotives. Kits are for Athearn Ready-to-Roll locomotives with 8-pin sockets (with or without sound) and feature 8-pin plug and 15mm x 35mm speakers with baffles and instructions. Assembly and soldering wires (wire not included) to speaker required. \$110 each. English's Model Railroad Division of Bowser Manufacturing Co. Inc., 570-368-2379, bowser-trains.com

Tools

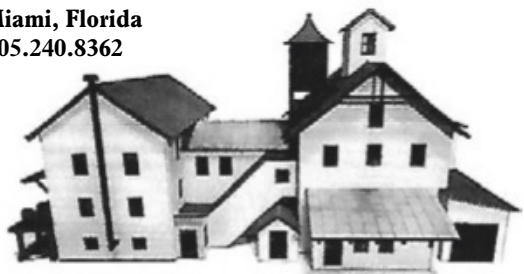
• Assorted scissors for modeling.

Model 440 for precise cutting of detail parts without distorting or bending. Also ideal for cutting thread, embroidery floss, yarn, and craft wood. Model 9180ET is specifically designed for cutting extremely small photo-etched parts and removing them from the fret. Both scissors feature a user-friendly spring to return them to the open position after each cut. Prices start at \$20.25. Xuron Corp., 207-283-1401, xuron.com

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More train sets, please

Our hobby needs more products similar to the train set reviewed on pages 62-63 of the March issue [“Menards exclusive HO scale ‘Rocket Freight’ train set”]. Lower priced models aimed at youth can lead to a lifetime of interest, future product development, and a vibrant hobby. The paucity of model railway supplies priced for youngsters’ enjoyment has long been a concern. The pricing of many current models is reasonable in light of product quality, but would make me reluctant to give them to children. The reduced detail and functionality of entry-level models are small prices to pay for attracting youngsters and promoting the hobby. Reviewer Steven Otte’s disdain for those who would scoff is entirely justified.

*John Chadwick
Nepean, Ont.*

For a model train aimed at an even younger set, check out my review of the new battery-powered Amtrak Acela train set from Atlas Trainkids in our May issue.
– Steven Otte

Wiring interference

I was reading the March 2020 “Ask MR,” in which Murray Symington asked a question regarding DCC wiring.

I’m a retired U.S. Navy Chief Gunner’s Mate. Our weapons systems used to be wired in nice neat bundles. Then the “experts” started worrying about an induced electrical field and possible errant signals. Their solution was to leave all the wiring loose. When you opened up a control panel, you had one big mess of wires that looked like a bowl of spaghetti. Then they found out bundled wiring made no difference when it came to stray signals.

By the way, all the wires were white, with tags at both ends to identify them. I agree with your answer to Murray.

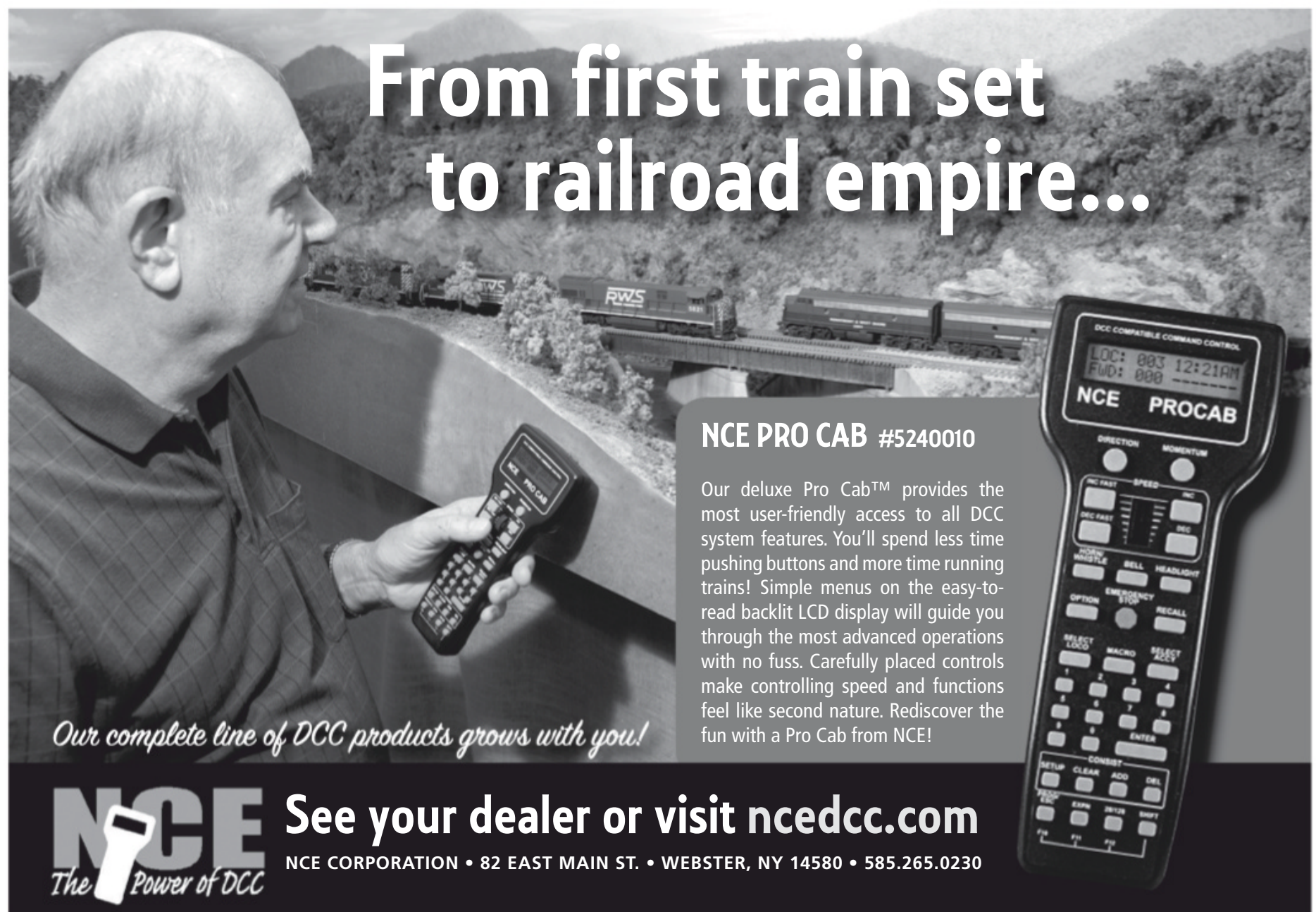
*Dave Black
Rushford, N.Y.*

Clarification

I’m writing about the article “Celebrating Steam’s Last Stand” in the April 2020 issue. The author, Gary Hoover, incorrectly states in the article that the Green Cove Station and Nella Station and Shelter kit were made by the Norfolk & Western Historical Society. While the society sold the kits, my company, KingMill Enterprises, designed and made both kits. (They are no longer in production.) I’m glad to see that the kits worked well for Gary, but I wanted to make sure they were properly credited.

*Chris Jessee
Charlottesville, Va.*

Comments, suggestions, and additional information on Model Railroader articles and departments are welcome in this column. Every comment will be read, but not all can be printed or answered. Make your statement in 300 words or less, and send it to **Railway Post Office, Model Railroader magazine, P.O. Box 1612, Waukesha, WI 53187**, or e-mail rpo@mrmag.com. Please include your name, city, and state.



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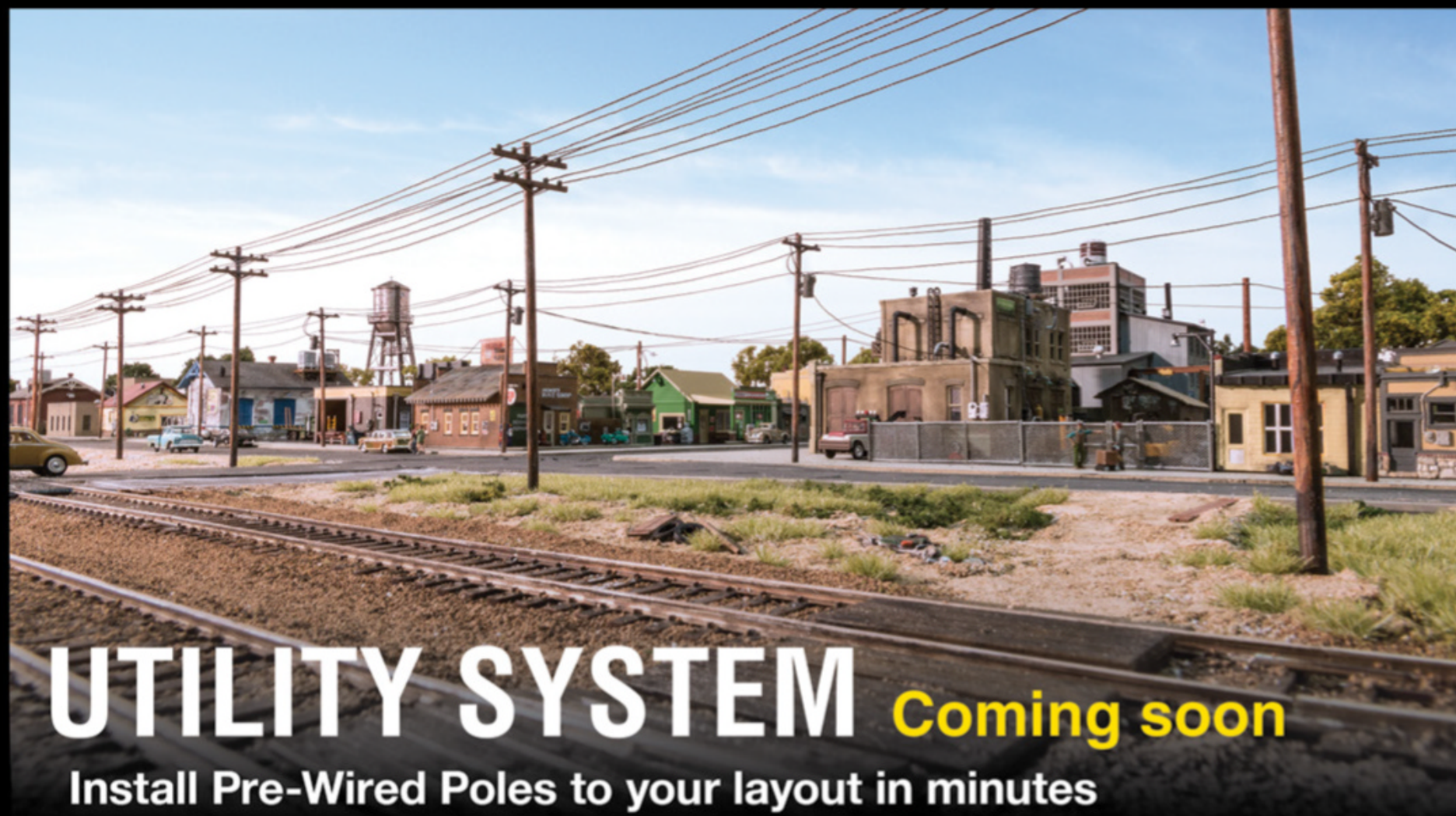
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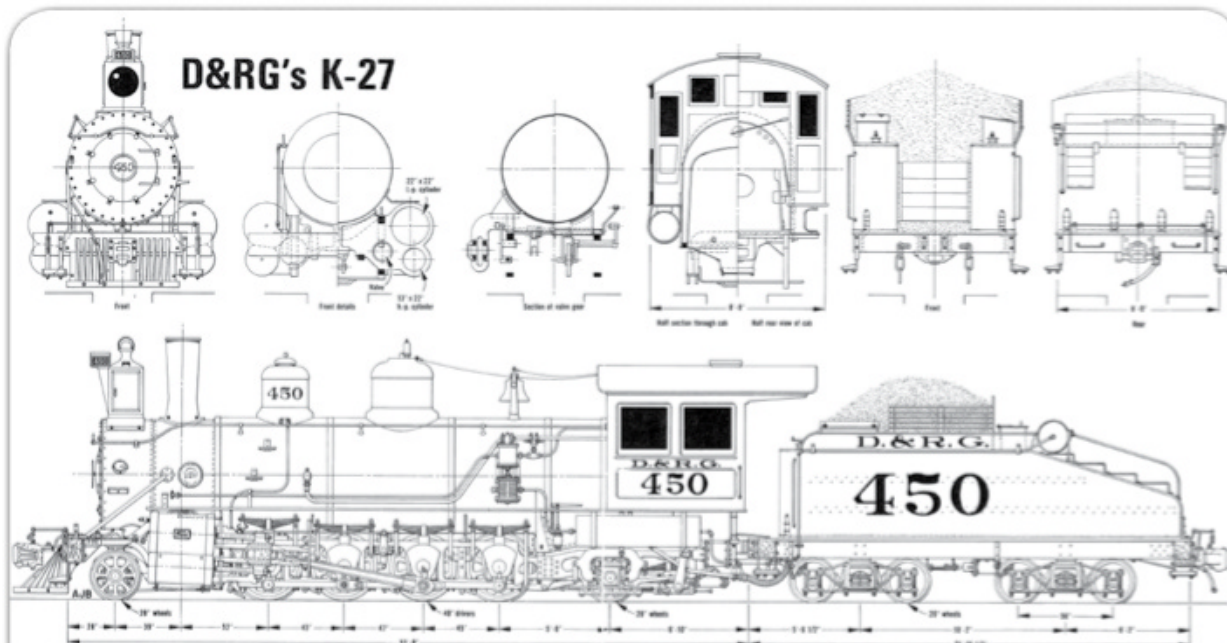
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HO scale models photographed.



These drawings of the Denver & Rio Grande's class K-27 2-8-2 "Mudhens" appeared in our March 1973 issue.

Where can I find scale drawings of the K-27?

Q When I was young, my father collected issues of *Model Railroader*. Some issues were lost when we moved. One of the lost issues contained scale drawings of the Denver & Rio Grande outside-frame narrow gauge 2-8-2 steam locomotive. I'd be very happy to know if such a scale drawing can still be bought. I've tried to find some information on American websites, without any positive result. Thank you in advance.

Vincent Lepais, Marsannay-la-Côte, France

A Those scale drawings of the Denver & Rio Grande's class K-27 "Mudhens" appeared in our March 1973 issue. A portion of them are reproduced above. Although I'm afraid we no longer have back issues that old for sale, you can read and print out that article – and any other article from our 84-year publication history – by subscribing to our online All-Time Archive. Go to modelrailroader.com/archive to sign up.

Q I built a loop-to-loop Digital Command Control layout with the reverse loops at each end governed by a DCC auto-reversing module. My question is, what happens to the direction of a locomotive that's is on the layout when another locomotive enters the reverse loop and the polarity is reversed? Will this cause problems, and if so, how do I get around them?

Wayne Kelder, Castro Valley, Calif.

A No matter how your layout is controlled, one thing is constant: the speed and direction of a locomotive is governed by the voltage and polarity of electricity supplied to the locomotive's motor. What differs is how that electricity gets there and how it's governed.

On a direct-current layout, the operator uses a power pack to control the voltage and polarity of the power supplied to the rails. That electricity is picked up by

the wheels and conducted directly to the motor. Changing the track polarity to resolve a short circuit between a reversing section and the rest of the layout could result in a train changing direction.

Under Digital Command Control (DCC), the electricity on the rails is constant voltage alternating current. Digital signals encoded in the AC current relay commands to the decoder in the locomotive, which uses that information to decide how much voltage to supply to the motor. The decoder converts that electricity to DC before relaying it to the motor. This means that when the polarity on the rails changes, the decoder keeps the current to the motor the same, and the locomotive doesn't change velocity. So, you should expect no problems.

Q I've been working with HO scale direct current for some time and have lighted some of my passenger cars with

homemade light-emitting diode (LED) circuits that include bridge rectifiers for directional features, such as headlights, rear markers, and a Mars light circuit for a cab car. These passenger trains are set up with connectors so that if any car has power, the locomotive has power. I'm visiting a DCC layout, and one of my two DCC-equipped locomotives is set up for a passenger train. I'd like to know if this train will work as configured. The train power system is well tested in DC operation and designed to handle 20V or more. I also have some lighted novelty cars, most of which feature a 1KΩ resistor connected to two LEDs to form a bipolar LED. Some have an interrupter cast into the wheels to create a flicker effect. I'd like to know how they will affect the system.

Ed Schmidt, Des Plaines, Ill.

A You say that your passenger car lighting circuits are built to handle substantial voltage, they have bridge rectifiers to convert DCC voltage to DC, and the locomotives you plan to use are Digital Command Control decoder-equipped. None of those factors should cause you any problems on a DCC layout.

You might have some trouble with having all your lighted cars wired up to your locomotive as one single circuit. If the bridge rectifiers in your cars are set up in series with the locomotive, so that track voltage is converted to DC before being passed on to the locomotive, that would be a problem. If that occurs, disconnecting the cars' circuitry from the locomotive's will fix it. But if the lighting circuits are in parallel to your ad hoc in-car power bus, you should be OK.

Another possible problem I can foresee is if your train is long enough that it might conceivably span three different power districts simultaneously, such as passing through a reversing loop or a leg of a wye. If these districts are set up with auto reversing circuits to manage track polarity, it might not be possible for the polarity of those power districts to be resolved without causing a short circuit. For this problem to crop up would require a very long train of electrically connected cars, a very short power district, and an unfortunate arrangement of district boundaries. If those unhappy

Send questions and tips to associate editor Steven Otte at AskMR@MRmag.com.

circumstances do happen to coincide, again, they could be fixed by disconnecting the cars from the locomotive.

Q I can't locate the issue that includes a building that you installed on the edge of the fascia of your HO scale Milwaukee, Racine & Troy. The construction was "hacked" in such a way that operators could see all the inside details and activity, including a forklift. Could you please tell me in which issue that fantastic building was featured?

Harry Castroman, North Miami, Fla.

A Continental Building Materials was part of our 2013 Winter Hill project railroad, in which the MR staff renovated a portion of our HO scale MR&T. The theme of that project was how to represent large industries in small spaces, so I modeled the shingle factory cut off at the fascia, with a visible warehouse interior. Information about how I built it was published in our March 2013 issue. We also taped a series of videos about that



Steven Otte built Continental Building Materials as a cutaway structure, exposing a detailed warehouse interior. Bill Zuback photo



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project, including two that showed how I kitbashed Continental Building Materials from Pikestuff parts. Registered users can watch them on our website, ModelRailroader.com. Look under "Online Extras."

Q How could I model unloading of acid on my copper mine railroad? Would a simple fuel rack work?

George Files, Jessup, Iowa

A It depends on the tank car. If the cars you're using have bottom valves, unloading facilities could be as simple as a pipe alongside the track, with hoses to connect it to the bottoms of the cars. Some hazardous materials are carried in tanks that are top-unloaded; these cars would require an unloading rack with two sets of hoses, one to draw out the cars' contents and another to supply a pressurized gas or vapor to push the contents out of the tank and into the unloading hoses. Acid is carried in both kinds of cars, so check what kind of cars you have to see what kind of facilities they'll need.

READER TIP

Place car weights over the trucks for stability

In "Build an HO scale freight car kit" [Step By Step, March 2020], Cody Grivno places the extra weight in the center of the car. I've found that placing as much of the weight as possible over the trucks helps the car track better. The weight should be divided evenly between each end, centered from side to side, and shouldn't interfere with the truck screws. If odd numbers of weights need to be added, I place the odd one in the center. Years ago I used recycled lead weights from automobile wheels, but now I use steel nuts and washers. I use four sizes of washers and three sizes of nuts, which gives great flexibility in making the car weigh within NMRA Recommended Practice 20.1. – *Terry Ulrich*

Q Please advise on why the switch machine on my Atlas code 100 Snap-Switch melted. How do I keep it from happening again?

Robert Paluch, Winnipeg, Man.

A Atlas Snap-Switch machines are solenoid-based, which means they are activated by intermittent current, such as via a push button. Apply current briefly, and they snap into position. Release the

button, and the turnout stays as it is. Snap-Switch machines don't require continuous current to stay in place, like a stall-type switch motor would. Though it's usually hard to diagnose electrical problems remotely, I'd bet money that continuous current was applied to the switch machine, probably due to a stuck control switch. Make sure the control switch is working as it should before replacing the switch machine. **MR**

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Today we have refined, sophisticated steam and diesel locomotives, diversified freight and passenger rolling stock in all scales, and electronics offering a multiplicity of operations and sounds for our miniature worlds. A postwar catalog revealed what the "best" was to an earlier generation when almost all models were kits.

Model Railroad Equipment Corp.'s (MREC) all-scales 1950 catalog embraced TT, HO, OO, S and O scales, revealing the hobby's growth from its prewar status and promising postwar diversification and technology. The Power and Controls section had very industrial-looking DC power packs, two Directifiers to convert AC transformers to DC, and several transformers for those still operating AC outside-third-rail layouts.

And plastic? Lionel and American Flyer were using it. But how could one build a kit if everything was molded? You

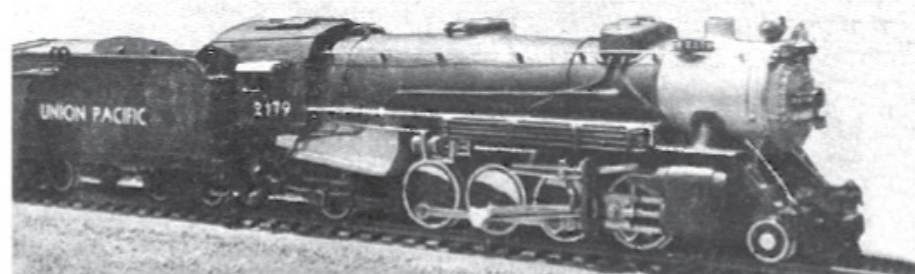
assembled kits from pieces: wood, cardboard, and metal. Building kits were wood-braced screen-printed cardboard or wood.

A photo of MREC owner Carmen Webster with an HO layout made for a client clearly shows printed cardboard buildings along with her own wood coaling tower and water tank. Our expectations were far simpler.

TT scale remained an orphan, never beyond single digits in popularity at 1.7 percent. It had potential – look at where N and Z are now – but never improved enough to effectively compete.

H.P. Products TT scale steam locomotives were barren of detail. Its plain Electro-Motive Division E unit had stamped-metal A-1-A truck sideframes attached with slotted screws.

The only other TT locomotive was Lindsay Products'



Model Railroad Equipment Corp. was an all-scale hobby shop in New York City offering products such as this O scale Union Pacific 2-8-2 Mikado from Hines Lines.

better-detailed Baltimore & Ohio Dockside. The scale had H.P. rolling stock and two building suppliers, one of unpainted solid cast plaster.

Prewar HO firms returned after the war: Varney, Mantua, Gilbert, Model Die Casting, and Walthers. Plus, there were many new manufacturers with a wide range of steam and diesel prototypes.

Japanese International Scale Models had a few imported Japanese-prototype boxcab electrics that could have passed for some American roads. A stamped and cast brass 0-6-0T was a far cry from later Japanese craftsmanship.

There were many freight and passenger car models, plus structure kits to supply a layout; HO's strength had reached 69.3 percent of the hobby.

OO was struggling to survive with 2.1 percent of the market and only three companies producing locomotives: Scale-Craft, Famoco, and Super Scale. Four made OO rolling stock, compared to HO's plethora.

S scale lagged in postwar growth, relying heavily on five steam and diesel locomotive producers and five turning out rolling stock. Hobbyists had to rely on converted American Flyer tinplate, with hi-rail a mix of scale models with tinplate wheels and couplers. Scale and tinplate combined garnered 3.4 percent of the market.

O scale was second after HO, with six companies making steam locomotives and five offering diesels, plus a

decent variety of rolling stock. Its 22.2 percent share is misleading, as tinplate counted for almost half.

Trends were there, but who foresaw them? All postwar models were domestic products except for International Scale Models. It was a heady new world. If only our grandparents and parents could see us now! 



PREWAR HO FIRMS RETURNED AFTER THE WAR: VARNEY, MANTUA, GILBERT, MODEL DIE CASTING, AND WALTHERS.
– KEITH



Carmen Webster places a gondola on a client's HO scale layout, filled mostly with cardboard structures from her Model Railroad Equipment Corp. (MREC) catalog.



Modifying an N scale hopper

Sometimes models evoke strong memories. For me it was an Atlas Trainman N scale 90-ton three-bay hopper decorated in Burlington Northern's 1991 scheme. Looking at the model took me back to a summer day in 1998. I was standing in a field access driveway on County Road 214 just outside my hometown waiting for Minnesota Northern Electro-Motive Division GP38 no. 3809 to come into the viewfinder of my Pentax ME Super. The unit, recently repainted in RailAmerica's red, silver, and blue scheme, was running long-hood forward with a cut of BN hoppers loaded with aggregates from the Strata Corp. pit east of town, including some similar to the Atlas model.

