

SPECIAL ISSUE • LATEST MATERIALS • TOP TIPS!
ANNUAL HOW-TO GUIDE

MODEL RAILROADING IS FUN!

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January 2021
ModelRailroader.com

Improve your layout photos p.50
Plus: Six detailed projects!

Model forbidden places

p.30

Take your photos to the next level with Brooks Stover's expert advice. See page 50.

PLUS

Reviewed: New HO Big Boy from Trix p.62

Visit an HO layout set in canyon country p.42

Learn to use fiber optic lighting p.56

**BONUS
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F59PH

IN HO SCALE

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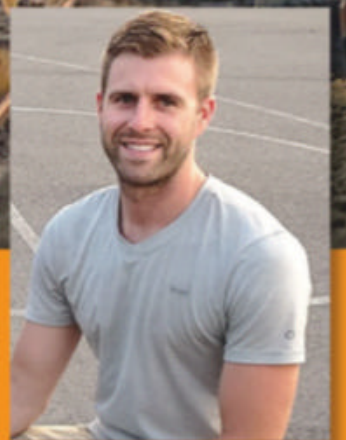
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▲ Brandon Lepley of Lewisburg, PA created this stunning entry for the 2020 NMRBO contest.



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WALTHERS

Planning your entry starts now with a visit to your local hobby shop in person or online to stock up on the tools and supplies that'll turn your ideas into a modeling masterpiece! **Watch for complete contest details and kit packs coming soon.**

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On the cover: Brooks Stover uses his S scale Buffalo Creek & Gauley to demonstrate how to take better photos. See page 50. Brooks Stover photo



Next issue

In February's issue, Pelle Søbørg shows his new layout modules, Doug Tagsold tells us how he built a snow scene, Tony Koester scratchbuilds a depot, and more!

MREXTRA

Trains.com subscriber extra

Model Railroader (USPS 529-810, ISSN 0026-7341) is published monthly by Kalmbach Media Co., 21027 Crossroads Circle, P.O. Box 1612, Waukesha, WI 53187-1612. Periodicals postage paid at Waukesha, Wis., and additional offices. POSTMASTER: Please send address changes to *Model Railroader*, P.O. Box 8520, Big Sandy, TX 75755. Printed in USA. Canada Publication Mail Agreement # 40010760.

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David Popp, Cody Grivno, and the entire *Model Railroader* team welcome you to our Trains.com website. Jenny Freeland photo

Model Railroader

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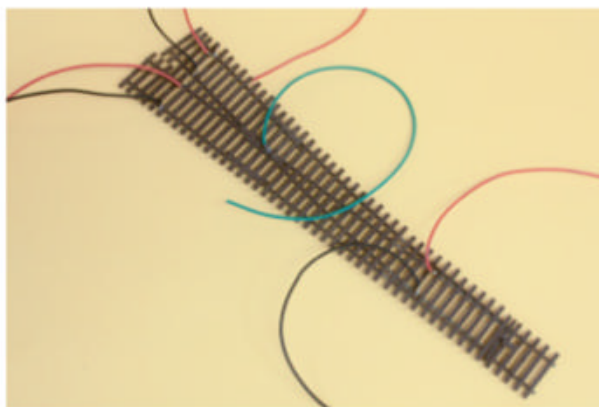
The *California Zephyr* emerges from a tunnel onto Clio Viaduct on David Savage's N scale layout. A reader wants to know more about how David carved his railroad from the earth under his crawlspace. David Savage photo

Get the dirt on this layout!

I just got my August issue of MR and am having a hard time believing one of the captions in Trackage Photos. David Savage's photo of Keddie Wye on his layout is pretty neat, but someone needs to do a story on how he built this layout. Cutting into the earth under his house with a pickaxe? Please tell me someone is getting the full scoop on this! And the sooner, the better.

Scott Wendt, St. Michael, Minn.

[Scott, we've forwarded your request to David Savage. If he wants to tell us more about his unique N scale layout, we'll gladly pass it on to our readers. – Ed.]



James McNab shared his techniques for more reliable turnouts, including wiring the frog and closure rails, in the August 2020 *Model Railroader*. James McNab photo

Double-check those turnouts

I enjoyed James McNab's feature on trouble-free turnouts, and I agree heartily that switch points have enough to do just keeping wheels on their designated

path. Electricity should be up to the wiring. Solidly soldered electrical jumpers are a pain, but worth every minute spent.

The article raises a question, however. It used to be true that commercial turnouts weren't truly ready to run. If you wanted trouble-free trackwork, you had to use an National Model Railroad Association (NMRA) standards gauge to check everything you bought. Is the quality now so consistent and good that today's turnouts can truly be installed as is? James seems to expect that.

If not, use an NMRA gauge (not a test car!) to ensure the guard rails protect the frog point from the wheel flanges as they pass and that there are no tight or wide spots. It will take only about 60 seconds to check that everything is OK. I would at least check a few samples.

Chris Reed, no city given

Practice skills, find new interest

In the August 2020 issue, Lance Mindheim talks about building a small layout to practice various techniques. That's what I did when I first jumped into model railroading. As I progressed and my skills improved, I tore up several areas and redid them. If an idea I had didn't work as well as it did in my head, I'd try something different.

In the process, I found I like building structures. I really like to build prototype structures on the Milwaukee Road. Maybe someday I'll build the layout of my dreams, but for now I'm content with improving my skills. As I read Lance's article, it made me smile that I was doing exactly what an expert suggests. Thanks, and keep up the good work.

Mark Ramsey, Castlewood, S.D.

More on uncoupler control

I enjoyed Craig Williams' article in the October issue where he used a rotary switch to control 16 RailCrew uncouplers. Since his rotary switch had only 4 levels, he chose to keep the panel light-emitting diode (LED) instead of the under-track LED. Actually, he can also use the under-track LEDs by simply connecting a negative power lead from the power supply to terminal 3 on all the uncouplers. The uncoupler's internal switch will light the under-track (and panel) LEDs when the uncoupler is in the active mode.

The under-track LED offers a big benefit. When uncoupling cars, the LED indicates where to stop and pull away. This is especially useful in yards where other cars can block the view to the couplers. Just look under the cars that are obstructing the view and watch for the trip pins to reflect the light.

Randy Schnarr, Southampton, Ont.

NYC's early 4-8-2s

In the August Heritage Fleet, Keith Wills states: "New York Central came later to 4-8-2s, in 1929-30." Not true. The first NYC Mohawk was new in July 1916. The Central received 185 class L-1 Mohawks between 1916 and 1918.

Peter Weiglin, Amelia, Ohio

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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N-Scale is a bi-monthly magazine
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DCC Workshop, T-Trak
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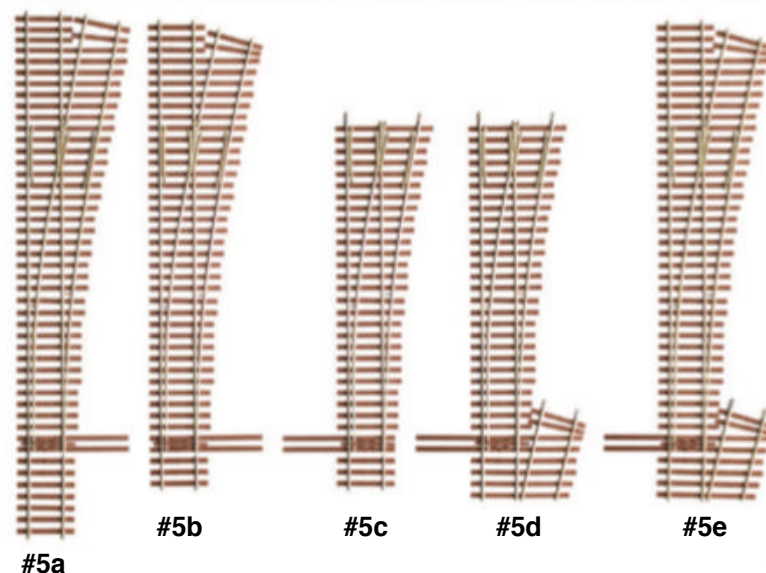
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General Electric Dash 8-40CM diesel locomotive. Rapido Trains offers these six-axle road units decorated for Quebec, North Shore & Labrador; Canadian National (four schemes); and British Columbia Ry. (three paint schemes). The N scale Dash 8-40CM is offered in two to six road numbers per scheme as well as undecorated in two body styles. The diesels

feature prototype-specific details; a die-cast metal chassis; and operational headlights, rear lights, and ditch lights. Direct-current models with ESU Next18 sell for **\$149.95**. Versions with a dual-mode ESU LokSound sound decoder are priced at **\$259.95**. Rapido Trains Inc., 905-474-3314, rapidotrains.com

Walthers purchases Chooch Enterprises

Mike O'Connell, founder of Chooch Enterprises, announced in mid October that he sold his company to Milwaukee-based Wm. K. Walthers Inc.

O'Connell had announced his retirement earlier in 2020, along with his intent to close the business. The sale means the popular resin and flexible vinyl scenery products will continue to be available. O'Connell said all orders placed after Oct. 1 would be forwarded to Walthers for fulfillment.

"After some 46 years in business, I want to thank you all for your support!" O'Connell said in his announcement. "It's been a wonderful time for me. Imagine having a dream come true; making a living creating products for our great hobby!"

"Now I hope to have time to REALLY work on my layout!"

Walthers will purchase all assets of Chooch Enterprises, including all tooling and inventory of the Chooch resin

scenery and flexible scenery detail product portfolio. Walthers will market and sell product under the Chooch name.

"We feel this product line has found a great home with us here at Walthers," said Stacey Walthers Naffah, president of Wm. K. Walthers Inc.

"We like having products to help modelers build a great layout, and we see this as a way to continue to do that," Walthers Naffah said. — *Eric White, senior editor*

HO scale locomotives

- **Electro-Motive Division GP39-2 diesel locomotive.** BNSF Ry. (Santa Fe patchout in two road numbers, Heritage III in one number), CSX (blue, yellow, and gray scheme in three numbers, Reading Co. patchout in two numbers), Delaware & Hudson (Reading Co. patchout in one number, 1989 rebuild in two numbers), Reading Co. (green-and-yellow scheme), and Union Pacific (faded Armour Yellow and Harbor Mist Gray in two numbers, repainted "lightning stripe" scheme with remote-control locomotive lights in one number). Three numbers per scheme unless noted. Prototype-specific details, light-emitting-diode headlights, and wire grab irons. Direct-current model with 21-pin NEM

plug, \$209.98; with dual-mode Sound Traxx Tsunami2 sound decoder, \$299.98. October 2021. Genesis series. Athearn Trains, 800-338-4639, athearn.com

HO scale freight cars

- **Assorted freight cars.** Agri-Grain Processors Pullman-Standard 4,750-cubic-foot-capacity three-bay covered hopper, \$21.98. Baltimore & Ohio 40-foot steel boxcars (Time-Saver Service in two road numbers, Sentinel Service in one number), single car, \$19.98; three-pack, \$58.98. Boston & Maine 36-foot double-sheathed wood boxcar with wood ends and straight underframe, \$19.98. Canadian Pacific 50-foot exterior-post boxcar (red with "Canadian Pacific Railway" lettering and beaver herald), \$19.98.

Milwaukee Road 40-foot ribbed-side double-door automobile boxcar ("Route of the Hiawathas" slogan), \$19.98. Vermont Ry. 50-foot boxcar (dark green), \$19.98. Injection-molded plastic kits with plastic wheelsets, Accumate couplers, and steel weight(s). Accurail, 630-365-1173, accurail.com



- **Scale test car.** Milwaukee Road (orange); Atchison, Topeka & Santa Fe

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Conducted by Cody Grivno



(black and silver); Canadian National (Mineral Red); New York Central (brown); and Pennsylvania RR (black). One road number per scheme. Die-cast metal body; separate, factory-applied brake wheel, handrails, and signs; blackened machined-metal wheels with non-magnetic blackened brass axles; and E-Z Mate couplers. \$41. Silver Series. Bachmann Trains, 215-533-1600, bachmanntrains.com



• **Conservative Gas Corp. (Pacific Gas) American Car & Foundry 11,000-gallon insulated tank car.** Black with RTCX reporting marks (built 1948, factory new). Injection-molded plastic with separate, factory-applied details; metal wheels; and Kadee scale couplers. \$45.95. Kadee Quality Products Co., 541-826-3883, kadee.com

HO scale passenger cars



• **Budd Manor-series 4-section, 4-roomette, 5-double-bedroom, 1-compartment sleeper.** CP Rail (Action Red), Amtrak (phase 1), Canadian Pacific (maroon), Seaboard Air Line, and VIA Rail (original and Canada schemes). Track-powered interior lighting (compatible with direct current and Digital Command Control); underbody details including separate air,

steam, and electrical lines; metal grab irons, stirrup steps, and end gates; multi-color interior detail; Macdonald-Cartier metal couplers; and sprung diaphragms. \$119.95. Scheduled for delivery in 2021. Superior Stainless line. Rapido Trains, 905-474-3314, rapidotrains.com



• **Atchison, Topeka & Santa Fe business cars.** Pullman-Standard: 74-foot steam generator car nos. 133 (American Revolution Bicentennial scheme, \$89.98) and 131 (silver, \$84.98). 74-foot baggage

car no. 77 (\$84.98). 85-foot 36-seat diner no. 61 (standard, \$94.98; lighted, \$104.98). 85-foot 4-compartment, 4-double-bedroom, 2-drawing-room sleepers *Regal Hunt*, *Regal Lane*, and *Regal Lark* (standard, \$94.98 each; lighted, \$104.98 each). Budd: 85-foot Big Dome bar-lounge-dormitory no. 60 (standard, \$99.98; lighted, \$109.98). Painted or real metal finish, tinted window glazing, and factory-printed car names or numbers as appropriate; 36" turned-metal wheelsets; factory-installed grab irons; and Proto-Max metal couplers. May 2021 through January 2022 delivery. Walther's Proto. Wm. K. Walther's Inc., 414-527-0770, walther's.com

HO scale



General Electric Dash 8-40C diesel locomotive. Citicorp (Union Pacific patchout with CREX reporting marks), Kansas City Southern de Mexico (*Southern Belle* scheme), Lancaster & Chester (light blue, one road number), and Pan Am (dark blue) are the new paint schemes offered on this Atlas Master Line model. Each paint scheme is offered in two numbers unless noted. The HO scale model has directional golden-white light-emitting-diode headlights, separately applied details, and Accumate couplers. Direct-current models with an eight-pin plug for Digital Command Control decoder are **\$179.95**. Models with a dual-mode ESU LokSound Select sound decoder retail for **\$289.95**. Atlas Model Railroad Co., 908-687-0880, atlasrr.com

HO scale



Electro-Motive Division GP7 diesel locomotives. Walther's has released these Proto-series models decorated for Great Northern; Belt Ry. of Chicago; Chessie System; Chicago, Burlington & Quincy; and Erie Lackawanna in four numbers per scheme (two each in direct current and Digital Command

Control). The HO scale GP7 features factory-installed and painted wire grab irons and metal lift rings. Direct-current models are **\$199.98**. GP7s with a dual-mode ESU LokSound Select sound decoder are priced at **\$299.98**. Wm. K. Walther's Inc., 414-527-0770, walther's.com

HO scale maintenance of way



- **Six-axle slewing railway crane.** Österreichische Bundesbahnen (Austria) and Deutsche Bundesbahn (Germany). Features digital decoder with light and sound functions; telescoping, positionable boom; and positionable outriggers. Superstructure can be rotated 360 degrees. Can be operated as self-propelled unit or transported in train. Includes barrier wagon with bearing block, counterweight, and support pedestals. Approximately \$800. Price may vary based on exchange rate. Roco, roco.cc

HO scale details and accessories



- **Ricko custom-lighted Dodge Chargers.** Eight models available, including police, fire, and sheriff. Features 14 (standard, including New York Police Dept.) to 16 (push-bumper-equipped models) light-emitting diodes with six flashing patterns, front passenger side slick top, operating light bar,

rear slick top with six LEDs, slick top with four LEDs (NYPD models), and head and taillights with strobe patterns. Input voltage 9-12 DC only. \$85 to \$90 including shipping. Available holiday season 2020. East Coast Circuits, eastcoastcircuits.com

N scale locomotives



- **Electro-Motive Division SD70M diesel locomotive.** Southern Pacific and CSX (dark blue and yellow). Two road numbers per scheme. Flat radiator section, five-pole motor with dual brass flywheels, illuminated number boxes with factory-printed number boards, and Kato couplers with modeler-installed trip pins. Direct-current model (compatible with Train Control Systems K1D4-NC and Digitrax DN163K1C and DN163K1D Digital Command Control motor and light decoders, sold separately), \$125. With Digitrax DCC motor and light decoder, \$205. With ESU LokSound DCC and sound decoder, \$325. March/April 2021. Kato USA Inc., 847-781-9500, katousa.com

N scale freight cars

- **Bi-level auto rack.** BNSF Ry. (Mineral Red with circle-cross herald and yellow with post-2005 herald), Canadian

National (white, six road numbers), Conrail (brown), CP Rail (red), CSX (yellow), Ferromex (gray), Grand Trunk Western (blue), Kansas City Southern (yellow with dual heralds), Mexican Rail Transportation (yellow), Norfolk Southern (yellow with Thoroughbred herald), Providence & Worcester (white), Southern Ry. (brown), Union Pacific (yellow with and without "Building America" slogan), and Western Pacific (brown). Four numbers per scheme unless noted. Etched-metal panels, wire grab irons, Micro-Trains trucks, and Magne-Matic couplers. Price to be announced. Fox Valley Models and InterMountain Railway Co., 800-472-2530, intermountain-railway.com

- **Pullman-Standard 4,427-cubic-foot-capacity three-bay covered hopper.** Atchison, Topeka & Santa Fe (Mineral Red with billboard lettering); BNSF Ry. (Mineral Red with circle-cross herald); Burlington Northern (Cascade Green with large herald); Chicago & North Western (gray); Continental Grain Co. (white); Corn Products Co. (gray); Denver & Rio Grande Western (gray with "The Action Road" slogan); and Rock Island (gray with italic lettering). Three single cars and one three-pack per scheme. Screw-mounted trucks and body-mounted McHenry couplers. Single car, \$32.98; three-pack, \$93.98. October 2021. AthearnN. Athearn Trains, 800-338-4639, athearn.com

N scale structures

- **Bellevue gas station.** Ozo (1950s-1960s details) and Total (1970s-1980s

details). Laser-cut cardboard kit. Measures 2.95" x 2.16" x 2.55". \$21.10. Price may vary based on exchange rate. Minifer, minifer.fr/en

N scale details and accessories

- **Log trucks with trailers.** Peterbilt 379 (Koch Logging), Kenworth T800 (Ireland Trucking and Weyerhaeuser), and Kenworth W900. All body styles available painted black, blue, red, white, and yellow but unlettered. \$44.95 each. Summer 2021 delivery. Trainworx, 970-874-9747, train-worx.com
- **Allis-Chalmers HD-21 crawler and dozer.** Crawler kit (no blade), \$15.99. Dozer kit, \$18.99. Assembled and painted crawler or dozer, \$85 each. Decals (completes one model), \$5. Model features urethane resin body, left-side and right-side treads, and 3-D printed acrylic blade, hydraulic cylinders, and exhaust pipe. Kits and decals are available now; assembled and painted models, January 2021. Wheels of Time, wheelsotime.com

O scale locomotives



- **Baldwin Class 10 2-6-2T trench steam engine.** On30. U.S. Army (builder's photo version in one road number, gray with black lettering in two numbers), Quartermaster Corps (green), and painted black but unlettered. Dual-mode TCS WOWSound decoder; Keep-Alive capacitor; blackened metal wheels and side rods; and separate, factory-applied parts. \$459. Spectrum series. Bachmann Trains, bachmanntrains.com

O scale details and accessories

- **Assorted fences.** Log (one section with large gate, one section with small

Club offerings



- **Chicago & North Western Pullman-Standard 50-foot PS-1 boxcar.** Kadee HO scale car custom-decorated for the Chicago & North Western Historical Society. One road number. \$48 (shipping included to U.S. addresses). Illinois residents add \$3.70 per car ordered. Chicago & North Western Historical Society, P.O. Box 1068, North Riverside, IL 60546; cnwhs.org

gate, and six intermediate sections), barbed wire (two gates, four corner posts, and eight brace posts), and rail (one section with large gate, one section with small gate, and six intermediate

Union Pacific Railroad (UP) class 4000

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



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Trix products are available from authorized Trix and Märklin dealers. See our complete line of products at marklin.com and trix.de/en. Contact customerservice@marklin.com for more information or to request a free New Items catalog.

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News & Products

sections). Each pack contains 192 scale feet of fence ranging in height from 4 to 5 scale feet. \$19.99 each. Woodland Scenics, 573-346-5555, woodlandscenics.com

Z scale locomotives



- **Alco RS-3 diesel locomotive.** New York, New Haven & Hartford. Three road numbers. Phase I body, two single-chime air horns, 800-gallon fuel tank, body-mounted number boards, 7.5mm coreless motor with dual flywheels, traction tires, built-in pilot, directional light-emitting-diode headlights, and body-mounted couplers. American Z Line, 614-764-1703, americanzline.com

Electronics/controls

- **HO scale passenger car lighting board.** Magnetic wand on/off control, super capacitors, 16 light-emitting diodes for even lighting, and adjustable brightness. Instructions and most parts for installation in cars without pickups are provided. Conductive wheels are required; can also use existing pickups. Circuit board can be shortened to as little as 4" with diagonal cutters or razor saw. 1F capacitance on board, limited maximum .2A current when charging

for Digital Command Control compatibility. Typical current draw is .01A after charging is complete. Board with magnetic wand on/off control, \$24.95; without wand, \$19.95. Shipping is \$5 for first unit. Additional units ship at no added cost. Voltscooter Engineering, 413-532-4306, voltscooter.com

Large scale locomotives



- **0-4-2T steam locomotive *Santa's Chloe*.** Locomotive, painted in Christmas paint scheme, features working headlight and Santa Claus engineer figure. Both driving wheelsets are driven by motor with ball bearings. \$419.99. LGB (Märklin Inc.), 573-365-9521, lgb.com

Large scale freight cars



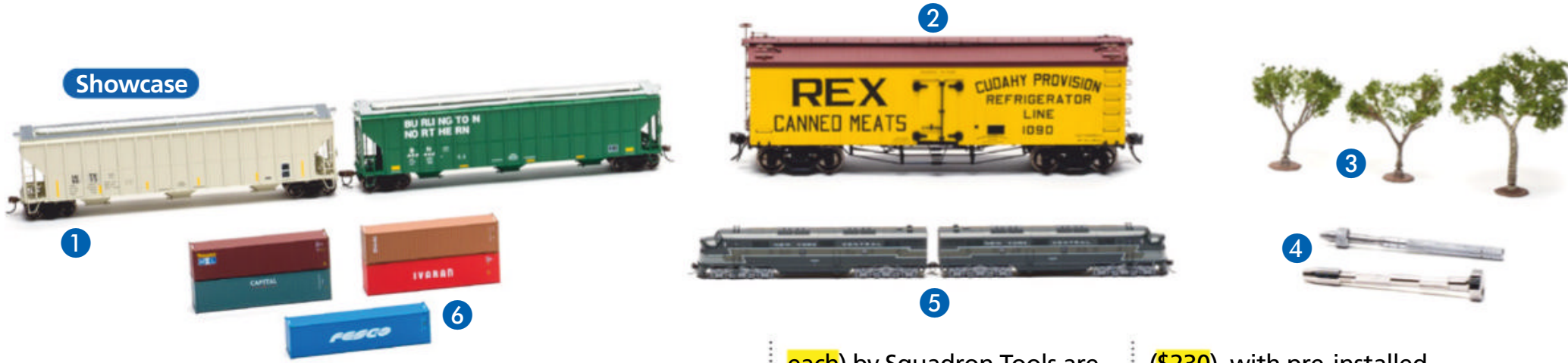
- **Christmas hot cocoa tank car.** Model features tank on top of flatcar base. Factory-applied handrails,

N scale



Pullman-Standard 50-foot single-door boxcar. Celebrate the Milwaukee, Racine & Troy's 45th anniversary with this custom-decorated Micro-Trains Line Co. boxcar. The model (\$39.98) has a one-piece injection-molded plastic body with positionable doors; etched-metal see-through crossover platforms; a separate, factory-applied brake wheel; plastic stirrup steps; a plastic and metal underbody; pin-mounted roller-bearing trucks with plastic wheelsets; and truck-mounted Magne-Matic couplers. See a review of the HO anniversary car by Accurail in this month's Product Reviews. The N and HO scale cars are available from the Kalmbach Hobby Store, KalmbachHobbyStore.com

Showcase



1 FMC 4,700-cubic-foot-capacity three-bay covered hoppers. Athearn offers these HO scale Ready-to-Roll cars decorated for Interstate Commodities Inc., Burlington Northern, BNSF Ry., Chicago & North Western, and Denver & Rio Grande Western. The hoppers (\$37.98) have see-through etched-metal running boards and 100-ton trucks. Athearn Trains, athearn.com

2 36-foot wood refrigerator car. Rex Canned Meats is one of eight new

paint schemes on this Atlas O Steam Era Classics line model. The O scale refrigerator car (\$79.95) has a plastic body, die-cast metal chassis, and 33" metal wheelsets. Atlas O, atlasrr.com

3 Gum trees. Woodland Scenics offers these factory-assembled and painted trees, which range in height from 2½" to 3½". The gum trees are sold in a three-pack for \$12.99. Woodland Scenics, woodlandscenics.com

4 Pin vises. Slide-lock and standard pin vises (\$6.99

each) by Squadron Tools are available from the Kalmbach Hobby Store. The standard pin vise features a swivel end and measures 3¾". The slide-lock pin vise measures 4½" and has a slide-lock head for easy bit changes. Kalmbach Hobby Store, KalmbachHobbyStore.com

5 New York Central Electro-Motive Division E7A diesel locomotives. Power for Kato's N scale New York Central *20th Century Limited* is now available. The models are sold in a two-pack in three versions: direct current

(\$230), with pre-installed Digitrax Digital Command Control (\$390), and with pre-installed ESU LokSound sound decoder, \$630. Kato USA Inc., katousa.com

6 40-foot high-cube intermodal containers. Jacksonville Terminal Co. has released these N scale models decorated for Touax/MOL, Capital, Triton, Ivaran, and Fesco. The containers, sold in two-packs for \$29.95, feature JTC's magnetic connecting system. Jacksonville Terminal Co., jtcmodeltrains.com

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News & Products

HO scale



Assorted details. MAC Rail LLC offers an assortment of HO scale details, including a ballast car door control battery boxes (two-pack, **\$9.98**). Small end-of-train device storage rack (**\$11**). Orange end-of-train (EOT) flags (two-pack, **\$6**). Orange EOT devices for Kadee no. 5 and similar couplers (three-pack, **\$20**). BNSF ballast car solar panel kit version two (two-pack with decals, **\$9.99**). Except for the flags, all details are hand-painted. MAC Rail LLC, macrailproducts.com

turnbuckles on tank bands, ladders, brake wheel, and stirrup steps; plastic wheels; and hook-and-loop type couplers. Car made with weather-resistant materials. \$115.99. PIKO-America, 619-280-2800, piko-america.com

Large scale passenger cars

- **Open-side passenger car.** For use with *Santa's Chloe* 0-4-2T steam locomotive (sold separately). Seatbacks can be flipped so passenger figures (not included) can sit facing the direction of travel. Car features metal wheelsets. \$109.99. LGB (Märklin Inc.), 573-365-9521, lgb.com
- **2020 Christmas car.** Features positionable doors, metal wheelsets, icicle detail, and hook-and-loop couplers. \$164.99. LGB (Märklin Inc.), 573-365-9521, lgb.com

Scenery

- **SceniKing Roll Outs photo backdrops.** S scale. Digitally printed inter-connectible photo backdrops. Fifteen scenes (6 feet long, 16½" tall) printed on

glare-free 24-pound paper with long-life inks. All scenes have ¼" seamless overlap and identical top sky coloration to enable upward extension using a matched paint. Sky scenes with clouds and deepening color are available to double backdrop height. \$41.95 each. BPH Enterprises, 705-739, 4878, sceniking.com

Tools

- **Spatula set.** Metal tools are ideal for mixing, applying, and spreading plastic putty, epoxies, and glue on plastic models and miniature figures. Four-piece set, \$16.98. Produced by Squadron Tools, available from Kalmbach Hobby Store, KalmbachHobbyStore.com



- **Precision flush cutters.** Model 410 (hobbies, crafts, and bead stringing), Model 2175 (jewelry making, wire crafts, basketry, caning, and cutting stained glass lead came), Model 9100 oval head (wire art, chain mail, and cutting jump rings), Model 9250ET (with extra tapered head), and Model 9200LH (long handle). High-carbon-steel construction with non-glare black finish, soft rubber hand grips, Light Touch return springs, and Micro-Shear blade by-pass shear cutting. \$15 to \$28 depending on model. Xuron Corp., 207-283-1401, xuron.com

Books

- **Rails Around the World: Two Centuries of Trains and Locomotives.** By Brian Solomon. Features a selection of the world's most significant trains and locomotives from the last two centuries. Includes Budd stainless-steel streamliners, Electro-Motive Division F units, Spanish Talgo trains, French TGVs, and Japanese Shinkansen trains, among others. Hardcover, 192 pages. \$40. Motorbooks, 978-282-9590, quartoknows.com/Motorbooks

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Union Tank Car no. 646518, a 20,500-gallon Funnel Flow tank car, is part of a southbound Canadian National freight passing through Lisbon, Wis., on March 20, 2018. The car is transporting methylene diphenyl diisocyanate, a chemical used in making polyurethanes, such as flexible foam insulation. Cody Grivno photo

Why are some tank cars “sway-backed?”

Q I’ve been watching trains since I was a child. (That’s like 75 years!) Today, I watch them crossing a highway just down the block from our apartment. I have a question about oil tank cars. Most of the tank cars I see on any freight train today are sway-backed. They bend in the middle! They’ve been built that way for at least 20 years. Why is it that no model railroad manufacturer produces a sway-backed oil tanker? Even the new Rivet Counter 31K tank cars are straight barrel-shaped cars. Am I wrong? Have I missed something?

Noel Allard, Delano, Minn.

A Those sway-backed tanks you’re seeing are called “Funnel Flow” tank cars, and they’re made and operated by Union Tank Car Co. And they’ve been around for a bit more than 20 years, having been introduced in 1967. They’ve been produced over the years in various model scales by Wm. K. Walther Inc., Atlas Model Railroad Co., Con-Cor, Trix, Märklin, MTH, and probably others. If you search your favorite model train website for “Funnel Flow,” you’ll find them.



Although this N scale covered hopper was sold in a variety of fantasy paint schemes, it does have a prototype. Greg Waskowsky photo

Q I’m trying to find any information about the prototype of this N scale covered hopper. The model itself is simply described as a “Roco 4-bay Centerflow Covered Hopper.” Is there anything about soda ash that would require this type of car instead of a regular covered hopper?

Greg Waskowsky, Kalamazoo, Mich.

A Though it’s a fairly crudely molded model and not all that accurate, your car appears to be based on the Flexi-Flo type of covered hopper built by American Car & Foundry for the New York Central. These hoppers were repainted by NYC successors Penn Central and Conrail. Your particular N scale model was made by Roco for AHM. A forum post I found said that the paint schemes offered by AHM didn’t correspond to any actual paint scheme ever worn by the prototype, but I don’t know how far that information can be trusted.

The Flexi-Flo is a type of pressure differential covered hopper, which means that pressurized air was used to facilitate the loading and unloading of the cargo. They didn’t carry only soda ash; the NYC cars were most often used in powdered cement service. Like powdered

cement, soda ash (used in glass-making, water softening, and as a food additive) is moisture-sensitive, which is why it’s carried in covered hoppers.

Q What type of primer do you use on slick engineering plastic, as used on diesel handrails and truck sideframes? Where can I find it? Should I check a big box store or an auto parts store?

Wes Garcia, Hettinger, N.D.

A Group Technical Editor Cody Grivno answers: “There are a few different routes you can take when applying paint to slippery engineering plastic.

“The first is to apply Specialty Performance Products Plastic Adhesion Promoter (item no. SXA 1050) to the parts. You can find this product, sold in an aerosol can, at stores that carry paints and other products used by auto body repair professionals. Use it in a well-ventilated area, follow safety precautions, and wear personal protective equipment.

“While I’ve used that technique with success, another product I’ve tried that works well is Tamiya Color for Polycarbonate. You can find this spray paint at well-stocked hobby shops, especially those that carry remote-controlled (RC) vehicles. As before, follow the manufacturer’s recommended safety precautions.

“If you’re just painting small areas like the vertical handrails on a locomotive, you can try bottle paints designed for R/C models. In my December 2017 article ‘How to weather without an airbrush,’ I used Duratrax R/C Car Paint to brush-paint the handrails on a Kato N scale ES44AC.”

Q I have a bunch of structures that I want to rehab, including adding interior lighting. What’s the easiest way to make a building light-proof? I’ve tried painting the interior walls black, but it’s really nit-picky and often needs more than one coat – a long process, given the number of buildings I have. Any better ideas?

Linda Flanagan, Timnath, Colo.

A Try lining the walls with black construction paper or cardstock, available at craft or scrapbooking stores. You can cut openings to match the windows you want illuminated.

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

Q My question is concerning billboard express reefers like those from Roundhouse. I know that express reefers such as those belonging to the Railway Express Agency (REA) ran on the head end of passenger trains, but what about billboard express reefers? Were they ever mixed in with freight trains, or were they run with passenger service, as well?

Matt McVicker, Johnstown, Pa.

A There were express reefers, and billboard reefers, but “billboard express reefers” weren’t really a thing. Billboard reefers had showy, colorful, poster-like paint schemes advertising their owner or contents. While a billboard reefer might have belonged to a car-leasing or shipping company that had “Express” in its name (like Fruit Growers Express), that didn’t make its cars true express reefers.

Express reefers had special equipment, including steam lines, signal lines, and high-speed trucks, that allowed them to run at the head end of passenger trains. Not only that, but also, express

reefers were painted in schemes to not stand out in a passenger consist, so they wouldn’t have been painted in a billboard scheme.

Express reefers generally handled temperature-sensitive less-than-carload-lot (LCL) express freight, not bulk shipments of fruit or meat, which would go in a freight train – often a unit reefer train. Billboard reefers were generally all gone or repainted by the late 1930s.

Q *Model Railroader* often makes reference to making your own decals. I’ve tried doing this with decal material, but the ink just smears due to the decal material not being porous like paper. What’s the secret?

Todd Schuman, city not given

A Purchase decal paper that is specifically advertised as being made for use in inkjet printers, and set your printer to the setting for glossy photo paper. That setting uses less ink than the setting for regular paper that absorbs ink. After printing, let the ink dry untouched for at

least 15 minutes before sealing it with a spray of Testor’s Dullcote or a similar spray varnish.

Q Is there a published list of National Model Railroad Association (NMRA) standards and recommendations for car length and weight in HO scale?

Norm Notdurft, Redmond, Ore.

A Sure. For HO scale, the recommended car weight is 1 ounce plus ½ ounce per inch of car length. So, for example, a 40-foot car that’s 5½" long in HO scale should weigh 3¾ ounces. That comes from NMRA Recommended Practice (RP) 20.1, which you can find along with all other NMRA standards and RPs at nmra.org/index-nmra-standards-and-recommended-practices.

Q I’d like to set up a 10-foot-long, point-to-point track. Is there any Digital Command Control auto-reversing device I could use to make a train go from one end to the other and then reverse? I thought that if I set up a

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Reader Tip: Secure parts for cleaning

It seems that today's kits contain more and more small metal or resin castings that need to be washed and dried prior to painting. Trying to wash them in your hand almost guarantees dismantling your shop sink trap to retrieve that critical casting. Otherwise, it's a call to the manufacturer for a replacement.

I found a better way. It's called a "tea ball." These golf-ball-sized, hinged, metal mesh balls cost around \$6. The fine screen keeps everything secure while you swish the ball in a bowl of warm soapy water, followed by a distilled water rinse. Just hang the ball up and let the castings air dry. You can also use 70 percent isopropyl alcohol. – *Robert Kroeger, Worthington, Ohio*

consist with a locomotive at each end of the train, I could have the DCC system (I use NCE) make the train go back and forth automatically.

Jonathan Berman, Boca Raton, Fla.

A If you search the web for "DCC autoreverser circuit," you'll find plenty of products, but be warned – they aren't what you need. The purpose of a DCC autoreverser is to correct a short circuit caused by a train entering a block with a different track polarity. Digital Command Control runs on square-wave direct current, so you can't reverse a train's direction just by flipping the track polarity like you could with direct current. What you need is something that sends a command to the locomotive to reverse direction – a macro controller.

Take a look at the Mini Panel, made by NCE. It lets you program in an operating sequence for a locomotive (or turn-out controller, or lighted signal, or anything else with a DCC decoder) and play it back. You can learn more about it at the NCE website.

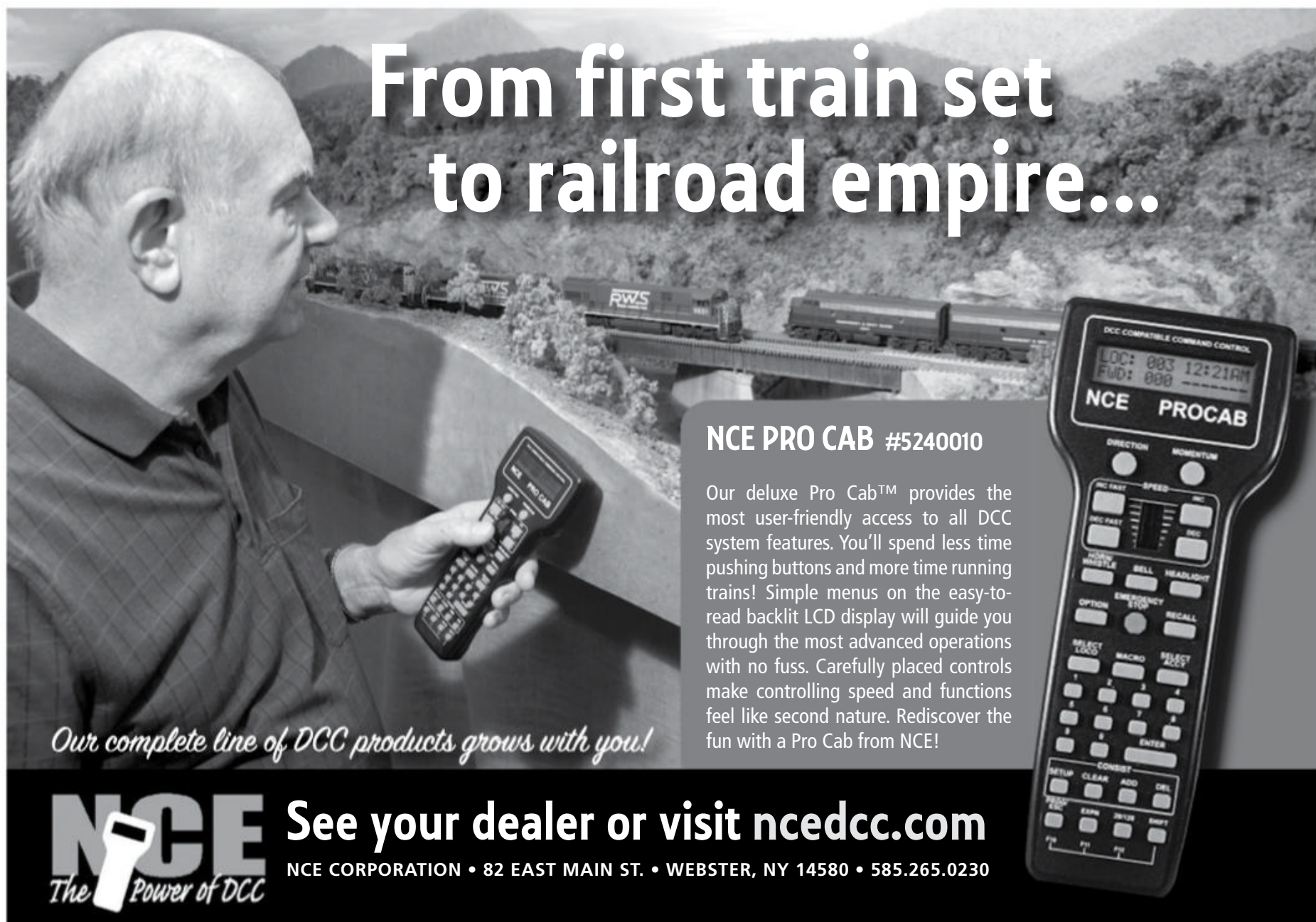
Also, Broadway Limited Imports' Paragon3 DCC decoders come with a macro-recording ability built in. You can record any command sequence, like sounding the horn, increasing speed, then coming to a stop at the next station, into the locomotive itself. You can then command it to play back that sequence as many times as you want. Learn more about Paragon3 locomotives' macro capabilities in the Paragon3 diesel manual, available at broadway-limited.com.

Q Many years ago you had a layout in your magazine named the Wawbeek & Sunmount. I would like to get a copy of this article.

Thomas Arnedos, North Augusta, S.C.

A "The Wawbeek & Sunmount: An Adirondack short line" was published in our November 1979 issue. That issue, and every other issue from 1934 to today, is available in our All-Time Digital Archive. You can access the archive – and so much more – by subscribing to the brand-new Trains.com. **MR**

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With the cork roadbed installed and the track in place, the *Model Railroader* staff is getting closer to running trains on its HO scale Jones Island project layout. David Popp shares his roadbed and track laying techniques in this month's Step by Step.

Roadbed and track for Jones Island

After a brief detour to Mukwonago for last month's Step by Step, we're back to Jones Island on the Milwaukee, Racine & Troy to continue work on our HO scale project layout. With the benchwork completed, it's time to start laying track and roadbed.

Though track and roadbed are topics we've covered many times in the pages of *Model Railroader*, this time we'll take a look at aspects that don't get addressed as often: Simulating rails embedded in a concrete lot, mixing different brands of track, and detailing rail.

Tracks embedded in concrete are common around industrial areas, and the Port of Milwaukee General Cargo Terminal no. 2 is no exception. I'd initially considered using plaster for the concrete. However, the terminal section of the layout is designed to be lifted out, subjecting the benchwork to repeated flexing. I decided styrene would be a safer, more stable option.

When it came time to lay track, I had to mix brands (Peco and Walthers) to get the correct geometry. There's nothing wrong with using multiple brands of

track. In fact, it's often necessary. But sometimes there are little surprises, like rail height mismatches. See step 4 on page 26 to learn how I addressed that issue.

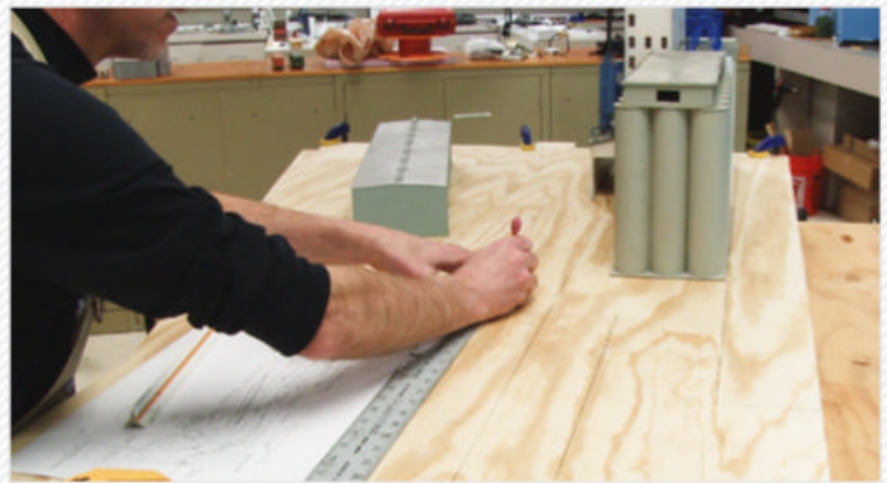
Finally, we'll make a return trip to Mukwonago. There you'll learn how Cody Grivno and I detailed the siding for Empire Level with simulated joints, rail bars, and weathering.