The ready-to-run N scale three-bay hopper looks nice, but I wanted to make some upgrades to the car. The first thing I noticed was that the model had truck-mounted couplers and plastic wheelsets. The hopper didn't have mounting pads for installing couplers. I considered making pads from styrene, but then remembered Trainworx offers its 622-series body-mount couplers designed for Atlas 90-ton three-bay hoppers and other N scale cars. I replaced the plastic wheelsets with metal versions from Fox Valley Models.

Since I wanted the option to run the car empty or loaded, I needed to do some work on the interior, too. To accommodate the plastic coal load, the longitudinal hood floor sheets were omitted, as were the middle of cross ridge floor sheets. These were all easy fixes with styrene.

Finally, I needed to convert the coal load to an aggregate load. The profile was

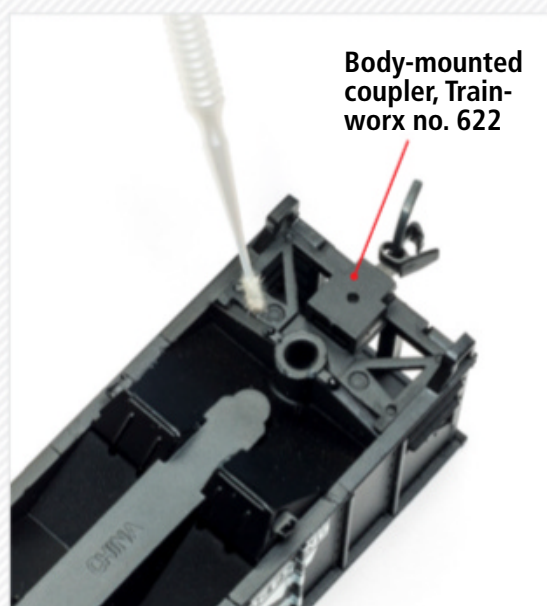
fine, but it rode too high in the car. See step 3 where I describe how to lower the load and fit it around the inside cross-ridge braces.

A single 90-ton three-bay hopper took me back to a day of railfanning more than 20 years ago. My Pentax ME Super has been replaced by a digital camera, my 1985 Dodge Omni is long gone, but those BN three-bay hoppers continue to earn their keep on the BNSF Ry.



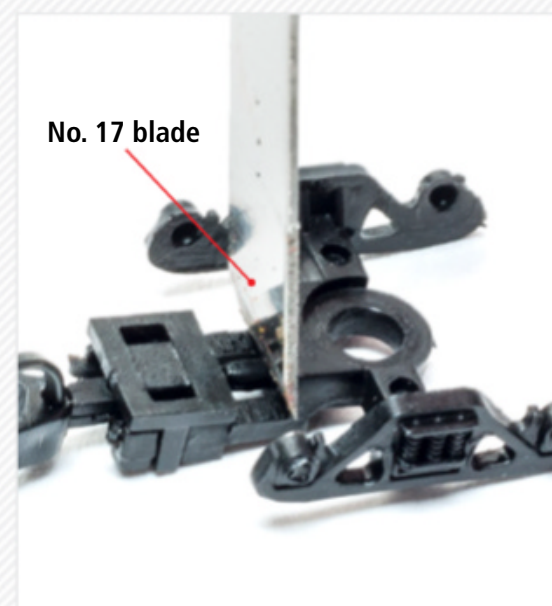
Group Technical Editor Cody Grivno shares how he upgraded this N scale Atlas Trainman 90-ton three-bay hopper. This inset image shows the aggregate train he photographed in 1998.

STEP 1 COUPLERS AND WHEELSETS



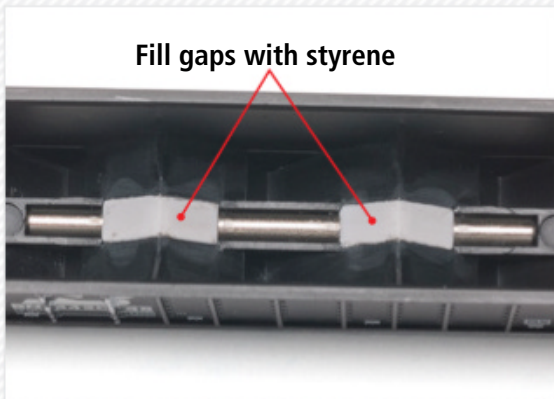
Body-mounted coupler, Trainworx no. 622

After removing the pin-mounted trucks with a flat-blade screwdriver, I test fit the Trainworx no. 622 body-mounted couplers. The one-piece assemblies are notched to fit around the bolster and feature a screw-mounted draft-gear box and diagonal braces but no brake appliances. I attached the body-mounted couplers with plastic solvent cement.

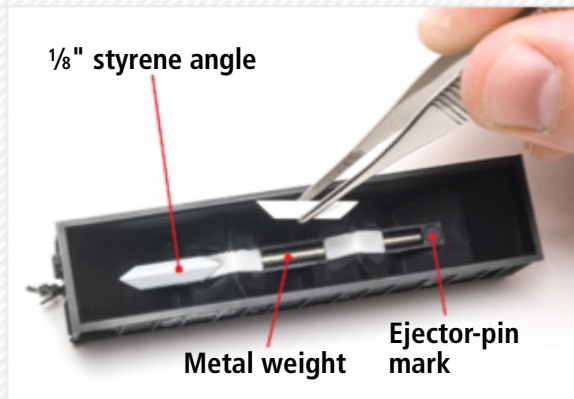


Next, I removed the plastic wheelsets from the trucks. Then I used a hobby knife with a no. 17 blade to cut off the truck-mounted draft-gear box. A gentle, rocking motion is all that's needed to cut through the plastic. When reattaching the trucks, put the squared-off edge toward the middle of the car. We'll revisit the trucks in step 4.

STEP 2 INTERIOR UPGRADES

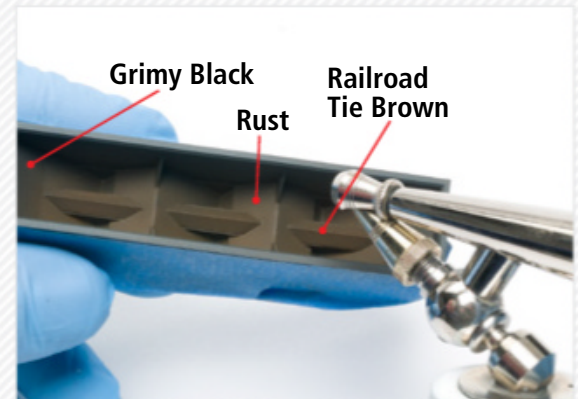


Since I'd be running the car loaded and empty, I needed to address the gap in the cross ridge floor sheets and install the longitudinal hood floor sheets. To fix the cross ridge sheets, I used .015" x .156" and .125" x .156" styrene strip and .005" styrene sheet. I used plastic solvent cement to attach the styrene to the car. Once the cement hardened, I filled in any gaps with medium viscosity cyanoacrylate adhesive and sanded the floor sheets smooth.



Next, I added the longitudinal hood floor sheets, which I made by cutting lengths of 1/8" styrene angle. The angle hides the ejector-pin marks and the cylindrical metal weight that spans the hopper's three bays.

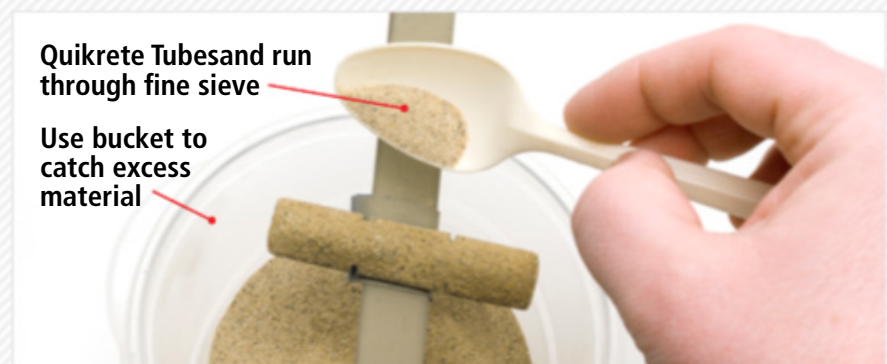
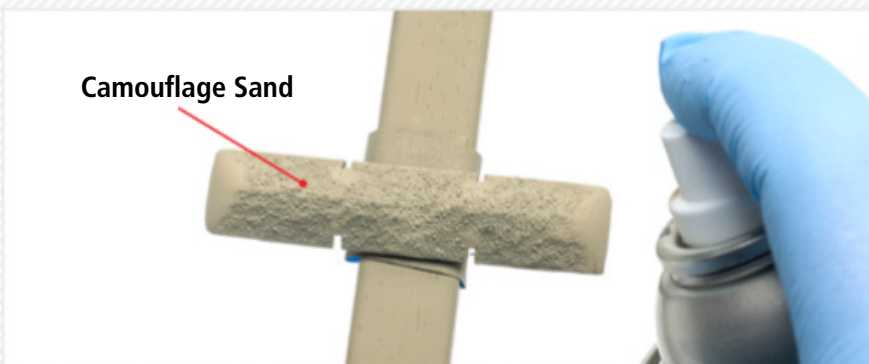
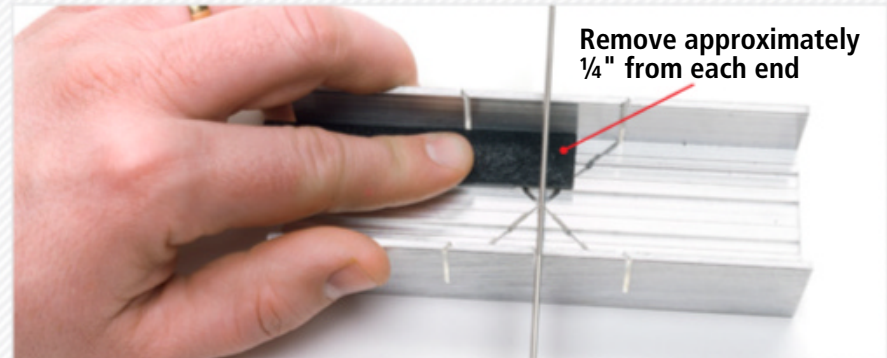
With the interior modifications completed, I washed the model in warm water with dish soap added to remove dust and other impurities. Then I sprayed the car's interior with Model Master acrylic Gray Primer



(no. 4680) to ensure the base weathering color would cover evenly.

The interior of hoppers used in aggregate service often have a rusty-brown appearance. To simulate that, I first used an airbrush to spray the car's interior with Model Master Railroad Tie Brown (no. 4885). Once that dried, I thinned the same company's Rust (no. 4675) to a wash and sprayed that over the Railroad Tie Brown. Then I sprayed thinned Grimy Black (no. 4887) along the top edge.

STEP 3 LOWERING THE LOAD



The Atlas hopper includes a plastic coal load. The load rides high in the car, which is fine for coal but not realistic for aggregates. Converting the load from coal to aggregates required a multi-step process. First, I used sprue cutters to remove the three pins on the bottom of the load.

Next, I set the load in a miter box and used a razor saw to remove approximately 1/4" from each end of

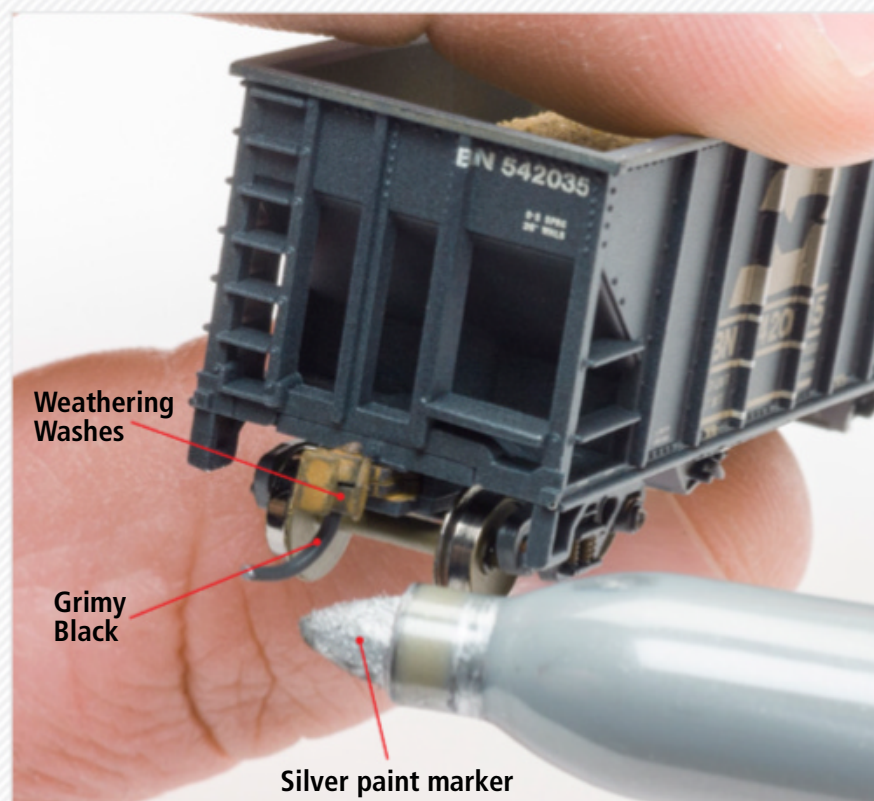
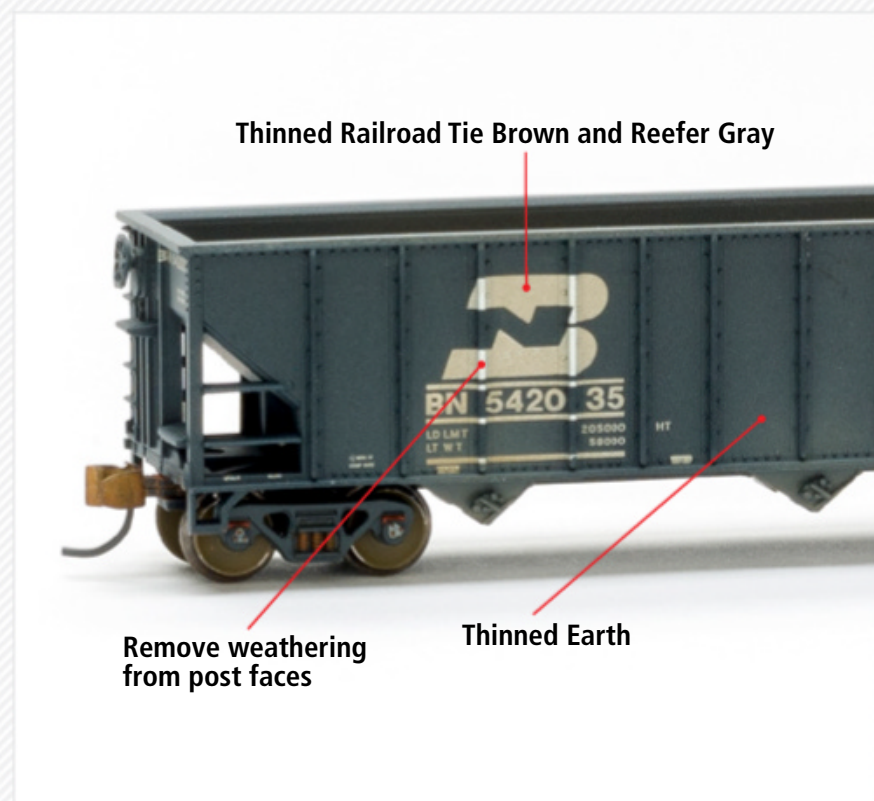
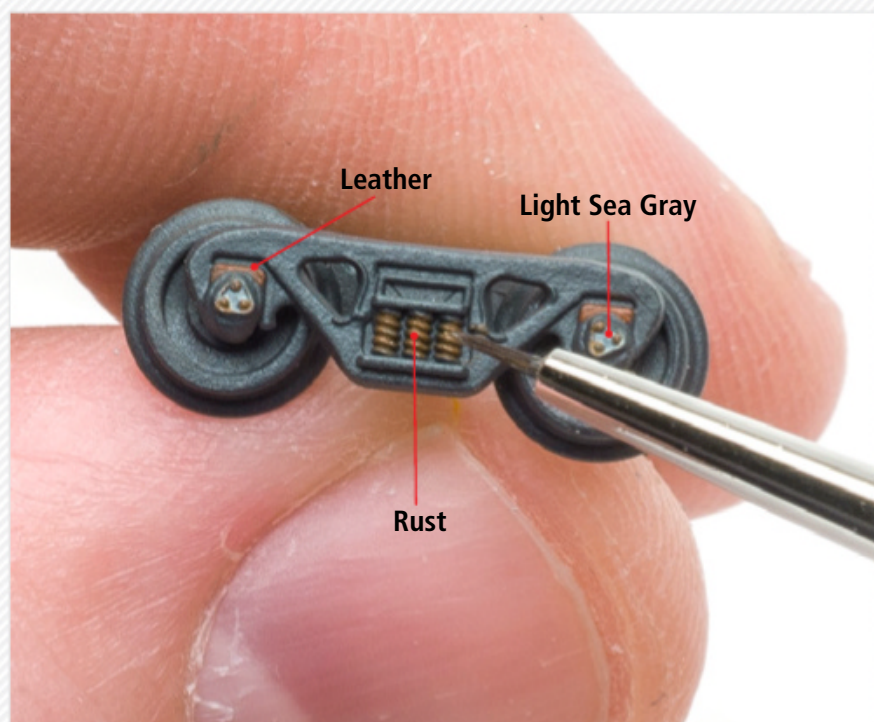
the load. Then I cut four notches in the load so it would fit around the inside cross-ridge braces. Cutting the notches slightly wider makes the load easier to remove.

I sprayed the load with Rust-Oleum Painters Touch 2X Flat Gray Primer. When that dried, I used the same firm's Camouflage Sand (no. 263653) as a base coat for the load.

I let the paint dry thoroughly

(24 hours, or until there is no discernible odor). Then I used a paintbrush to apply slightly diluted white glue to the top of the load, keeping it off the edges and out of the notches. With the glue still wet, I used a spoon to apply Quikrete Tubesand that I ran through a fine sieve. After the load was coated, I wet it with 70 percent isopropyl alcohol using a pipette.

STEP 4 FINISHING TOUCHES



With the plastic wheelsets in place to mask the sockets, I sprayed the trucks with Tamiya Light Gray Fine Surface Primer. Once that had dried, I airbrushed the trucks Model Master Grimy Black (no. 4887). To further enhance the trucks, I brush-painted the springs with Model Master Rust (no. 4875), the roller-bearing adapters Leather (no. 4674), and added a Light Sea Gray (no. 4759) wash to the faces of the bearing caps.

I replaced the plastic wheelsets with 36" metal wheelsets from Fox Valley Models (no. 3611). I wiped the wheelsets with a cotton swab dipped in 70 percent isopropyl alcohol to remove any impurities

from the manufacturing process that might affect paint adhesion. Then I used a super fine and fine Microbrushes (Kalmbach Hobby Store no. 84036) to paint the wheelsets Model Master Dark Earth enamel (no. 2054).

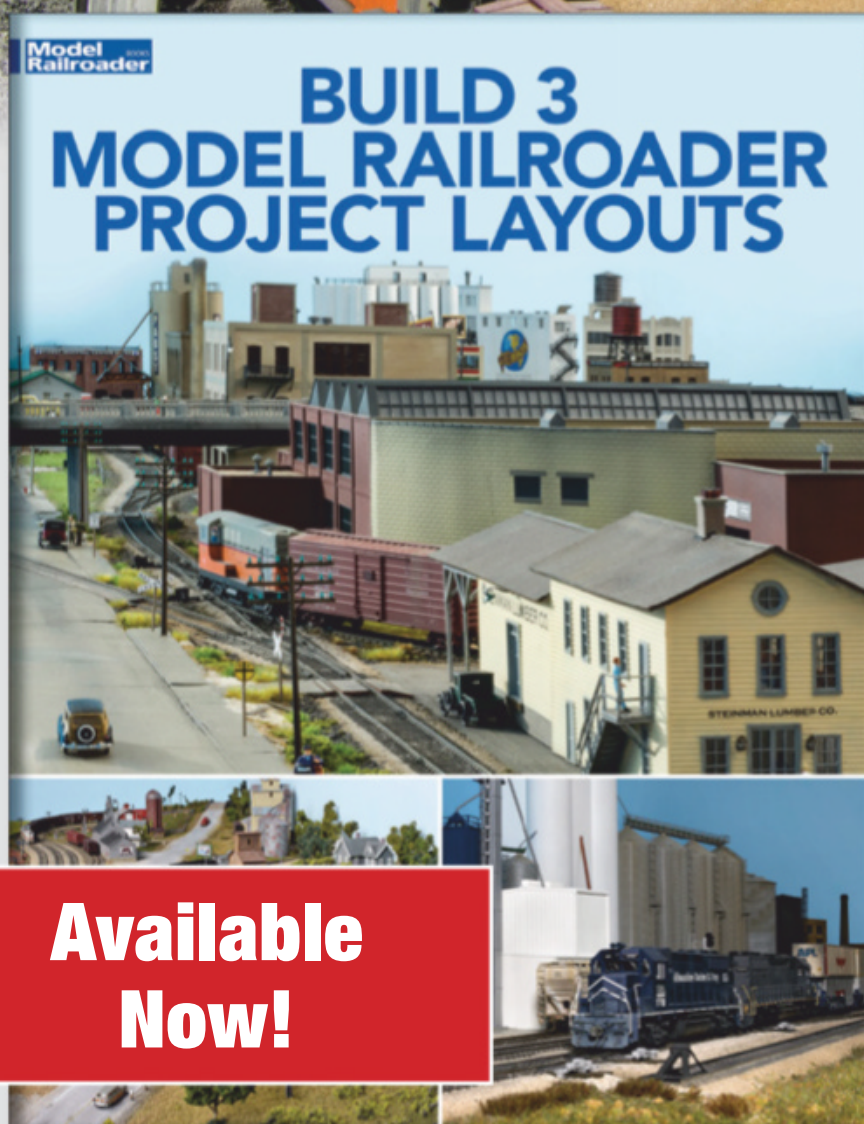
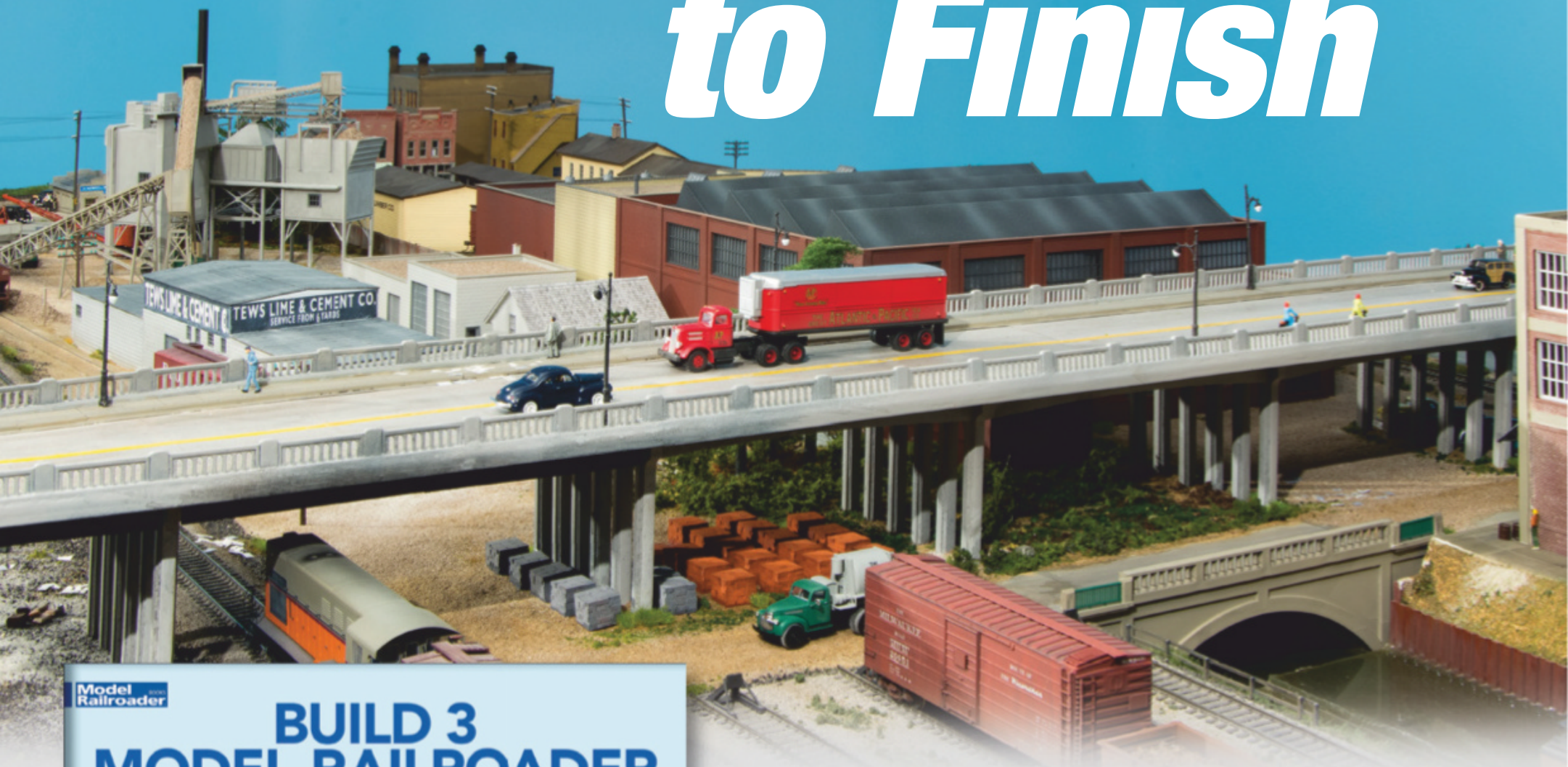
I weathered the car sides and ends using an airbrush and Model Master Railroad Tie Brown and Reefer Gray, both thinned to a wash with Testor's Universal Acrylic Thinner and built up in light layers. Then I used the same company's Earth, thinned similarly, to weather the hopper bays.