You may not be modeling Jones Island, but you can use these same techniques to install roadbed and track on your model railroad.

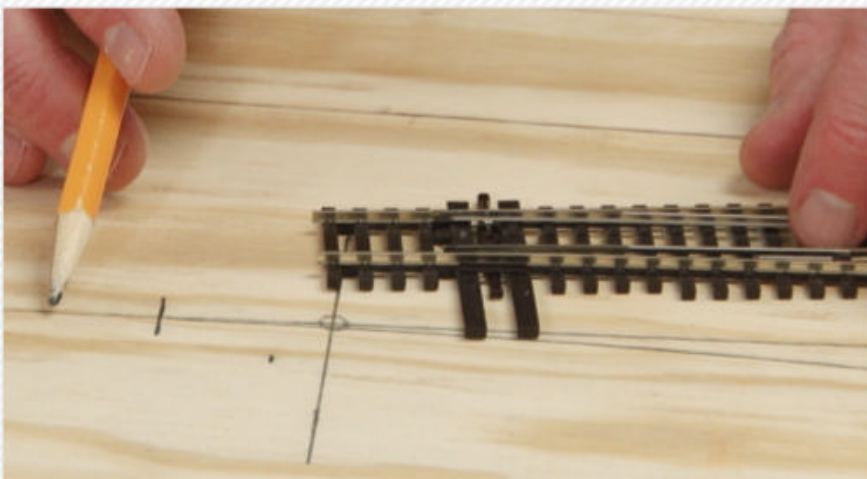
STEP 1 TRANSFERRING THE PLAN



It's fairly easy to take a scale drawing of a track plan and, with an architect's rule, transfer the locations of turnouts, structures, and other features on the plywood subroadbed. My hand-drawn version of the plan is shown above. The computer-rendered version of the track plan for our Milwaukee, Racine & Troy Jones Island project was published on page 25 of the October 2020 MR.

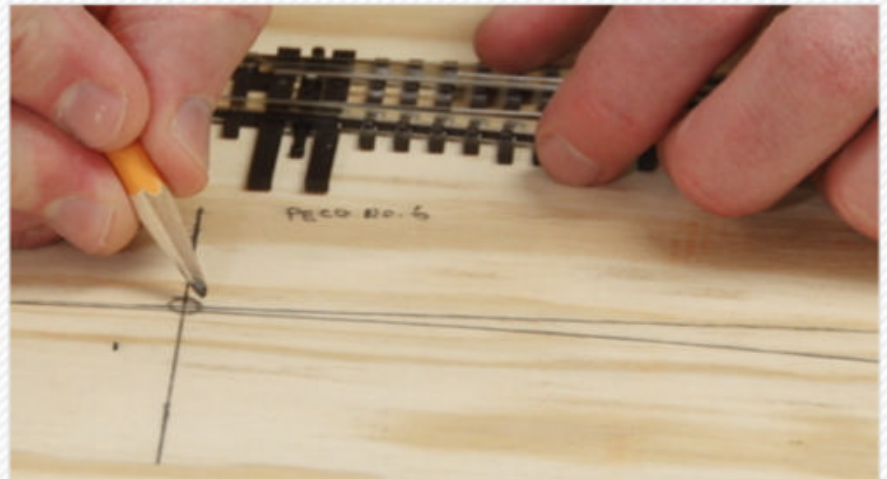


The track plan is just a large grid. I used a pencil to mark track locations at each end of the 5-foot section of the layout. Then I connected the lines until I'd transferred this portion of the plan to the plywood. An aluminum yardstick is handy for drawing straight lines, as seen above. A piece of 1/4" square styrene strip works well for curved lines.



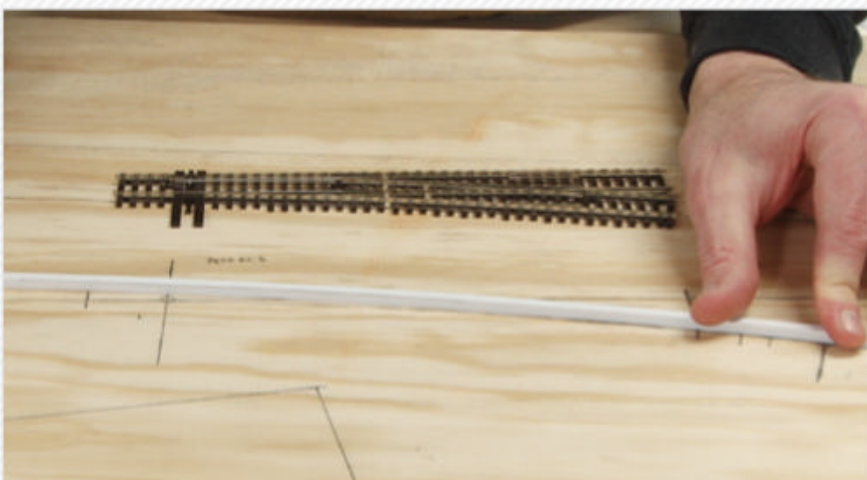
It's ideal to have samples of the turnouts you'll be using when transferring the plan from paper to plywood, as you need to know exact sizes. I lined up the no. 6 turnout shown here on the track center that I'd already drawn.

After I set the turnout in place, I made sure it was lined up on the straight leg at the opposite end. Then I marked the centerline of the diverging route.



Next, I marked the locations of the switch rod (line perpendicular to track centerlines) and points (tick mark to left of line for the switch rod).

The circle marks the location of the hole for the switch machine's actuating rod, necessary for below-layout switch motors. If you're using an above-layout ground throw or turnout controller, the hole isn't necessary.



Once I had the turnout's location penciled in, I marked the diverging route. This is necessary so you know where to install the roadbed. As shown in the photo above, I used a piece of 1/4" square styrene, held in place with pushpins, to draw the curved line.



Transferring the plan to the benchwork also helps you catch things like bad track locations. When I marked the location of the no. 5 turnout above, I discovered the hole for the actuating rod lined up with a framing member. Sliding the turnout ahead just a bit fixed this problem.

STEP 2 INSTALLING ROADBED



Next, Cody Grivno and I worked on installing the cork roadbed. We used Midwest Products HO scale cork strip (no. 3013) and sheet (no. 3014) on the majority of the layout. We secured the cork with DAP Alex Plus all purpose acrylic latex caulk, spread into a thin layer with a putty knife. Wood glue can also be used to secure the cork to the plywood subroadbed.

To ensure a strong bond and to smooth out any bumps, we ran a wallpaper roller over the roadbed.



On several turnouts we used Itty Bitty Lines nos. 1500 and 1501 turnout pads. The cork pads are designed for no. 4 and no. 6 turnouts, perfect for our layout. The one-piece cork pads have smooth, beveled edges. Unlike the roadbed strips, no touch-up sanding was required on the edges of the turnout pads.



I wanted to simulate rails embedded in the concrete at the Port of Milwaukee General Cargo Terminal no. 2. To do this, I turned to an old trick. First, I covered the lot with HO scale cork sheet, leaving a trough (the exposed plywood) for the track. I used the same DAP latex acrylic caulk as before to attach the cork sheet.



Then I set N scale cork (the strip of lighter cork shown in the photo above) in the trough. Don't split the cork to reveal the beveled edges. Instead, leave the roadbed as it comes from the factory, with the edges squared off. Don't worry if there are small gaps, as they'll be covered with styrene.



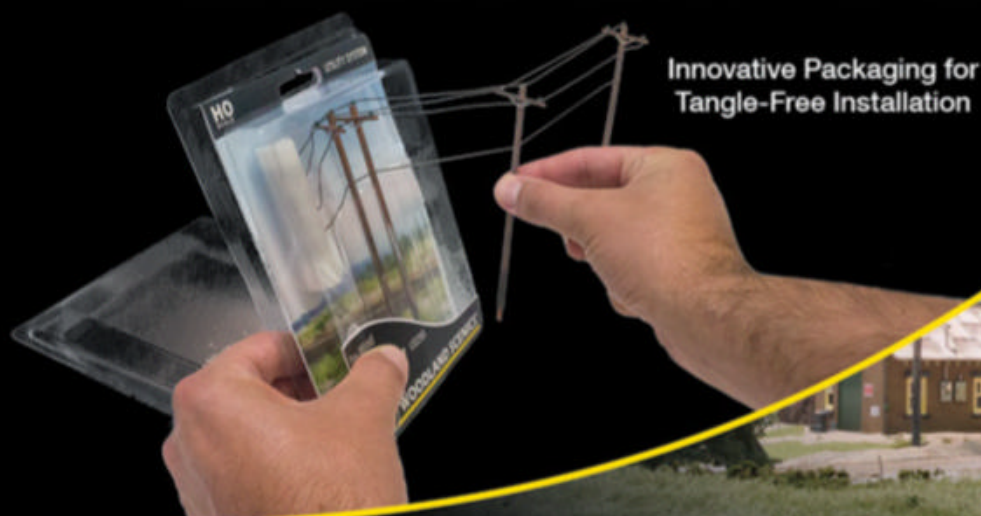
When the track is installed on the N scale cork, the ties are at the same level as the HO scale cork sheet. Then you can attach styrene sheet to the cork with acrylic latex caulk. This leaves the railhead exposed, minimizing the risk of derailments and promoting good electrical continuity for locomotives.

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STEP 3 FINE-TUNING THE ROADBED



After 48 hours, Cody and I came back with coarse sanding sponges to smooth the shoulders of the cork roadbed. Smoothing the edges gives the roadbed a realistic profile and prevents ballast from hanging up on the ragged cork.



Next, I cut the cork at the separation line between the two sections of layout with a box cutter. This is necessary so we can work on the end section of the layout in the workshop, giving us access to all four sides.



Another area I needed to address was the transition between the HO and N scale cork at the Port of Milwaukee General Cargo Terminal No. 2. To make the transition smoother, I used a belt sander.



There was a small hump in the cork roadbed between the two sections. Since the height difference wasn't too dramatic, I again turned to the belt sander to smooth the transition.

STEP 4 LAYING TRACK



I turned to tried-and-true methods when installing the track. First, I ran a narrow bead of DAP Alex Plus clear all purpose acrylic latex caulk down the centerline of the cork roadbed.



Then I gently set the track into the caulk, using the seam in the cork roadbed as a guide to center the track. I visually inspected the track and used a metal yardstick to align any sections that were crooked.



Next, I used a putty knife to spread the caulk into a thin, even layer. Apply the adhesive sparingly around turnouts, especially the switch rod. Adhesive can prevent the points from going through their full range of motion.



I put black .020" styrene sheet under the Walthers curved turnout to bring the rails to the same height as the adjacent Peco flextrack. I secured the styrene with a smooth, thin layer of DAP Alex Plus caulk.

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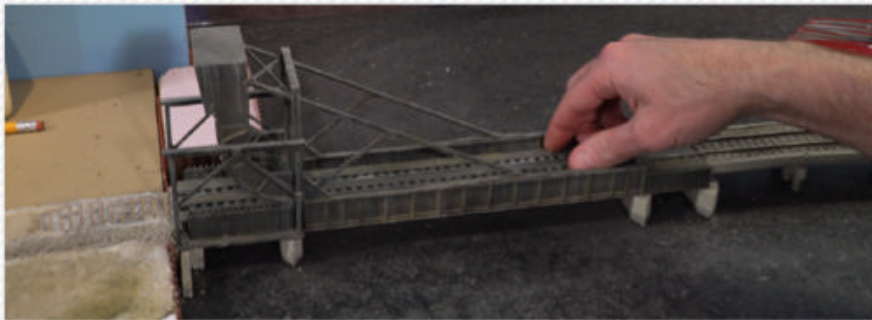
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STEP 5 FIXING THE BRIDGE



Finally, I added rails between the curved turnout and the existing track on the ballasted-deck concrete trestle. Between these two locations is a lift bridge. Its loose deck has caused many derailments over the years.



The second issue with the lift bridge is that it was never secured to the piers. A slight bump was all it took to knock the rails out of alignment, sending locomotives and freight cars into the harbor.



To improve operations over the bridge, I used a piece of flextrack. I kept the ties on the end that connects to the curved turnout. I stripped the ties off the rails over the lift bridge. I glued the unsupported rails to the molded plastic tie plates on the bridge deck with thin-viscosity cyanoacrylate adhesive. To hold the track in gauge, I added rail joiners where the lift bridge meets the ballasted-deck trestle.

STEP 6 DETAILING TRACK



When I relaid the siding for Empire Level in Mukwonago, I detailed the track with simulated joints, rail bars, and weathering. First, I used a fine-tooth razor saw to cut small notches in the rail to indicate joints.



Next, Cody installed Details West three-bolt rail bars (no. 921). Before attaching the white-metal castings to the rail with CA, Cody removed the molded spike detail on the ties where the rail bars would be located.



Then Cody sprayed the track Model Master Railroad Tie Brown (no. 4885). Make sure your workspace is well ventilated and wear personal protective equipment when airbrushing in a layout room.



About an hour after the paint dried, I used a fine Microbrush to apply Vallejo Model Air Light Rust (no. 71.129) to the rails. The paint was a bit too orange for my taste, so I thinned it with Vallejo airbrush thinner. 



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MODELING FORBIDDEN SPACES

Add the places to your layout you can't visit in real life

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



Conrail SD50 no. 6712 leads a late-running COSE through the interlocking with the Syracuse, N.Y., skyline in the background and one of Conrail's ubiquitous "No Trespassing" signs at left. Dave Abeles shares some of the forbidden places he's added to his layout.



1 Where few have gone before. Night lighting brings a new level of fascination with the details inside the engine servicing facility taking front stage. Electro-Motive Division GP15-1 no. 1650, at right, is just entering the shop for some repairs after a small accident that looks to have damaged the m.u. hoses and a handrail stanchion.

Danger: there's a word that's familiar to every railroader. Danger comes with the job and it's woven into the fabric of every railroad career.

Years ago, when laws, security threats, and safety regulations were simpler (and litigation less prevalent and costly), many railroad employees would let photographers wander into company facilities with little more than a wave or at most a friendly suggestion to be careful. Many railfans were able to get close to massive locomotives and equipment without worry and without causing corporate or law-enforcement concern. The most cautious places made visitors sign a release.

However, as time has passed, many employees are now trained to politely (but firmly) ask prospective visitors to leave or even to call the authorities to remove them. Much of today's railroad-ing happens in places that are off-limits to the public under all but the most constrained circumstances.

A beauty of model railroading is we can bypass NO TRESPASSING signs and ignore security cameras. We don't even have to worry about the junkyard dog.

Modeling can take us to forbidden areas, giving us and our visitors ultra-privileged access at all times. We can build forbidden zones to take advantage of available space and to become suitable backdrops or foregrounds for scenes on our layouts, which in turn allow us to create photographs as though taken from somewhere normally off-limits.

On my HO scale Conrail layout, the Onondaga Cutoff, you stand beside one of the busiest and most important trunk lines in North America. The operation models the intensity, excitement, and drama of the prototype – and, like any high-speed, double-track main line, it also models the danger.

I've included a variety of Central New York's forbidden spaces as they looked in the mid-1990s. Let's take a look at a few of them and see how modeling privileged access can help set the layout in a time and place and allow us an insider's view on Conrail operations of the time.

Onondaga Engine Terminal

What railroad hobbyist, prototype or modeler, doesn't love locomotives? Most

of us modelers acquire more locomotive models than we can really use on our layout at any one time, but that doesn't stop the fascination with good models of familiar prototypes. Especially with today's quality and scale fidelity, it sure is nice to have a place to display locomotives on the railroad.

Locomotive shops and maintenance facilities are typically off-limits to most anyone not a railroad employee. Even railroad employees not familiar to the regular workers can be greeted with suspicion. Our model facilities have no such reservation – you can wander to your heart's content **1**.

On the prototype, engine facilities adhere to regular routines to service locomotives. First, inbound locomotives are brought into the facility by a crew and tied down. Then a mechanical department employee, called a hostler, will climb aboard and move the locomotive through the various parts of the facility to ensure all required maintenance occurs in proper order.

From service and inspection (S&I) tracks and bays, to the fuel rack, and then to the ready track, locomotives are moved



2 Should I stay or should I go? Conrail's standard yellow gates were installed to restrict vehicular access to the right of way, such as here at CP 277. It doesn't help when the track gang leaves the gate unlocked, but still serves as clear notice that visitors are "on the property" past that point.

through the stages of preparation for another run. Each one is given a visual inspection, ensuring the mandated inspections are up-to-date. Paperwork is verified and the locomotive is moved to refill fuel, oil, and sand for traction (deployed from each locomotive when starting trains, pulling upgrade, and especially to allow extra traction when needed such as with wet or leaf-covered rail). Cab areas are cleaned, locomotive toilets emptied, windows and lights wiped down. After that work is completed the power is moved to a "ready track."

A few key layout design elements help allow visitors to feel like they are part of the scene. First, allowing enough space in an aisle so viewers can pause alongside the enginehouse is important. Locate the enginehouse toward the middle or even front of the scene, close to the aisle, putting the visitor "on the property."

Work to locate outdoor servicing tracks to the aisle side of the enginehouse or roundhouse; while we allow time for locomotives to be fueled and sanded, they may as well sit where they can be appreciated. While our model

locomotives need far less maintenance, we can still model the procedures followed by the prototype, helping viewers feel like they are close to the action in a place normally off-limits to outsiders.

This process of moving locomotives around the facility provides opportunities to appreciate the details and weathering, and to make photographs that evoke the same mystique that shop photos on the prototype do. Large open doors and windows on the shop building can allow for creative photography, and on our layouts, there's no worry that the foreman will shout at you. By placing the camera low to include some of the interior of the facility in the image, the resulting photo can feel like you're standing in your layout's shop doors.

We can include some basic details in the interior, as well as lighting, that help draw attention and add to the flavor of what we're trying to capture. More information on modeling engine facilities and their operation is in contributing editor Tony Koester's book *Steam & Diesel Locomotive Servicing Terminals*, available from Kalmbach Media.

Interlockings

As the intersections of the railroad, interlockings are critical points for operations. As such, they have long been closely watched by railroad designers, operators, and maintenance crews. In the decades before remote control, interlockings were generally staffed by operators in a tower adjacent to the switches and signals that comprise the interlocking plant. Some operators were friendly and accommodating to the respectful photographer, but many were not.

As centralized traffic control (CTC) came into being in the 1920s through the 1940s, railroads found it possible to control many interlockings remotely from another tower or a dispatcher's office, and towers began to disappear.

Few remain in the 2020s due to the relentless march of technology. Today, while many interlockings aren't under the eye of the tower operator, some are fenced in and many are watched by railroad police via security cameras. Almost all have clear, obvious signage: NO TRESPASSING.



Photography of forbidden places

On the prototype, places are restricted for a reason – they are dangerous and unforgiving. In locations like chemical plants and ports, security concerns and related regulatory restrictions prohibit easy access to outsiders. Trespassing is illegal and dangerous and must be avoided at all times. However, this isn't the case on the layout.

While all modelers would love a bit more space for their layouts, the reality is that we often have to selectively compress scenes to fit space and budget. Many scenes end up more tightly organized than what we would find on the prototype. These can be difficult to photograph, but thanks to technology, new opportunities have come to the forefront of model photography.

For less than the price of a new DCC-equipped locomotive, you can purchase photo-stacking software that allows you to take a series of photos from the same vantage point, each with a different point of focus. When this series of images is loaded into the software, the computer is able to pick the sharpest points from each image and assemble those as one image, which thus appears in focus throughout the range of the photograph. The result is amazing clarity and depth of field.

Best of all, you can even use your smartphone for this application. By building a holder that supports your smartphone and holds it steady, you can place the lens close to the layout surface. With the camera totally stationary, shoot a series of photos with the camera focused on different points throughout the scene.

Those are loaded into a computer and entered into the program, and are rendered to a "stack" of images. The resulting images really can evoke "being there" on the prototype. Options for photography are much wider when using focus-stacking software, as it allows far greater flexibility for the vantage point than was previously possible. – *Dave Abeles*



3 Keep out. Industries, above, can be forbidden places, too. Niagara Propane has a manual gate operated by crews using an uncoupling skewer.

Brakes on. Tall grass, right, functions as a brake – stiff enough to stop a rolling car, but soft enough not to derail the wheels.



While those signs carry a lot of weight on the prototype, when you're the General Manager of your model railroad, you can go where you please. Still, a good model evokes recognition of the prototype, so we can include a variety of details that help tell the story. Obviously, a model – or close stand-in – for the

distinctive architecture of your prototype railroad's tower designs and signal bridges is a good place to start.

But don't forget to sweat the little details, as well. Generic NO TRESPASSING signs are available from a variety of sources as decals, or they can be easily made using heavyweight paper and a

printer. Select a font close to what you see in prototype photos, create a layout similar to what you see, and print it out. Most printers and almost all copy machines allow you to then scale that text down to create signs appropriate for your layout that can then be mounted at interlockings around your railroad.



4 Just a pinch between the track and fascia. Empire Recycling is a scrap dealer. Dave chose to model only a corner of the industry, including just the loadout and chain link fence with a gate.

For the Onondaga Cutoff, I found photos of Conrail fonts and signage available on the internet. In many cases official signage plans are available from websites such as multimodalways.org. If you model a fallen flag, check the railroad's technical or historical society. Many of the larger societies publish widely. Conrail's NO TRESPASSING signs add a touch of familiarity to interlockings on the Onondaga Cutoff, such as the one seen in the lead photo at CP 282.

For more interlocking photos and history, as well as an extensive discussion on signals, hardware and details, my book *Signals & Interlockings* will be released this spring by Kalmbach Media.

The right-of-way

From the beginning of railroading, management spent scarce dollars to ensure the public knew where the exact limits of company property were to ensure trespassers were discouraged or at least warned. Legal costs from trespassing incidents have been a feature of railroading from the start, and those costs soared in the 1980s, '90s, and continue today. At locations where clearances are tight or access easy, such as access roads and at grade crossings, railroads placed gates or barricades to block access.

Trips and falls are some of the most common injuries on railroad property,

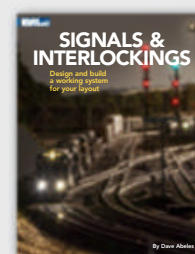
and with good reason – since railroads maintain their own track and structures, materials are often left trackside, either in preparation for maintenance operations or immediately after they occur. Such areas, to be avoided on the prototype, can add realistic detail and visual fascination to any model scene. Consider including details like extra rail along active tracks, new tie bundles or piles of old, rotted ties, and pallets of spikes or fasteners for your scale maintenance crews to use.

Where access to former track beds or access roads was easy, especially at areas near grade crossings, maintenance crews from the local Track Department or B&B (Bridges & Buildings) were assigned to help prevent trespassing. These workers used supplies on hand and their maintenance equipment to weld together and install gates and fences according to specific needs at local trouble spots. Signage would be erected at the same time, warning of the dangers and liability of trespassing.

Conrail, born of bankrupt predecessor railroads and government action, was a frugal company as it took charge of its properties in 1976. As gates were needed, the railroad developed standard plans that used materials on hand to create heavy-duty manual gates. Old, worn-out rail was cut to length and driven into the ground as fenceposts. Heavy-duty

hinges and a plate with a hole torched in it for a chain was welded to the rail. Another plate was welded to the bar stock that made up the gate, which was then locked using a standard railroad padlock to another plate on the gate. The whole assembly was painted yellow for visibility. After a few years, crews began to leave them open out of habit, but the bright yellow paint reminded visitors welcome or unwelcome that they were on the property, **2** on page 32.

Chances are your favorite prototype has gates similar to these, too. Conrail modelers are fortunate to have a supplier of standard gates from Mike Rose Hobbies (mrhobby.com) including laser-cut and 3-D printed parts. For locations near the edge of the layout, where contact is likely, I used sections of HO scale rail for the posts for the additional durability. Finally, a good use for all that old brass track some of us have laying around!



Dave Abeles' first book, *Signals & Interlockings*, reveals the secrets of operating signals. It's available this spring at hobby shops and

KalmbachHobbyStore.com.

Industrial applications

Like railroads, customers (shippers and consignees) are mostly businesses that own (or lease) property and have an interest in protecting it. Especially for layouts set in modern times, the likelihood of employees objecting to photography is higher at some industries than on railroad property – which makes industries some of the most enjoyable forbidden spaces to model.

Niagara Propane. Located at the west end of Onondaga Yard, Niagara Propane is a small local propane distributor that takes bulk propane from railcar delivery and performs local delivery with its trucks. Due to the danger of pressurized flammable gas, propane companies usually erect chain-link fence as needed along their boundaries.

I used etched-metal fence from Alkem Scale Models (alkemscalemodels.biz/chain-link-fence) to represent the heavy-duty fence I've seen at prototype dealers. One nice feature of the kit is it includes pedestrian, swing-gate, and full roadway rolling gate details that can be used to model different features. I used

the swing-gate etchings soldered to .050" brass wire posts to create manual swing-gates for Niagara, which the local switch crew can open with their uncoupling skewer, ③ on page 33.

Empire Recycling. A more recent addition to the Onondaga Cutoff is the Cazenovia Industrial Track, which runs through the backlots of Onondaga Yard to reach several customers along the branch. One of those is Empire Recycling, a scrap-metal recycling center that purchases scrap from the public and contractors and, upon resale, loads gondolas for shipment. This spot has limited real estate, so rather than model the whole facility I modeled only the loadout area and terminated the fence at the layout edge, suggesting more of the facility beyond the fascia, ④ opposite.

Long notorious for their hostility toward trespassers, the vast majority of scrapyards are surrounded by security fencing and usually protected by cameras – and the feared junkyard dog. For Empire, I used Alkem's fence again, including another manual gate. Piles of scrap of different sorts help suggest a larger dealer, and the crane with both an

electromagnet and a claw attachment allows us to plausibly load ferrous and non-ferrous metals for shipment.

Creating forbidden places

There has never been a better time to be a model railroader, nor a more difficult time to visit spaces off-limits to the public. Some railroads and businesses allow visits with prior written permission upon request, but even this is less frequent than it once was. That limitation becomes an opportunity for us to develop some of the real estate on our layouts to better represent these forbidden places and use them as elements to enhance the plausibility and the effectiveness of our layouts and images we make of our railroads. Our modeling can take us places where we can't be any other way. **MR**

Dave Abeles is a career railroader and civil engineer residing in northern New Jersey with his wife, Kristen, and three children, Susie, Teddy, and Pete. His Onondaga Cutoff layout has been featured in Model Railroad Planning 2018 and in several articles in MR.



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Add REAL ROCKS to your scenery



Jim Clark, Ed Stiles, and Jim's dog Leo watch the comings and goings on the streets of Kingfield from a perch atop a flat rock near Kingfield Station on Lou Sassi's On30 Sandy River & Rangeley Lakes. The outcropping is a real rock from the part of Maine served by the prototype railroad, as is the smaller one on the other side of the main line.

For scenic authenticity, there's nothing like the real thing

By Lou Sassi • Photos by the author

While attending the National Narrow Gauge Convention in Augusta, Maine, in the fall of 2016, my wife, Cheryl, and I had a chance to wander the hills and dales surrounding the former Sandy River & Rangeley Lakes RR. Some readers may recall I model the SR&RL in On30 [see *Great Model Railroads 2020 – Ed.*] One thing we both noticed was that this area of Maine was very rocky.

I've always believed that when recreating a prototype railroad, the model will look more authentic if it contains scenic features found on the real thing. With that in mind, we decided to add rocks similar to those we saw to the layout. I had also learned ages ago that it's often easier and more realistic to work

with real rocks than cast-plaster replicas of them.

During one of our strolls, we acquired a few loose rocks of different sizes and shapes along the old right-of-way ① and brought them back to North Carolina. Once home, we began to test-place some of these rocks in different locations around the layout. What follows is based on the final installation of one of them.

Since I'd already placed a rock behind the switchback to Peerless Tanning Co. in Kingfield, I decided on a flat grassy area just across the main line from Kingfield Station. (If you look closely in the photo above, you can see the first rock in the background.) After trial fitting a large flat rock ②, I removed the "ground goop" ground cover ③ along with some foam terrain using a utility

knife ④. I continued to test fit the rock and remove additional Styrofoam terrain until I was happy with how the rock seated in the scenery.

After spreading white glue on its underside, I pressed the rock into place ⑤. I spread some dirt I had in my materials bin that was a close match to the color of the rock around it. This filled any voids while blending it into the surrounding terrain ⑥. I wet the dirt, first with 91 percent isopropyl alcohol ⑦, followed by a mix of 1 part white glue to 2 parts water ⑧.

Once the glue dried, the SR&RL company arborist (Cheryl) planted some bushes and weeds around the rock. Our one-evening project was complete, giving the layout a bit more of the flavor of Maine. **MR**



1 Rock hunting. The rocks Lou and his wife, Cheryl, found in Maine. The one covered in the article is at right.



2 Finding the right spot. Lou set the rock in different locations on the layout to see how it would look.



3 Out with the old. Lou cut around the perimeter of the rock with a utility knife to remove the scenery.



4 Excavation. Next, Lou cut a recess in the white Styrofoam terrain with a utility knife.



5 A solid bond. Full-strength white glue was used to secure the rock to the Styrofoam scenery base.



6 Seamless. Dirt from Lou's scenery stash filled voids around the rock and blended it into the surrounding scenery.



7 Wetting agent. Lou wet the dirt with isopropyl alcohol to break the surface tension so the glue would soak in.



8 A tried-and-true method. White glue thinned 1 part glue to 2 parts water secured the dirt around the rock.

Using grout to model soil

Easy to use, inexpensive material
comes in a variety
of colors

By Lance Mindheim

Photos by the author

One of the basics of scenery is the underlying soil base – dirt, in other words. Even though it's needed in almost all scenes in one form or another, modeling it isn't always easy. Soil materials available from scenery manufacturers aren't available in a lot of colors, and the colors that are available

may not be a match for the soil in the region you're modeling. You could make your own ground cover by going to the prototype site, collecting shovels of real dirt, and sifting it, but that can be time-consuming and expensive.

Recently I was at the hardware store and saw a color chart of earth tones



To adhere grout to the terrain surface, brush a thin layer of white glue on the area. Then sift the grout into the glue using a fine mesh sifter.



Once the grout is in place, spray it with a mix of dilute matte medium (1 part matte medium to 2½ parts water) using a fine mist spray bottle.



You can brush different colors of grout onto the surface to represent highlights, stains, tire marks, and the like, then affix it with a spray of matte medium.



To prevent the grout from absorbing moisture and hardening between uses, Lance transfers it from the bags to containers with airtight lids.

posted on a display rack next to bags of grout. I'd always thought grout only came in whites and grays. Not so. The range of color was remarkably large and included many earth tones that looked like those we need for our modeling. The bags were large and – excuse the pun – dirt cheap.

I picked up a few colors, ran some tests, and was pleasantly surprised at both how easy it was to work with and how good it looked when dry.

I've found that there are numerous benefits to using grout as a soil base. Grout is inexpensive and readily available in a broad range of earth tones. It's also easy to apply and can be dry-brushed on.

Applying grout

For my initial tests, I picked four colors from the Polyblend product line: Earth (how nice of them to make that for us), Tobacco Brown, Charcoal, and Bone. Other colors may be a better match for your situation depending on the locale

you model. It's also easy to create your own tones simply by mixing different grout colors in a cup or canister.

To adhere the grout to the layout surface, begin by brushing a thin layer of white glue over the area you'll be covering. The most important part of the process is the application procedure. Unlike ballast, which has larger grains, when you're working with such a fine powder as this, you need to use a method that will give a smooth layer free of ridges and bumps. Avoid applying the grout by pouring it from a cup. Instead, apply the grout by sprinkling it on through a fine mesh sifter, using a motion like waving a wand. Sifters can be found at most grocery stores.

To ensure everything stays in place, once the grout is down, apply a final fine spray of dilute matte medium using a mister bottle. Use a bottle that produces a fine mist, because large droplets will cause craters on your surface. I dilute my matte medium 2 parts medium to 5 parts water, plus a drop of dish soap to help cut surface tension.

Advanced techniques

If the soil is going to be exposed, rather than covered by ground foam or static grass, you need to guard against an overly uniform color tone. I usually start with a base of Earth color and follow up with a random sprinkling of Tobacco Brown, perhaps followed by some Charcoal or my own custom mixes.

After the base layer of grout has dried, I've found I can also drybrush on streaks of other colors to represent tire marks or the like. I use a paint brush for this, just as I would when weathering a boxcar.

I found that after opening the bags, humid air will make grout start to harden and clump. To keep my grout dry and free-flowing, I store it in a large coffee can with a tight-fitting plastic lid. **MR**

Lance Mindheim is a frequent contributor to MR and its special issues. He's also the owner of The Shelf Layouts Co. (shelflayouts.com), a custom layout building and design firm.



Tortoise by Circuitron slow-motion switch motors provide reliable operation on thousands of model railroad layouts across the world. Gerry Albers shares his tips for installation and maintenance to make them last even longer. Steven Otte photo

The care and feeding of TORTOISES

Installation and repair tips for these slow-motion switch motors

By Gerry Albers

Photos by the author unless noted

Tortoise by Circuitron slow-motion switch motors have stood the test of time. I have more than 100 of them on my layout, most of which have been in service for 15 or more years, with very few problems. The friends who I spoke to for this article have had similarly positive experiences.

I have found Tortoise switch motors to be well engineered and reliable. But like all things mechanical, Tortoises occasionally need some tender, loving care. The only problem I've had with them is loss of electrical contact on the internal switches, particularly for low-current logic circuits. These problems can occur for two primary reasons, corrosion or mechanical failure.

I've developed remedies for both that I'd like to pass on to those with similar experiences. In addition, I've developed some best practices for installing Tortoises, which I'll relate first. I hope these tips help your experience.

Installing a Tortoise

I try to minimize the amount of time and effort spent under the layout, and mounting a Tortoise under a turnout is one of the most challenging tasks. Here are a few practices I've found helpful:

For the actuating wire, I use .033" diameter solid music wire, also called piano wire, instead of the .025" wire provided with the Tortoise. It transmits

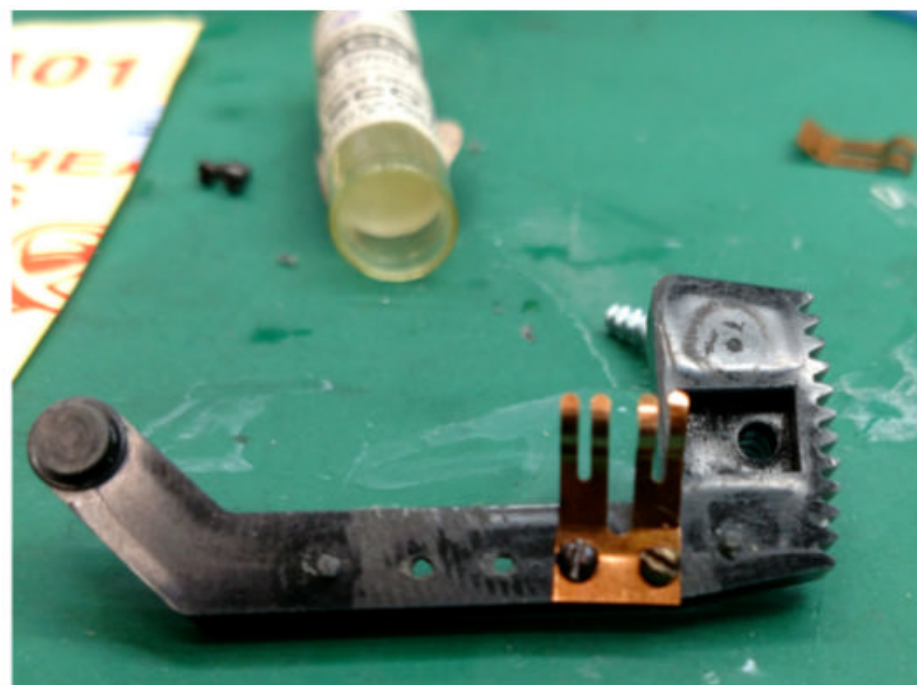
more force to the turnout points but requires drilling a slightly larger hole in the Tortoise's throw arm. I cut this wire longer than I need. I grind both ends of the piano wire to sharp points to facilitate insertion into the mounting hole before making the recommended bends.

I connect the Tortoise's eight electrical contact strips to an eight-position terminal strip using eight-conductor CAT-5e cable, used for computer networking and sold in hardware and electronics stores. I mount the terminal strip at the edge of the layout in order to make wiring (and subsequent diagnosis of problems) much easier.

Then I place a strip of foam double-sided adhesive tape on top of the Tortoise



When disassembling a Tortoise for maintenance, lay it on the workbench with the non-label side down. This will keep the gears in place.



If the metal wipers come loose from the plastic throw arm, they can be reattached using self-tapping 0-48 screws.

case. This foam strip will temporarily hold the Tortoise in place under the layout until I can secure it with screws.

I center the Tortoise throw bar and the switch points before mounting. I also place a light source on top of the turnout, facing down, so that I can easily see the hole to insert the actuator wire into the turnout throw bar hole from below.

Once the Tortoise is securely mounted to the underside of the benchwork, the excess actuator wire protruding above the turnout's throw bar must be cut off with a pair of hardened wire cutters. Be careful! The end of the wire can become a projectile, lodging in the ceiling, your eye, or some other undesirable location. I suggest placing a rag (not your hand) over the end during cutting.

The foam tape also acts as a pivot point, allowing me to tilt the switch motor to slightly adjust the directional throw distance. For example, if there's too much pressure on one side of the switch points, I loosen the mounting screws on one side and tighten them on the other.

Chemical Rx

If the contacts inside the Tortoise become corroded, good contact can sometimes be restored by spraying an appropriate cleaning chemical into the throw arm opening. The chemicals I've had good results with include:

- **Contact cleaner:** I've successfully used CRC QD Contact Cleaner no. 02130 and WD-40 Specialist Contact Cleaner. These products are usually solvents intended to penetrate and dissolve corrosion, carbon buildup, and other non-conductive contaminants.

- **Light lubricating oil:** These products, such as WD-40 Multi-Use Oil, aren't conductive but can dissolve contaminants. More importantly, they protect the conductive surfaces from building up contaminants. I recommend using contact cleaner before using oil.

- **Conductive lubricating oil:** These are specialty products that may take some searching to find. One that I have used successfully is Conducta Lube and Cleaner (ACT-3753). Again, I recommend applying contact cleaner before applying a conductive oil.

I recommend applying a small amount of the chemical through the supplied spray straw or nozzle, moving the throw arm in the opposite direction, and repeating this process several times. While applying these chemicals, and for a period of time afterward, I suggest placing a paper towel below the Tortoise to absorb any drips.

Mechanical Rx

If the chemical remedy doesn't work, disassembly may be required. This is easy to do, and reassembly is likewise quick and straightforward, thanks to the high quality of the Tortoise design and manufacture. However, disassembly voids the manufacturer's warranty, so don't do this unless the Tortoise would be a loss otherwise.

There are five screws securing the case, one of them in the middle of the label. Once the case is open, the contacts and wipers are exposed and easily accessed for servicing.

One possible, though infrequent, problem is that one or both of the electrical contact wipers may have broken off

of the throw arm. During manufacture, they're aligned with and secured to the arm by four plastic posts that extend through the metal wiper. The tops of the plastic posts are then melted to form a "t-top" like a rivet head, securing the contacts. If these "t-tops" fail, the wipers can dislodge.

My friend Keith VandeStadt developed a method for re-attaching the wipers to the throw arm. I've modified his method slightly. I can now perform this in 20 minutes or less.

- Leave the Tortoise laying on the non-label side when separating the halves of the case. The gears will remain in place this way.

- Lift off the throw arm without disturbing the motor or gears.

- Remove the metal wipers, if necessary, and shave or file off the four plastic posts flush with the surface of the arm.

- Using a no. 60 (.044") bit, drill four holes through the former post positions. Ream out the top of each hole slightly to help the screws in the next step get purchase.

- Use four self-tapping 0-48 x 3/16" screws (Kadee no. 401) to reattach the wipers. This size screw threads easily through the wiper contact holes and fits snugly into the drilled holes.

- Re-insert the throw arm and reassemble the Tortoise. It might be advisable to apply a small amount of plastic-compatible grease to the gears before closing the case.

With these techniques, your Tortoises should give you reliable operation for decades, just like mine. 

Gerry Albers is a Cincinnati resident who models the Virginian in HO scale.

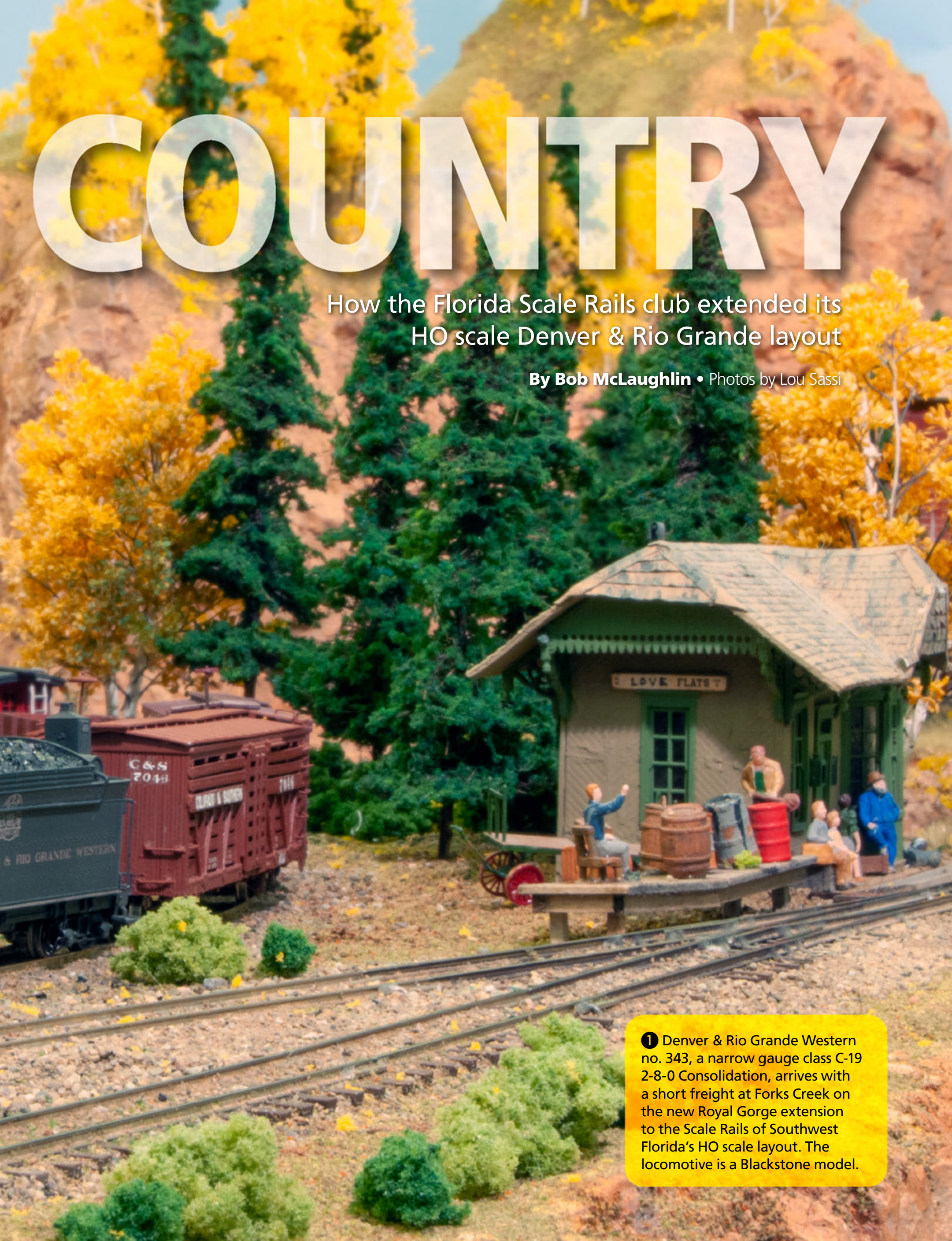
INTO CANYON



COUNTRY

How the Florida Scale Rails club extended its
HO scale Denver & Rio Grande layout

By **Bob McLaughlin** • Photos by Lou Sassi



① Denver & Rio Grande Western no. 343, a narrow gauge class C-19 2-8-0 Consolidation, arrives with a short freight at Forks Creek on the new Royal Gorge extension to the Scale Rails of Southwest Florida's HO scale layout. The locomotive is a Blackstone model.