On some full-size cars, the weathering doesn't seem as heavy on the faces of the exterior posts. To

replicate that effect, I used a cotton swab dipped in Windex to remove the thinned paint.

Finally, I masked the car ends and sprayed the couplers with Testor's Dullcote. Once that dried, I used a Microbrush to weather the couplers with Monroe Models' Dark Buff (no. 977) and Dark Rust (no. 979) alcohol-based Weathering Washes, giving the couplers a rusty appearance. I painted the trip pins Grimy Black, and touched the tip of each pin with a silver paint marker to simulate a gladhand. Then I reattached the pin-mounted trucks, added the load, and declared this three-bay hopper ready for service. **MR**

From Start to Finish



Build 3 Model Railroader Project Layouts, a new book from *Model Railroader*, brings together three of the magazine's most popular annual project layouts into one exciting volume. For the first time, you'll find all of the Beer line stories plus two more exceptional layouts: Red Oak and Bay Junction.

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Conquering the Cascades

Steam, diesel, and
electric power lead
trains over the
multilevel Great
Northern Ry.

By Lee Marsh
Photos by the author



① A pair of Great Northern class Y-1 electrics lugs a manifest freight up Stevens Pass on Lee Marsh's HO scale Great Northern Cascade Division. Superdetailed steam, diesel, and electric locomotives and stunning mountain scenery feature prominently on the 12 x 32-foot model railroad.





2 This overall view of the railroad shows off its panoramic mountain views. The monitor on the fascia is connected to a four-camera closed-circuit TV system that monitors the hidden track beneath the mountains.

When I was kid in the 1960s, I first saw photos of John Allen's HO scale Gorre & Daphetid in the pages of *Model Railroader*. Since then, I dreamed of building my own mountain railroad. The journey to achieve that goal started with a Christmas layout, progressed through several more "plywood Pacifics," and then endured a 20-year hiatus from the hobby.

My interest in mountain railroading and Pacific Northwest scenery was also fueled by participating in mountain sports, which my wife and I immersed ourselves in when we moved to Washington in 1985. Our activities often took us to the Stevens Pass area, where we encountered the Burlington Northern RR main line over the Cascades. My railroad interests resurfaced, and after reading Charles Wood's *Lines West* (Superior Publishing Co., 1967), a book that chronicles the Great Northern Ry.'s construction and operation of this main line, I was hooked on building a GN-themed mountain layout.

Design on my current railroad, the 12 x 32-foot HO scale Great Northern Cascade Division, began in 1994 when my wife and I moved into a new home. However, before I started working on the layout itself, I spent a year building a diorama. I wanted to test the waters and



3 At Everett, Wash., Great Northern no. 2551, a class S-1 4-8-4, waits with its train on the Delta Yard tracks while GN no. 3250, a class O-3 2-8-2, and Northern Pacific no. 1756, an NP class W-3 2-8-2, roll past in opposite directions. All the steam locomotives are accurately detailed and painted brass models.

convince myself that I had the skills – and more importantly, the patience – to build a full-fledged mountain railroad, especially since my previous layouts' scenery hadn't progressed much farther than the surface of a sheet of plywood.

Adapting a layout design

The MR special issue *Great Model Railroads 1995* featured Jack Parker's HO scale Northern Pacific. Its expansive scenery and uncluttered, realistic look

inspired me. The layout's L-shaped configuration would also fit the available space in my 14 x 42-foot train room, which has a wood stove in the middle of it. Because the stove is a source of emergency heat during winter power outages, my wife and I decided the stove had to stay, so this set my minimum radius requirement at 24".

Following techniques outlined in track planning pioneer John Armstrong's books and articles, I developed my layout design, including

The layout at a glance

Name: Great Northern Cascade Division
Scale: HO (1:87.1)
Size: 12 x 32 feet
Prototype: Great Northern Ry., Northern Pacific (trackage rights)
Locale: Everett, Wash., and Stevens Pass in the Cascade Mountains
Era: 1947 to 1951
Style: island
Mainline run: 142 feet
Minimum radius: 24" (helixes)
Minimum turnout: no. 6
Maximum grade: 2.7 percent (helixes)
Benchwork: L girder and open grid, plywood in staging and yard
Height: 51" to 59"
Roadbed: cork and 1/2" plywood
Track: Atlas code 83 flextrack
Scenery: plaster hardshell
Backdrop: painted tempered hardboard
Control: Digitrax Digital Command Control

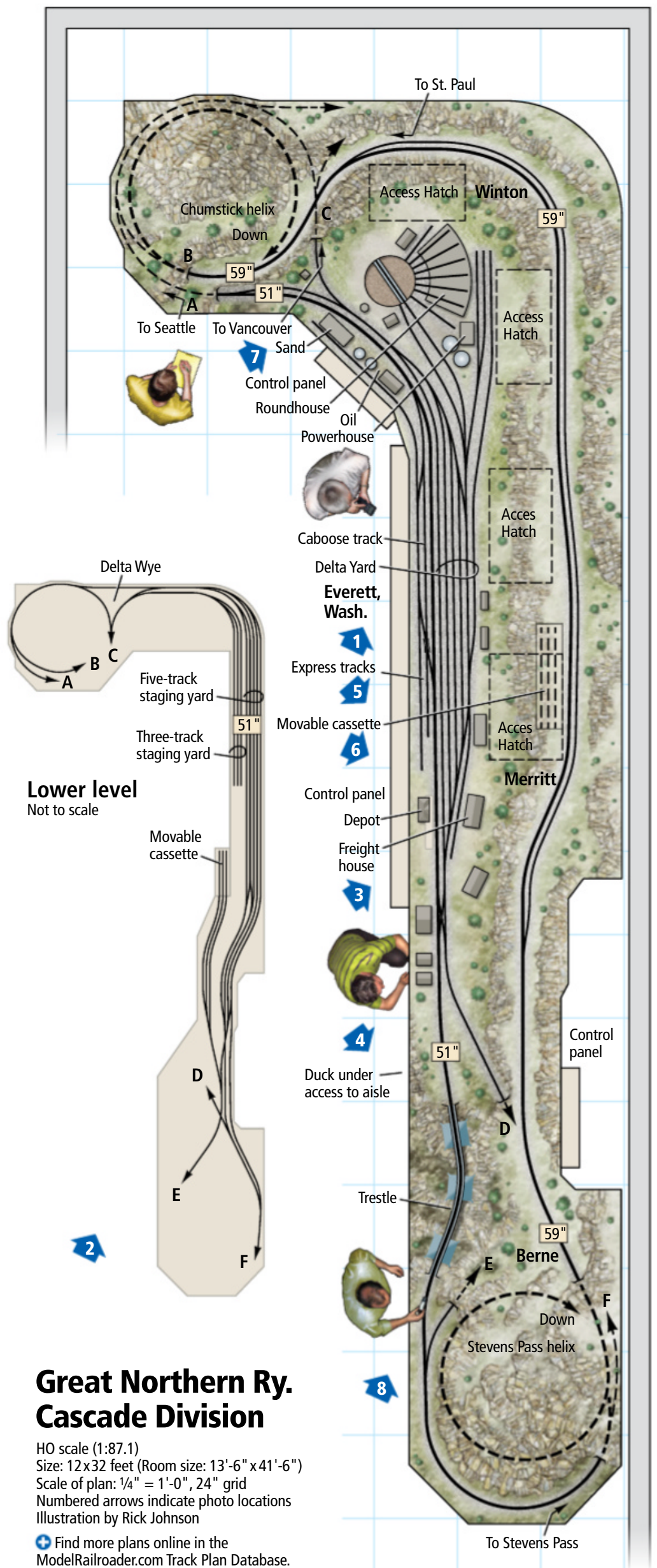
locating its major curves and other design considerations. My Cascade Division features two levels and is ultimately a scaled down version of Jack's track plan. I loved his layout's long, winding upper level set in the mountains, with a small yard, engine terminal, and junction in the foreground.

The layout design fit well with my chosen setting of GN's Everett, Wash., connection of its transcontinental main line. The line south of Everett ran to Seattle while the line north ran to Vancouver, B.C., in a configuration called "the head of the rake" by one of the GN's founders, the "Empire Builder" himself, James J. Hill.

My GN Cascade Division features trains running from St. Paul to Everett, then on to Seattle or Vancouver. Delta Yard and Delta Junction are focal points for local traffic.

There are three staging yards under the scenicked level: one five-track, double-ended yard, capable of handling 30-car freights and prototypical-length passenger trains; and two three-track, stub-ended yards to stage locals. Helixes at each end of the layout provide connections between levels.

Overall, the layout configuration is a folded dogbone. Transcontinental trains leave staging (St. Paul), go up the Chumstick helix, traverse the upper level, then descend the Stevens Pass helix, pass through Everett, and finally return to staging.





Raising the railroad

The train room was already finished when layout construction began. I built the layout benchwork with L-girders supported by 2 x 2 legs. In most areas of the layout I used open-grid construction atop the L-girders, except for staging and visible yards, where I used plywood.

I'd originally built the lower level at a 40" height, but after some test operations, I quickly realized that this was too

low. After suspending the layout from the ceiling joists with threaded rods and nuts, I slowly tightened the nuts and raised the layout by 11", which put the lower level at 51" above the floor. After building benchwork underneath, I removed the rods.

Most of the trackwork consists of Atlas code 83 flextrack and Shinohara turnouts. I used code 100 flextrack in the original staging areas. All the turnouts are controlled by Tortoise by Circuitron

4 Led by a trio of Electro-Motive Division F3 diesels, the Seattle-bound *Empire Builder* races downgrade. The tree in the left foreground was modeled from prototype photographs by Canyon Creek Scenics.

switch motors via fascia-mounted control panels. Much of the track on the lower level was reworked after I completed the upper level. Well-planned access is crucial to my layout's design, as I describe on page 36.



I also added a four-camera closed-circuit TV system in the lower level. A fascia-mounted monitor, visible in the photo on page 30, lets me make sure trains are rolling smoothly through the extensive hidden trackage.

The layout was originally wired as a single-cab block system. It's been converted to Digitrax Digital Command Control. The block system has proved extremely helpful for diagnosing shorts and preventing lamps from burning out.



Western Washington scenes

The Cascade Mountains are heavily forested, steep, and have snow for much of the year. My layout depicts the Cascades during early summer.

I painted the backdrop on Masonite, using panoramic photos taken in June near Stevens Pass as reference. I added some snow to the mountain tops to give the scenes a distinct, Cascade-mountain effect. I also used the trick of not mounting the backdrop right against the wall. Leaving just an inch or so provides an illusion of added distance.

I made a hardshell scenery base to create the steep contours of the layout's landscape. The hardshell is composed of plaster cloth over aluminum screen followed by a runny coat of plaster. When this dried, I added brown latex paint and various ground foam products.

For exposed rock faces, I installed both plaster rock castings and flexible rubber rocks from Cripplebush Valley Models. I also used real crushed rock embedded in matte medium to represent scree slopes that are commonly found in the mountains.

The masterstroke for helping this layout look like the western slopes of the Cascades are the trees. I've installed some generic "bottle-brush" trees, but most of the trees are from Canyon Creek Scenics (canyoncreekscenics.com). These trees accurately represent the various firs, cedars, and hemlocks of the Cascade forests. I use 12" to 24" tall trees in the foreground and 2" trees along the back of the layout to force perspective.

The CCS trees are exquisite, some of which are as finely detailed as any top-of-the-line model of railroad equipment. The firm has also custom-fabricated tree models for me based on photos that I've taken during trips to the mountains.

5 Here's another view of the scene from photo 3. With the freight station on the left and the passenger depot to the right, Everett, Wash. is the largest town on the layout. The structures are freelanced to fit the available space.

One key lesson that I've learned is that mountain scenery looks most realistic if it's kept expansive and highly detailed. Nature is complex, so the more variation included in the layout scenery, the better.

Everett, the main town on the layout, includes Delta Yard and an engine terminal. Like the track arrangement, the structures are freelanced to fit the available space. I built and combined two Walthers kits to make the roundhouse. I also added an operating turntable. Since I primarily focus on mountain scenery, my favorite structure models are those I buy from swap meets already built and repaint or modify as needed.

Era-specific trains

It's taken me years to acquire and model accurate locomotives and freight and passenger cars. My layout's time period is between 1947 and 1951. All equipment on the layout is accurate for that time frame, which was determined by the passenger trains I wanted to run. The postwar, lightweight *Empire Builder* showed up in 1947, as did the heavy-weight *Oriental Limited*. I have brass models of both trains. On the prototype these trains ran until 1951, when the dome-car version of the *Empire Builder* replaced its predecessor and the *Oriental Limited* ceased operation.

To ensure the trains can handle my layout's 24" minimum radius, I have to modify the underbodies of my brass passenger cars and remove portions of the

Continued on page 36





MORE ON THE WEB

• This photo is also this month's computer desktop wallpaper. Download the image for free at ModelRailroader.com

6 One of the Great Northern's massive 5,000 hp class W-1 electric locomotives helps a pair of Electro-Motive Division E units haul the just launched streamlined *Empire Builder* through GN's Cascade Division. The class W-1 is an NJ Custom Brass model and the passenger consist is by Shoreham Shops. At this point Lee has chosen to model only the catenary poles and not the overhead wire.



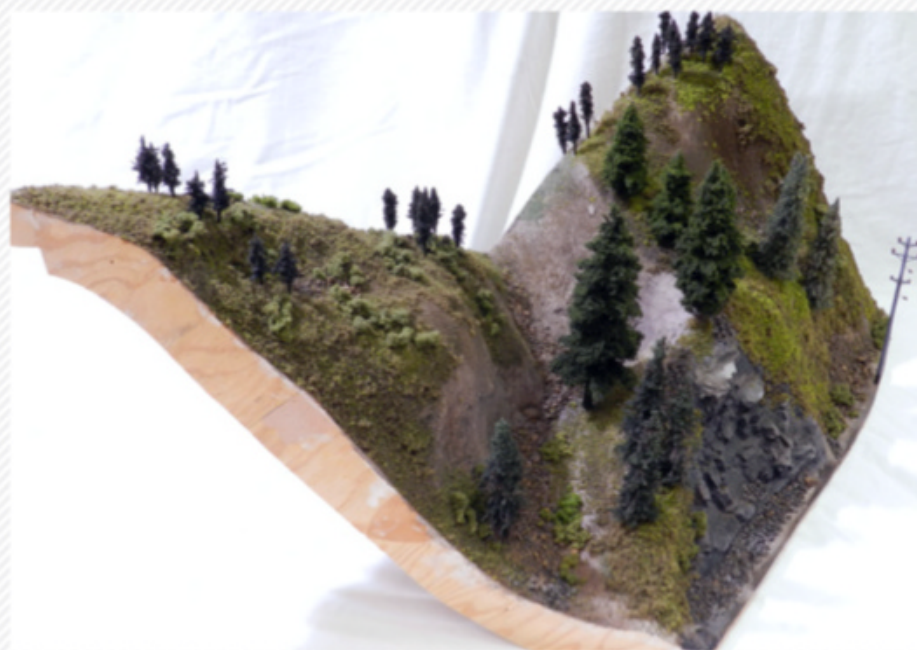
This shot was taken from lower level staging with two of the upper level panels removed. Ample access allowed Lee to work on the lower level after the upper level was complete.

Under the mountains

I made sure every location on my Cascade Division is easily accessible. My layout features four swing-down hatches and three lift-out panels.

The hatches feature contoured plywood sides that I match-cut with a jigsaw to keep the seams tight enough that they aren't noticeable. The lift-out panels are made to perfectly fit into the surrounding scenery. Each panel has a wood frame covered with plaster hardshell. This forms a sturdy yet lightweight unit that's easy to handle.

After completing the upper level, I found that there was a lot more usable space under the layout than I anticipated. Thankfully, the access panels and hatches, as well as a lower level height of 51", provided plenty of room to comfortably work under the layout. I reworked the hidden staging track, including adding a fifth track; built two stub-ended yards; and installed a sliding cassette to increase the capacity of the three-track yard. The access panels and hatches were also helpful as I painted the backdrop and finished scenery. – *Lee Marsh*



Each removable panel is built on a wood frame with a plaster hardshell scenery base. The lightweight panel fits seamlessly into the layout scenery.

Continued from page 33
coupler pockets. These modifications aren't visible during operation.

On the brass cars, I also replace one truck bolster spring with a washer made from a section of styrene tube, which helps the cars negotiate superelevated curves. In addition, each car gets a long-shank Kadee coupler on one end and a medium-shank coupler on the other.

This combination allows just enough articulation to avoid derailments.

Most of my steam, diesel, and electric locomotives are brass models of era-appropriate GN and NP prototypes. The locomotives have DCC decoders but no sound, as I don't care for the way sound "scales" on a model railroad.

My freight car fleet includes resin and brass models. I weather the equipment

using an airbrush, powdered chalk, and drybrushing techniques.

With only one modeled town, the opportunities for prototype-based car routing and operations are limited. However, I recently developed a simple scheme based on a train register for a schedule combined with a spreadsheet of wheel reports and switch lists for the town of Everett.



7 Two Y-1 motors haul the all-heavyweight *Oriental Limited* through GN electrified territory. The rock faces in the photo are Cripplebush Valley Models rubber rocks and the catenary poles are 3-D printed models.



8 An A-B-A brace of three passenger F7s (GN Class P-3-7-AB) leads the *Oriental Limited* over the Alpine Creek trestle. The ballasted-deck trestle clearly illustrates the prototype's "chorded" (linear) concrete deck pans and curved track.

The journey continues

I've immensely enjoyed the journey of building the Great Northern Cascade Division and re-creating a piece of western Washington in my basement. I spend almost equal time working on the layout, building models, researching the prototype, and photographing scenes. I especially enjoy railfanning and running the

trains through the detailed scenes of my Cascade Mountain main line.

I also continue to enjoy the friendship of several people who have helped me along the way. These include my brother, David, and friends Mike Dziubinski, Tom Noe, and Steve DePolo. They helped me figure out that I could achieve anything in this hobby, so long as I just jumped in and started building. **MR**



Meet Lee Marsh

Lee Marsh and his wife, Nancy, live in Issaquah, Wash., just outside Seattle. Lee recently retired as president of a civil/structural engineering consulting firm. He finds that model railroading has been a fantastic creative balance to engineering work. Lee and Nancy also enjoy mountain biking, which keeps Lee agile enough to crawl around under his layout.

MODEL SPRING

This five-foot span is based on a Milwaukee Road prototype

By **Dan Lewis** • Photos by the author



Milwaukee Road train No. 118 rumbles across the Spring Creek Trestle northwest of Lewistown, Mont. Dan Lewis explains how he built this nearly 5-foot-long span for his N scale model railroad.

At over a quarter-mile long, Spring Creek Trestle on the Milwaukee Road's North Montana Line is one of the longest wood pile trestles in the Big Sky State. Located nine miles northwest of Lewistown in the central part of Montana, the full-size bridge was built jointly by the Milwaukee Road (MILW) and Great Northern (GN) in 1912 to cross Big Spring Creek. Since I model the North Montana Line in N scale during the steam-to-diesel locomotive transition era, I needed to model this signature structure.

The full-size bridge is 1,391 feet long. Though largely constructed of wood, there are two steel sections with deck girders. In its early days the bridge had a gantlet track so the MILW and GN could each have its own line between Spring Creek Junction to the west and Hanover to the east. The gantlet track

was later removed in favor of a single-track arrangement. The Spring Creek Trestle isn't used today, but the structure still stands.

Selective compression was necessary to fit the bridge on my model railroad. I shortened the trestle to 785 scale feet (approximately 5 feet) and included one of the two steel sections. Even though my model version is only slightly more than half the prototype's length, Spring Creek Trestle is still an impressive structure.

Concrete abutments

When I photographed the trestle in 1995, I didn't get good photos of the abutments. An internet search of available images was equally unproductive. Hence, I built the abutments

CREEK TRESTLE

in N scale



based on my knowledge of other trestles, cutting the components from $\frac{3}{16}$ " thick plaster sheets that I cast in balsa forms (styrene sheet will also work) ①, as shown on the next page. After gluing the components together, I stained them light gray and weathered them.

I used extruded-foam insulation board, covered with plaster gauze, as the scenery base for the coulee area on my layout. It was relatively easy to cut through the foam board and plaster base to insert the cast-plaster abutments at each end of the trestle.

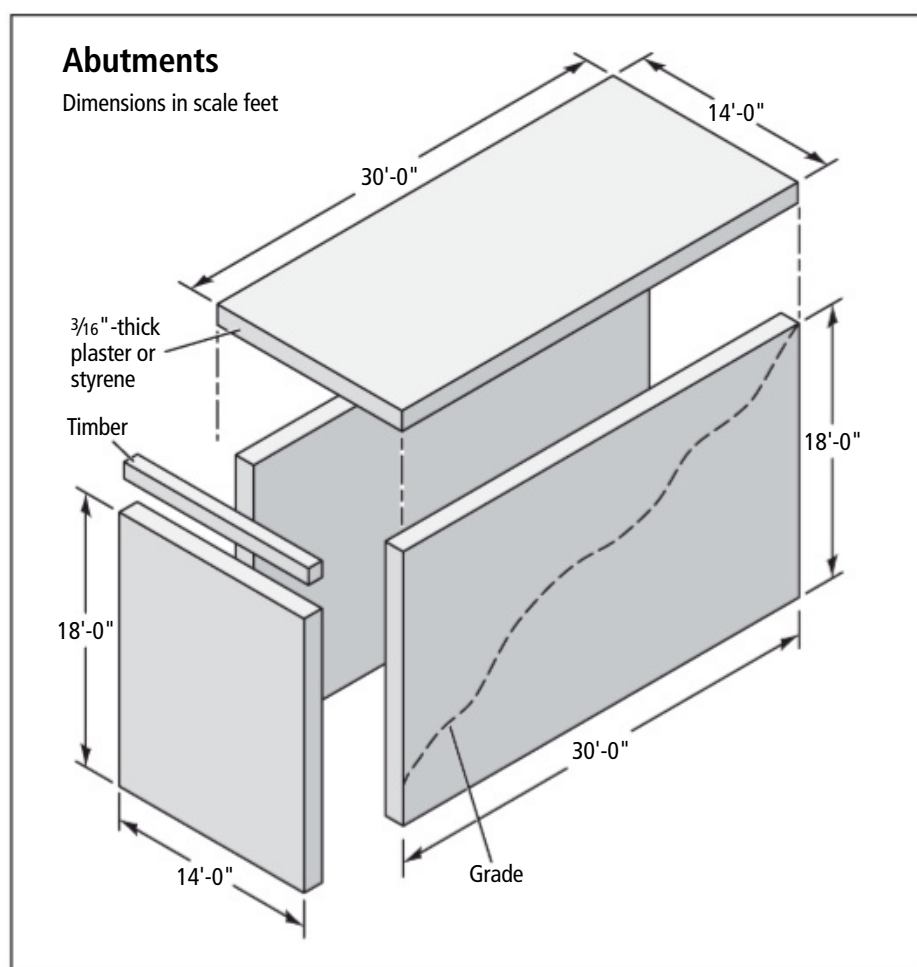
I installed a weathered horizontal timber on the top of each abutment ②. The ends of the stringers beneath the bridge track rest on these timbers. I scenicked the terrain around the abutments, figuring it would be easier to do it now rather than after the trestle was constructed.

Bridge track

Though my mainline features Micro Engineering code 70 flextrack, I used the same company's code 55 bridge track for the trestle. Unfortunately, Micro Engineering doesn't offer metal transition rail joiners in N scale, so I made my own.

Making the metal transition rail joiners is a multi-step process. First, I temporarily fit rail joiners on a piece of code 70 track. Then, using a motor tool with a cutting disk, I cut a notch in the upper part of the joiners [Wear eye protection when using a cutting disk in a motor tool – *Ed.*] Do not cut through the base of the joiner ③.

Next, I used a pair of needle-nose pliers to flatten half of the rail joiner. I soldered the flattened ends to the bottom of the code 55 bridge track, as shown in ④. I found it helpful to tin



1 Building the abutments. This illustration shows the dimensions of the abutments at each end of the bridge. Dan cut the abutments from $\frac{3}{16}$ " thick sheets of plaster that he made in balsa molds. Illustration by Rick Johnson

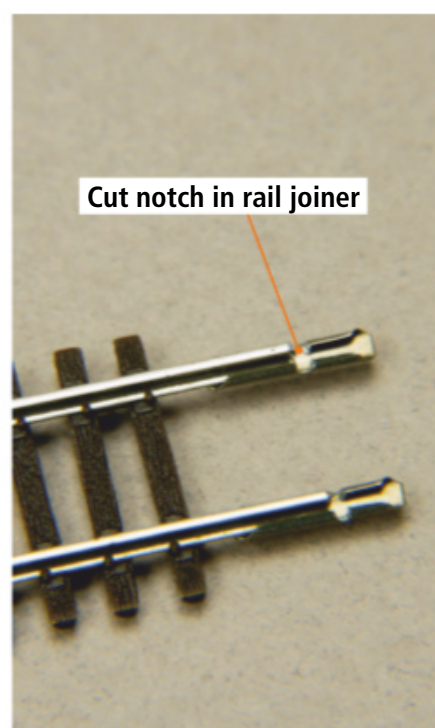


2 Abutments installed. The scenery for the coulee was already in place before Dan built the bridge. He carefully cut through the plaster gauze and into the extruded-foam insulation board to install the plaster abutments.

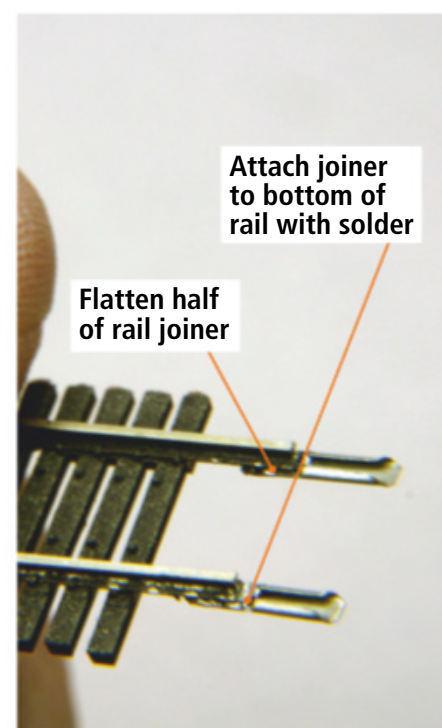
both the underside of the rail and the top of the flattened half of the rail joiner. This allowed me to quickly heat the solder without melting the plastic ties.

The Micro Engineering bridge track includes code 40 guard rails, which I installed with cyanoacrylate adhesive (CA). Once the CA cured, I masked the rail joiners and painted the bridge track with Valspar Flat Velvet Brown spray paint. While the paint was still soft, I used a wood paint mixing stick (any flat wood stick will work) to remove the paint from the railhead. After the paint had cured, I used an abrasive rubber track cleaning block to remove any stubborn paint spots.

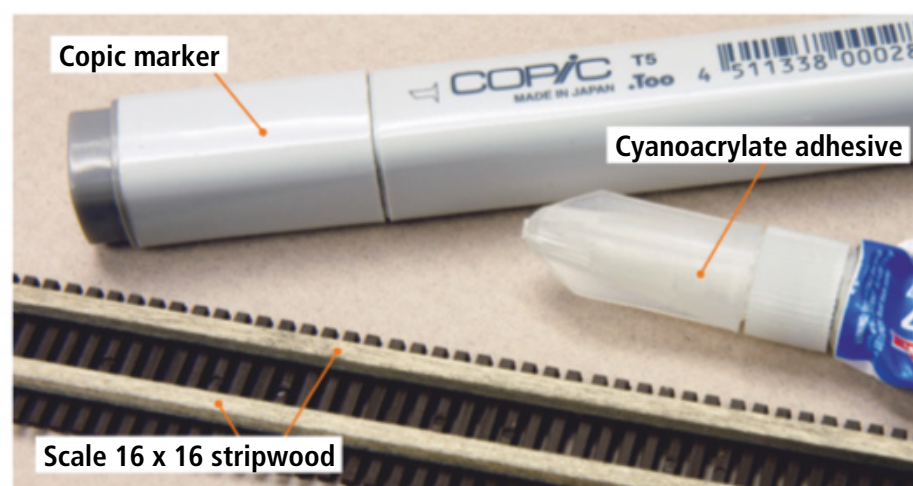
Next, I flipped the bridge track over to attach the scale 16 x 16 basswood strip stringers. I weathered the basswood with Copic permanent markers (T4, T5, and W4 work well for simulating aged wood), available at most art supply stores. I attached the wood stringers to the bottom of the plastic bridge ties with CA **5**. I didn't add stringers to the section of the bridge track that rests on the steel deck girder. The addition



3 Transition rail joiners. Dan had to modify rail joiners to make a smooth transition between the code 55 bridge track and the adjacent code 70 track. He attached rail joiners to a scrap of code 70 track and cut a notch in the middle with a cutting disk in a motor tool.



4 A solid connection. After using a pair of needlenose pliers to flatten half of the rail joiner, Dan attached it to the bottom of the rail with solder. By tinning the joiner and rail, Dan was able to heat the solder quickly without melting the bridge ties.



5 Bridge stringers. Dan used scale 16 x 16 stripwood for the stringers. He weathered the wood with Copic markers, available at most well-stocked craft and art supply stores. Dan attached the stripwood with cyanoacrylate adhesive.

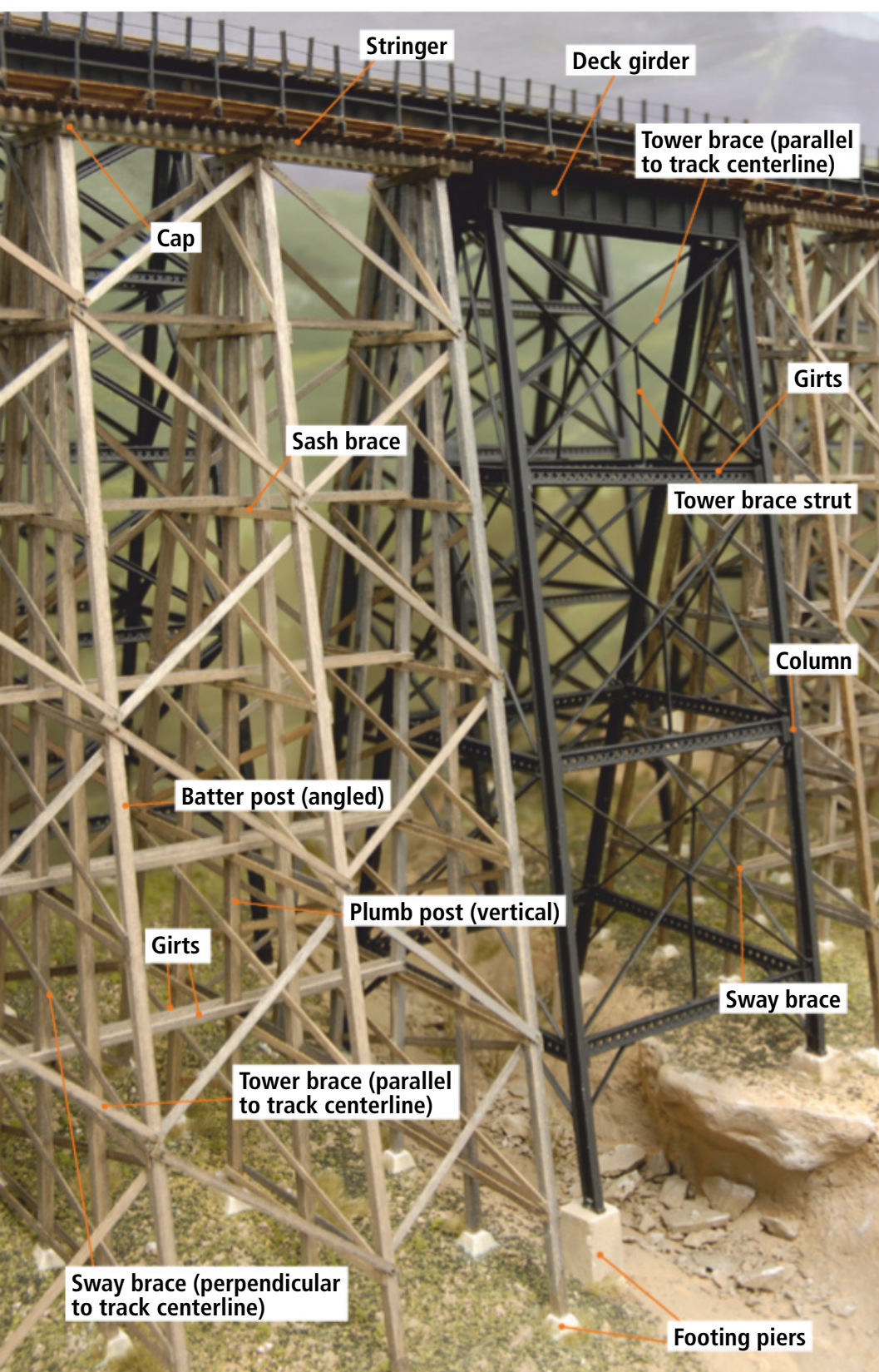
of the stringers significantly stiffened the bridge track, making it easier to handle.

Before attaching the bridge track to the main line at both ends of the trestle, I found and marked the centerline between the newly installed abutments. This step ensured that the steel tower and timber piers would be precisely centered beneath the bridge track. I marked the centerline with a series of straight pins, which I was able to easily insert in the scenery base.

With the centerline established, I attached the bridge track to the main. I cut pieces of 2"-thick extruded-foam insulation board to fit and placed them at intervals to support the bridge track across the coulee. I adjusted the foam blocks until the track was level.

Steel tower

Near the center of the span is a steel tower **6**. I initially considered using a tower from Micro Engineering's tall steel



6 Terms of the trade. This photo shows the steel tower, which is located approximately in the middle of the trestle. Notice how some of the part names vary whether they're steel or wood.

viaduct kit (no. 75-518), but it wasn't tall enough. However, by combining parts from the kit with styrene and brass shapes, I was able to make a plausible representation of the full-size steel tower.

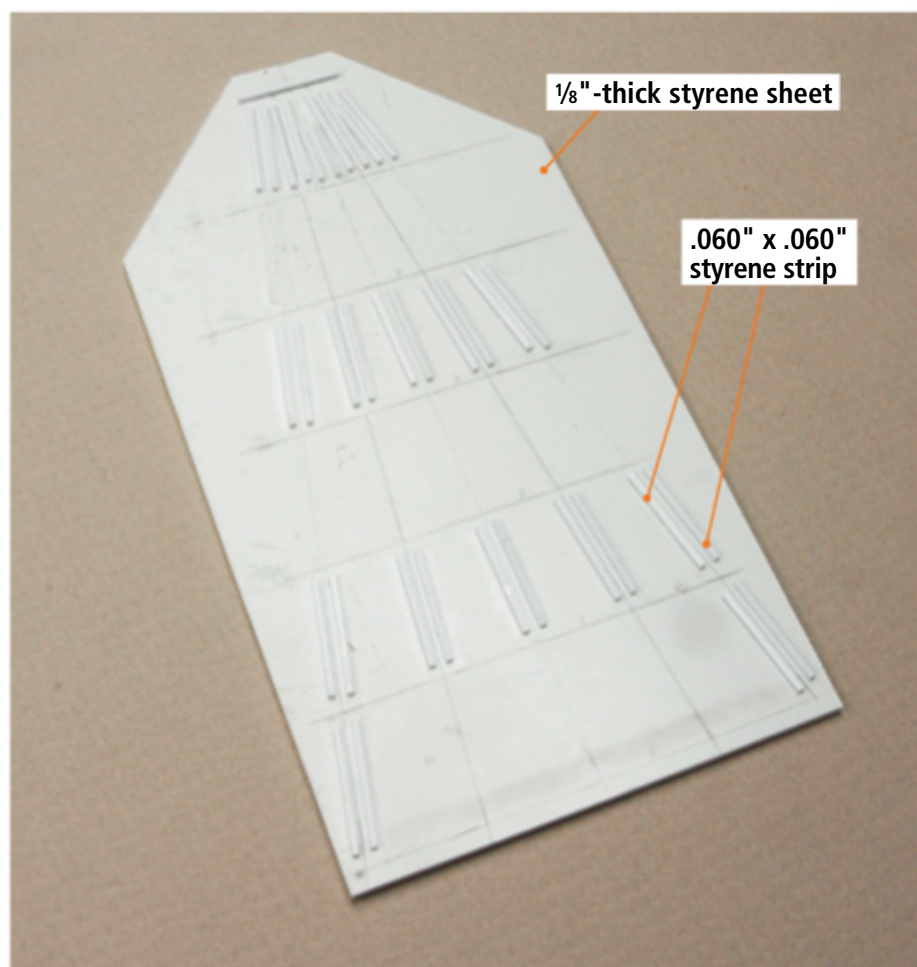
I used Evergreen $\frac{5}{32}$ " I beam (no. 275) for the tower's four columns. I harvested the tower struts (girts) from the Micro Engineering kit. I used Detail Associates .015" x .042" flat brass bar (no. 2528) for the sway braces, tower braces, and tower brace struts. The deck girder span is from the Micro Engineering kit.

When building the tower, I made the four columns slightly longer than necessary so I could cut them to fit once the footing piers had been installed. After the steel tower was constructed, I spraypainted it Testor's Flat Black (no. 1249).

The scale 4 x 5-foot footing piers are plaster castings that I made. Since the piers are on uneven terrain, the heights vary. Before installing the piers, I placed the steel tower beneath the bridge track and centered it based on the straight



7 Homemade footing piers. The uneven terrain in the coulee forced Dan to scratchbuild the footing piers for the columns on the steel tower. The plaster piers all measure a scale 4 x 5 feet; the height varies based on the terrain.



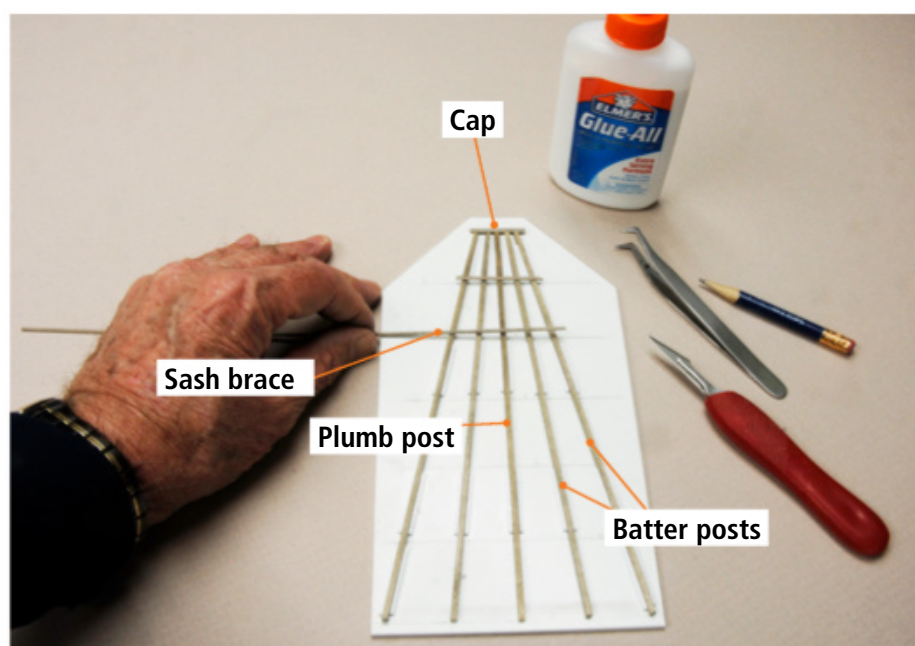
8 Styrene jig. To make sure the timber bents were consistent, Dan built this jig from styrene. He used a piece of $\frac{1}{8}$ " thick sheet and .060" x .060" strip for the plumb and batter posts.

pins I installed earlier. After marking the location for each pier, I cut out small sections of the scenery base and set the plaster castings in place with Loctite Foamboard Adhesive. The thick adhesive takes a few hours to set, giving me ample time to make sure the piers were vertical **7**.

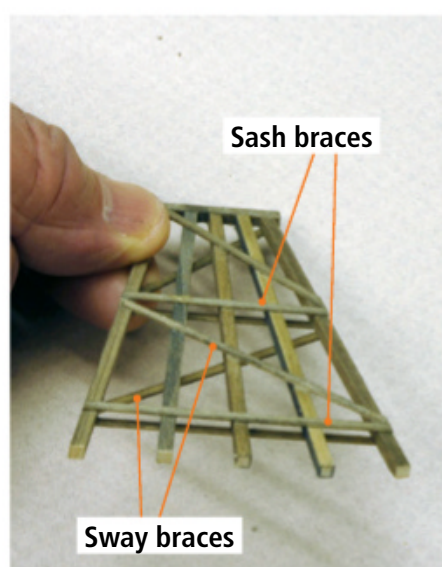
I then temporarily placed the steel tower, making sure it fit snugly between the foundation piers and the bridge track. I trimmed the oversize I-beam columns to size and attached a strip of styrene to the bottom. With the steel tower fixed in place, the first support for the bridge track was finished.

Timber bents

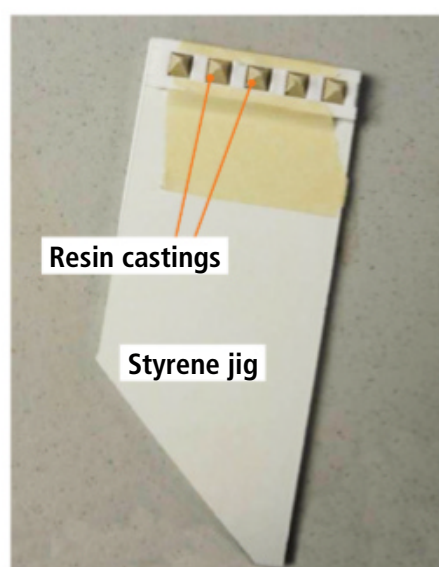
Then I turned my attention to the timber bents. I installed them working from the steel tower to the abutments in each direction. Except for their height, which varies based on the terrain, the bents need to be exact copies of each other. I made a master bent from scale 16 x 16 stripwood. Using the master



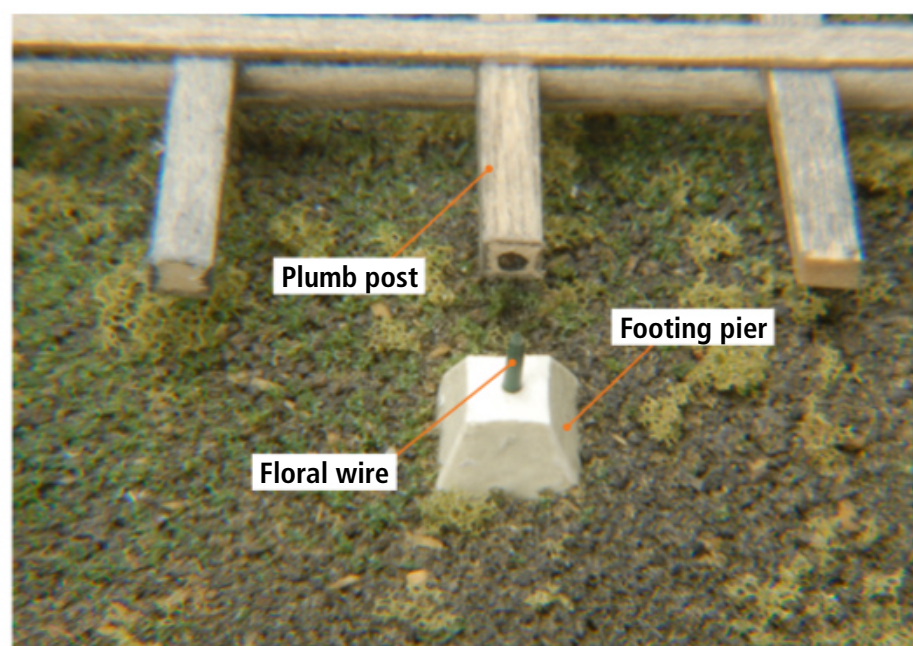
9 Making the bents. Dan used scale 16 x 16 stripwood for the cap, plumb post, and batter posts. The sash braces are scale 4 x 12 stripwood. He used full-strength white glue to attach the braces.



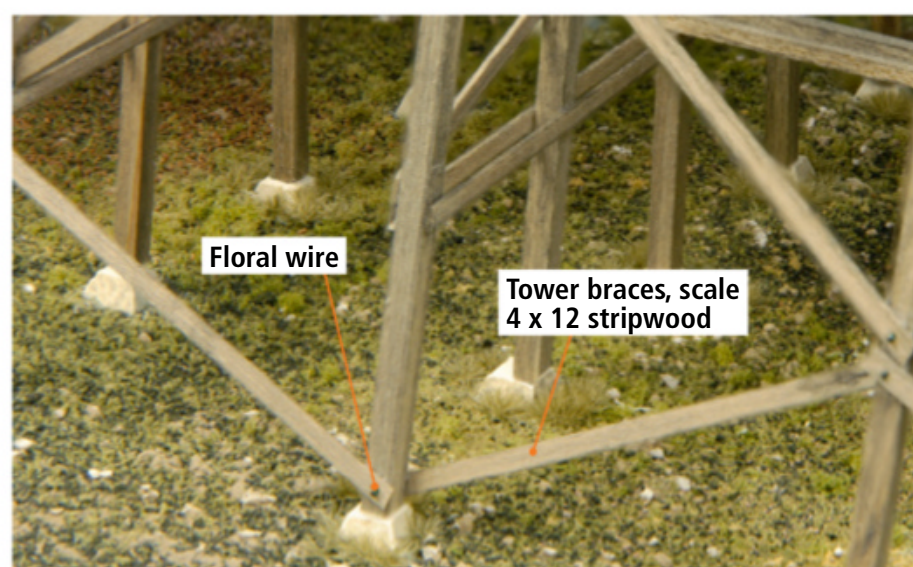
10 Finishing the bent. After removing each bent from the jig, Dan added the sway and sash braces, which he stained ahead of time, on the opposite side. As before, he used full-strength white glue to attach the braces.



11 Footing piers. These pyramid-shaped resin castings are designed to polish jewelry. Dan made a jig to hold the resin pieces so he could sand the tops flat to look like footing piers for the bents.



12 Drill-and-pin technique. Dan used floral wire to attach the plumb posts to the cast-resin middle footing piers. The floral wire sticks up approximately $\frac{1}{8}$ " from the pier. Read more about this technique in the sidebar at lower left.



13 Tower braces. With all of the bents in place, Dan attached the tower braces, which he made using scale 4 x 12 stripwood. The braces were secured with bolts on the full-size bridge. Dan used floral wire to simulate that detail.

as a guide, I built a styrene jig using $\frac{1}{8}$ " thick sheet and .060" x .060" strip (see **8** on the previous page).