The upper level of the Scale Rails of Southwest Florida club layout follows the Atchison, Topeka & Santa Fe from San Bernardino, Calif., up over Cajon Pass and on to Victorville, Calif., including Blue Cut, Sullivan's Curve, Mormon Rocks, Summit, the Frost Flyover, and the Rainbow Bridge. The lower level begins in Denver and runs through Castle Rock, Colorado Springs and Pueblo, Colo., but didn't include any of the gorgeous canyons and mountains for which the Denver & Rio Grande Western is so well known. That omission has been corrected with an 8 x 12-foot addition to the HO scale model railroad shown in *Great Model Railroads 2017*.

It was important for us to maintain some geographical fidelity on the railroad, so our Royal Gorge Route follows in the footsteps of the original Denver & Rio Grande narrow gauge. We did, however, have to exercise some geographical license given the constraints of our space. Therefore, we enter our Royal Gorge after leaving Denver and before arriving in Castle Rock.

Because the Royal Gorge Route was originally laid in narrow gauge, we feel comfortable in having both standard gauge and narrow gauge track in this location. The standard gauge follows along the riverbed and the narrow gauge is higher up on the side of the cliffs, following a route that brings it to mining and lumber opportunities higher up in the canyon.

Extending the plan

On the standard gauge, we merely inserted 30 feet of main line on the new peninsula between Denver and Castle Rock. There are no passing sidings or industries along this section of track, just the beautiful scenery of the Palisades along the river.

On the narrow gauge, we added a 30-foot track between Colorado Springs and Deer Creek, two communities which already existed on the original track plan. We also added a branch line that runs around a 1½ turn, 2½ percent grade helix to gain altitude, through a snow shed, and up to a mountain town we named Red Mountain Town. Several

② This overall view from the entrance shows the new narrow gauge peninsula front and center, with the main layout behind it. Visible above are the light-emitting-diode lighting strips the club recently installed over the entire layout.

branches radiate from this town to timber operations, an oil filling rack, and three mines, one of which is accessed with a 5 percent switchback and a turntable reminiscent of Corkscrew Gulch.

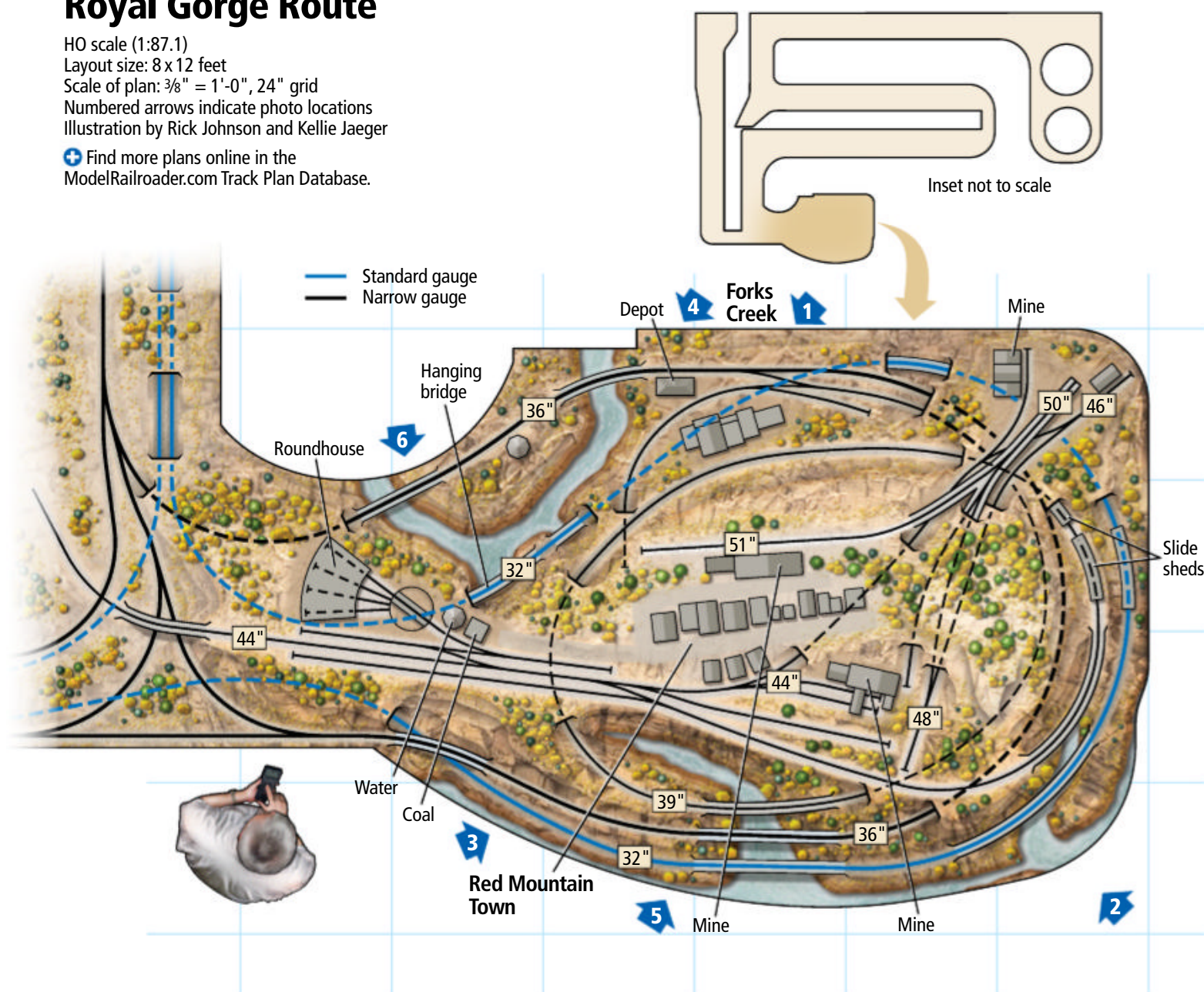
We followed the tried-and-true model railroad construction techniques outlined in *Model Railroader*, including L-girders supporting spline subroadbed. We made the spline by ripping ¼" pine plywood into 1 inch wide, 8 foot long strips. If the minimum radius on the spline roadbed is more than 24", you can use lauan plywood. If your radius is smaller than that, you need to use laminated plywood.

We found the easiest and safest way to make the 1" wide strips was to have the lumberyard rip the 4 x 8 sheet into four 1 x 8-foot strips. This made it easier for us to feed through the table saw.

Because this is for a club layout, we wanted the strength and stability of solid

Royal Gorge Route

HO scale (1:87.1)
Layout size: 8 x 12 feet
Scale of plan: 3/8" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson and Kellie Jaeger
Find more plans online in the
ModelRailroader.com Track Plan Database.



plywood. We therefore didn't use spacers between the plywood strips, but instead used layer after layer of plywood, building to a total thickness of 10 pieces wide (2 1/2") on the standard gauge and eight pieces wide (2") on the narrow gauge.

We added removable posts to the inside of the curves of the risers and then laid the spline against those posts to get the correct curvatures. We applied glue on each of the plywood strips and used brads in an air gun to hold each layer to the others while the glue dried, so we didn't need clamps. The construction progress went much faster than we expected, and the strength of the roadbed is quite impressive.

Trackwork and wiring

On the standard gauge, we used Atlas code 83 flex track. On the narrow gauge it's all code 70 Micro Engineering flex-track. We hand-build all our turnouts using Fast Track jigs. We used no. 4, no. 5, and no. 6 (left and right hand) turnouts and also no. 5 wyes.

The track is glued to cork roadbed. The ballast also holds the track in

position. On the narrow gauge, in the yard and locations close to the fascia, we line the turnouts with ground throws. In harder to reach locations, the turnouts are controlled by Tortoise by Circuitron switch motors.

The Scale Rails club layout is operated by a Digitrax Digital Command Control (DCC) system. Most of our members started with DCC back in the late '90s. We've expanded and grown over the years. Today, with wireless throttles, we run 25-plus trains on the standard gauge portion of the layout. The club owns about 16 throttles and members bring in their own from home for operating sessions. We use 9.6V Imedion NiMh batteries in the throttles with two 10-station Maha chargers. The layout and decoders are set for digital-only operation; no "address zero" direct-current operation is allowed.

Mountain scenery

When we began to think about scenery, our collective experience was in plaster hardshell, plaster cloth, and cast plaster rocks. However, as a National

The layout at a glance

Name: Royal Gorge Route
Scale: HO (1:87.1)
Size: 8 x 12 feet
Prototype: Denver & Rio Grande Western (standard and HOn3 narrow gauge); Atchison, Topeka & Santa Fe; and Union Pacific
Locale: Colorado
Era: 1930s to '60s
Mainline run: 75 feet
Minimum radius: 22"
Minimum turnout: no. 4
Maximum grade: 2 1/2 percent (narrow gauge)
Benchwork: open grid
Height: 42"
Roadbed: cork on wood spline
Track: Micro Engineering flextrack, code 83 (standard gauge), code 70 (narrow gauge)
Scenery: Hydrocal with plaster rock castings over cardboard grid
Backdrop: none
Control: Digitrax Digital Command Control



Model Railroad Association-affiliated club, we take seriously our responsibility to try new methods, educate our members, and publicize these methods to the general public. So we decided to try latex rock molds from Bragdon Specialty Products as a learning opportunity for our members.

We attached vertical cardboard strips to the spline roadbed using hot glue and then crisscrossed them with horizontal strips. We glued them together at the crossings with hot glue, creating a reasonably rigid frame.

In some places where the cardboard lattice was still too flexible, we temporarily stuffed wadded-up paper behind the cardboard strips for rigidity until the

plaster hardshell had dried. On top of the cardboard strips we laid two courses of dry Hydrocal-impregnated gauze matting, which we then wet to create a reasonably solid base upon which to attach our rock molds.

Applying wet plaster molds to hardshell takes a bit of experimentation, but the results are worth it. You begin by mixing water and plaster of Paris or Hydrocal to the consistency of ketchup. After the rubber molds have been sprayed with water (we don't use mold release), pour this ketchup-like-plaster into the rubber molds and let it set until it's just solid enough so you can pick it up and lay it against the well-wetted plaster cloth without it spilling. Hold the

3 While a 2-8-0 backs a boxcar toward the mine switchbacks above Red Mountain Town, a diesel switcher works the local mine and a stock train with a drover's caboose heads downgrade toward Colorado Springs. Red Mountain Town is the highest station on the railroad, exceeded in altitude only by the mine switchbacks.

mold against the surface gently but firmly until the Hydrocal has a chance to bond to the plaster cloth and solidify enough to maintain its form. This will take about 10 minutes, depending upon the humidity in the room. As the Hydrocal sets, you'll feel the heat of the chemical reaction through the rubber mold. Once this has happened, you can



slowly and gently start peeling the latex mold from the rock casting. Connect the molds to each other by using a hobby knife to carve strata and cracks that cross the joints between the castings so they become inconspicuous. Apply each mold slightly overlapping the previous one as you carve the joints to make them one. The results can be truly spectacular.

Since we were modeling the Colorado area, we used raw sienna as the base color for these rocks. We bought it at a paint store and watered it down to the point where we could spray it with a spray bottle, like the kind window cleaner comes in. We did small areas at a time, and while the misted area was still wet, used a moderately stiff “wet” brush



④ The hanging bridge is a holdover from the original days of the narrow gauge. It’s a popular sight for railfans riding the seasonal tourist train through Royal Gorge.

Building the hanging bridge

The hanging bridge at Great Chasm was built in 1878 during the original construction of the Denver & Rio Grande through Royal Gorge. The impossibility of blasting out enough space to build traditional bridge piers in the raging river at this exceedingly narrow spot made it necessary to suspend the bridge instead. The bridge still exists and is a favorite sight for travelers on the seasonal tourist train through Royal Gorge. Club members didn’t know of any other club that had modeled it, and since we were modeling the Royal Gorge and Glenwood Canyon, it seemed the bridge would be an interesting highlight. Our hanging bridge is somewhat shorter than the prototype and is at the entrance to a tunnel that doesn’t actually exist, but it’s otherwise faithful to the prototype. – *Bob McLaughlin*

rubbing in inexpensive raw sienna chalks and raw umber paint to color in the cracks and crevices of the rocks. As with joining the rock molds, this process is slow. It’s important to keep prototype photos handy as a reference.

The final step is to superdetail the scenery with static grass, ground foam shrubbery, and trees. I won’t detail our

specific techniques, as they’ve been covered very completely in past issues of *Model Railroader* magazine. Great scenery doesn’t happen in a day, but it’s definitely achievable. But if you have a location in your scenery that didn’t come out as well as you like, an aspen or pine tree can cover the offending area so nobody will see it.



LED illumination

For years, the club used several forms of incandescent lighting above the layout. Over the years, dissatisfaction grew along with the cost to operate and maintain these lights. Members started looking for another solution that would satisfy several criteria: deliver even lighting; offer adjustable lighting levels for day-to-night operation; use less power; reduce maintenance costs; and easily scale to cover the main layout, staging, and the new peninsula.

We decided on warm white light-emitting-diode strips for the visible layout and LED rope lighting for staging. The layout lighting is controlled by an entry-level DMX system. The basic components are a 12VDC, 30A supply connecting to a non-flicker driver. The drivers are run by a small stand-alone controller, set up by a computer.

On the lower level, where the distance from the lighting to the layout surface is uniform, we arranged the lighting strips on light blue-painted panels, spaced 6" apart. The upper level uses drop ceiling grid material to support the panels about 30" above the layout surface. We added a lighting valance to give the model railroad a museum look.

The new extension was a bit trickier. The challenge was the huge range in distance from the panels to the different track levels. We compensated by altering the spacing and number of strips on each panel to provide different levels of light [see photo 2 on page 34].

After a year and a half of work and an investment of \$7,000, we have near perfect light levels at half the operating cost of the old system. – *Bob McLaughlin*

5 Standard gauge Rio Grande power follows Glenwood Canyon on the lower level while a K-27 carries a merchandise freight on the narrow gauge. Above, the Galloping Goose is about to enter Red Mountain Town, and above it, the mine is at the top of the switchback.



Structures

We have a couple of members who are experts at kitbashing and scratchbuilding structures. Additionally, we have become reasonably well known in the southern Florida area and have on numerous occasions assisted in dismantling railroads of people who can no longer maintain their own home railroad. This is how we came to own numerous rare and discontinued kits, such as the magnificent Como roundhouse on the narrow gauge line.

Generally speaking, we don't try to save track and turnouts that have been glued to a railroad we're dismantling. We will remove structures if they're not glued down; otherwise, we cut around



6 While a local freight trailed by a Blackstone caboose crosses the narrow gauge wood truss above, Union Pacific 4-6-6-4 Challenger no. 3802 crosses the hanging bridge on the standard gauge line, deep in Royal Gorge.

them with a jigsaw. These buildings may be saved for future use on our railroad. On some occasions, they've found new homes with members or other friends who have expressed interest in them.

A team effort

I've belonged to numerous clubs in the New England area, and in my experience, 10 percent of the members do some kind of work and the other 90 percent expel hot air. Not this group! Here, 90 percent of the members are very competent and willing to work. If you're ever in the Fort Myers area, come visit us at 1262 Piney Road, North Fort Myers. We'll leave the air conditioning on for you! **MR**



Meet the club

Scale Rails of Southwest Florida currently has 47 members, 35 of whom are "snowbirds," part-time Florida residents who spend the warmer months at their primary residences in the northern states from Minnesota to Maine. There are also a few Canadian members. These members bring to the club a broad range of experience both in terms of model railroad construction and prototype procedures.



Creating BETTER LAYOUT PHOTOS

Try these suggestions for improving photographs of model railroads

By Brooks Stover • Photos by the author

Creating photographs of our layouts is a fun part of the hobby. Fortunately, since modeling and model photography are both art forms, there are no “rights or wrongs.” There are as many opinions about what makes a good layout photo as there are modelers taking them. Volumes have been written about the principles for creating great photographs in general, and many of those principles apply to

layout photography, but there are also some elements unique to our task.

In this article I discuss the elements that make layout photographs better technically and more interesting visually. What works to make a photo better also generally makes the layout itself look better, so whether you take photographs or not, you may want to consider some of these ideas. This article is based on material in my illustrated *A modeler's*

guide to digital photography, available on MR's website at trains.com.

Good modeling

The foundation of good layout photos is, of course, good modeling. The camera will exaggerate, not hide, imperfections. Structures need solid joints, and rolling stock must be well painted with properly applied decals. Scenery must be complete.



Carefully look over the area to be photographed and repair, replace, or tune up anything that's not up to the best of your modeling standards. Remove any dust or cobwebs. The camera will find any defect you miss.

Generous, uniform lighting

No matter how good the modeling, if a scene doesn't have proper lighting it will be difficult to get a good photo. Many layouts are illuminated with light that by photography standards is too dim. The most common problem with layout photos is they were taken without enough light, resulting in images that lack contrast and look "flat" or "muddy."

To complicate things, some modelers use spotlights to highlight scenes, which produces uneven lighting across the layout that shows up in photos. Our

It's a cool morning in the Appalachian Mountains in 1971 as Buffalo Creek & Gauley Whitcomb no. 20, affectionately known as "Peanut," begins the process of setting out a few loaded hoppers on the Baltimore & Ohio interchange at Dundon, W.Va. As usual, the company store, a gathering place for locals and visitors alike, is humming with activity though it's not yet noon.

The crewman in the foreground looking at the locomotive draws the viewer's eye to the main subject, engine no. 20. He and the crewman on the locomotive pilot were positioned for the photo. Care was taken to ensure that details are visible even in the shadowed areas under the locomotive. The shed on the left, the discarded lumber, the ground cover, and scattered gravel add interest in the triangular space created by the diagonal track. The diagonal edge of the roadway leads the viewer's eye to the car being serviced in front of the store, and the store interior draws the viewer deeper into the image. The yellow caboose adds a splash of color that balances the black locomotive, and the crewman just visible in the caboose window is a fun element to discover.



The crew of BC&G railbus motor A has completed its preparations and has found a moment to discuss the affairs of the world. They won't be able to move off the bus barn siding until BC&G Consolidation no. 13 has finished pulling cars from the interchange and departed Dundon.

The railbus and the maintenance-of-way shed frame the locomotive and focus the viewer's attention on the engine. The illuminated headlight and added smoke effect leave no doubt the engine is underway. The illuminated light pole and the lights in the store and company house in the background confirm the buildings are occupied. There are strong geometric elements in the twin oil barrels, roof gable, leaning ladder, and truss bridge in the background, and there's plenty of visual texture throughout the scene. The figure facing the camera isn't an example of best practice. The camera isn't quite at eye level, but close enough to be convincing while still showing what's behind the bus and train.

adaptive eyes can adjust when viewing an irregularly or dimly lit layout, but the camera can't.

Also, many layouts are illuminated with multiple types of lights. Such lighting presents challenges to even the best digital cameras. Incandescent lights look yellow or red compared to fluorescent

lights, which look blue or green. While some "white balancing" can be done both within the camera and with photo editing software, it's best when the scene is uniformly, and brightly, lit with a single type of light.

Even with generous lighting, it's sometimes necessary to either "bounce"



Buffalo Creek & Gauley no. 14 stands quietly beside a maintenance-of-way shed while two crewmen discuss their next move. They can't complete their work until the road's railbus, just visible above the tender, has tied up at the station. Even on a little short line, paying passengers have priority.

The main subject of this simple scene is offset to the left of the frame, but balanced by the strong color and shape of the shed, the visual detail of the barrels and crewmen, and the tree on the right. The rails running diagonally from the lower right draw the eye to the locomotive, and the standing crewman also seems to be looking toward it. The triangular patch of ground in the lower left has just enough texture to be interesting. The camera is a bit above eye level, but the extra height allows the bus and ice house in the background to be included. The smoke and steam effects were added in Photoshop. In this case the lamp pole was turned off, as it drew attention away from the foreground elements.

some light into shadowed areas, such as a locomotive's running gear, with a large white card, or bring out some shadow detail with photo software.

While dramatic images can be created using a single, directional light source producing strong shadows, it's far easier to get a good photograph with bright, uniform lighting.

The photos accompanying this article were all taken on my 12 x 25-foot S scale Buffalo Creek & Gauley layout (see *Model Railroad Planning 2019*) and, except where noted, were taken using only the generous ambient light from ceiling fluorescent fixtures in the room without any auxiliary lighting.

If auxiliary lighting is needed, begin by evenly illuminating the entire scene with one type of light (see my guide, online, pages 7 and 29-32). Once you can create good images with bright, uniform lighting, you can proceed to experiment with dramatic shadows produced by single light sources and other "expressive" lighting techniques.

Correct camera settings

An expensive camera isn't required to get satisfactory results (see the guide, section B: Cameras and Lights, pages 5-6). What's needed is to use the proper settings for the camera and to not ask the camera to perform outside its capabilities.

A full discussion of what settings to use for aperture, ISO, focal length, and shutter speed, as well as how to maximize the all-important depth of field is contained in the guide (see "Taking Layout Photographs," pages 8-9, and section G: More About Cameras, pages 21-28). All the photos accompanying this article were taken with a Fujifilm HS30 EXR in aperture priority mode, aperture set at f8 (the smallest available), ISO 100, and focal lengths between 28mm and 55mm focused on the main subject.

Well composed scene

Composition is the heart of the creative process of photography,

so there's really no right or wrong. Nonetheless, applying a few simple principles will produce images more likely to be satisfying.

The primary objective is to capture viewers' attention, draw them into the scene, and then hold their attention with interesting, complementary elements throughout the image so viewers' eyes move completely around the picture. For me, a great photo has a main subject, a "story," and additional interesting elements to discover.

What's in the picture?

The most successful photographs, model or prototype, are focused on a main subject and tell a simple story. It's helpful to think about the caption that will go with a photo while composing the image in the camera. What's happening, or just happened? Why is this photo worth taking? What will make this image unique and memorable?

Avoid including elements that don't reinforce the main story. A common error is placing the main subject too far away and trying to include too much. Move the camera or adjust the focal length of the lens to crop out everything except the players in the story and what's required to set the stage.

Eliminate distracting elements in the background like walls and ceilings. Make sure the foreground is in focus and that no part of the layout fascia appears in the image. If unavoidable, be prepared to remove these distractions from the final image by cropping or with photo-editing software.

Believable point of view

For obvious reasons, layout photos look the most realistic when taken from near eye level. But placing the camera at ground level on a layout makes getting the foreground in focus more difficult. Fortunately, it's by no means essential to have the camera at scale eye level. Photos that appear to be taken from a hillside, a bridge, a control tower, the upper floor of a building, or the roof of a boxcar can be perfectly believable.

Sense of life

One way to bring life to a photo is to include human figures. It's most effective to have figures involved with each other or something else in the scene. Figures talking with each other in small groups or a crewman on the ground talking



The summer of 1964 saw the final steam-powered trains on the Buffalo Creek & Gauley. Consolidation no. 13 creates little disturbance as it rolls across the Sand Fork Bridge on one of its thrice-weekly trips with a short train of wood chips and finished lumber brought down from the sawmill at Swandale. A sportsman is enjoying both the beauty of the Appalachian Mountains near the railroad's namesake Buffalo Creek and a great view of the last of steam in the eastern United States.

This is an example of a linear composition where less is more. While the bridge runs through just about the middle of the image, the locomotive is offset to the right. The secondary subjects – the fisherman, truck and trailer – balance the composition and add just a touch of color. The river pulls the viewer into the scene and directs the eye to the locomotive. The vantage point below the train adds drama, and there's just enough visible of the end of the tender and hopper that the view is more interesting than a straight profile. The fact the fireman is visible in the window is a nice detail. The strong rectangular shapes of the bridge abutments and center pylon contrast nicely with the scattered rocks and forest canopy. The light smoke effects added in Photoshop reinforce that the engine is running tender first, and quietly under light power.

with a crew member on a train are good examples. A lone individual should be performing some task or looking at something else in the image, like the passing train.

The viewer of the photo will look where the figures are looking, creating eye movement. When possible, avoid having figures looking toward the camera, as the faces of model figures often don't look realistic in photos.

Illuminated lamps and lights also bring a photo to life. Power up the layout so that any structure or pole lights show up, even if dimly. Interior lights make structures appear occupied and businesses open for customers. With Digital Command Control (DCC) it's possible to have locomotive lights on while they are stationary, signaling to the viewer that the engine is ready to move or in motion. The problem of locomotive light-emitting diode (LED) headlights appearing too bright can be controlled by turning them off part way through a long exposure.

Lines, shapes, color, and balance

The arrangement of lines and shapes and the use of color are the core elements



It's been a long day and the sun is disappearing behind the mountains as engineer Raymond Davis finally gets the log cars spotted on the log pond track.

This is the only photo presented here not illuminated by the lights in the layout room. Sunlight coming in through a window to the right of the camera provided all the illumination for this photo. The various smoke stacks, the battens on the sawmill siding, the stakes on the flatcars, and even the smoke rising from the locomotive create a pattern of vertical lines across the image. The opening at the top of the jack slip and the end peak of the roof above it form strong geometric shapes. The figure on the ground was positioned for the photo.



Elk River Coal & Lumber's Climax no. 4 has been prepared for the day's work and is just pulling away from the enginehouse at Swandale, W.Va.

The triangles in the enginehouse structure, roofs, and water plug framework create strong geometric elements in this image, and they contrast with the nearly circular boiler front, number plate, and headlight. The eye is drawn to the brightest color object in the scene, that red number plate. There's plenty of texture everywhere. Normally, crisply focused backgrounds are desirable, but here the locomotive and foreground objects appear to pop off the page due to the softly focused buildings and hillsides in the far distance. The camera is sitting on the layout facing the layout edge, and therefore the near side of the locomotive is in shadow, which makes the boiler front stand out even more. Even in the shadows all the major details of the side of the engine are visible. Just enough smoke effects were added to bring the locomotive to life.

in the composition of an image. These elements have been the subject of endless study in art. Adhering to a few of the more basic principles of composition can help our layout photos.

It's commonly recognized that images are often more appealing if the main subject isn't simply centered in the frame. Symmetrical arrangements look more static and less interesting. Offsetting the main subject vertically, horizontally, or both, creates more visual interest. Generally, an offset main subject should be balanced with a secondary point of interest elsewhere in the image.

A photo will often benefit if it includes strong linear elements or geometric shapes. Tall chimneys, power poles, roadways, or fences can provide such linear elements. A track or roadway positioned diagonally will draw the viewer's eye into the image and can be used to direct attention toward the main subject. A triangular roof, an intricate wooden or steel structure, a sweeping river, an archway, or a cylindrical tank can provide strong shape elements.

Generally speaking, the character of the colors should be uniform throughout an image. If most of the scene has subdued colors but there is an element with saturated color, like a bright yellow structure in an otherwise weathered scene, it will look out of place. The final image should appear to have been "painted by a single artist." However, careful use of contrasting or accenting colors can provide a balancing element or a secondary points of interest.

The proportion of the images itself can be an important element. Pictures don't have to be the commonly cited 8 x 10 proportion. Explore images with longer horizontal or vertical proportions. An image with 16:9 ratio makes a perfect computer wallpaper or screen saver. Square images can be interesting, too. Most digital cameras allow for images to be taken using different formats, so you can experiment right in the camera.

Visual texture

For lack of a better one, I apply this term to the myriad of details, textures, and color splashes arranged throughout a photograph that add visual interest and fill in areas that otherwise would look monotonous or unfinished. For me it's the final element of composition.

This texture is a bit like the second layer of detail on scenery. These textural elements create that all-important eye movement around the complete image.



It looks like it might rain as Climax no. 4 rolls into Swandale with Theodore Burdette at the controls late on a summer afternoon.

Confirming that there are exceptions to the rules, in this photograph the main subject is just about dead center, but there isn't symmetry amongst the other elements, so the composition isn't static. The diagonal lines formed by the logs and the porch of the store converge on the locomotive, moving your eye directly there. The white fence rails, lumber stacks, the logs, porch steps, and even the siding on the store create complementing sets of fine, parallel lines, creating a unifying theme within the image. The illuminated and detailed store interior asks to be explored, and there are just enough figures to bring life to the scene. This is the only image presented with the painted sky of the layout room replaced with a Photoshopped sky. It contributes substantially to the mood.

Textures can be natural items like small clumps of foliage, weeds, and color variation in ground cover, bare tree branches, and rocks.

Man-made items that can serve to catch a viewer's attention include boxes, barrels, garbage cans, discarded boards, and small piles of coal or ballast. Fences, bridges, and motor vehicles also serve this purpose. Splashes of color in the form of clothing on a figure, a contrasting color motor vehicle, a brightly painted freight car (like a reefer or caboose), or a contrasting colored structure or autumn tree can also serve to move the viewer's attention around the image by adding interest to otherwise static parts of a scene.

Using these details in a photo is a matter of taste. Much like salting food, this visual seasoning can be overdone. I keep a box of barrels, scrap lumber, figures, motor vehicles, and other small items on hand when taking photos so I can place them exactly where they're needed to complete a scene. It's rare that the arrangement of these details on the layout can't be improved once you're looking through the viewfinder. If several photos are to be taken of the same area of the layout, relocating figures and moving or substituting motor vehicles will further add to the uniqueness of each image.

Take photos

There's no formula when it comes to composition, so study photos you like to see how the lines, shapes, colors, asymmetry, and textures have been used to focus attention on the main and secondary subjects and what details draw your eye around the image.

Taking photos of your layout, and others' layouts as well, can become a fascinating and stimulating hobby within a hobby. With a little practice and following the principles outlined here and in my guide, you'll be able to share your model railroad with others through photographs. With today's digital technology, each click of the shutter is basically free. So take lots of images, experimenting with different compositions and using secondary subjects, visual texture, and lighting in differing ways and to differing degrees. Remember, there's



The management of the BC&G was very accommodating to railfans and photographers in the final years of operation, as they knew they had one of the last steam shows in the country and were eager to share it. After a railfan signed a release, he was free to wander the property. It was great fun! When I captured no. 14 at the grade crossing in Swandale in 1963, there were a couple of other railfans doing the same thing.

This scene was composed specifically to be used as a cover image, with a lot of foreground space. The version here has been cropped as a standalone image. Nothing says "railroad" like a crossbuck, and the two here frame the locomotive. The red truck points right at the engine and the crewman is looking at it, too. The barrels in the foreground and the crewman standing by his truck were repositioned for the photo, but the two railfans are permanently photographing the railroad. The crossbuck on far side of the track was turned so the lettering faced the camera for the photo.

no right or wrong. The only way to fail is to not give it a try! **MR**

Brooks Stover stover has written many articles for Model Railroader and its

special issues. Brooks rebuilt his S scale layout when he moved to a new home, and the new Buffalo Creek & Gauley was featured in Model Railroad Planning 2019.



Installing FIBER OPTIC LIGHTING

Paul McCarty used fiber optic lighting from Dwarvin Enterprises to illuminate the covered bridge, yard light, and distant campfire on his 4 x 7-foot N scale layout. Follow along as Paul shares his techniques.

A wiring-free solution for adding illuminated scenes to your layout

By Paul Jack McCarty • Photos by the author unless noted

Lighting adds beauty to any model railroad. Illuminating buildings, roads, and scenery enhance the effort we put into making our layouts operational works of art.

A move to a new home with less space for a layout necessitated a switch from HO to N scale. The switch resulted in a larger scenery-to-track ratio, longer trains, and larger yards. However, when it came time to add lighting, the techniques I'd used in HO scale were hard to use on my compact N scale layout. There had to be a better solution. And there was: fiber optic lighting.

A trip to the clinic

Over the years I've used grain-of-wheat bulbs and light-emitting diodes,

but wiring was a drawback. As I added LEDs for structure interiors, street lights, vehicles, and other accent lighting on my N scale layout, the wiring quickly became a confused, tangled mess.

I tried small, tiny, and mini lightbulbs and various LEDs, including megas, chips, nanos, and picos. Nothing satisfied me. For a long time I procrastinated installing additional lighting on my N scale railroad.

My frustration came to an end at the 2019 National Model Railroad Association National Convention in Salt Lake City. I attended a curious, but intriguing, clinic titled, "Lighting Without Wiring." I wasn't disappointed. The presenter was Michael Groves, owner of Dwarvin Enterprises (dwarvin.com). His products use a single light source, remote from

structures, and end-glow fiber optics to deliver the light. This system had everything I was looking for.

Setting up the system

I purchased a Lamplighter 1 starter kit ① and some swan-neck lamps from Dwarvin Enterprises after the clinic. When I returned home I mounted the light source, the Lamplighter, underneath the layout and central to where I wanted to put the lighting. This limited the length of the fiber runs I'd need to make.

Next, I had to determine where to put the lamps. I wanted some areas to be well lit and other areas in shadows, much like you'd find in real life ②. To re-create that look, I placed the lamps about 3" (or 35 to 40 scale feet) apart.

With the locations selected, I used a $\frac{3}{16}$ " bit to drill holes in the layout. I inserted the fiber optic cable into the hole from above. The shafts of the lamps, which are made from thin-walled metal tubing, fit into the holes securely without the need for glue. Once all of the lamps were in place, I inserted the cables into the Lamplighter box.

My biggest fans and cheerleaders as I ripped out the old LED wiring and installed the fiber lighting were my grandchildren, Philip, 4, and Rachel, 2. They sat under the layout table as I installed the Dwarvin Lamplighter system. "Ohhh, its magic, Grandpa!" they said. In fact, they liked being underneath the layout and looking at the lit fiber optic cables the best ③, next page. [Do not look directly into the Lamplighter box as the light source is very bright. – Ed.]



Beyond the basics

After I had the Dwarvin system installed, I started experimenting with it to try different lighting effects. For

① **Getting started.** After attending a clinic by the owner of Dwarvin Enterprises, Paul purchased the Lamplighter 1 starter kit and N scale swan neck lamps (not shown). The starter kit, above, includes two sizes of fiber optic cable and a power supply. Bill Zuback photo



② **Realistic spacing.** This overhead view shows how Paul spaced the various fiber optic lights on his compact N scale layout. Though some scenes are well lit, other areas have no lights, creating a realistic effect.

6 reasons to switch to fiber optic lighting

On the fence about making the switch to fiber optic lighting? Here are six reasons I quit using grain-of-wheat bulbs, light-emitting diodes, and other lighting sources to illuminate my N scale layout. – *Paul McCarty*

- 1** Fiber optics transmit light, not electricity. No longer was I overwhelmed with hundreds of feet of wire and the complexity of soldering them, and their associated resistors, together.
- 2** Fiber optic cables don't emit heat. This is a plus, as some of my scenery materials are heat-sensitive.
- 3** Fiber optic cable is immune to temperature changes and moisture. My layout is in the basement, which has moisture and humidity issues at certain times of the year. The damp basement affected the traditional wiring on my model railroad. Those issues went away when I switched to fiber optics.
- 4** Fiber optic cable isn't bothered by electromagnetic interference (EMI) that can interrupt data transmission. Our computer server is near my model railroad layout. This has caused EMI interference in the past. When I switched to fiber optics, the problem went away.
- 5** I've always wanted imaginative and detailed lighting. I'm amazed at all the innovative and creative uses that fiber optic lighting offers. It can be used to light buildings and individual lamps. A single fiber can simulate many smaller lights in a row. Nearly all of this was impossible when working with traditional wired lighting.
- 6** Putting nicks in the cable allows a small amount of light to escape. These nicks can be painted with translucent paints to create such things as runway or Christmas lights.



3 Grandkid approved. This below-layout view shows the Lamplighter 1 box and optical fibers. Paul's grandchildren, Philip and Rachel, enjoy looking at the glow of the lit fibers.

example, I was able to adjust the light's intensity by selecting larger or smaller cables as appropriate and adjusting how far I inserted them into the Lamplighter. Pulling the cable away from the light source slightly dims the output.

Changing the color of the light is easy to do with fiber optics, too. I've used translucent paints, such as those offered by Tamiya, and permanent markers on the end of the fiber optic cable to get the color I wanted.

One of the features I was keen to try to create was the effect of moon glow on the scenery. To do this I used 4 mm solid side-glow fiber optic cable inserted into the Lamplighter box. Then I put the cable under dark blue cellophane wrap. This resulted in a soft moonlight glow that illuminated the rest of my layout, especially the mountains.

Worth a look

Fiber optic lighting has been a real game changer for my layout **4**. The lit fiber optic cables can be located virtually anywhere and take any form without the concern of heat. It's extremely cost effective when compared with other commercial lighting systems. Best of all, no wiring is required.

Using fiber optics has opened the door to a lot of creativity and imagination. I'm able to add lights to a structure in minutes. If you're looking to illuminate scenes on your model railroad, give fiber optics a try. **MR**

Paul McCarty and his wife, Rebecca, live in Draper, Utah, happily surrounded by their grandchildren. Besides model railroading, Paul enjoys camping, fishing, canoeing, and genealogy. He's a member of the Wasatch N-Scale Model Railroad Club of Utah.



4 A game changer. A Dwarvin Enterprises swan neck lamp illuminates the City Hall scene on Paul's layout. The system allows him to add lights to scenes and structures in a matter of minutes.

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Intro to the Wiring for DCC website



A drag freight passes by "Bear Wallar Hollar" on Allan Gartner's old High N Xiety HO layout. After a move to Tennessee, he's begun construction of a new model railroad.

It's my pleasure to write the new Digital Command Control (DCC) column for the readers of *Model Railroader*. Before I introduce myself, thank you, Larry Puckett, for your service to the DCC community.

For many of you, I may not need an introduction. My Wiring for DCC website (WiringForDCC.com) has been well received by modelers the world over since 1996. I'm humbled by the impact I've already had on the industry. Through this column, I look forward to doing more for the hobby. Thanks to all who contribute to my website and its question and answer forum.

I learned to wire my model trains before I learned multiplication tables. Hey, some things are important! OK, multiplication tables are important, too. I went on to become an electrical and computer engineer. It was only a matter of time before computers would fit inside model trains.

A friend had a layout that was started in the 1950s and had decided to go with an early command control system. There was a lot of frustration. The entire layout shut down frequently. They were ready to send everything

back. I gave everyone a chill-pill and took the manuals home to read.

The problem wasn't the equipment as much as it was

BASIC WIRE
Use Colored Push Pins
Using Tail Light Bulbs
Tail Light Alternatives
Use Screw Terminals
Use a Color Code
Buying Wire
Good Track Connection
Using IDCs
TRACK WIRING
No Common Rail
Crossing/Crossover
Which Rail is Which?
Short Block Wiring
Track & Wire Resistance
Track Feeder Wire Size
Bus Wire Size
Feeder Spacing

1 A sample from the Track Wiring web page. Allan broke the information into two pages. The bright white links are part of the web page you're on. A dim topic means it's in the other page. Either way, just click on it and you're on your way.

the 40-plus-year-old wiring. I also brought some automotive taillight bulbs to break the layout up into districts. (Electronic circuit breakers weren't available yet.)

I anticipated friends would ask me questions. The World Wide Web was just getting going, and I decided to put the answers to their questions on a website. Mail started flooding in. I'd hit a nerve. The Wiring for DCC website was born. My mission was to provide the electrical novice with industry best practices that were sure to work.

Not everyone is an electrical engineer. Not everyone thinks electronics are easy. I try to explain things so non-engineers can understand. To jump-start my readers, one of the pages in my website is the DCC for Beginners web page. If you're new to DCC, I encourage you to read this particular page in its entirety before you explore the rest of the website.

Within the website you'll find web pages on track wiring, soldering, sound, decoder installations, turnouts and their control, garden railroading, illumination, block detection, parts, boosters, and more. If it's come up in the past 25 years, it's on my website.

The track wiring section contains basic information on how to plan your wiring and keep things organized. It also contains recommendations for feeder and bus wire sizes as well as how long your chosen feeder wire can be and still allow your equipment to



2 Clicking on this link will immerse you in a world of DCC wiring information!

work reliably. There's information on both basic wiring and more complicated issues, like wiring reversing sections.

The track wiring section is so big, I broke it up into two pages. Part I primarily contains general information about wiring. Part II contains more specific track wiring information. Don't know which one to go to? No problem. The red menu on the right side of the web page 1 is the same on both parts and will take you directly to the other part if need be.

The turnout and turnout control wiring pages are also popular. You'll find not only general turnout wiring information, but also detailed, step-by-step wiring instructions for most popular turnouts.

Wiring information for wiring switch motors, particularly the popular Tortoise by Circuitron, is covered on the turnout control web page. This includes wiring control panels and indicator lights.

The decoder installation web page contains projects that go back to the "beginning of time." Don't ignore those early installation notes or ones for a model you're not working on. Manufacturers often made their models with similar internal construction. So the installation notes may still be useful to you for the model you're working on.

I receive more questions than I have time to personally answer. So I created the

Wire Resistance	DCC for Beginners
Track	Locomotives
Sound	Decoder Installs
Manufacturers	DCC in Garden
Parts	Turnout Control
Booster	What's New
First Looks	WWW Tips

3 Hot topics links are at the top of every page.

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Wiring Turnouts
11/24/19

4 A sample from the Table of Contents menu shows the dates a particular web page was updated.

Question and Answer forum. There, engineers and modelers other than myself answer your questions. I don't know it all, and in this forum you may get several ways of tackling a particular issue.

Feel free to join the forum! You can elect to get every question and answer as individual e-mails or as digests, or not at all. If you do have a question, please ask it on the forum. That way others can learn from the answer you get.

The website contains about 600 printed pages. There are several options to help you find the information you're after on my website.

From the home page, click on the DCC Topics link at the top left or the DCC train graphic 2. You'll be taken to the table of contents page.

You now have three things to note. The popular pages on my website are in the blue section at the top of the page 3. In the red column on the left, 4, is each topic page within the website and the date of the last substantive change to that page. Finally is the What's New block 5. It contains substantive changes to the website going back at least six months.

My favorite way to find things on my website is the Site Map/Index. You'll find a

What's New

10/03/20 [Conductive ink and paint](#) for wheel mounted resistors. [Resistors](#) to mount on axles. More resistors added on 10/17/20.

09/30/20 [How many boosters do you need?](#) A DCC Beginner topic.

09/30/20 [Have an out-of-control locomotive going fast?](#) A DCC Beginner topic.

09/19/20 [LED Basics](#)

5 The What's New block. Check back here periodically.

link to it on every page in the top, blue section. It contains a link to every page in the site. This includes decoder installation notes. Come here to find a particular web page that's not listed in a top, blue section.

The index portion is just like the index in a book, 6, but better, because unlike a book, the link will take you right to the topic you're after. Clicking on a letter at the top of the index takes you to topics beginning with that letter.

Each web page has a red menu on the right. This contains the topics on that page. Clicking on the link will take you to that topic.

One thing you won't see on my website is software information. How many times have you bought something with software in it and the instructions don't match the product? If manufacturers can't keep their documentation up-to-date with their products, how can I do any better?

I hope this introduction has provided you with insight and tools you need to find the help you're after.

Q&A

Q When attaching feeders, do they need to be right at the ends of the turnouts?

*Neil Bennett,
Aspen, Colo.*

A Solder the feeders to your turnout's stock rails away from places you could knock the rail out

Track Wiring cont'd

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[Tortoise, extra switch contacts](#)
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TROUBLESHOOTING

6 A sample from the Site Index. Many of the topics are cross-indexed so that whatever you're thinking about, you can find it.

of gauge, like the points. Pretty much anywhere else is OK.

Q My power district has a single black wire for ground and up to four powered wires which I plan to use for detection (current transformer coils using RR-Cirkit's products); one red line each for approach, main, and siding. Does the snubber have any negative effect on detection? None of my bus wires are longer than 40 feet.