I started by inserting the vertical plumb post and four batter posts, gluing them to the cap that supports the stringers **9**. I also glued the sash and sway braces (scale 4 x 12 stripwood) on one side of the pier while it was still in the jig.

After the glue had dried, I used a hobby knife with a chisel blade to carefully pry the bent from the jig. Then I flipped the assembly over and glued the sash and sway braces in place on the other side **10**.

As with the steel tower, I built the bents slightly longer than necessary so I could cut and fit them to match the uneven terrain. Altogether I needed 33 bents: 14 to the left of the steel tower and 19 to the right.

Footing piers and installation

The next step was sourcing the 165 footing piers. The footing piers on the full-size bridge resembled a pyramid with the top half removed. Fortunately, I discovered small, pyramid-shaped resin castings used by jewelers for polishing metal. I built a styrene jig to hold five pyramids at a time and used an electric disk sander to uniformly remove the top half of each resin casting **11**.

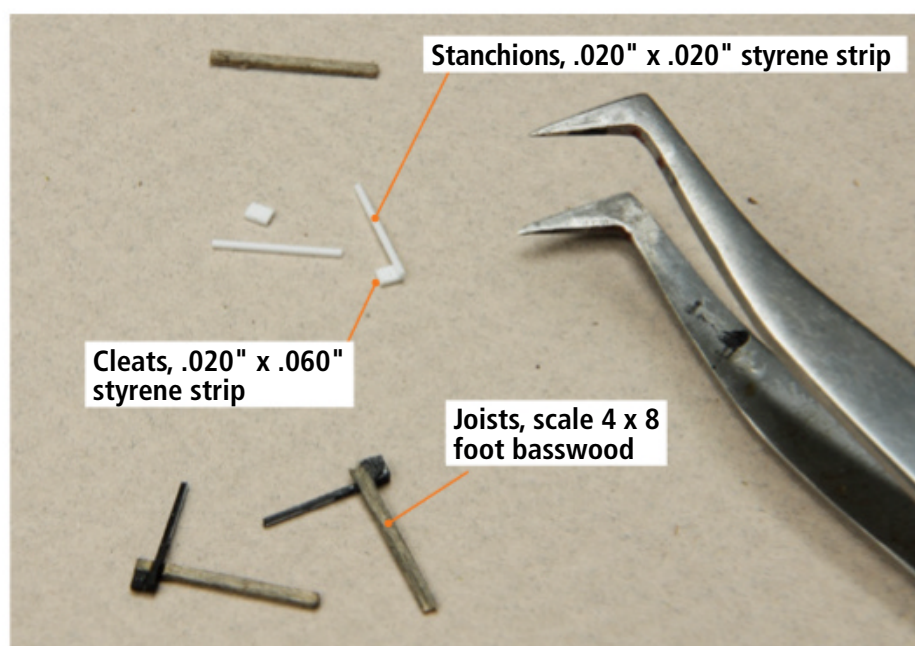
Drill-and-pin technique

I used the **drill-and-pin technique** to precisely and firmly attach the plumb posts on the bents to the center footing piers. Here's how it works.

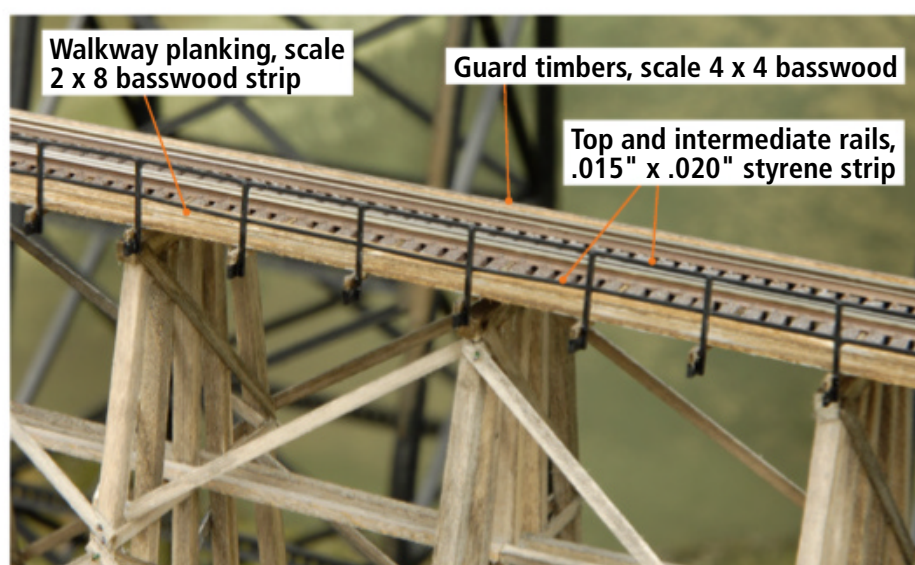
First, I drilled a hole in the center of the plumb posts and the footing piers. Then I used cyanoacrylate adhesive to secure a short length of floral wire to footing piers, letting the wire protrude about $\frac{1}{8}$ ". Once the glue dried, I set the plumb post on the pin.

For this project I only installed pins on the middle footing piers. You can add pins to as many footing piers as you'd like, but the center one is the most important in order to anchor the bents and keep them in alignment.

– Dan Lewis



14 Safety first. Dan made the handrail stanchions from scale 5½ foot lengths of .020" x .020" strip; the cleats are scale 1 foot lengths of .020" x .060" strip. The cleats are attached to scale 4 x 8 basswood joists.



15 Finishing touches. Dan added scale 2 x 8 basswood strip walkway planking and scale 4 x 4 basswood guard timbers. He used styrene solvent to attach the .015" x .020" styrene strip top and intermediate rails to the stanchions.

Then I began installing the footing piers, five each per bent. I started with the pier for the plumb post, using the centerline I marked with straight pins as a guide.

I cut into the plaster skin of the terrain with a hobby knife and attached the footing piers with Loctite Foamboard Adhesive. After the adhesive dried, I carefully trimmed the plumb posts to their final length, attaching them to the footing piers using the drill-and-pin technique **12**. [See the opposite page for more information. – Ed.]

Once the plumb post footing pier fit precisely, I installed the other footing piers and trimmed the batter posts to fit. I then attached scale 4 x 12 basswood strip tower braces. Notice that the tower braces are glued to the outside of the batter posts for the one angle and to the inside for the other. Also, there are girts (scale 12 x 12 stripwood) glued parallel with the rails on each side of the plumb posts. The girts extend the entire length of the trestle. On the full-size bridge the tower and sway braces were attached to the batter posts with bolts. I simulated this detail with floral wire **13** opposite.

Walkways and handrails

The final part of the project was installing the handrails and walkways. Each handrail stanchion (111 of them) required a

Materials list

Copic markers

T4 Toner Gray no. 4
T5 Toner Gray no. 5
W4 Warm Gray no. 4

Detail Associates

2528 .015" x .042" brass
flat bar

Evergreen styrene

110 .015" x .020" strip
120 .020" x .020" strip
123 .020" x .060" strip
153 .060" x .060" strip
275 .156" I beam

Kappler Mill & Lumber Co. stripwood

KP1175-HOP12 HO scale 8 x 8
(for N scale 16 x 16)
KP1122-HOP12 HO scale 2 x 6
(for N scale 4 x 12)
KP538P12 N scale 4 x 4

Micro Engineering

11-112 bridge flextrack (2
sections)
26-055 code 55 rail joiners
26-070 code 70 rail joiners
75-518 tall steel viaduct

Midwest Products stripwood

8002 N scale 4 x 8

Northeastern Scale

Lumber Co. stripwood

3003 HO scale 1 x 4 (for N scale
2 x 8)

Henkel Adhesives

Loctite 411 cyanoacrylate
adhesive
1421941 PL 300 foamboard
construction adhesive

Testor Corp./Model Master

1249 Flat Black enamel
spray paint
3502 plastic cement
4768 Flat Black acrylic paint

Valspar spray paint

65046 Flat Velvet Brown

Miscellaneous

¾" styrene sheet
Green floral wire (larger
diameter)
Jewelry polishing pyramids
Styrene solvent
White glue

joist and cleat. I stained the scale 4 x 8 basswood joists with Copic markers. Once dried, I cut the basswood into scale 7½ scale foot lengths using a Northwest Short Line Chopper.

Next, I worked on the stanchions, which are scale 5½ foot lengths of .020" x .020" styrene strip. The cleats are scale 12" lengths of .020" x .060" styrene strip **14**.

I attached the joists between the bridge ties with CA at intervals of five ties. The walkway, which is six scale 2 x 8 basswood strips wide, is attached to the joists with white glue.

Then I made the top and intermediate rails using .015" x .020" styrene strip, which I spraypainted Flat Black before installation. I attached the rails to the stanchions with styrene solvent. I used a paintbrush and flat black acrylic paint to do any touch-up work.

The final piece of the project was to install scale 4 x 4 basswood guard timbers, which I stained with markers **15**. With that, Spring Creek Trestle was ready to carry freight and passenger trains across Big Spring Creek. **MR**

Dan Lewis lives in Rochester Hills, Mich. His article "7 ways to add operating interest" appeared in the June 2015 Model Railroader. Dan dedicates his N scale version of the Spring Creek Trestle to the memory of Milwaukee Road engineers "Red" Hanley and Bob Spring.



Ride the **FRISCO** to **ST. LOUIS**

This double-deck HO scale empire
is packed with scenes from the
prototype's Missouri main line

By Patrick Hiatte
Photos by the author



❶ The eastbound *Meteor* slows for a stop at Webster Groves on John Peluso's double-deck HO scale Frisco layout.

FROM JOHN PELUSO'S HOME in suburban St. Louis, you can hear trains passing on BNSF Railway's line between St. Louis and Springfield, Mo. Inside his basement, though, the trains are HO scale versions of those that ran over the same line when it belonged to the St. Louis-San Francisco Ry., also known as the Frisco.

John's layout is a collection of familiar scenes in the St. Louis area and along the line, such as the Arsenal Ave. overpass that cuts through the middle of Lindenwood Yard, the gasworks and McCausland Ave. underpass at the west end of the yard, and the Meramec River bridges and limestone bluffs, which were so much a part of the Frisco that the railway featured them on its timetables.



❷ Lindenwood Yard is the main classification yard in the St. Louis area. All freight trains except coal drags originate, terminate, or are switched here. This view is looking east.



❸ A westbound freight powered by two GP7s in Frisco's original black-and-gold freight paint scheme rounds a curve near the end of the double track west of St. Louis. Limestone bluffs are a landmark of Frisco's lines west and south of St. Louis.

"I tried to emphasize popular scenes that interested me and that people would recognize from the route the railroad takes," John said. Although John has freelanced industries and other structures, the town names and scenery have the look and feel of the prototype, and the towns are in the same order as on the prototype.

Construction begins

With the help of St. Louis-area modeler John Garavaglia, Peluso designed the track plan and began construction. He used standard construction methods, with benchwork of 1 x 3 and 2 x 3 dimensional lumber supporting a sub-roadbed of ¾" plywood.

The track is code 83 from Atlas and Micro Engineering laid on cork roadbed, with sidings and industrial trackage at a slightly lower level.

After the track was completed, John and Bill Giese began work on scenery, creating contours with cardboard strips laced together with masking tape and covered with plaster-soaked paper towels and drywall mud. They used ground foam as the basic ground cover. The results were satisfactory to John, who says he would use the same techniques if he were building another layout. The layout is complete, including scenery.

A CVP EasyDCC system controls the trains, which look like the ones you would have seen if you were trackside from the 1950s through the mid-1960s.

During the period John models, the Frisco retained its red-and-gold paint scheme for passenger locomotives, while freight locomotives were transitioning from the original black-and-gold scheme to the orange-and-white that Frisco locomotives would wear up to the Burlington Northern merger in 1980. John painted and decaled many of the locomotives himself, and added locomotives painted and lettered for the Frisco as they became available from manufacturers.

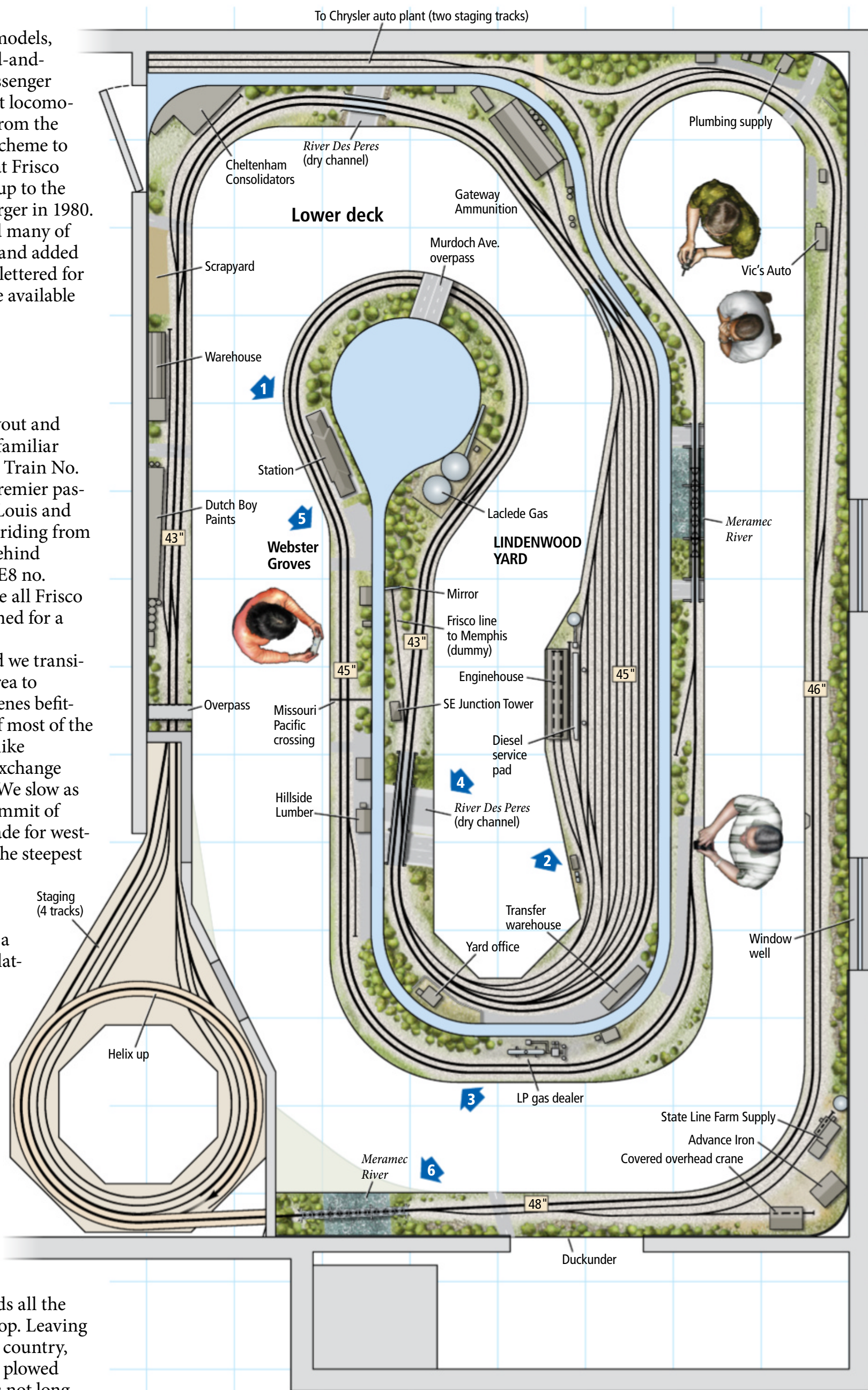
Riding The Meteor

To get a feel for the layout and how John has re-created familiar scenes, let's climb aboard Train No. 10, *The Meteor*, Frisco's premier passenger train between St. Louis and Oklahoma City. We'll be riding from Springfield to St. Louis behind Electro-Motive Division E8 no. 2016, named *Citation*; like all Frisco passenger diesels, it's named for a famous horse.

As we leave Springfield we transition from an industrial area to industries and lineside scenes befitting the rural character of most of the country along our route, like Midwest Fruit Growers Exchange and Mid States Produce. We slow as we reach Dixon, at the summit of Dixon Hill, the ruling grade for west-bound trains and one of the steepest on the Frisco system.

Going down Dixon Hill, we pass such scenes as a family cemetery and a footbridge made from a flat-car. Next in view is Great Plains Gravel, patterned after a similar quarry at Pacific, Mo., and large enough to merit its own switch engine as well as service from a pair of through freight trains, which stop to pick up and set out cars.

Another sharp curve brings us to Rolla, with its Railway Express Agency depot, many other industries, and a passing siding that extends all the way to Dillon, our first stop. Leaving Dillon, we're still in farm country, with a bridle path, barns, plowed fields, and cattle pens. It's not long



The layout at a glance

Name: Frisco Lines

Scale: HO scale (1:87.1)

Size: 16 x 30 feet

Prototype: St. Louis-San Francisco Ry. (Frisco)

Locale: St. Louis to Springfield, Mo.

Era: late 1950s to late 1960s

Style: double-deck walk-in

Mainline run: 400 feet

Minimum radius: 30" (main), 26" (staging)

Minimum turnout: no. 8 (main), no. 6 (secondary tracks)

Maximum grade: 1.7 percent

Benchwork: open grid

Height: 43" to 48" (lower deck), 62" to 68" (upper deck)

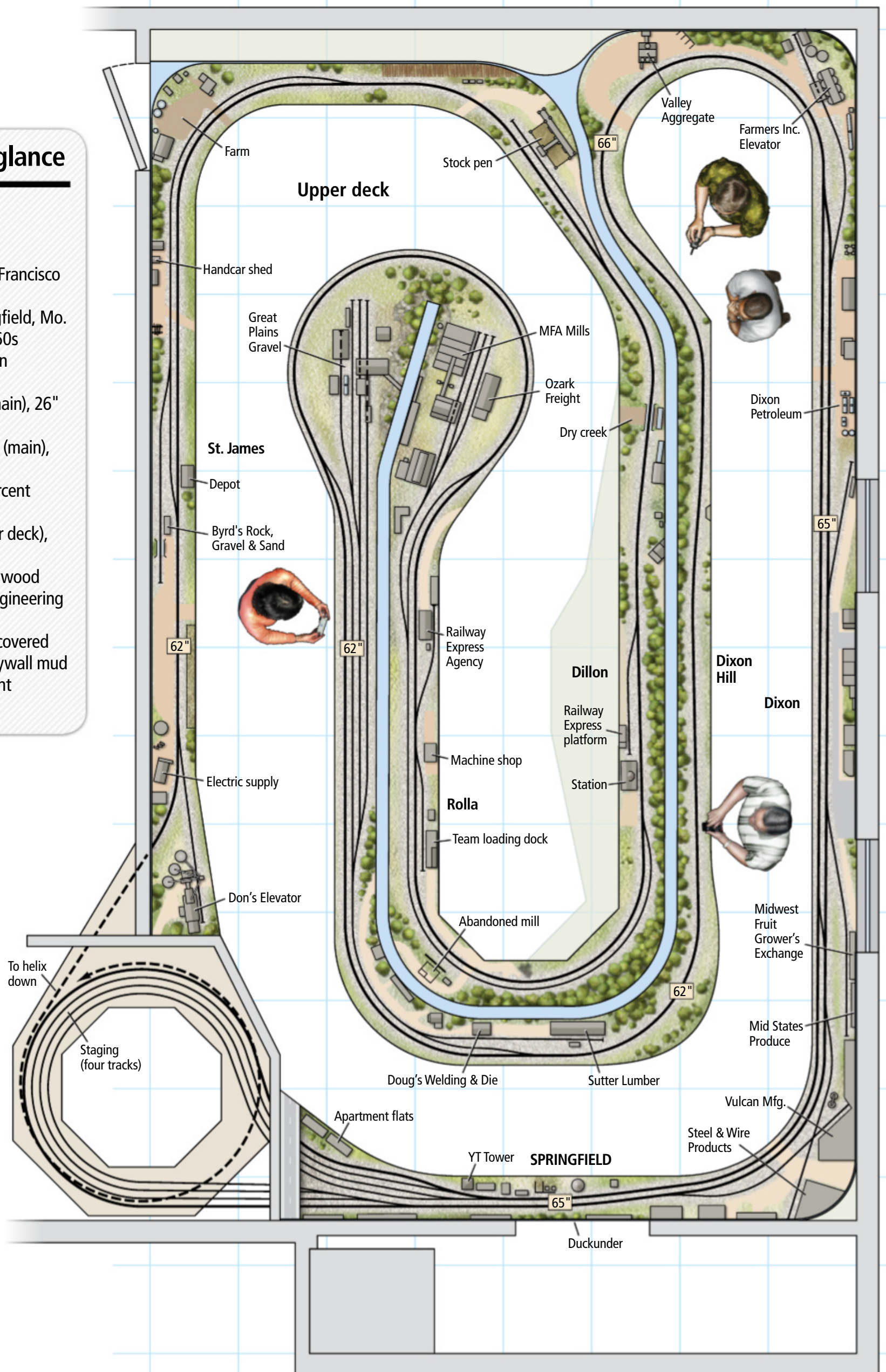
Roadbed: cork on 3/4" plywood

Track: Atlas and Micro Engineering code 83 flextrack

Scenery: cardboard grid covered with plaster gauze and drywall mud

Backdrop: photo and paint

Control: CVP Easy DCC





Meet John Peluso

John and his wife, Deborah, moved to Ballwin, Mo., in 1989, and John retired in February 2008. John owns a 2017 Ford Mustang GT and is a member of the Fords Unlimited Car Club, which sponsors cruises and car shows. He also participates in shooting sports and enjoys watching amateur sports.

before we're slowing for our second station stop, St. James.

We leave the modeled world briefly for a descent down a helix to the layout's lower level. John solved the problem of "helix panic" that can set in when a train is out of sight of its operator by installing a porthole. The helix also accommodates the four-track Springfield and St. Louis staging yards on the upper and lower levels, respectively.

Emerging from the helix, we make our first crossing of the Meramec River at Eureka and wind through tree-covered hills. Off to our right, a wye leads to the Chrysler automobile plant. One of the major customers on the Frisco, it merits one inbound train each

4 A westbound freight crosses McCausland Avenue and the dry channel of the River Des Peres on this ballasted deck plate girder bridge, a handy place to advertise Frisco service. Southeastern Junction, guarded by an interlocking tower, is just ahead.

of auto parts and empty auto racks daily and one outbound train each of empty auto parts cars and loaded auto racks.

After making our second crossing of the Meramec, we pick up a second main track that will run all the way into Chouteau Ave. in downtown St. Louis. We make our final stop at Webster Groves. John made measurements of the depot, which is still standing, and built the structure from scratch. The prototype station is home to the Big Bend Railroad Club's O scale layout [which was featured in the January 2019 *Model Railroader* – Ed.].

We pass the Laclede Gas storage facility and the interlocking tower protecting Southeastern Junction, where Frisco's line to Memphis comes in on our right. We then cross the River Des Peres and McCausland Ave., then pass Lindenwood Yard, the freight traffic hub of the St. Louis-Springfield line. Every freight train works Lindenwood, and many originate or terminate here.

The landscape grows more industrial as we're on the home stretch to downtown St. Louis and Chouteau Ave., right outside Union Station. Gateway Ammunition and Dutch Boy Paints are among the larger industries requiring switching service. The Kings Highway underpass marks our entry into staging and the conclusion of our trip.



What about more of those familiar scenes? The overpass in Springfield is a dead ringer for the Grant Ave. viaduct. The Webster Groves depot, Laclede gasworks, Southeastern Junction tower, and the River Des Peres/McCausland Ave. overpass are immediately recognizable to anyone familiar with the St. Louis area. The Lindenwood Diesel Shop is oriented just as the prototype was.



5 Westbound freight and eastbound passenger trains meet on the double track at Webster Groves; passengers will get on and off as soon as the freight clears. As many as 20 trains run during a typical operating session.



Prototypical operations

With the aid of fellow St. Louis-area modeler Gary Gross, John has designed an operating plan that mirrors the prototype as well. The full operating cycle spans two three-hour sessions, and includes through freights, locals, and coal trains, as well as *The Meteor* and a passenger run from Chouteau Ave. to Dillon and back. Operation is by sequence, watched over by a dispatcher using a magnet board to keep track of train locations.

John hosts about four operating sessions per year and is part of a round-robin group of layout owners in the St. Louis area. Seven operators make up a full crew: four road crews, two yard crews, and a dispatcher. Sessions typically run about three hours. Car cards and waybills are used for car forwarding. A dozen trains move about 140 of the 225 cars on the layout during a session.

Although the model railroad is complete, John has more plans for it. They include adding a computerized dispatcher panel to control mainline turnouts and upgrading a few cars to better fit the era he models. Like most model railroads, John's is changing constantly, for the better.



6 *The Meteor*, on its way to St. Louis, emerges from a dense forest onto a bridge over the Meramec River. The vegetation conceals the entry into the helix connecting the layout's two levels.

One thing that won't change is the time machine that is John's layout. The Laclede gasworks, the Southeastern Junction tower, and the Lindenwood Diesel Shop may be gone now on the prototype, but visiting them is as easy as descending the stairs to John's basement, where it's always the early diesel era on the Frisco. 

Patrick Hiatte is a 35-year veteran of BNSF Ry. and its predecessors Burlington Northern and St. Louis-San Francisco (Frisco). He lives with his wife, Sandy, in New Bloomfield, Mo., where he models the Missouri Pacific (Mopac) and Frisco in N scale. His article "Modeling a modern-era rail hub" appeared in the March 2020 Model Railroader.



Colorado Midland rotary snowplow no. 8 is at the Basalt coal dock on Andrew Dodge's Proto:48 O scale layout. After scratchbuilding his locomotive fleet, Andrew decided to give a rotary snowplow a go.

A WINTER'S

Take a look at a scratchbuilt turn-of-the-century steam-powered rotary snowplow

By Andrew Dodge

Photos by the author

The rotary snowplow was probably the most important piece of maintenance equipment a railroad needed during winters in the Colorado Rocky Mountains. In 1888, one year after beginning operations, the Colorado Midland Ry. bought a rotary snowplow

from the Leslie Brothers Co. of Paterson, N.J. The brass hats in the main office had realized after the first year they couldn't solely rely upon what would become known as the "Midland Snowbirds" to shovel the snow by hand.

The plow had a 9-foot rotary blade with a shroud extending out an additional foot on each side. At 11 feet across, the machine would clear a path wide enough for any Midland equipment. An interesting aspect of the Leslie design was that the carbody resembled a greenhouse, with large windows along both sides and in the operator's area just behind the rotary and impeller blades.

No doubt the windows provided the operating and steam engine crews with plenty of light and a nice panoramic view of the mountains, but were of little other practical value. One can only imagine all the broken glass that had to be repaired each winter.

In 1895 the Midland rebuilt the body of the plow. The railway's shop converted the body of the machine to a more conventional and durable design, which included fewer windows and a larger work space for crews in the machine.

The plow served the railroad well as its sole snow removal machine until the terrible winter of early 1899. The snow was so bad the Midland

had to rent a Jull machine from the Santa Fe and another rotary from the Rock Island.

In 1900 the Midland bought a larger 11-foot-bladed machine from the Schenectady Locomotive Co. The Leslie plow was renamed from "08" to "Rotary A," and the new machine was designated "Rotary B." Both machines survived until abandonment of the line in 1918. The Midland Terminal Ry. bought the Leslie machine in 1921, and it served that railroad until its demise in 1949.

Gathering information

As with any scratchbuilding project, one has to do some



research and draw up plans. On this front I had some good news and some bad news. The Morris Cafky book *Colorado Midland* provided very few, but valuable, overall specifications, and a drawing of the exterior of the post-1895 Leslie machine. However, the exterior image concerning the placement of windows and doors didn't match the photographs taken in the late 1890s.

Dan Abbot's *Colorado Midland Railway: Daylight through the Divide* provided a much more detailed drawing of the plow and its interior, but it was based on the pre-1895 period or perhaps another railroad's machine. One of the best sources of information

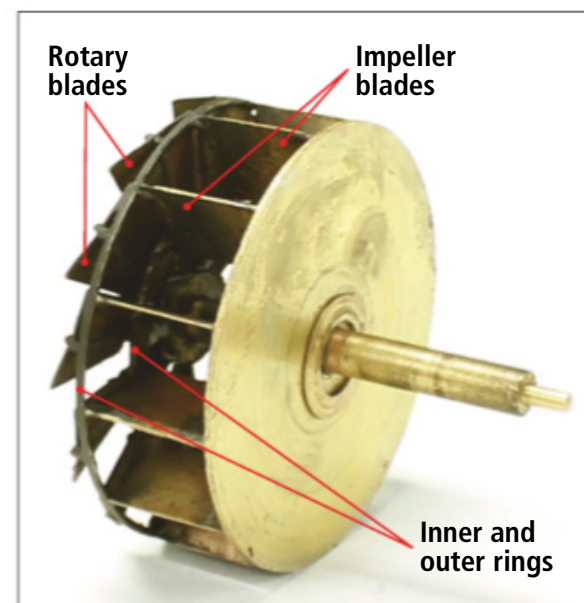
would prove to be from the photographic record, but these would have huge limitations due to the fact that almost all of the pictures were taken in the snow and from the front.

My best course of action proved to be selecting the most historically correct information for my desired period from all three sources. Photographs were helpful for determining the placement of the various doors and windows and the structure of the rotary blade, which wasn't easy because most images showed the plow full of snow.

Cafky provided the height and width of the rebuilt car body and the only photo of the tender. Abbot's inclusion of a

side elevation with all the interior details proved invaluable for constructing and placement of all the interior machinery. After analyzing all the sources and determining the accuracy of the information, I was ready to step off into the wilderness.

I say "wilderness" because designing and doing the layout work proved to be more difficult than building one of my scratchbuilt steam locomotives. This wasn't a project that, as one modeler once remarked, "isn't much more difficult than making a boxcar." My goal was to make, in essence, a steam engine and a tender plus a rotary and impeller blade structure, and



1 Andrew started construction with the rotary assembly. The impeller blades are made from sheet brass and soldered to a disc cut from .034" sheet brass. The rotary blades are .016" sheet brass with wire stiffeners attached.

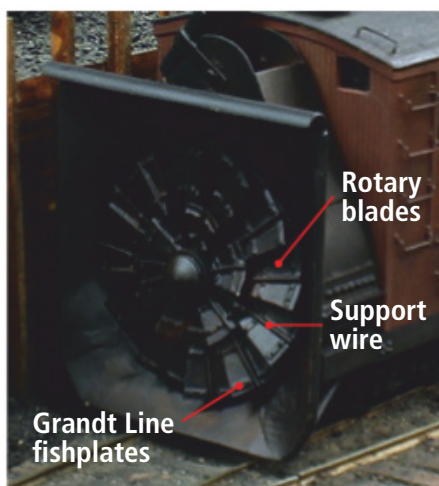
make it all work, which was challenging and rewarding at the same time.

Rotary and impeller system

Constructing the base for the blades presented my first hurdle since I wanted to use brass bar stock, which would require a piece approximately 2.5" across and cost \$150 just for the brass. Since that was too much, I used .034" sheet brass, which could be used with some creative work.

After scribing a line for the circle, I rounded it in a lathe, but one could do the same with careful work using a motor tool. Next came the 12 impeller blades, which would be cut exactly to the same size and soldered going from the outer rim toward the center, where the outer and inner blades met. I then formed another piece of brass into a circle and soldered it to the outer edge of the impeller blades. Another piece was soldered forming the inner ring. These two rings would serve as the base for attaching the rotary blades, 12 on the outer ring and six on the inner ring **1**.

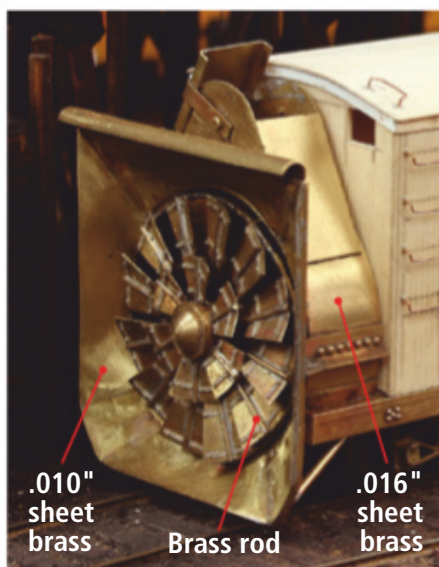
Making the two sets of rotary blades out of .016" sheet



② The rotary blades are in two concentric sets. A paper template ensured all the blades were bent identically. Andrew soldered wire stiffeners to the blades. Grandt Line fishplates simulate reinforcing straps.



③ From the back it's easy to see the moveable shield on top of the impeller shroud that allowed the operator to throw snow to either side of the plow.



④ The outer shroud, which directs snow into the rotary blades, is .010" sheet brass soldered to a frame of brass rod. Andrew used resistance soldering equipment carefully to avoid overheating the thin brass sheet.

brass proved rather easy. Using a little math gave me the sizes of the blades at the outer and inner edges. With a little cutting and trimming, I got 18 blades ready.

To bend each blade so it would cut into the snow, I marked a centerline, placed the blade in a vise, and using a block of wood, bent each using a piece of marked paper as a guide, so each blade had the same angle.

A piece of wire soldered on both sides of the blade where it was bent simulates the mounting system used on the prototype. To finish the blades, I used Grandt Line [Now San Juan Details – Ed.] code 70 rail fishplates to replicate the supporting bars for the blades ②.

The shrouding structure required two types of building techniques. First I built a circular cover for the impeller blades, then cut and fit the impeller discharge chute.

The operator directly behind the rotary blades in the cab controls the discharge system by rotating the upper shield so the snow is thrown out to the left or right of the train ③. All of this was hand-fitted.

Building the outer shrouding, extending out past the blades, required fabricating a box structure using brass rod material with angled corners at the bottom. I soldered this together and fitted it to the housing where the riveted sheet metal with the riveted brass rods angled down to the slanted corners.

While .016"-thick brass is suitable for most sheet work, the outer structure of the outer blade housing proved too intricate for any brass thicker than .010".

Brass this thin and other fine and detailed brass parts will be incinerated if too much heat is applied. Resistance soldering is one of the best tools to have in a shop, but one has to be careful only to touch the heavier material and use only as much heat as needed ④.

The body and frame

Building the frame and base of the snowplow was rather simple. Since the frame was built of steel and I like building with brass, I used brass for the frame.

Before soldering the .125" x .250" bar stock, I laid out, drilled, and secured the brass rivets along the outer side of the frame. Photos provided the needed information to resolve all the placement issues ⑤, opposite.

One sheet of .016" sheet brass mounted on top of the frame completed the floor under the operator's platform.

In the midsection where the gearbox, driving wheels, and cylinders are located, I mounted the floor plate along the bottom edge of the frame to provide as much room for the rotary's drive wheels as possible, keeping in mind the floor can't be open or snow will fly inside.

The rear section included one piece of brass plating on each side of the boiler with the bottom mostly open for the firebox, part of which extended below and behind the rear truck.

One item that didn't appear to be included in the machine was a scraper blade mounted between the two trucks. Neither a circa 1918 photo of the Midland's plows taken in the Colorado City yards nor a semi-side shot taken around 1900 show a blade. This seems to be a question left to each railroad – some had them, and others didn't.

My model represents the reconstructed body. Scribed wood sheet provided the most practical solution for vertical beadboard siding with 3- to 4-inch spacing ⑥. Roof rafters formed from O scale 2 x 12 wood stock are sheathed in scale 1 x 6 planks, then covered in tissue paper to complete the roof.

However, since a smokestack and a steam dome with its whistle and relief valves would protrude through the

roof of the finished model, assembly of the roof would have to wait until the boiler was installed in order to achieve proper placement.

Most of the grab irons are from Tichy Train Group with the rest scratchbuilt. Windows, door hinges, and nut-bolt-washer castings are Grandt Line; and the sliding doors are from another car. Model ship sail cloth served well to represent the canvas drape used to protect the crew from the elements.

The interior

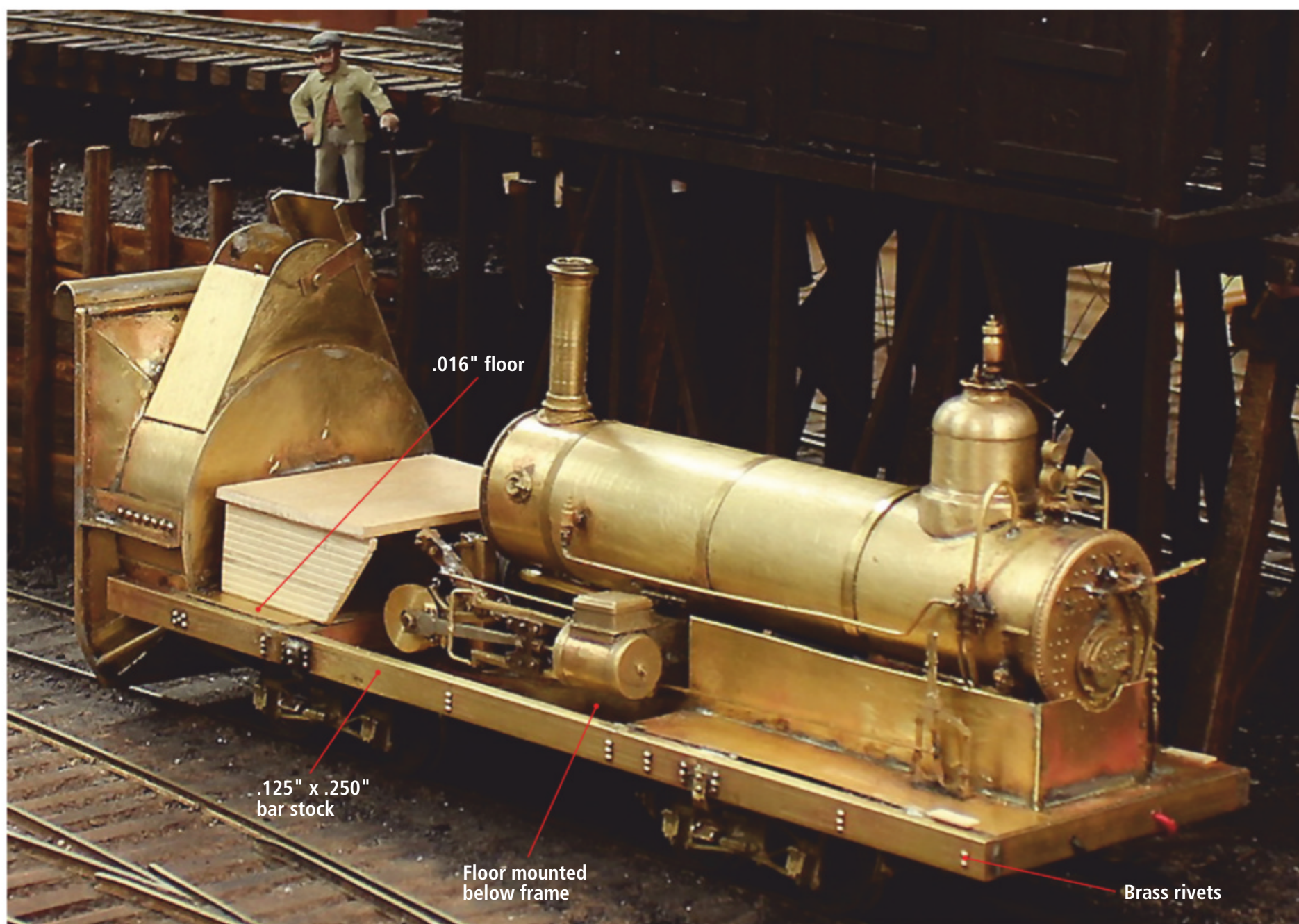
Inside the body of the plow ⑦, on page 54, was a rather standard placement of the boiler; cylinders, rods, and drive wheels; rear deck area; and operator's platform.

Just behind the plow's discharge chute and snow deflector, operators controlled a lever, or in some cases a wheel, to throw the snow in the desired direction. They also had windows on each side looking forward in order to see what was ahead and gauge how well the machine was doing its job.

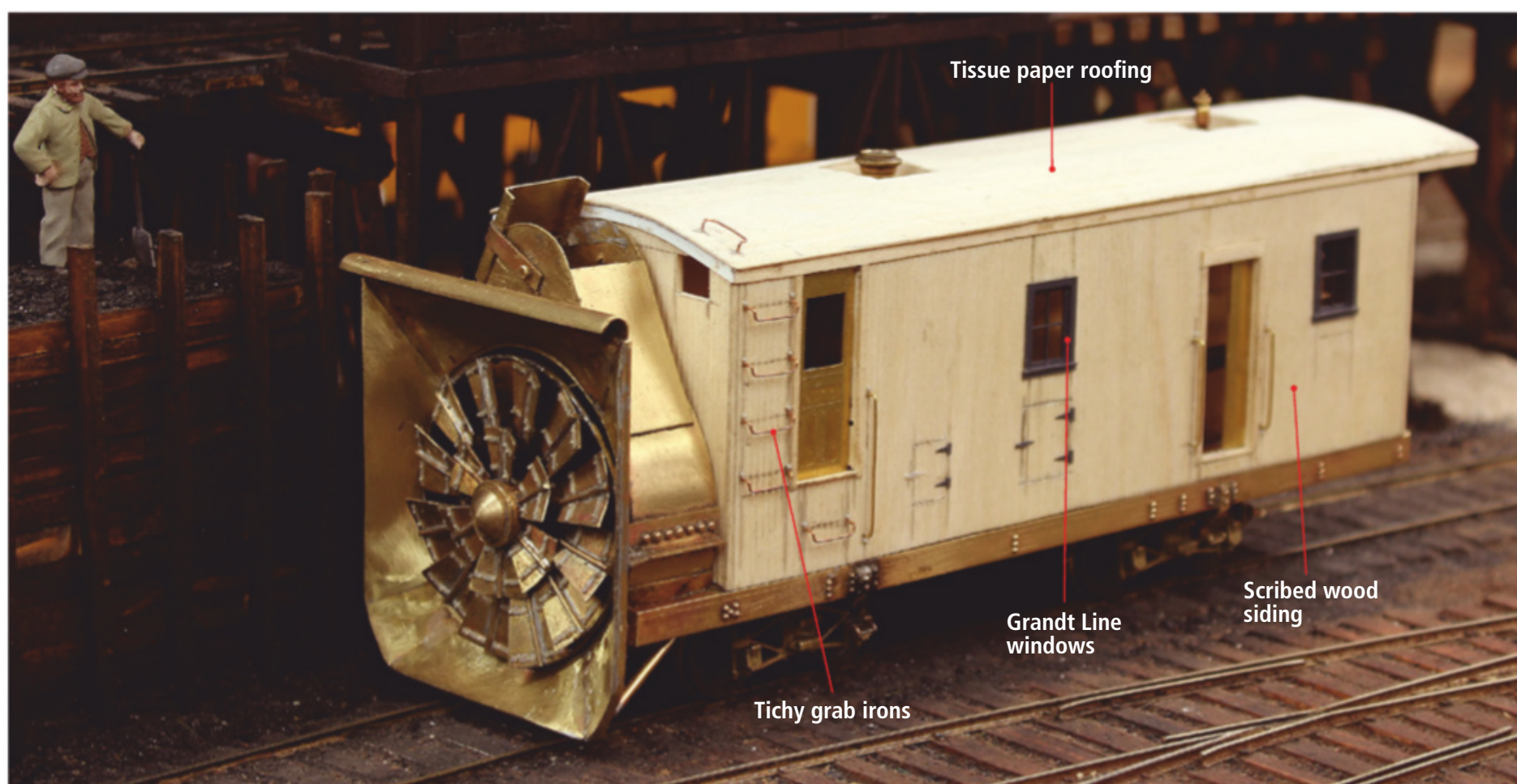
On the operator's deck was an auxiliary air tank to serve as a backup for the brakes. I installed an operational gearbox directly below the platform that runs the drive wheels, main rods, and the plow's blades. All the systems needed to operate the engine, injectors, Johnson bar, gauges, the tricocks, air brakes, and throttle were in easy reach of the boiler crew.

Perhaps the whistle served as the most important item the crew relied upon during operations. Located on the far side of the steam dome, the whistle served as the only means of signaling the four or five locomotives in the snow train outfit, telling everyone when to stop or back up, and how hard to push forward.

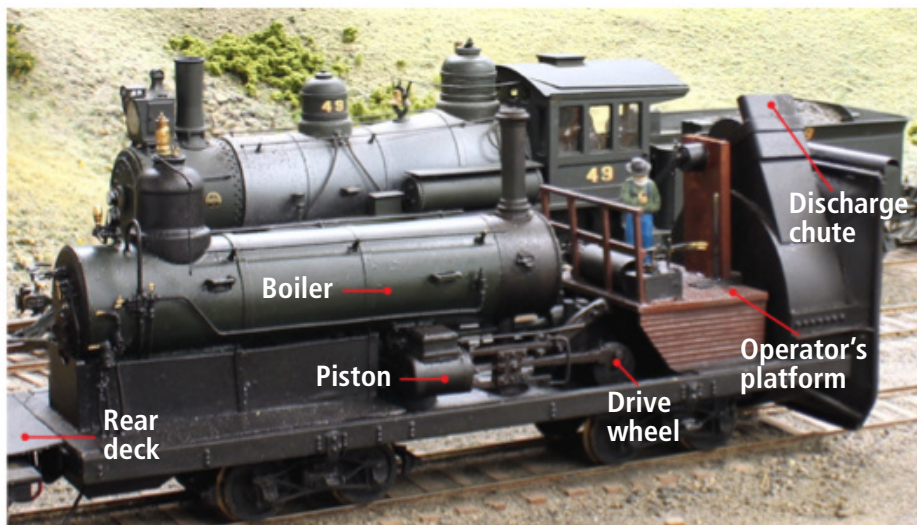
During the winter of 1899, while the plow train worked to clear the west of Hagerman Pass, the crews got the whistle



⑤ Andrew made the plow's frame from .125" x .250" brass bar stock. He laid out the rivet locations and drilled all necessary holes before soldering the parts together. The floor at the front and back of the frame are mounted to the top, while the floor under the pistons is mounted to the bottom.



⑥ Andrew built the body from scribed wood sheet to simulate the vertical beadboard siding of the prototype. The roof is also made of wood, with a tissue paper covering to simulate tar paper. The windows and door hinges are Grandt Line parts, and the grab irons are either Tichy Train Group or scratchbuilt.



7 Andrew scratchbuilt the interior equipment and concealed a motor in the boiler to drive the rotary and pistons via a gearbox under the operator's platform. The spinning impeller blades produce a nice breeze from the discharge chute.

signals confused. The plow crew wanted to stop. The first two engines got the signal correct while the other two opened up the throttles to go forward. The train buckled and derailed the plow's tender and several other parts of the train in deep snow and sub-zero temperatures at an altitude of about 10,000 feet. Fortunately, we modelers don't have to contend with that type of railroad reality.

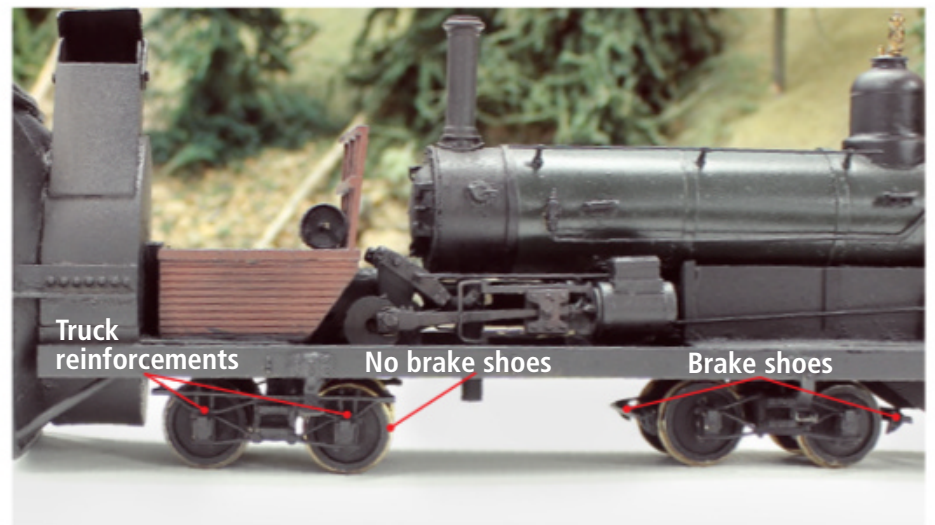
The plow's trucks

Photographers almost always took pictures of snow plows in action, which leaves modelers with little to no information on the trucks. Since my subject is long gone,

I couldn't do a personal inspection. I had to rely on the illustration in Abbot's book and one helpful photograph.

The photograph I discovered showed the machine in the open with no snow packed around the trucks. I deduced that the rear truck under the boiler had brake shoes, which would be needed to keep the machine from rolling away. On the other hand, the front truck didn't appear to have shoes **8**. The front truck would be more susceptible to getting clogged with ice and snow, rendering the brakes inoperable.