Dan Brewer, Granger, Ind.

A Don't place snubbers or twist your buses together after a block detector, as this may give you a false occupied indication. I suggest you run your main bus, twisted together through the 40-foot length, and place snubbers at each end. Then branch off shorter sub-buses and place your block detectors on them. Don't twist the sub-buses or use snubbers on them.

Q With sub-bus wires no longer than 12 feet or so, do I need snubbers? I planned to twist the sub wires downstream from the Hex

Juicer. Is there any reason not to do so? Would the reason not to twist those wires be to make later installation of occupancy detectors easier?

*Bill Demarest,
Gainesville, Va.*

A With wires no longer than about 12 feet, you don't need snubbers. You should be able to twist sub-bus wires downstream from the Hex Juicer. See the section on block detectors for using Juicers. The reason for not twisting sub-buses is to avoid false occupancy indications when using block detectors.

Q I'm attempting to use the NCE Light-It to control signals on my layout. I've followed the instructions to give it a "signal" address, which it takes. Is there a way, using the NCE ProCab, that I can test to see if my signal LEDs are working?

*Mickey Nuttall,
Grand Junction, Colo.*

A Yes, you can access the signals with your NCE throttle. See "Programming the signal address using any NCE DCC system:" at step 3 in the Light-It instructions on page 10. Press the SHIFT and CLEAR keys at the same time. Once you test that they're working, you'll probably leave it up to your Mini-Panel or JMRI to control your signals. **MR**



MY MISSION WAS TO PROVIDE THE ELECTRICAL NOVICE WITH INDUSTRY BEST PRACTICES THAT WERE SURE TO WORK.
-ALLAN



Trix HO scale Union Pacific Big Boy no. 4014

The excitement created by Union Pacific when it brought Big Boy no. 4014 back to life can now reach your HO scale layout with this specially detailed locomotive model from Trix, the two-rail, DC subsidiary of Märklin.

The prototype. Union Pacific's 4-8-8-4 Big Boy steam locomotives are some of the most famous in the world. The 25 locomotives were built in two groups, delivered in 1941 and 1944. No. 4014 is from the first group.

All of the Big Boys, also known as 4000s due to their number series (4000-4024), were coal-burners except one, no. 4005, which was refitted to burn bunker C in 1946. It proved to have such a voracious appetite for the heavy oil that it was impractical to switch the locomotives to oil burning. Of course, the rebuilt no. 4014 burns oil like its other steam program mates.

Of the 25 locomotives, eight were preserved. In 2012, Union Pacific (UP) indicated it was considering returning a Big Boy to the rails, and in 2013, UP arranged

a trade with the Southern California Chapter of the Railway & Locomotive Historical Society, sending a diesel locomotive and caboose to the RailGiants Museum in exchange for no. 4014.

In spring 2014, UP moved the locomotive from Southern California to Cheyenne, Wyo., with numerous stops for fans to see the locomotive. The staff of *Trains* magazine recorded the event.

Work on the restoration of no. 4014 kicked into high gear in 2016, and by the spring of 2019, no. 4014 was ready to return to the limelight. The summer and fall found no. 4014 touring across the Upper Midwest and the Southwest, to the delight of millions of railfans.

The model. Trix didn't just renumber its Big Boy model, first released nearly 20 years ago (Andy Sperandio reviewed the model in the April 2002 MR); it made more than a dozen changes to the model.

The most obvious change is the oil-burning tender. Märklin also revised the front of the tender to replicate the modified prototype, added steps to the rear of

the tank to ease filling its water tank, and added the train control box to the engineer's (right) side of the tender.

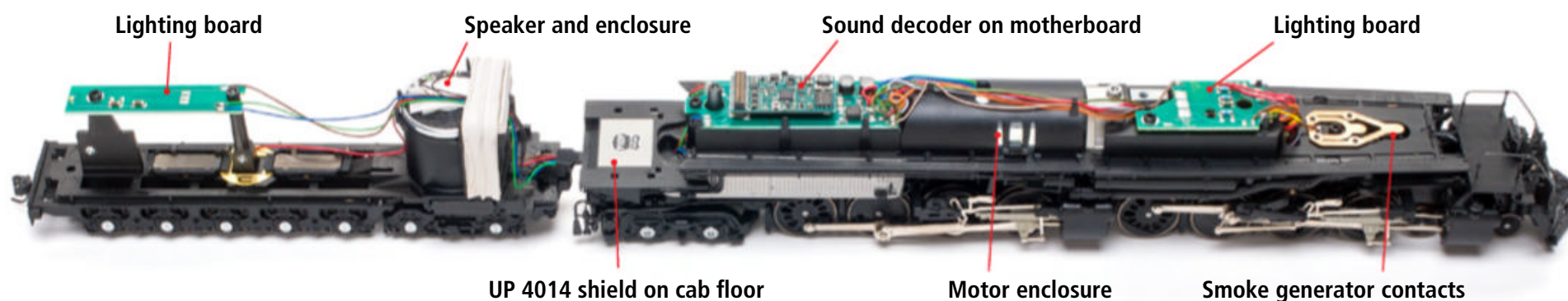
On the locomotive, the ash pan was removed as on the prototype, as were the handwheels for emptying the ash pans. Inside the cab, the backhead has been modified to reflect changes made in the restoration, and the large UP 4014 logo on the cab floor has been replicated. The large cab windows and interior lighting make this easy to see.

On the cab roof, a blade-type radio antenna has been added, and a second turbogenerator stands next to the original, as the restored engine has higher electrical power needs than the 1940s originals did.

Märklin also updated the location of steam lines and painted the bearing caps silver. To match the prototype, the steam blowoff valves are turned brass.

The final touch is the "Big Boy" lettering on the smoke box door.

As Andy said in his 2002 review, all of the model's dimensions are within scale inches of published drawings,



Under the die-cast metal tender shell and boiler of Trix's Big Boy is an enclosed speaker and lighting board in the tender, and a sound decoder and lighting board mounted atop the die-cast frame of the locomotive.



except the driver diameter, which scales 63½" instead of 68".

This is common on model steam locomotives, as the larger flanges on the model mean either the wheel diameter has to get smaller or the wheelbase between drivers has to get larger. Märklin chose to make the wheelbase accurate. Andy's note about the eccentric cranks on the left side has been addressed; they now lean forward at bottom dead center.

The die-cast boiler and tender shell are sharply molded, and the numerous metal and plastic detail parts make for a satisfyingly busy appearance. The paint is smooth and opaque, with sharp color separations between the black boiler and graphite-colored smokebox and firebox. The lettering is sharp and legible.

Under the shell. We don't usually disassemble steam locomotives, as they tend to go back together poorly, but this model is an exception. Popping off the steam dome and the round foam-collapsing muffler ahead of the cab reveals two screws. I removed those, and the die-cast metal boiler lifted off easily.

Inside is a die-cast metal frame and a mostly concealed can motor, flywheels, and other drive gear. A sound decoder is mounted to a motherboard with a 21-pin connector. At the front of the frame are contacts for optional, user-installed smoke generators (Märklin no. 7226).

The tender is equally easy to open, with a single screw hidden under the first water hatch behind the fuel bunker. Inside are an enclosed speaker and electronics for the backup light. The tender shell and frame are also die-cast metal.

Clever engineering continues with the chassis design, which allows the

PERFORMANCE CHARTS

DRAWBAR PULL	4.4 ounces 61 free-rolling HO scale freight cars/20 free-rolling HO scale passenger cars (in excursion service)
SCALE SPEED (DC)	
VOLTS	SCALE MPH
6.3 (start)	6.4
7	16
9	35
11	56
12	72
SCALE SPEED (DCC)	
SPEED STEP	SCALE MPH
1	1.7
7	10
14	31
21	64
28	100

locomotive to negotiate a claimed 14⅜" minimum radius. I don't have access to any curves that tight, but the engine easily negotiated compound yard ladders made up of Atlas no. 4 turnouts on my home switching layout. Overhang is significant, though.

On the test track. I started testing with my NCE PowerCab. At speed step 1, the engine crawled along at 1.7 scale mph. At speed step 28, it hustled down the track at 100 scale mph, about 20 scale mph faster than most engineers were willing to run the full-sized locomotive.

The Trix Big Boy exerted 4.4 ounces of drawbar pull, enough to pull 61 free-rolling freight cars or 20 passenger cars on a straight and level surface. On our staff layout, the Milwaukee, Racine & Troy, the Big Boy clawed its way up a



To update the model as no. 4014 in excursion service, Trix added steps at the top of the water tank. For now, no. 4014 carries Challenger no. 3985's tender.

Facts & features

Price: \$999.99

Manufacturer

1406 Creek Trail Dr., Suite 100
Jefferson City, MO 65109
marklin.com

Era: 2019 to present as decorated

Roadname: Union Pacific no. 4014

Features:

- 14⅜" (360mm) minimum radius
- Die-cast metal boiler and tender shell
- Directional headlight
- Engineer and fireman figures included
- Lighted cab interior
- Lighted train indicators
- Metal knuckle couplers, at correct height
- Multi-mode digital sound decoder (DC, DCC, and mfx)
- No. 4014-specific details
- Turned metal RP-25 contour wheels, in gauge
- UP 4014 logo on cab floor
- Weight: 3 pounds, 2.2 ounces
- Wood presentation box and display panel

3 percent curving grade with 15 50-foot boxcars on its tail.

The locomotive's DCC-compatible sound decoder is designed to operate on Märklin's mfx system and Märklin Motorola systems. The function buttons are arranged differently than most U.S.-market systems. The headlight is still Function (F) 0 and the whistle is set to F2, but the bell is at F9, while F1 turns on the locomotive sounds. A grade-crossing sequence is available at F10. A short whistle is at F7, labeled "switching whistle" in the instruction booklet.

On DC power, there are no sound effects. The headlight came on at a little over 4V, and the locomotive started moving at 6.3V at just over 6 scale mph. Speed at 12V was 72 scale mph, and reached 95 scale mph at my power pack's maximum output of 13V.

The Trix Big Boy 4014 brings back the excitement of standing trackside to see the huge locomotive rush by. The high level of detail and quality of the model makes this a top contender if you're a fan of present-day railroading. The wooden presentation case and display panel make this a top choice for collectors, as well. – *Eric White, senior editor*



Atlas N scale Electro-Motive Division GP38 diesel locomotive

A new run of N scale Electro-Motive Division GP38 diesel locomotives is now available from Atlas Model Railroad Co. The Master Line models are offered in two versions. Silver series models have a factory-installed speaker, while Gold series locomotives have a dual-mode ESU LokSound Select sound decoder.

The prototype. Electro-Motive Division produced the GP38 from January 1966 to December 1971. During that time, 733 units were built for railroads in the United States (706), Canada (21), and Mexico (6).

Our sample is decorated as Norfolk Southern (NS) no. 5642, feature the railroad's eye-catching "Training First Responders" scheme. The unit was built as Penn Central GP38 no. 7868 in January 1971. The four-axle road unit retained its road number when it went to

Conrail in 1976. In the early 1990s, the GP38 was repainted in a special scheme for Conrail's Philadelphia Division.

Norfolk Southern acquired the GP38 when Conrail's assets were split between NS and CSX in the late 1990s. The railroad renumbered the locomotive 2923. According to the online resource altoonaworks.info, the 2923 was one of 73 former GP38s and GP38ACs that were rebuilt to GP38-2 standards at NS's Juniata Locomotive Shop in Altoona, Pa., between January 2005 and June 2007. The rebuilt units became part of Norfolk Southern's 5601 through 5673 series.

The 2923 was rebuilt in May 2006. Among the upgrades made during the rebuild included a rooftop air conditioner, extended-range dynamic brakes, cab signals, and Locomotive Speed Limiters. The rebuilt locomotive also

received a new cab and short hood; the long hood was retained.

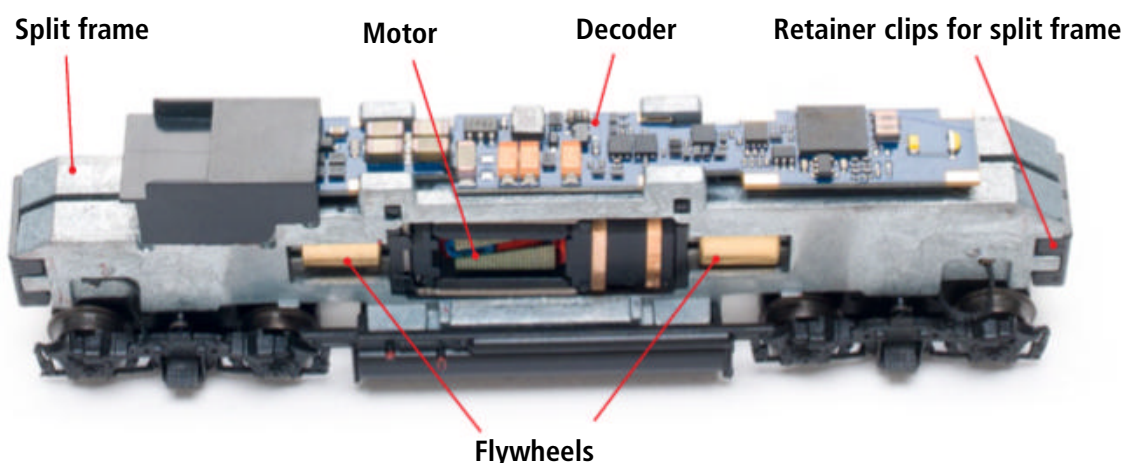
During the rebuild the 2923 was renumbered 5642 and painted in the railroad's Thoroughbred paint scheme. The Training First Responders scheme was applied in November 2015.

The model. The Atlas GP38 has been part of the manufacturer's Master Line since 2006. The model has a multi-piece plastic body; plastic handrails and stanchions; separate, factory-applied air conditioner, snow plow, and horn; and clear window glazing. I appreciated the painted gaskets around the number boxes and front and rear cab windows.

Other details, such as the grab irons, uncoupling levers, m.u. cables, and train line air hose are molded onto the body. The lift rings on the top of the long hood are represented with nubs.

Some details specific to the NS 5642 were omitted, including front and rear ditch lights; m.u. receptacles; extra exhaust stacks; cab antennas, sun shades, and mirrors; extended range contactor access hatch; and spare knuckle holders on the rear pilot. The model's air horn should have five chimes instead of three. The front and rear class lights were removed on the prototype.

The paint job on the full-size 5642 is quite involved, and Atlas did a good job executing it in N scale. The model depicts the locomotive right after it left the Juniata Locomotive Shop in 2015.



Like other Atlas N scale diesel locomotives, the GP38 features a split-frame mechanism. The speaker is housed in the fuel tank.

PERFORMANCE CHARTS	
DRAWBAR PULL	.48 ounce 12 N scale freight cars
SCALE SPEED (DC)	
VOLTS	SCALE MPH
7.4	2.9
9	30
10	62
11	82
12	87
SCALE SPEED (DCC)	
SPEED STEP	SCALE MPH
1	1.6
7	23
14	61
21	110
28	116

Today the prototype engine has a Norfolk Southern Police logo in the white stripe below the road number on each side.

There are a few voids in the stripes, most notably in the “knuckle buster” door handles. These could easily be fixed with some paint and a fine brush.

Measuring up. The Atlas model closely matches prototype drawings of a GP38 published in the *Car and Locomotive Cyclopedia of American Practice* (Simmons-Boardman Publishing Corp., 1970). The body-mounted Accumate couplers are installed at the correct height, and the blackened-metal wheels are correctly gauged.

To separate the plastic body from the metal chassis, I gently wiggled the shell until it slid off. The model has a split-frame mechanism with wired truck leads. The ESU LokSound Select decoder is mounted on top of the frame. The Scale Speed motor is flanked by brass flywheels. The cube-type speaker is located in the fuel tank.

I tested the model in both direct-current (DC) and Digital Command Control (DCC) environments. For the DC test, I used a Bachmann power pack. The sounds came on at 6.4V, which is in the typical range for locomotives with a dual-mode sound decoder. The locomotive started moving at 2.9 scale mph at 7.4V and achieved a top speed of 87 scale mph at 12V. Full-size GP38s had a top speed between 71 and 83 mph, depending on the gear ratio.

I turned to a Model Rectifier Corp. Prodigy Express² for DCC testing. The model crawled down the test track at 1.6 scale mph at speed step 1. At step 28, the model topped out at 116 scale mph. To bring the top speed to a more realistic

Facts & features

Price: Direct current with speaker, \$129.95; with dual-mode ESU sound decoder, \$239.95

Manufacturer

Atlas Model Railroad Co.
378 Florence Ave.
Hillside, NJ 07205
atlasrr.com

Era: November 2015 to present
(as decorated)

Road names: New paint schemes: Norfolk Southern (Training First Responders and Operation Lifesaver, one road number each), Amtrak (phase 3 non-revenue), CP Rail (red with “Canadian Pacific” on long hood), and Kansas City Southern (Southern Belle). New numbers: Bangor & Aroostook (red, gray, and black), Burlington Northern (Cascade Green with nose stripes), Chessie System (Chesapeake & Ohio reporting marks), Conrail (blue), and Union Pacific (Armour Yellow and Harbor Mist Gray). Two numbers per scheme unless noted.

Features

- Body-mounted Accumate couplers at correct height
- Correctly gauged blackened metal wheels
- Directional golden-white light-emitting-diode headlights
- Separate, factory-applied air horn, rooftop air conditioner, and snow plow
- Weight: 2.7 ounces
- With or without dynamic brakes

range, I adjusted Configuration Variable (CV) 5, maximum speed. When I set CV5 to 75, the top speed was 81 scale mph. When lowered to 60, the GP38 maxed out at 67 scale mph. With a drawbar pull of .48 ounce, the model can pull 12 freight cars on straight and level track.

Looking sharp. I applaud Atlas Model Railroad Co. for releasing models in unique schemes, such as the N scale Norfolk Southern Training First Responders unit. I was really impressed with the painting and printing on the EMD GP38, right down to the yellow rooftop parts. The prototypical sounds were the cherry on the sundae. – *Cody Grivno, group technical editor*

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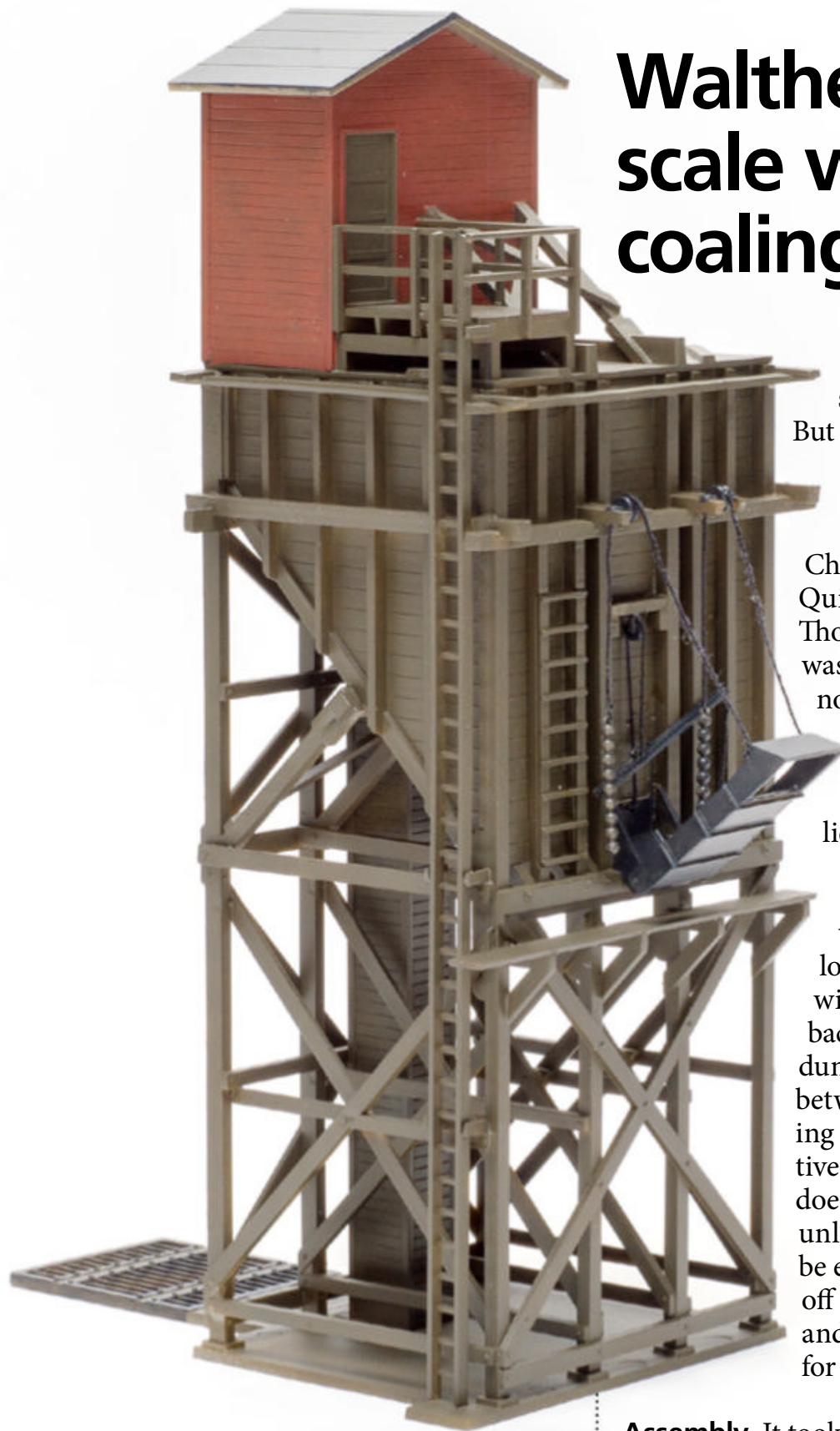
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Model Railroader January 2021



Walther's HO scale wood coaling tower

behind the tower) and standing under 8" tall. But this isn't a selectively compressed model; it's based on a small prototype built by the Chicago, Burlington & Quincy at Gilman, Mo. Though the prototype was built in 1924, there's nothing about this model that would make it out of place on a railroad set earlier in the steam era.