Although the boiler weighs a lot, all the heavy steel used in the gearing, and the mass of the impellers, cutting blades,



8 The trucks are scratchbuilt. The front truck is reinforced to carry the weight of the rotary plow and gearbox. Only the rear truck has brakes, as the front truck could become packed with snow, where brake gear would only be in the way.

and shrouding would have exerted a tremendous load on the front truck. To compensate for the extra burden on the archbar structure, extra pieces of steel were placed across the top of the bolster and angled down to the top of the journal boxes. Two additional support rods running from the top of the journals to the top crossbar completed the structure to the truck.

The tender

The tender used behind plow no. 8 conforms to the general design of all the tenders on the Midland (except one, which would be another story). Morris Cafky's book provided the only useful

photograph of the tender. The photo was taken while the snowplow was parked on a side track in the Colorado City yards, affording a side view of the machine around 1918, when the snowplow was identified as Rotary A.

The coal bunker had a structure with straight, high sides to hold more coal, plus a curved shield over the front **9**. This was apparently done to limit the effects of snow and ice on the coal load and allow the fireman protection from the elements. One can't shovel coal if it's all frozen together in one unwieldy lump! The water hatch was also higher than the usual design to protect it from accumulation of flying snow from the front of the plow.

Epilogue

The winter's project has been completed just as the season ended. I'll have to wait until next year to take advantage of the newest addition to my Colorado Midland Ry. I do know it will work, because when I apply power to the motor in the boiler, the rotary and impeller blades produce a nice breeze out of the discharge chute. **MR**

Andrew Dodge has written several articles for Model Railroader and its special issues. Andrew models the Colorado Midland in Proto:48 O scale.



9 The tender for the rotary plow followed the same design as the Colorado Midland's steam engines. Modifications included a cover over the coal bunker and a taller water hatch housing.

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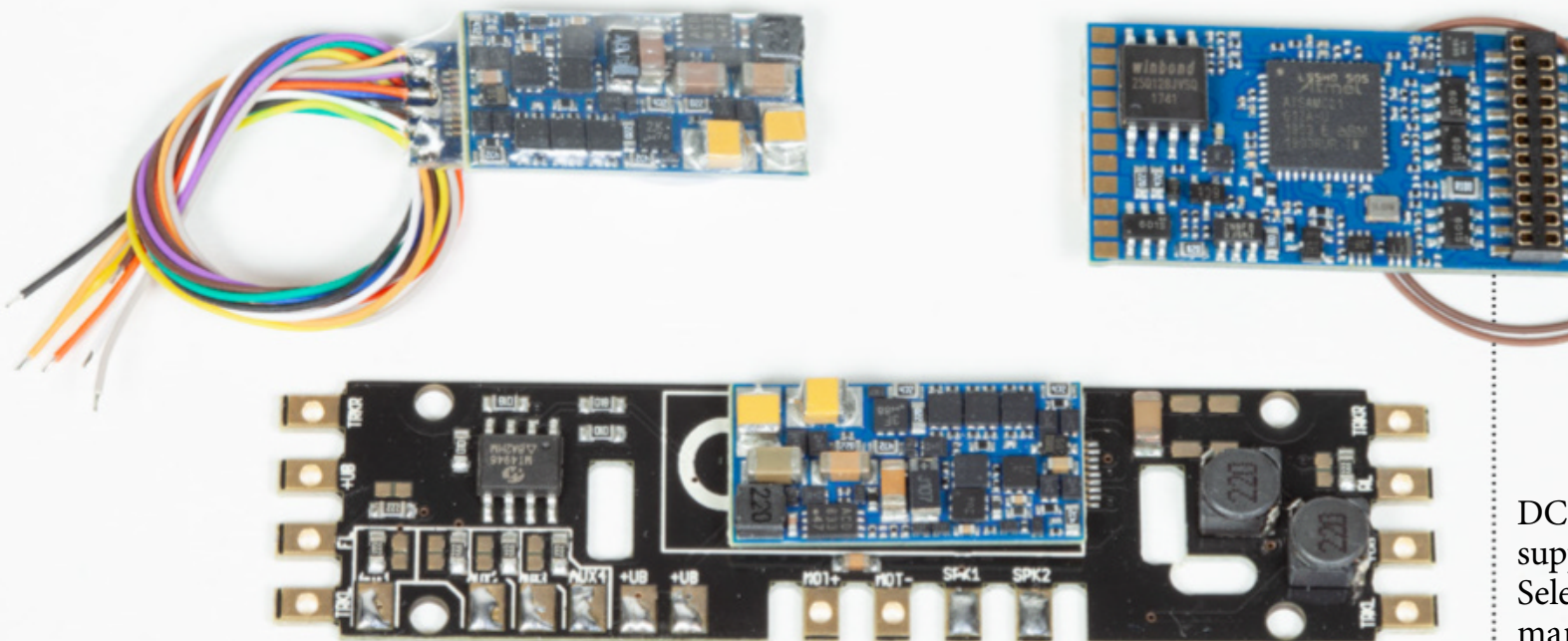
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Start Your 7 Day Trial Today!

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ESU's LokSound 5 is here!



1 Popular choices. The Electronic Solutions Ulm LokSound 5 decoders are available in a number of different sizes and configurations, including (counterclockwise from top left) the popular micro, Direct board, and 21MTC.

Electronic Solutions Ulm (ESU) LokSound version 5 decoders began to arrive in late 2019, but it took a while longer to get all the various shapes, sizes, and wiring configurations into production. Then there was the lag time in getting sufficient stock to dealers to meet demand. For example, I got many emails from folks looking for the micro-sized decoders, which were the last ones I was able to find, especially those with wiring harnesses.

However, by now you should be able to find just about anything you need, including the micro decoders, standard, Direct boards, 21MTC (21-pin style), and large-scale versions. So let's take a look at what's so different about this new version.

First, let's run through some of the technical specification changes. The biggest change is the size of the onboard memory chip, which has been increased from 32 to 128 Mbits. This means that the sound project developers at ESU will now have plenty of room to pack in many more new sounds and features.

Lack of space had been a growing issue for ESU, especially with the introduction of its Full Throttle technology. This gives more control of throttle sounds, but Matt Herman of ESU USA told me that at one point they even had to cut the brake sounds back from two to one option because of the space limitation.

Another improvement was the move up to a 32-bit processor, giving developers the ability to produce 10 sound channels simultaneously. In addition, each channel has 16-bit resolution for more accurate sound reproduction.

LokSound decoders have always had excellent motor and speed control, and ESU was an early adopter of back-electromotive force (back-EMF) load compensation. In version 5, its decoders feature improved back-EMF that is adjustable from 10 to 50 kHz pulse wave modulation (PWM) frequency, and noise-optimized motor control.

This gives added low-speed control for coreless motors, whose high efficiency design makes this especially difficult. I ran into this problem last year with a

coreless-motor-equipped locomotive and ended up swapping in several different brands of decoders before I found one that would work smoothly at slow speeds.

The new algorithm provides up to 10 different configuration variables (CVs) to fine-tune motor control. In addition, the owner's manual provides settings for several different types of motors, and there's an automatic calibration procedure.

One other change has been the elimination of the "Select" product designation. In LokSound version 4 there were two types of decoders. With the standard decoder, sound projects could be developed by users and uploaded into the decoder, although ESU also provided a large selection. The Select decoders, on the other hand, only used sound projects that had been developed by ESU.

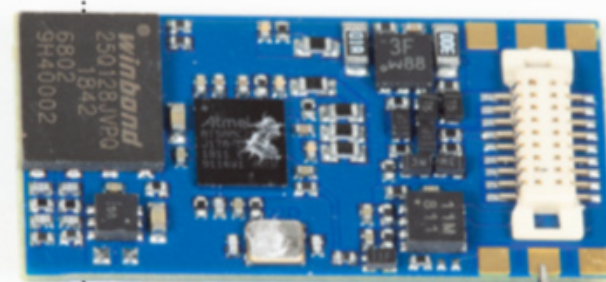
With the new version, LokSound 5 DCC decoders are made for the North American and Australian markets, whereas LokSound 5-branded decoders are made for use elsewhere. It appears

users will be able to upload their files into any version 5 decoder. The main distinction is that those for the North American and Australian market are limited to operation with DCC and analog

DC, whereas the others also support the Motorola, Selectrix, and MFX/M4 command control formats. All decoders also support RailComPlus.

One area that isn't completely clear is the sound circuit power ratings. In the full owner's manual, the decoders are reported to have an amplifier rated for 3 watts (W) at 4Ω, and are compatible with speakers rated at 4Ω to 32Ω. However, in the quick start guide supplied with the decoders, these ratings are given as 2W and 4Ω to 16Ω, respectively.

Assuming you're using the typical 8Ω speaker, then the power rating would be 1W in the latter case, and 1.5W in the former case. I point this out since overdriving a speaker may damage it, so it's a good idea to reduce your master volume setting accordingly.



2 Micro pads. The solder pads on the micro decoder are small but well-spaced, making connections possible with a pencil-tipped soldering iron. The tip of a push pin is shown for size comparison.

I typically set my master volume CV at 75 percent of maximum, but with 3W I'll probably start with a setting of about 50 percent and increase volume if necessary. I asked the folks at ESU USA about this, but they weren't sure which values were correct, and as of press time, still haven't been able to provide an answer.

As with earlier LokSound decoders, both the sound projects and firmware of LokSound 5 decoders can be updated. This means you have the option of keeping your decoders up to date with these new sounds and capabilities. However, this process does require an ESU LokProgrammer, which is only compatible with a Windows PC. (In an upcoming article I'll go over the process for updating the sound projects for LokSound decoders).

The folks at ESU have made considerable progress with converting LokSound version 4 sound projects to version 5, but mainly with diesels. There are only a handful of North American steam projects available. And although the list of diesel projects is extensive, some are still unavailable.

For example, the Fairbanks-Morse H-16-44 sound project I had planned to use for an installation wasn't available yet. It's a good idea to check the LokSound download website (projects.esu.eu) to make sure the sound project you need is available before ordering a decoder.

So let's take a look at what's available with respect to size and

shape formats. Basically, all your favorite sizes and shapes are available in the new product line ①. However, with some there are more options.

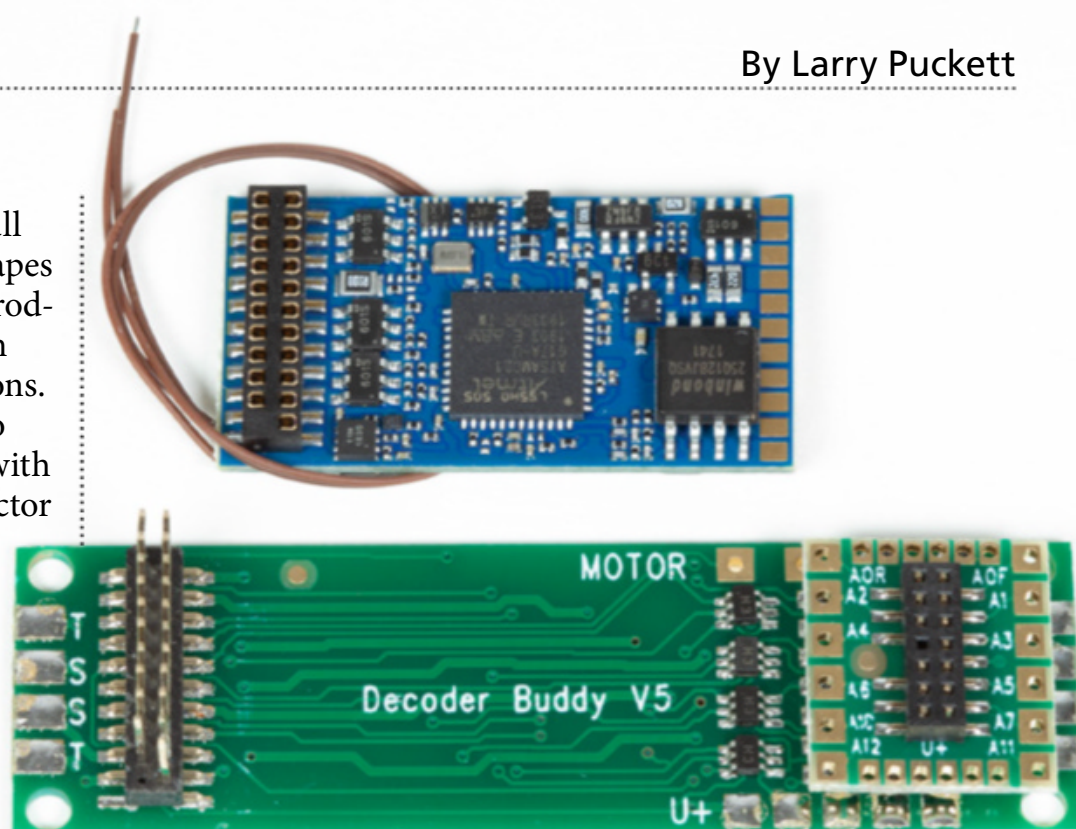
For example, the micro decoder is now available with wires and an 8-pin connector as well as a Next18 connector, or a flex strip. The increasingly popular 21MTC format makes it easy to install a decoder, assuming the locomotive manufacturer has included a prewired circuit board with the 21MTC pins. I discussed this option in the April 2019 DCC Corner column and showed a couple of compatible circuit boards.

In the September 2019 column I discussed the Decoder Buddy from Nix Trainz (nixtrainz.com), which is designed for use with 21MTC decoders. Decoder Buddy developer Nick Santos has released a new version of the Decoder Buddy designed to support the LokSound 5 decoders' expanded functions.

One especially important thing about the Decoder Buddy is the solder pads on the board for connecting a stay-alive device. Although ESU has provided much more guidance in the instruction manual for connecting its

stay-alive devices (esu.eu/en/downloads/instruction-manuals) it still requires making connections to some really small solder pads on the decoder itself ②.

The solder pads on the Decoder Buddy are a lot easier to get to, making stay-alive installation less intimidating. However, Nick included solder pads for only



③ **A buddy for your decoder.** The Nix Trainz Decoder Buddy version 5 is designed to support the Loksound 21MTC version 5 decoder's increased functions and includes the ground (GND) and U+ (blue function common) solder pads for connecting a stay-alive. A 21MTC is shown (top); note the speaker wires come factory-installed on the decoder.

the ground (GND) and U+ (blue wire), not for the third control wire found on the ESU stay-alives ③.

The folks at ESU USA advised him this wire can be connected directly to pin 1 on the 21MTC connector. Then, with some fancy decoder programming, the ESU PowerPack stay-alive will function properly (more on that in a future article). At any rate, the provided solder pads on the Decoder Buddy make installing a stay-alive much easier, but first let me pass along some warnings about using non-ESU stay-alives.

ESU USA has been experiencing a number of decoder failures due to folks using stay-alives other than ESU's PowerPack. Last year ESU told me it would be more closely evaluating warranty replacements caused by the use of non-ESU-approved stay-alives.

In discussing this problem with ESU representatives, they offered some suggestions for folks who still choose to use non-ESU devices. They have found damage to the

decoder may occur if the stay-alive is not disconnected during programming operations. In addition, the chance of damage increases with the number of CVs being programmed during a single operation. So, if you change just the momentum rate (CV3), there's less chance of damage.

However, if you're using Java Model Railroad Interface's DecoderPro program and give the command to write all CVs on a page, look out. Your best option is to totally remove the stay-alive during programming or install a single-pole single-throw switch so you can turn it off. Some folks have told me they use a magnet-activated reed switch.

Over the next few months I'll be doing columns on installing, updating, and programming LokSound 5 decoders as part of my series on legacy locomotives. Among those will be a stay-alive installation. So if you've wanted to add DCC and sound to an old Atlas S2 or GP7 locomotive, keep coming back for more. 



I TYPICALLY SET MY MASTER VOLUME CV AT 75 PERCENT OF MAXIMUM, BUT WITH 3W I'LL PROBABLY START WITH A SETTING OF 50 PERCENT.
— LARRY



Rapido Trains HO scale MLW RS-18 diesel

For the first time in plastic an accurate, roadname- and roadnumber-specific version of a Montreal Locomotive Works (MLW) RS-18 is available as a ready-to-run, HO scale plastic model. The Canadian road switcher is available with a factory-installed LokSound 5 dual-mode decoder, featuring sound files recorded from existing prototypes.

The prototype. Built by Alco subsidiary MLW, the RS-18 was a Canadian version of the Alco RS-11. Both locomotives featured 12-cylinder 251B diesel engines rated at 1,800 hp. The main spotting

feature between the two locomotives is that the hoods of the RS-18 don't have the notched corners of their Alco counterpart.

Between 1956 and 1968, MLW built 351 RS-18s for eight Canadian railroads. Canadian National Ry. had the largest fleet at 225 units. Canadian Pacific Ry. and Pacific Great Eastern/BC Rail rostered the second and third largest fleets of RS-18s. Most RS-18s were out of service by the 21st century.

The model. According to Rapido, the model was designed from 3-D scans of

existing prototypes. The HO RS-18 definitely captures the prototype's unique contours, especially at the corners of the hoods. The model's dimensions also match a prototype builder's diagram.

Classed MR-18a to MR-18g, the CN RS-18s were delivered between 1956 and 1960. Our review sample models CN no. 3125, which was one of 30 units designated MR-18e delivered in 1959. These units were geared for 80 mph and featured pass-through piping so they could be used with steam-generator cars in passenger service.

These units also had their dynamic brakes installed in the short hood, which can be identified by the louvers on the short hood's left side (with the locomotive's long hood facing forward).

Rapido included all these details and more in its exquisite model. Grills and access doors are well defined in the injection-molded plastic body shell. Separate detail parts abound, including metal handrails in plastic stanchions, etched-metal steps, and radiator grill with fan detail underneath. The firm has also produced all the different truck, fuel tank, and other detail variations of the



Removing the short hood and cab reveals a detailed cab interior, including separately applied seats. The control panel features backlit gauges.

PERFORMANCE CHARTS

DRAWBAR PULL	3 ounces 42 HO scale freight cars
SCALE SPEED (DC)	
VOLTS	SCALE MPH
7.5 (start)	2
9	18
10	31
11	47
12	63
SCALE SPEED (DCC)	
SPEED STEP	SCALE MPH
1	1
7	19
14	32
21	68
28	76

RS-18 as appropriate for each road name.

Our review sample accurately models no. 3125 as it appeared in the 1980s. The locomotive was originally built as a “lightweight” version with transverse fuel and air tanks, riding on 8'-10" trucks. By the 1980s no. 3125 had been refitted with “heavyweight” AAR Type B trucks that had a 9'-4" wheelbase and a prominent center leaf spring, as depicted on the Rapido model. Our model even includes yellow rerailing frogs under the side sills.

The striped CN paint scheme features sharp color separation and accurately placed lettering that matches prototype photos. This includes the MR-18e designation under the road number and the FL on the sills at the end of the long hood, which designated that the unit ran long hood forward.

Taking things apart. After removing the handrails, I pressed the cab sides and carefully removed it from the frame. The cab interior is impressive with painted,



The model features separate handrails and other detail parts.

separate seats for crew figures (not included) and a detailed control panel.

According to the instructions, removing the long hood to access the model's mechanism is difficult and should be avoided. After removing the cab, the short hood, and handrails, the long hood can be removed by carefully disengaging the clips that hold it to the chassis. The clip locations are shown in the exploded view diagram in the instruction manual. It's a tight fit and breaking one of the clips means that the shell won't reseat properly during re-assembly.

Resting in the center of the die-cast metal frame, the model's dual-flywheel-equipped can motor is connected to truck mounted gear boxes powering all four axles.

The main printed-circuit board is attached above the mechanism with the ESU LokSound decoder plugged into its 21-pin socket. The decoder is also connected to a well-enclosed smartphone-style flat speaker.

Performance. On our DCC test track, the model crept along at 1 scale mph in speed step 1 and accelerated to a top speed of 76 scale mph. Its drawbar pull is equivalent to 42 free-rolling freight cars on straight and level track.

I pressed function 8 (F8), heard the 251 diesel engine rumble to life and saw the number boxes illuminate. Function 0 turned on the dimmable (F7) headlight. Pressing F11 turned the white class lights on and off.

Rapido really upped its lighting game with some additional effects on the RS-18. There are ground lights (F18) above the trucks under the cab. Remember the detailed cab interior noted above? The gauges on the control stand are actually backlit.

Other user-triggered functions include the Nathan M3H horn, bell, and a realistic dynamic brake sequence. All the functions can be remapped and every other aspect of the decoder can be adjusted using configuration variables (CVs). A full ESU decoder manual is available as a free download at loksound.com. I used the free LokProgrammer software and a LokProgrammer computer interface (MRSP \$179.99) to program our review sample.

Facts & features

Price: \$335 (DCC sound), \$225 (DC, no sound)

Manufacturer

Rapido Trains
500 Alden Road, Unit 21
Markham, ON L3R 5H5
rapidotrains.com

Era: 1956 to (late 1970s to early 1990s, as detailed and decorated)

Road names (multiple road numbers produced): Canadian National (stripes, green, Tempo, and “wet noodle” schemes), Canadian Pacific (block scheme and script scheme), CP Rail. Undecorated versions also available.

Features:

- 21-pin DCC socket
- All-wheel drive and electrical pickup
- Blackened metal wheels in gauge
- Die-cast metal chassis
- Dual-mode ESU LokSound 5 decoder
- Light-emitting diode headlights, class lights, ground lights, and number boxes
- Macdonald-Cartier knuckle couplers at correct height
- Weight: 13.8 ounces

After adjusting our RS-18's momentum and braking rates, I ran a freight around our Milwaukee, Racine & Troy layout. I enjoyed using DRIVE/HOLD (F9) to keep the speed constant while I used the throttle to notch the engine rpm. Pressing F10 triggers the brake.

The locomotive easily maneuvered through no. 5 and no. 6 turnouts. During our hill climb test, the RS-18 pulled 10 freight cars up a winding 3 percent grade without slipping.

On our DC test track, the engine's sounds and lights started at 6V. At 7.5V, the model rolled smoothly at 2 scale mph and accelerated to 63 scale mph at 12V. On DC the sound effects are limited

to engine rpm and squealing brakes unless an analog DC Controller, like a Model Rectifier Tech 6, is used.

For three decades RS-18s were a ubiquitous sight in eastern Canada. Kudos to Rapido for bringing this Canadian road switcher to HO scale. – Dana Kawala, Senior Editor

MORE ON THE WEB

Check out the ESU LokSound-equipped Rapido HO scale MLW RS-18 in action at ModelRailroader.com



Sneak peek: Broadway Limited Imports HO scale streamlined PRR K4s

It was a lucky day for the Pennsy fans around the *Model Railroader* offices this month. Broadway Limited Imports sent us an undecorated pre-production engineering sample of the firm's new HO scale model of the Pennsylvania RR's first streamlined K4s 4-6-2 steam locomotive, no. 3768. And rather than wait for the production model to become available, we wanted to share this sneak preview with our readers.

Part of BLI's Paragon3 series, the model features a dual-mode decoder with sound, light, and smoke effects that operate on Digital Command Control (DCC) and direct-current (DC) layouts.

The prototype. The PRR streamlined five of its 425 K4s Pacific steam locomotives. The first was no. 3768 in 1936. The initial design was by famed PRR collaborator Raymond Loewy and was part of a mid-1930s initiative to improve passenger revenues by offering more modern-looking trains.

Initial testing showed the streamlining could result in an additional 300 hp available from the engine, but that was only going into a headwind. Tailwinds and crosswinds resulted in diminished benefits, and the enthusiasm for streamlining waned, but not before four more K4s locomotives were streamlined in

1940, albeit in a simpler design.

PRR no. 3768 became a public relations star pulling trains between Philadelphia and Pittsburgh, and also saw service into St. Louis and Chicago. In addition to the streamlined shroud on the locomotive, a unique (for the Pennsy) six-axle tender was used. It had been designed for use with an IIs Decapod and carried 18,500 gallons of water and 18.75 tons of coal.

After 12 years, the shrouding on 3768 was removed, as was its large tender. The



The detailed tender includes an operating backup light.

locomotive was dropped from the roster in October 1953.

The model. The major dimensions of the Broadway Limited's model of no. 3768 were within scale inches of numbers printed on PRR equipment diagrams on Rob's Pennsy Page (pr.railfan.net). The distance between the HO locomotive and tender is about a scale foot farther apart than on the prototype, which helps the model negotiate tight curves. However, this extra distance isn't that noticeable, especially when the cab apron is folded down over the tender deck. All of the panel lines and detailing I could see in the prototype photos of no. 3768 were reproduced on the model.

The boiler is a heavy die-cast metal casting, as is the tender shell. The combination weighs 1 pound, 11.8 ounces. A gearbox connects the third axle to the flywheel-equipped motor while side rods transfer power to the other axles. Traction tires on the third drivers should make this locomotive a stout puller.

A six-wire harness connects the locomotive to the electronics in the tender. A drawbar under the locomotive cab snaps securely to a post concealed in the front of the tender. In addition to the decoder, the tender also houses dual downward-facing speakers.



Although this preproduction sample was undecorated with unpainted detail parts, the boiler and tender shell were smoothly painted in PRR's Dark Green Locomotive Enamel. Broadway Limited is also making versions in the prototype's earlier bronze paint scheme, as shown in the product listing.

On the layout. Since our sneak peek locomotive was an engineering sample, and not a production model, we didn't think it fair to run it through our standard performance tests. However, since the model's sounds and smoke worked, we did take it for a run on our staff layout, the Milwaukee, Racine & Troy.

The locomotive exhaust sound is synchronized with the sound and smoke unit. The speakers provided impressive sound at all volume levels. The Paragon3 decoder supports the Rolling Thunder subwoofer system (sold separately) for those want the room-shaking impression of standing trackside.

The smoke unit produced distinct puffs of smoke at low speeds. As I ran the locomotive faster, the smoke began streaming back over the boiler, helping convey a feeling of power at speed.

Although we didn't have an instruction sheet, the user-triggered functions followed a table in BLI's Paragon3 steam manual available for free on the company's website. Function 2 triggered the correct PRR passenger-style

Facts & features

Price: \$549.99

Manufacturer

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

Era: 1936 to 1948

Paint schemes (one road number, 3768):
Bronze paint, as-delivered, high-mounted keystone; bronze paint, as-delivered, low-mounted keystone; dark green locomotive enamel, low-mounted keystone; unlettered, bronze paint; unlettered, dark green locomotive enamel

Features

- Die-cast metal body and chassis
- Factory installed engineer and fireman figures
- Flywheel-equipped motor
- Metal Kadee-compatible coupler
- Minimum radius: 18 inches
- Operates on code 70, 83, and 100 rail
- Paragon3 dual-mode sound and operation system, compatible with Rolling Thunder
- Separately applied handrails, ladders, whistle, and brass bell
- Synchronized puffing smoke with chuff sound

whistle. Pressing functions 5 and 6 let me adjust the intensity of the chuffs to simulate drifting downgrade or powering up a hill with a heavy load. Function 3 triggers a coupler crash sound or the sound of coupler slack letting out when the locomotive starts moving.

Lighting features include cab interior number boards, classification lights, and a backup light and markers on the tender. The lights except for the cab interior, came on when I pressed Function 0.

Like other Paragon3 locomotives, the K4s will also run on DC layouts. Using a

Broadway Limited Imports DC Master analog controller allows access to all the sound and lighting functions and provides some programming capability on a DC layout.

We hope you enjoyed this first look at the Broadway Limited Imports HO scale PRR streamlined K4s. – *Eric White with Dana Kawala*

MORE ON THE WEB

Check out additional photos and a short video of the BLI HO scale streamlined K4s at ModelRailroader.com

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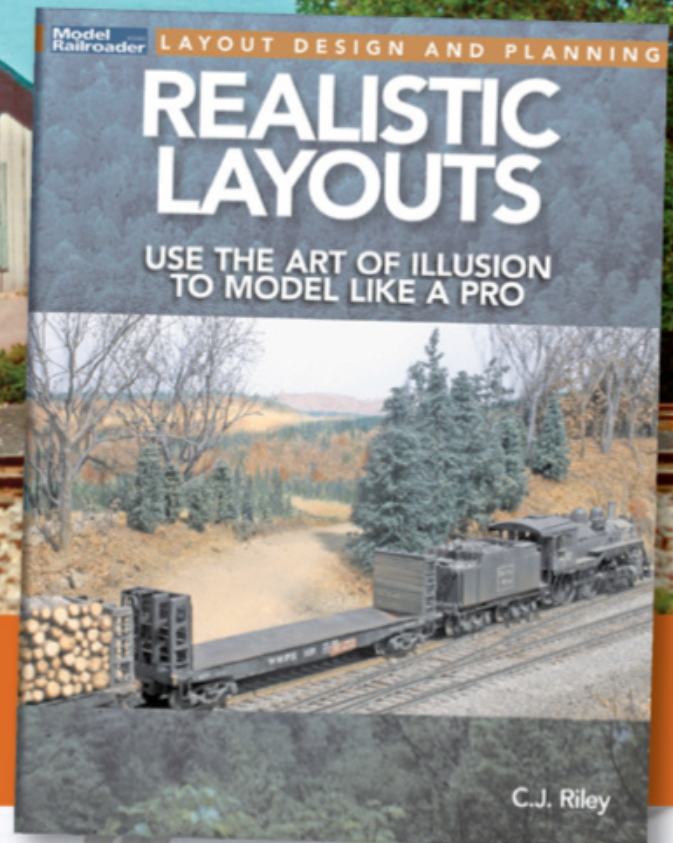
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Micro-Trains N scale heavyweight coach

A workhorse New York Central heavyweight coach is now available in N scale from Micro-Trains Line Co. Our review sample is accurately detailed and decorated for NYC coach no. 2347.

The prototype no. 2347 was one of 40 78-foot steel heavyweight coaches built by American Car & Foundry for the NYC in 1926. The cars were equipped with air-conditioning equipment during the 1930s. By the 1950s some cars were used in commuter trains. Those that lasted into the 1960s ended their careers in MOW service or had their center windows blanked out for use as rider cars.

The model's dimensions are within scale inches of prototype builder's diagrams. Because model couplers are



oversize, the overall length between coupler pulling faces is 2 scale feet longer than the prototype. The plastic body shell features sharply molded rivet seams and other details.

Our review sample is detailed and decorated as no. 2347 appeared in the late 1930s to 1940s. The car body is smoothly painted in Pullman Green with black roof, underbody, and trucks. The gold lettering is the appropriate sans serif "Gothic" style font adopted by the Central at that time. Around 1940 lettering on NYC passenger cars would be

changed to a yellow, imitation gold color. The "C" under the road number designates that the car has air conditioning equipment.

The press-fit roof is easy to remove by running a fingernail between the seam that separates the roof from the body. Lifting off the roof reveals a one-piece interior molded in blue-green plastic, with seats and partitions. Passenger figures could be easily added to the simplified interior.

The underbody features the correct fish-belly center sill with molded equipment boxes and brake gear detail. Like

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Removing the heavy-weight coach's press-fit roof reveals a one-piece interior with seat and partition detail.

the prototype, our NYC sample runs on four-wheel trucks with the correct 8 scale foot wheelbase. The plastic truck sideframes also matched prototype photos, including well-defined brake shoes, leaf springs, and journal details.

The low-profile plastic wheels are in gauge and had no problem operating on code 55 rail. The wheels are also the correct 36 scale inches in diameter. The passenger car easily rounded an 11" or larger curve radius.

The car weighs 1.2 ounces, which is about .1 ounce lighter than National Model Railroad Association (NMRA)

Recommended Practice 20.1. The Magne-Matic couplers are body-mounted at the correct height per NMRA standards and all the wheelsets are in gauge.

Micro-Trains has also released versions of the 78-foot heavyweight coach with six-wheel trucks in road names that include Canadian Pacific Ry., Great Northern Ry., and Pennsylvania RR.

With its continuing release of various heavyweight car types, Micro Trains Line makes it easy for N scalers to model passenger traffic in the steam and steam-to-diesel transition era. – *Dana Kawala*

Facts & features

Price: \$29.95

Manufacturer

Micro-Trains Line Co.

351 Rogue River Parkway

Talent, OR 97540

www.micro-trains.com

Era: 1920s to 1960s (late 1930s to 1940s as decorated)

Road name: New York Central

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Called for a Barlow Turn

One of my regulars committed a flagrant violation during an operating session by asking when Rule G was in effect. Rule G, which prohibits alcohol consumption on duty, is paramount on my layout. It applies between 2 a.m. and 6 a.m., carefully considered because I can't imagine ever having a session between those hours.

Looking him right in the eye, I said, "You're called for a Barlow Turn!"

Rules, rules, rules. The mere mention of the word turns off many of us. But rules are as certain as taxes, and safe, efficient railroad operation has depended on them since England's Liverpool & Manchester issued its first *Book of Rules* in 1830. Railroading has much in common with the military. Both rely on hierarchical structures; both rely on discipline in the ranks.

Suspension and dismissal became common forms of rules enforcement. In 1886, Superintendent G.R. Brown developed a less severe system for New York Central predecessor Fall Brook RR. He reasoned that education was more important than harsh punishment, especially when the affected employee's dependents would suffer from loss of income.

Brown developed a point system that logged incidents, good and bad. He posted bulletins describing the incidents, educating all employees without naming those involved. An employee with

a long record of reliability was not measured by a single minor incident. However, an employee whose record showed a long string of carelessness could be removed.

Brown's principles appear in the motor vehicle point systems most states use to identify high-risk drivers. Motorists whose records are free of moving violations for a period of years have them wiped clean.

London's Railway Gazette published *The Brown and Other Systems of Railway Discipline* in 1923. Its author, with the coincidental name of K.J. Norman Browne, argued the benefits of the system and gave examples of its use on various English and North American railroads.

Today, such systems are known as progressive discipline, but demerits persist in railroad jargon as "Brownies." Some credit the familiar "Brownie points" slang with railroad origins.

One floor above commuters rushing through New Jersey Transit's venerable and vital Hoboken Terminal, opened by the Delaware Lackawanna & Western in

1907, is the place shown in the photo. A sign above the door that leads to the hushed scene declares it "The Long Hallway." For years, the Trainmaster summoned suspects to his office at its far end. The Rules Office and the General Superintendent's office commanded a good view of the hallway's entrance, making



Two New Jersey Transit railroaders stride through The Long Hallway, echoing generations of Erie-Lackawanna employees who also marched along it. Jerry Dziedzic photo

such occasions even more intimidating. I know the nerves eating at the railroaders whose steps echoed ominously through The Long Hallway, having been called during investigations of two incidents in my own still-young railroad career with another carrier.

Bob Willer, a longtime Spokane, Portland & Seattle historian and modeler, wrote to me about Frank S. Barlow, Assistant Superintendent and later Superintendent of the railroad. Bob's personal collection includes a November 27, 1959 letter to a young brakeman reading crisply:

Please report to my office at your earliest convenience.

/s/ F.S. Barlow, Jr.

Assistant Superintendent

Such a visit to the railroad's general office building at Northwest 11th and Hoyt in downtown Portland, Ore., became known as "making a Barlow Turn." Confronting

the accused, Mr. Barlow would read him the riot act. Defiance was usually met with brownie points or days of suspension.

The most satisfying operating sessions are those in which a layout comes alive the way its host dreamed it would. No threatening investigations take place and the only brownies are those served with good-natured ribbing after the session. On the other hand, someone whose carelessness damages prized models or who refuses to play the game risks losing the host's invitations.

My friend who asked about Rule G innocently said he hadn't run the Barlow Turn before and looked forward to a change in jobs. He's a good operator with a sense of humor who'll always be welcome, but long will he suffer teasing about being called for a Barlow Turn. **MR**



DEMERITS PERSIST IN RAILROAD JARGON AS "BROWNIES." SOME CREDIT THE FAMILIAR "BROWNIE POINTS" SLANG WITH RAILROAD ORIGINS.
—JERRY



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Boston & Maine class S-1a 2-10-2 heads westbound from Boston, pulling a string of boxcars bound for Mechanicsville, N.Y., in the fall of 1944. John VanDenburgh photographed the locomotive, an NJ Custom Brass model, on his HO scale B&M Fitchburg Division. John decaled the locomotive, weathered it with powdered chalks, and installed a TCS WOWSound decoder.



A logger at the Fanny Gorn Lumber & Box Co. guides a log into the mill chute while a Baldwin 4-6-0 pushes a log car over to the ramp for unloading into the mill pond. Meanwhile, boxcars are loaded with cut lumber in the background. Greg Smith of Brookings, Ore., shot the photo on his On30 layout. The locomotive is a Bachmann Trains model. The sawmill is scratchbuilt.

Pennsylvania RR's famed *Broadway Limited*, behind a pair of Electro-Motive Division E8 diesels, passes a trio of Baldwin Sharknoses on its way to meet a manifest freight at Horseshoe Curve, west of Altoona, Pa. Art Mulrooney of Millmont, Pa., built the N scale Pennsylvania RR Middle Division layout with the help of his friend Bill Tufts. Julian Kaiser shot the panorama.



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Schedule of Events

AZ, GLENDALE: ARHS Model Train Swap Meet. Glendale Christian Church, 9661 North 59th Ave. Saturday, May 16, 2020, 9:00am-1:00pm. Admission \$5.00. Tables \$25.00 to sign up send stamped envelope, check or money order to ARHS, PO Box 5816, Glendale, AZ 85312-5643. Contact: Craig Faris 623-340-3529

FL, OCALA: Lions Tri-Annual Train Show. First Christian Church, 1908 E Fort King St. Saturday, June 13, 2020, 9:00am-2:00pm. Adults \$4.00, children 12 and under free w/ adult. Bring two canned goods and receive \$1.00 off admission. Information: Bob 352-694-6381 or cell 813-203-3216

IL, GREENVILLE: American Heritage Railroad Train Show @ American Farm Heritage Museum I-70 @ IL Rt. 127 (Exit #45). Saturday, June 13, 2020, 10:00am-4:00pm. Admission: \$5.00, under 12 FREE. Train ride with paid admission. Operating layouts. Dealers welcome \$15.00 per table. Contact Jim @ 217-825-6230.

IL, ST. CHARLES: 44th Annual Kane County Railroadiana and Model Train Show. Kane County Fairgrounds, 525 South Randall Rd. Sunday, June 14, 2020, 10:00am-3:00pm. Admission: \$6.00 w/tax. Tables \$60.00. For information: 847-358-1185, RussFierce@aol.com or www.RRShows.com

KS, HUTCHINSON: CANCELLED-Kansas Central Model Railroaders, Center of the Nation Model Railroad Expo. Kansas State Fairgrounds, Pride of Kansas Building, 2000 N Poplar or 23rd and Main entrance. June 6-7, 2020. Saturday 9am-5pm, Sunday 10am-3pm. Admission \$7.00, under 12 free w/adult. 100+ Vendor Tables & numerous layouts, free parking (handicap accessible). Contact Don Phillips 620-662-5906 or www.kansascentralmodelrailroaders.org

NC, SPENCER: Model Train and Railroadiana Show at the North Carolina Transportation Museum. May 16-17, 2020. Saturday 9am-5pm. Sunday 12-5pm. Dealers, layouts, clinics, train rides, and more for the whole family! Details: nctrans.org or 704-636-2889 ext. 251

TN, JOHNSON CITY: George Carter Railroad Museum Train Show. East Tennessee State University MINIDOME, 1081 John Robert Bell Drive. June 5 & 6, 2020. Friday Noon-6:00pm and Saturday 10:00am-4:00pm. Admission \$6.00, under 12 free. Free garage parking. Vendors, working layouts, live steam. Contact Roger Tienart 423-791-4937 or Gary Emmert 903-452-5012.

TX, AUSTIN: Austin Area Train Show, Williamson County Expo Center, 5350 Bill Pickett Trail, Taylor, TX (just minutes past Dell Diamond). September 5-6, 2020, Saturday 10am-5pm, Sunday 10am-3pm. Admission: \$7 (includes both days), children 12 and under FREE w/adult. Vendors, model and lego railroads, home tour included. Concessions and free parking. For more info, visit austintrainshow.org

WI, EAU CLAIRE: 3rd Annual International Toy Train Expo. July 11-12, 2020. Saturday, 10am-5pm. Sunday, 10am-4pm. Chippewa Valley Expo Center, 5150 Old Mill Plaza, Eau Claire, WI 54703. Toy trains, kids events, family fun! \$3 early bird, \$6 at the door. Ages 17 & under FREE. Tickets: menards.com/trains or any Menards store.

WI, LA CROSSE: Rail Fair, Copeland Park, Rose & Clinton Streets. July 18, 2020, 10:00am-4:00pm. Admission \$5.00, under 12 free. Railroad Show, Sale & Exhibition. Model, Toy & Antique Trains & Memorabilia, Railroad Exhibits & Displays. Information: 4000 Foundation, PO Box 3411, La Crosse, WI 54602, 608-781-9383

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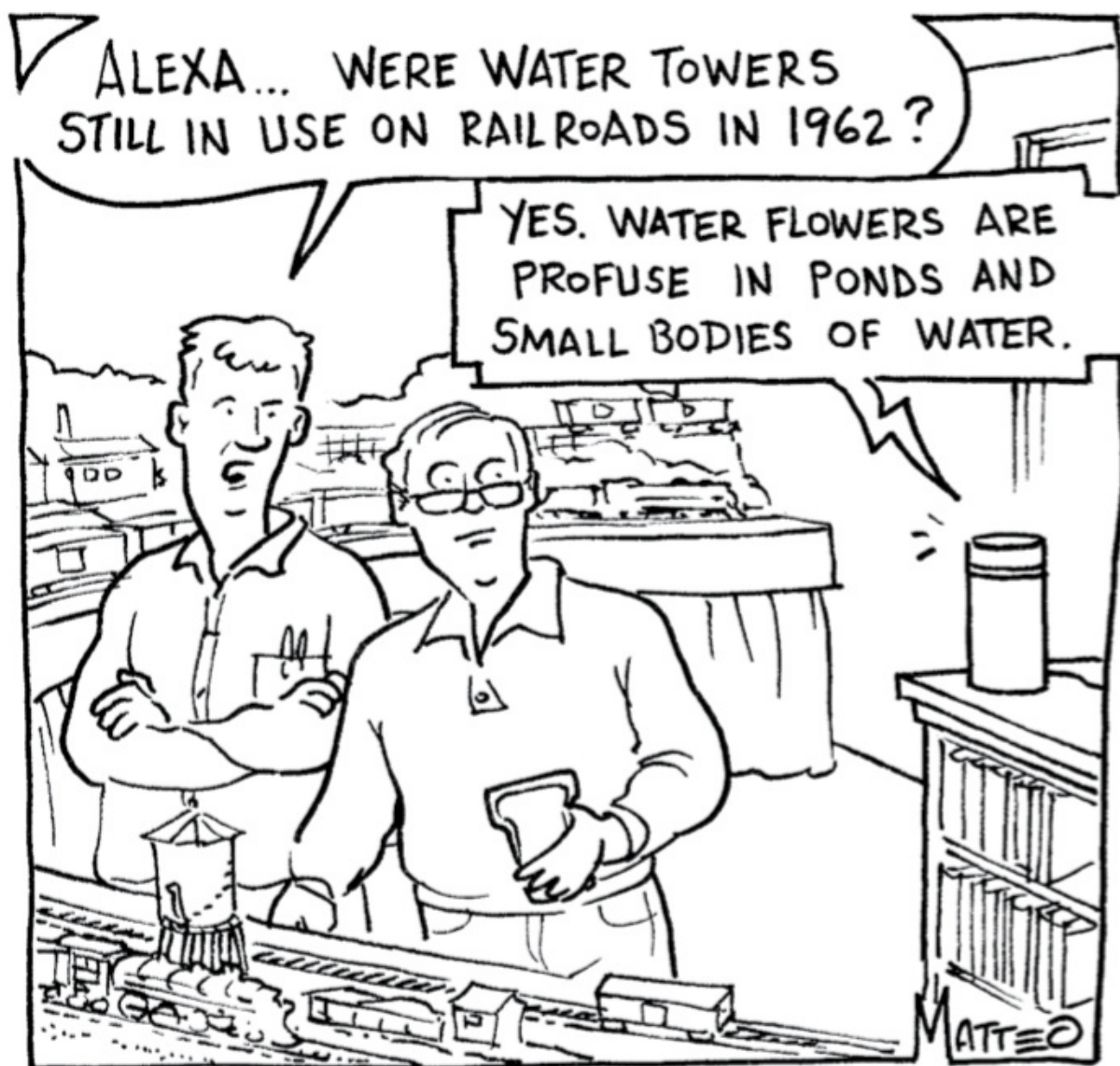
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The Art of Illusion	62	Micro-Mark	17
Atlas Model Railroad Co., Inc.	5	Modeler's Marketplace	68-69
Axian Technology	13	MR Best of Scenery	64
Bachmann Industries, Inc.	76	Nace's Videography	13
Broadway Limited Imports	21	National Train Show	22
Build 3 MR Projects	27	NCE Corp.	18
Circuitron	17	Nicholas Smith Trains	16
The Coach Yard	17	PECO Products	14
Custom Model Railroads	63	Rapido Trains	2
Digitrax	15	Right on Track Models	17
Galesburg Model Train & Toy Show ..	9	Showcase Express	13
GMR 2021	72	Sievers Benchwork	17
Great Midwest Train Show	17	Train Collector's Association	61
Great Train Expo	17	Trainz.com	63
Greenberg Show	17	Wm. K. Walthers	3
Halfpricehobby.com	63	Woodland Scenics	19
Kato USA, Inc.	75	Xuron Corporation	13
Menard, Inc.	7	Yankee Dabbler	17
Micro Engineering	22	Z-Stuff for Trains	16

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The all-too-familiar problem of inertia

Sometimes, all it takes

is a little push. We want to do something – we know we should do something – but we can't seem to get off the dime. And yet, from long experience we know that once we get started on this dead-in-the-water project, others will fall in line, and significant progress will be made.

So what's the problem? Inertia.

You don't have to be a

physics major to have a keen understanding of the pros and cons of inertia. Get something heavy rolling and, for better or for worse, it tends to keep on rolling as it gathers momentum. The problem is getting it rolling in the first place; we can deal with stopping it later.

Regardless of their mass, modeling projects have built-in inertia. They'll sit there staring back at us for weeks, months, years. If only we could summon the energy to get them started.

On my HO tribute to the Nickel Plate Road's St. Louis line in 1954, only a few important buildings – a depot, the superintendent/dispatchers' office, a small yardmaster's office, a lumberyard, and maybe more accurate versions of two shanties – remain to be built. Frank Hodina and Randy Laframboise each contributed an L-shaped joint depot, helping progress significantly.

The super's two-story brick office looks like a complex kitbashing project based on two, maybe three, Walthers Merchant's Row III kits. To test the feasibility, I made sketches of what could go where, and I may make several photocopies of each wall and then cut and tape them together as further insurance of eventual success.



Overcoming inertia is largely a matter of nibbling away at intimidating projects, such as scratchbuilding this intricately detailed (but incorrectly repainted, at least for the 1950s) wood-and-brick depot at Veedersburg, Ind. Tony Koester photo

The NKP depot at Veedersburg, Ind., still stands, so obtaining information won't be difficult. What does concern me is a handful of tricky architectural features, including a wood arch over the entrance door and a compound, or "cranked," hip roof. Despite these challenges, the project looks doable once I get started.

Three other structures – a complex L-shaped brick depot, a two-story hotel, and an L-shaped wood freight house modified from a Monon Historical Society kit – were quickly completed as a video shoot loomed. Forrest Nace of Nace Videography should have completed the shoot for a two-hour DVD before you read this, but I'm hoping to get at least one more key structure done before he calls it a wrap. Deadlines – be they for videos, magazine articles, layout tours, or the next operating session – are great motivators.

When we built our current home, I was 31 years old. I could work all day, build the

Allegheny Midland till late at night, and teach folks how to fly sailplanes on weekends. I was kidded about being over the hill when I reached age 30, but that was actually a high-energy time for me. Few hours were wasted.

I seldom waste time today, either, but my definition of what constitutes a waste of time has changed since then. One of my favorite ways to not waste time is to sit in a comfy chair on the top deck of a Viking longship as a portion of scenic Europe glides by, contributing not a whit to the progress of my model railroad.

If you had visited the Allegheny Midland before it was dismantled at the turn of the century, you would have come away with the impression that it looked "finished." Lots of work on the signaling

system remained incomplete, but that wasn't visible and hardly affected operations. Similarly, if you visit the NKP layout in the same basement today, I suspect your impression would be that it's largely "finished."

So what's my secret to overcoming inertia? Deadlines.

I scare easily when a deadline looms, and I seem to encounter a lot of external or self-imposed deadlines.

Finishing projects before the next operating session, National Model Railroad Association convention, or prototype modelers' meet are good examples of how to use pressure to your own benefit.

Yes, model railroading is just a hobby, but most of us are happier when we get a lot done. **MR**



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