The tower is set up for use with two tracks: one in front for locomotives to load up with fuel, and one in back where coal hoppers dump their loads into a between-the-rails unloading grate. If your locomotive servicing facility doesn't have space for the unloading track, it should be easy to cut the grate off the back of the base and switch it to the front for single-track use.

Assembly. It took me about seven hours – an enjoyable day in the workshop – to assemble and paint the kit. The parts were cleanly molded, free of flash, and fit together well. My only complaint is that the isometric diagrams in the instructions show the parts in exploded form, but without any dotted lines to show where parts join. The placement of most pieces is obvious, but it took me a while to figure out where to attach some of the inner braces that were hidden at the viewing angle used in the diagrams. A diagram showing the tower from the back might have helped, too.

I deviated from the order of assembly twice. First, the instructions say to attach the window glazing at the time of assembling the head house, but since I wanted to airbrush the model, I didn't do that until after painting. I left the roof off the

Facts & features

Price: \$39.98

Manufacturer

Wm. K. Walther's
5601 W. Florist Ave.
Milwaukee, WI 53218
walther's.com

Era: steam era

Features

- Clear window glazing
- Dimensions: 3" x 5⁵/₈" x 7¹³/₁₆"
- Injection-molded plastic construction
- Positionable coal chute
- Thread for rigging included

head house until after adding the window glazing. Second, the holes for the thread rigging for the coal chute and door are not much larger than the thread itself. Rigging the thread can be very tricky if the parts are attached to the model. I brush-painted the door pulley (part 48) and waited until after the tower was painted to run the thread through it and attach it. (Assembly hint: Brushing cyanoacrylate adhesive on the tip of the thread stiffens it, turning it into its own needle and making it easier to push through tiny holes. White glue would do the same, but take longer to dry.)

Following the paint scheme of the completed tower depicted on the box, I airbrushed the coal tower with Testor's Model Master Railroad Tie Brown, then brush-painted the head house Oxide Red. Metal parts like the coal chute, coal door, pulleys, and door lever I brush-painted Grimy Black. I don't recommend painting the whole tower by hand, due to the intricate interior bracing and hard-to-reach areas. Had I noticed before assembly that the conveyor enclosure was the same siding as the head house, I would have waited to attach the tower to the base until after this interior part had been painted a matching Oxide Red.

Just the right size. This nicely engineered, finely molded, and well detailed kit built into a realistic structure that will make a great centerpiece for any small steam servicing area. It may not have the capacity to serve a busy engine terminal, but for a logging or mining line, a tourist railroad, or a station at the end of a branch, it would be just right. I already know where I'm putting it on my layout. – *Steven Otte, associate editor*

If your steam-era railroad needs a compact locomotive servicing terminal, Walther's has a new HO scale structure that will fill the bill (and your locomotive's tender). The compact Wood Coaling Tower (item no. 933-4202) is big enough to keep a handful of steam locomotives fueled without taking up a lot of layout space. Its short height also makes it perfect for a multi-deck layout where air space might be at a premium. The kit assembles easily and precisely, forming a realistic, visually interesting structure that would look right on any steam-era model railroad.

The prototype and the model. The coal tower is quite small, being about 3" square (not counting the unloading grate

Milwaukee, Racine & Troy 45th anniversary HO scale boxcar kit

An **HO scale** injection-molded plastic boxcar kit commemorating the 45th anniversary of the Milwaukee, Racine & Troy, *Model Railroader's* staff layout, is now available from the Kalmbach Hobby Store. The kit, produced by Accurail, features a one-piece body, separate doors, and roller-bearing trucks.

Though our model is decorated in a fictional paint scheme, the Accurail 5700-series boxcar is based on an actual car, the Association of American Railroads 50-foot welded-side boxcar. The kit depicts a car built after 1966, as it lacks running boards and features a low brake wheel and short ladders on the sides and ends.

The model. The injection-molded plastic kit is an enjoyable afternoon or evening workbench

project. An 8½ x 11-inch instruction sheet, which covers six different series of Accurail boxcar kits, illustrates the assembly process.

The 8-foot Youngstown doors are separate parts but aren't positionable. Instead, they're attached to door straps, separate castings that need to be secured to the car's interior.

The one-piece underbody, shown on the next page, features center sills, cross-members, body bolsters, bolster blocks, and draft-gear boxes. The air reservoir, brake cylinder, and control valve are individual castings. The roller-bearing trucks and draft-gear box covers are attached with supplied ⅜" 2-56 screws.

Our sample is neatly painted Conrail Blue with Reefer White doors. The



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The 50-foot boxcar's underbody features crossmember detail as well as separate castings for the air reservoir, brake cylinder, and control valve.

lettering is crisp, opaque, and legible under magnification. To the right of the door is the MR&T 45th anniversary logo. The road number reflects the anniversary's year (2020) and number (45).

On the layout. The model includes a steel weight that needs to be secured to the top of the underbody with double-sided tape or a solvent-free adhesive. I used a water-based contact cement.

The weight accounts for most of the boxcar's 4.2 ounces of weight, which is .3 ounce too light based on National Model Railroad Association Recommended Practice 20.1. There's plenty of room to add weight inside the boxcar.

The body-mounted Accumate couplers with modeler-installed trip pins are at the correct height. The 33" Delrin engineering plastic wheelsets are correctly gauged.

To see how the car would perform on a layout, I pushed and pulled it in a train on our Wisconsin & Southern model railroad. The car navigated the no. 5 turnouts and 30" radius curves without any issues.

Going fast. The HO scale Milwaukee, Racine & Troy 45th anniversary boxcar is a limited-run kit. We haven't forgotten our friends who model in N scale. A similar Micro-Trains Line Co. boxcar is

Facts & features

Price: \$24.99

Manufacturer

Accurail Inc., available exclusively from the Kalmbach Hobby Store, KalmbachHobbyStore.com

Era: modern

Road name: Milwaukee, Racine & Troy 45th anniversary scheme. One road number.

Features

- 33" Delrin engineering plastic wheelsets, correctly gauged
- Body-mounted Accumate knuckle couplers, at correct height
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When green means go

Ever since color light signals have beamed green, yellow, and red, green means that the block a signal protects is clear, or unoccupied. So, does green mean go? Only when a train has authority to use the main track. Such authority can come in various forms, such as a schedule, a train order, or a track warrant, depending on era. It can also come from certain rules by which signal indication gives authority.

Two such rules that appear in timetable-and-train-order (TTTO) rulebooks are Rule D-251 and Rule 261. October's On Operation column described Rule D-251 operation on double track. Rule 261 describes what is commonly known as Centralized Traffic Control (CTC).

A dispatcher or an operator under his supervision controls CTC signals from a remote location and gives authority to occupy a main track by signal indication. CTC signals also protect a train's rear, like automatic block signals. An employee timetable designates territory subject to Rule 261. Green means go on such CTC track.

Centralized Traffic Control developed as technology advanced. Automatic Block Signal (ABS) systems depended on battery power when they first appeared. Reliable electric relay circuitry improved interlockings; soon, it grew to protect single track between interlockings in Absolute Permissive Block (APB) systems.

Centralized Traffic Control developed next, extending control of signals and switches to a remote location. It became possible for a dispatcher to use signals to communicate with a train, authorizing movements without schedules or train orders.

Railway Signaling reported the first CTC system on 40 miles of New York Central between Stanley and Berwick, Ohio, designed and installed by General Railway Signal (GRS) in 1927. The following year, Union Switch & Signal (US&S) equipped its first on 20 miles of Pere Marquette between McGrew Yard and Bridgeport, Mich.

Curiously, the term rarely appears in manuals in my collection. A 1967 Detroit, Toledo & Ironton rulebook used a synonym, Traffic Control System (TCS). A 1976 Southern Pacific dispatcher's manual had the first mention of CTC I found. Today's General Code of Operating Rules (GCOR) names CTC and includes several applicable rules, but the Northeastern Operating Rules Advisory Committee (NORAC) rulebook uses nei-

ther TCS nor CTC. It relies on generic terms such as control station and controlled point (CP).

Yet, GRS and US&S literature made CTC popular since the system's beginnings. CTC found common usage in signal literature, including trade journals and Association of American Railroads publications.



IT BECAME POSSIBLE FOR A DISPATCHER TO USE SIGNALS TO COMMUNICATE WITH A TRAIN, AUTHORIZING MOVEMENTS WITHOUT SCHEDULES OR TRAIN ORDERS.
— JERRY



Centralized Traffic Control signals guard CP64 at Musconetcong Tunnel on Norfolk Southern's Lehigh Line, past which SD70M 2640 and a C40-9 muscle eastbound manifest 32A through a blizzard on Feb. 12, 2006. Jerry Dziedzic photo

Railroads expanded CTC rapidly because it proved reliable safe operation and saved money. Except at manned interlockings, trains in ABS and APB territory had to stop to line passing siding and crossover switches they needed. Centralized Traffic Control systems operated switches electrically by remote control, eliminating such delays. Centralized Traffic Control was also nimbler than TTTO, allowing quick adjustments which further expedited traffic. Many train order offices could be closed; double-track ABS lines could be made single-track CTC.

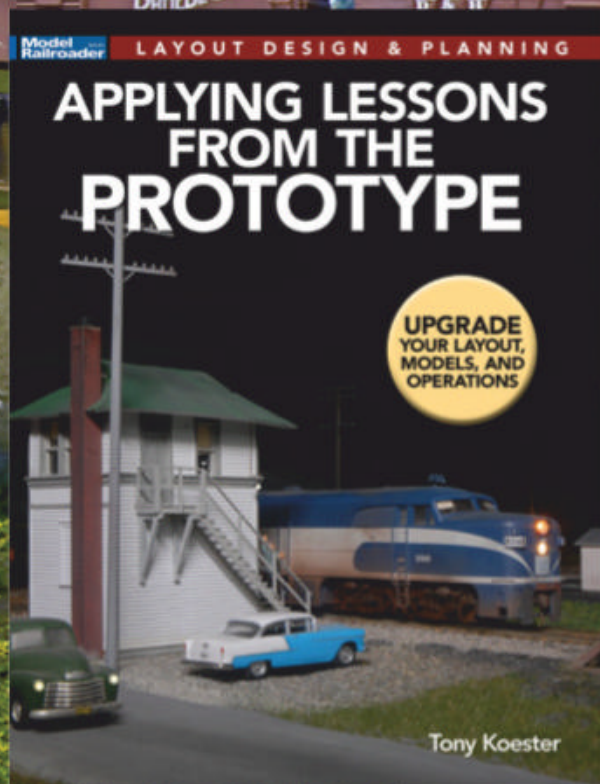
Nevertheless, TTTO remained essential to Rule 261 until its end because TTTO could continue operation in the event of CTC

system failure. Rule 261, still found in NORAC, or its equivalent, GCOR 10.1, now govern CTC territory.

Some modelers rescued original CTC machines, restored them, and returned them to service on their layouts. However, JMRI (Java Model Railroad Interface) freeware can display a modern CTC screen on a personal computer, making it possible to equip an important junction or a busy portion of a main line with CTC as affordably as a pair of Dash 9-44CW diesel locomotives.

Most operating layouts make space for a dispatcher's desk, where such a small CTC panel can be right at DS's fingertips. Put Rule 261 to work for your dispatcher, so he can make green mean go. **MR**

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A pair of Atchison, Topeka & Santa Fe

General Electric C44-9Ws leads a double-stack train out of a tunnel and up the 1.9 percent grade at Cascade Canyon. The action takes place on the HO scale railroad built by John Vavra of Escondido, Calif. The diesels are made by ScaleTrains.com, and the trees are from JTT Tree and McKenzie Bros. Timber Co. John shot the photo.



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MORE ON THE WEB

John Vavra's photo of his H0 scale Santa Fe layout is this month's wallpaper. Download it free at Trains.com

Weyerhaeuser Timber Co. Climax no. 12 is being put away for the night at Log Camp no. 1. Carl Brainerd of Kemah, Texas, photographed the scene on his HO scale logging layout. The locomotive is a Bachmann product; the engine-house is built from a Master Creations wood kit.



Norfolk Southern no. 9692, a General Electric C40-9W, leads a cut of coal empties upgrade through the snow-dusted Appalachian Mountains. Braden Gryskiewicz of Wadsworth, Ohio, photographed the scene on his HO scale diorama. The Dash 9 is a ScaleTrains.com model; the trailing Electro-Motive Division SD50 is by Athearn.



In the Maine Central's Mountain Division through New Hampshire's White Mountains, snow can fall even before the leaves fall from the autumn trees. On this late October day, the railroad had to call a plow extra to clear the tracks through Crawford Notch. John Ciesla of Mineola, N.Y., shot the photo on his modular HO scale Eastport Branch. The 2-8-0 Consolidation is a Bachmann model; the Russell snowplow is by Walthers.

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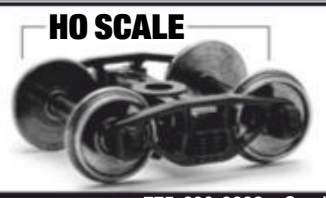
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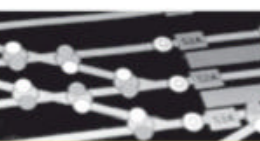
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IA, MONTICELLO: Monticello Railroad Club Train Show and Swap Meet. Berndes Center, Jones County Fairgrounds, 766 N. Maple St., Monticello, IA. Sunday, January 31, 2021, 9:00am-3:30pm. Admission \$5.00, children under 12 free w/adult. For show updates contact, Denny Beasley, 319-270-1171 or email: circlebarb607@aol.com

NY, LINDENHURST: Northern Spur Model Train/Diecast Vehicles/Toy Meet. Firemen's Memorial Park, 555 Heiling Blvd. (north off of Hartford St.) January 3, 2021, February 21, 2021, March 21, 2021, September 26, 2021 and November 7, 2021, 8:30am-1:00pm. \$5.00 adults, under 16 free w/adult. Handicap accessible. Contact: Carmelo Sancetta. PO Box 1286M. Bay Shore, NY 11706. 631-666-6855

TX, PLANO: Dallas Area Winter Train Show. Plano Event Center, 2000 E. Spring Creek Parkway. January 16-17, 2021, Saturday 10:00am-5:00pm; Sunday 10:00am-4:00pm. Adults \$10.00, 12 and under free w/adult. All scales. 80,000 sq. ft. of layouts and vendors. Information: Chris Atkins, chris@railroadmodeler.com 469-438-0741. Visit: www.dfwtrainsshow.com

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1. Publication title: Model Railroader
2. Publication No.: 529-810
3. Filing date: October 1, 2020
4. Issue frequency: monthly
5. Number of issues published annually: 12
6. Annual subscription price: \$58.95
7. Complete mailing address of known office of publication: 21027 Crossroads Circle, Waukesha, WI 53187-1612.
8. Complete mailing address of general bus. office of publisher: same.
9. Publisher: Nicole McGuire, 21027 Crossroads Circle, Waukesha, WI 53187-1612. Editor: Carl Swanson, same.
10. Owner: Kalmbach Media Co., 21027 Crossroads Circle, P.O. Box 1612, Waukesha, WI 53187-1612; stockholders owning or holding 1 percent or more of total amount of stock are: Deborah H.D. Bercot, 22012 Indian Springs Trail, Amberson, PA 17210; Gerald & Patricia Boettcher Trust, 8041 Warren Ave., Wauwatosa, WI 53213; Alexander & Sally Darragh, 145 Prospect Ave., Waterloo, IA 50703; Melanie J. Duval Trust, 9705 Royston Ct., Granite Bay, CA 95746; Harold Edmonson, 6021 N. Marmora Ave., Chicago, IL 60646; Laura & Gregory Felzer, 3328 S. Honey Creek Dr., Milwaukee, WI 53219; Susan E. Fisher Trust, 3430 E. Sunrise Dr., Ste. 200, Tucson, AZ 85718; Bruce H. Grunden, 7202 Wild Violet Dr., Humble, TX 77436; Linda H. Hanson Trust, P.O. Box 19, Arcadia, MI 49613; George F. Hirschmann Trusts, P.O. Box 19, Arcadia, MI 49613; James & Carol Ingles, 1907 Sunnyside Dr., Waukesha, WI 53186; Charles & Lois Kalmbach, 7435 N. Braeburn Ln., Glendale, WI 53209; Kalmbach Profit Sharing/401k Savings Plan & Trust, P.O. Box 1612, Waukesha, WI 53187; Elizabeth King Trust, U.S. Bank, 777 E. Wisconsin Ave., Milwaukee, WI 53202; William J. King Estate, 4816 Washburn Ave. S., Minneapolis, MN 55410; Mahnke Family Trust, 4756 Marlborough Way, Carmichael, CA 95608; Milwaukee Art Museum, Inc., 700 N. Art Museum Dr., Milwaukee, WI 53202; Cynthia Darragh Oatman, 1708 Roxborough Rd., Unit E, Charlotte, NC 28211; Mary K. Szalanski, 3355 S. Ann Louise Dr., New Berlin, WI 53146; Lois E. Stuart Trust, 1320 Pantops Cottage Ct. #1, Charlottesville, VA 22911; David M. Thornburgh Trust, 8877 Collins Ave., Unit 307, Surfside, FL 33154.
11. Known bondholders, mortgages, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities: N/A
12. Tax status (for completion by nonprofit organizations authorized to mail at special rates): N/A
13. Publication title: Model Railroader
14. Issue date for circulation data below: September 2020
15. Extent and nature of circulation:

	Average no. copies each issue during preceding 12 months	Actual no. copies of single issue published nearest to filing date
a. Total number of copies (net press run)	117,464	115,539
b. Paid and/or requested circulation		
1. Paid or requested mail subscriptions	74,956	76,101
2. Paid in-county subscriptions stated on Form 3541	0	0
3. Sales through dealers and carriers, street vendors, counter sales, et al.	8,316	6,930
4. Other classes mailed through the USPS	0	0
c. Total paid and/or requested circulation (sum of 15b1-15b4)	83,272	83,452
d1-3. Free distribution by mail (samples, complimentary, or other free)	430	421
d4. Free or nominal rate distribution outside the mail	0	0
e. Total free distribution (sum of 15d1-15d4)	430	421
f. Total distribution (sum of 15c and 15e)	83,702	83,452
g. Copies not distributed	33,762	32,087
h. Total (sum of 15f and 15g)	117,464	115,539
i. Percent paid and/or requested circulation:	99.49%	99.5%
16. Paid Electronic Copies		
a. Paid electronic copies	8,230	3,242
b. Total paid print copies + paid electronic copies (sum of 15c and 16a)	91,502	86,273
c. Total print distribution + paid electronic copies (sum of 15f and 16a)	91,932	86,964
d. Percent paid (both print and electronic copies; 16b divided by 16c times 100)	99.53%	99.51%
17. This statement of ownership will be printed in the January 2021 issue of this publication.		
18. I certify that the information above is true and complete.		
Nicole McGuire, Senior Vice President Consumer Marketing.		
Date: September 25, 2020		

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Scenery color palette



As he prepared to add scenery to his Milwaukee Road branch line, Gregg Condon counted more than 100 different scenery “textures” on hand to ensure a realistic randomness to the finished product. Gregg Condon photo

“If you ever write a commentary about common scenery practices,” wrote my good friend and prolific layout builder Gregg Condon, “here’s a photo to illustrate a point: Most layout scenery has too few colors and textures. Even good modelers will buy one color of track ballast and two shades of ground foam and call it a day.

“The photo shows one aisle of my Milwaukee Road branch line as I commence the final scenery layer. What you see is mostly scenery materials, and I counted 114 containers of different ‘stuff’ – my palette for ‘painting’ layout scenery.”

I clearly recall similar advice from two other long-time friends and scenery gurus, Dave Frary and Bob Hayden, about the use of what they called “texture.” To achieve this requires the use of myriad colors and materials, many of the latter items we might not normally associate with model railroading or even model building. Gregg’s

accomplishments, like those of Dave and Bob, have been published often enough in various media that they don’t need to be documented here to prove their points.

You need only page through a Scenic Express, Woodland Scenics, or Walthers catalog to find all of the color and texture variety you’ll ever need to meet the objectives these three veteran modelers suggest. But there are other sources of color and texture closer to home that we often overlook.

As I write this, it’s winter here in the Northeast, and that exposes branches and weeds that might make armatures for trees and shrubs. And a trip to a hobby shop or a craft store like Michaels will reveal all sort of odds and ends that have vast potential. I remember being alerted to Pot Toppers to model the lush grasses found along streams, and to whisk brooms as a source for reed structures. I haven’t done this, but I’ll bet a stop at a flower shop would uncover more useful material.

Materials in hand, our job is only halfway complete. Judging by Gregg’s photo, our next step is to make a real mess of the railroad room. But I recall equally prolific layout builder Doug Tagsold’s hard-won advice to manage projects in such a way that they can be completed prior to the next regularly scheduled operating session. It’s far too easy, I have found, to postpone first one session and then another, and then a third. Doug doesn’t allow even major scenery projects to interfere with regular operations. I suspect Gregg agrees with Doug.

Another veteran modeler, Randy Laframboise, a professional construction project manager, has written about the importance of

having the needed tools and materials on hand before starting a project. Nothing takes the wind out of your sails like running out of materials or lacking a critical tool, and that applies to scenery as well as structure, car, or locomotive building projects.

But even with our ducks lined up in a row, we still need to think about how Mother Nature applies her artistry. We refer to prototype photos when we build, paint, and weather buildings and rolling stock, and the same guidelines apply to building scenery. It’s far too easy to lapse from prototype modeling to no-holds-barred freelancing when it comes to scenery as we conjure up our own visions of how things should look. The few true artists among us may succeed at that; the rest of us are better advised to refer to photos.

That leads us to photo backdrops, which have been the norm since digital cameras and printers have become available. Several commercial suppliers can save us the trouble of printing backdrops depicting anything from rows

of trees to power plants and grain elevators. About 95 percent of my HO scale Nickel Plate Road’s backdrop was supplied by SceniKing; only specific town and grade-crossing scenes are photos of actual locations.

But we were discussing color and texture. Variety is the key. It may not take 114 different elements, but one or two or six won’t cut it. **MR**



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